Case No. 20-71554

In the United States Court of Appeals
for the Ninth Circuit

FOOD & WATER WATCH, INC.; SNAKE RIVER WATERKEEPER, INC.,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

On Petition for Review of Final Action of the United States Environmental Protection Agency

Petitioners Food & Water Watch, Inc.; Snake River Waterkeeper, Inc. Excerpts of Record Volume 1

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TABLE OF CONTENTS

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 155
Seattle, Washington 98101-3188

Authorization to Discharge under the National Pollutant Discharge Elimination System For Concentrated Animal Feeding Operations (CAFOs)

In compliance with the provisions of the Clean Water Act, 33 U.S.C. § 1251 *et seq*., as amended by the Water Quality Act of 1987, P.L. 100-4, the "Act", owners and operators of CAFOs in Idaho, except those CAFOs excluded from coverage in Section I of this permit are authorized to discharge in accordance with discharge point(s), effluent limitations, monitoring requirements, and other conditions set forth herein.

This permit shall become effective: June 15, 2020

This permit and the authorization to discharge shall expire at midnight: May 31st, 2025

The permittee shall reapply for a permit reissuance on or before December 2, 2024, 180 days before the expiration of this permit if the permittee intends to continue operations and discharges at the facility beyond the term of this permit.

DANIEL OPALSKI
Digitally signed by DANIEL OPALSKI
Date: 2020.06.04 11:30:00 -07'00'

Daniel D. Opalski, Director
Water Division

I. Permit Area and Coverage

A. Permit Area and Eligibility

This permit offers National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges from facilities that meet the definition of a concentrated animal feeding operation (CAFO), as defined by 40 CFR § 122.23(b)(2), in the State of Idaho. Any facility that meets the definition of a large, medium or small CAFO, as defined in 40 CFR § 122.23(b)(4), (6), and (9), and that is not specifically excluded per one of the conditions in Section I.F.1, is eligible for coverage under this permit.

CAFO owners/operators ineligible for coverage under this permit (Section I.F.1) or who believe the terms and conditions of this permit are not appropriate for their CAFO facility, must apply for an individual permit in accordance with Section I.F.3.

B. Application for Coverage

1. Owners/operators of CAFOs seeking to be covered by this permit must submit an NOI (Appendix A) and a Nutrient Management Plan (NMP) that meets the requirements of Section III.A of this permit.

2. Signature Requirements: The NOI must be signed by the owner/operator or other authorized person in accordance with Section V.C.5 of this permit.

3. Where to Submit: A signed copy of the NOI must be sent to:

   United States Environmental Protection Agency, Region 10
   Manager, NPDES Permits Section
   1200 Sixth Avenue, Suite 155, WD 19-C04
   Seattle, WA 98101-3188

   Copies of the NOI shall also be sent to the Idaho State Department of Agriculture (ISDA), the Idaho Department of Environmental Quality (IDEQ) state office, and the appropriate IDEQ regional offices at:

Idaho State Department of Agriculture 2270 Old Penitentiary Road P.O. Box 790 Boise, ID 83701
Idaho Department of Environmental Quality Water Quality Division IDEQ State Office 1410 N. Hilton Boise, Idaho 83706

IDEQ Boise Regional Office 1445 N. Orchard Boise, ID 83706	Counties:	Ada Adams Boise Canyon Elmore	Gem Owyhee Payette Valley Washington
IDEQ Coeur d'Alene Regional Office 2110 Ironwood Parkway Coeur d'Alene, ID 83814	Counties:	Benewah Bonner Boundary	Kootenai Shoshone
IDEQ Idaho Falls Regional Office 900 N. Skyline, Suite B Idaho Falls, ID 83402	Counties:	Bonneville Butte Clark Custer Fremont	Jefferson Lemhi Madison Teton
IDEQ Lewiston Regional Office 1118 "F" St. Lewiston, ID 83501	Counties:	Clearwater Idaho Latah	Lewis Nez Perce
IDEQ Pocatello Regional Office 444 Hospital Way #300 Pocatello, ID 83201	Counties:	Bannock Bear Lake Bingham Caribou	Franklin Oneida Power
IDEQ Twin Falls Regional Office 1363 Fillmore St. Twin Falls, ID 83301	Counties:	Blaine Camas Cassia Gooding	Jerome Lincoln Minidoka Twin Falls

Beginning December 21, 2020, all NOIs must be submitted electronically.

4. Upon receipt, EPA will review the NOI and NMP for completeness. EPA may request additional information from the CAFO owner or operator if additional information is necessary to complete the NOI and NMP or to clarify, modify, or supplement previously submitted material. If EPA makes a preliminary determination that the NOI is complete, the NOI, NMP, and draft terms of the NMP to be incorporated into the permit will be made available for a thirty (30) day public review and comment period (http://yosemite.epa.gov/r10/HOMEPAGE.NSF/Information/R10PN). The process for submitting public comments and requests for hearing will follow the procedures applicable to draft permits as specified by 40 CFR §§ 124.11 through 124.13. EPA will respond to comments received during the comment period as specified in 40 CFR § 124.17 and, if necessary, require the CAFO owner or operator to revise the NMP in order to obtain permit coverage. If determined appropriate by EPA, CAFOs will be granted coverage under this general permit upon written notification by EPA. EPA will identify the terms of the NMP to be incorporated into the permit in the written notification. Each CAFO covered by this permit must comply with the site-specific permit terms established by EPA based on the CAFO's site specific NMP.

5. For new sources, the National Environmental Policy Act (NEPA) requires EPA to conduct an environmental review pursuant to 40 CFR Part 6. NEPA requirements must be complied with prior to authorizing permit coverage to new sources (i.e. Large CAFOs whose construction began after April 14, 2003). New sources seeking permit coverage must submit an Environmental Information Document (EID) or Draft Environmental Assessment (EA) along with their NOI and NMP (40 CFR § 6.200(g)(2) and 40 CFR § 6, Subpart C). Information concerning preparation of an EID or EA can be obtained by contacting the NEPA compliance officer in the EPA, Region 10, NPDES Permits Section.

   These NEPA and NOI requirements also apply to expansions of existing CAFOs that meet the definition of a new source at 40 CFR § 122.2 and the new source criteria at 40 CFR § 122.29(a) and (b). In order to determine if an expansion is a new source, the applicant must submit to EPA information describing the expansion and a map showing the location of the expansion. If EPA determines the expansion meets the new source definition, the owner/operator must prepare and submit an EID or draft EA as described above. The information must be submitted to:

   United States Environmental Protection Agency, Region 10
   Manager, NPDES Permits Section
   1200 Sixth Avenue, Suite 155, 19-C04
   Seattle, WA 98101-3188

C. Permit Expiration

This permit will expire five (5) years from the effective date. If this permit is not reissued or replaced prior to the expiration date, the permit will be administratively continued and remain in force and effect until it is replaced by a new/reissued permit. Any permittee who has submitted a NOI and been granted coverage will automatically remain covered by the administratively continued permit. Coverage under an administratively continued permit cannot be granted following the expiration date.

D. Change in Ownership

If a change in the ownership of a facility whose discharge is authorized under this permit occurs, coverage under the permit will automatically transfer if (1) the current permittee notifies EPA at least 30 days prior to the proposed transfer date; (2) the notice includes a written agreement between the existing and new permittees containing a specific transfer date for permit responsibility, coverage, and liability between them; and (3) EPA does not notify the existing permittee and the proposed permittee that the operation is no longer eligible for coverage under the General Permit. If the new CAFO owner or operator modifies any part of the NMP, the NMP shall be submitted to EPA in accordance with Section III.A.5 of the permit. EPA will determine if the scope of changes warrants public notice and comment per the requirements of Section I.B.4.

E. Termination of Permit Coverage

1. A permittee may request to terminate coverage under this permit if the permittee makes such a request in writing and one of the following conditions is met:

   a. The facility has ceased all operations and all wastewater or manure storage structures have been properly closed in accordance with the Idaho Natural Resources Conservation Service (NRCS) Conservation Practice Standard No. 360, Closure of Waste Impoundments (Appendix B) contained in the Natural Resources Conservation Service Field Office Technical Guide and all other remaining stockpiles of manure, litter, or process wastewater not contained in a wastewater or manure storage structure are properly disposed in accordance with Section III.C; or

   b. The facility is no longer a CAFO that discharges manure, litter, or process wastewater to waters of the United States; or

   c. The entire discharge is permanently terminated by elimination of the flow or by connection to a publicly owned treatment works (POTW).

2. Requests to terminate coverage under this permit must be made in writing and submitted to EPA at the following address:

   United States Environmental Protection Agency, Region 10
   Manager, NPDES Permits Section
   1200 Sixth Avenue, Suite 155, 19-C04
   Seattle, WA 98101-3188

   Beginning December 21, 2020, all requests to terminate coverage must be submitted electronically.

3. Termination of coverage will become effective 30 days after the EPA sends written notice to the permittee, unless the permittee objects within that time.

F. Individual Permit Coverage

1. The following CAFOs are not eligible for coverage under this permit, and must apply for an individual permit:

   a. CAFOs that have been notified by EPA that they are ineligible for coverage under this general permit due to a history of non-compliance.

b. CAFOs that are seeking coverage that will adversely affect species that are federally listed as endangered or threatened ("listed") under the Endangered Species Act (ESA) or adversely modify critical habitat of those species.

c. CAFOs that are seeking coverage that will have the potential to affect historic properties. CAFO owners/operators must determine whether their permit-related activities have the potential to affect a property that is listed or eligible for listing on the National Register of Historic Places.

d. CAFOs with discharges to a designated Outstanding Resource Water. As of the effective date of this permit there are no Outstanding Resource Waters approved by the Idaho Legislature.

e. CAFOs located in Indian Country.

2. EPA may require any facility authorized by this permit to apply for, and obtain, an individual NPDES permit. EPA will notify the operator, in writing, that an application for an individual permit is required and will set a time for submission of the application. Coverage of the facility under this general NPDES permit is automatically terminated when: (1) the operator fails to submit the required individual NPDES permit application within the defined time frame; or (2) the individual NPDES permit is issued by EPA.

3. Any owner/operator who believes that the terms and conditions of this general permit are not appropriate for his/her CAFO facility, either prior to or after obtaining coverage under this permit, may request to be covered under an individual permit pursuant to 40 CFR § 122.28(b)(3)(iii). The owner/operator shall submit an application for an individual permit (Form 1 and Form 2B) with the reasons supporting the application to EPA. If a final, individual NPDES permit is issued to an owner/operator otherwise subject to this general permit, the applicability of this NPDES CAFO general permit to the facility is automatically terminated on the effective date of the individual NPDES permit. Otherwise, the applicability of this general permit to the facility remains in full force and effect.

II. Effluent Limitations and Standards

A. Effluent Limitations and Standards Applicable to the Production Area

Except as provided in Section II.A.3, there must be no discharge of manure, litter, or process wastewater into waters of the United States from the production area except as provided below.

1. Whenever precipitation causes an overflow of manure, litter, or process wastewater, pollutants in the overflow may be discharged into waters of the United States provided:

a. The production area is designed, constructed, operated, and maintained to contain all manure, litter, process wastewater, and the runoff and direct precipitation from the 25-year, 24-hour storm event for the location of the CAFO.

b. The design storage volume is adequate to contain all manure, litter, and process wastewater accumulated during the storage period including, at a minimum, the following:

   i. The normal precipitation less evaporation during the storage period;
   ii. The normal runoff during the storage period;
   iii. The direct precipitation from a 25-year, 24-hour storm event;
   iv. The runoff from the 25-year, 24-hour storm event from the production area;
   v. The residual solids after liquid has been removed;
   vi. The necessary freeboard to maintain structural integrity; and
   vii. In the case of treatment lagoons, the necessary minimum treatment volume.

2. The production area must be operated in accordance with the additional measures and records specified below:

   a. Visual Inspections. There must be routine visual inspections of the CAFO production area. At a minimum, the following must be visually inspected:

      i. Weekly visual inspections of all storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to the wastewater or manure storage structures;
      ii. Daily visual inspections of all water lines, including drinking water and cooling water lines;
      iii. Weekly inspections of the manure, litter, and process wastewater impoundments, storage and containment structures. The inspection will note the level in liquid impoundments as indicated by the depth marker in Section II.A.2.b in this section;

   b. Depth Marker. All open surface liquid impoundments must have a depth marker that clearly indicates the minimum capacity necessary to contain the runoff and direct precipitation of the 25-year, 24-hour rain fall event. Install a depth marker in all open wastewater or manure storage structures. The depth marker must clearly indicate the minimum capacity necessary to contain the runoff and direct precipitation of the 25-year, 24-hour rainfall event.

   c. Corrective Actions. Any deficiencies found as a result of the daily and weekly inspections must be corrected as soon as possible.

d. Mortality Handling. Mortalities shall not be disposed of in any liquid manure or process wastewater system and must be handled in such a way as to prevent the discharge of pollutants to surface waters of the United States.

e. Record keeping requirements for the production area. The maintenance of complete on-site records documenting the implementation of all required additional measures and corrective actions listed above must be maintained for a period of five years.

3. For all swine, poultry and veal facilities for which construction of the facility began after April 14, 2003 (New Sources), there shall not be a discharge of manure, litter or process wastewater pollutants into waters of the United States from the production area.

B. Effluent Limitations and Standards Applicable to the Land Application Area

For CAFOs where manure, litter, or process wastewater is applied to land under the control of the CAFO owner/operator, the NMP required by Section III of this permit must include the following requirements:

1. Nutrient transport potential. The NMP must incorporate elements in Section III.A.2.f based on a field-specific assessment of the potential for nitrogen and phosphorus transport from the field.

2. Form, source, amount, timing, and method of application. The NMP must address the form, source, amount, timing, and method of application of nutrients on each field to achieve realistic production goals, while minimizing nitrogen and phosphorus movement to surface waters.

3. Determination of application rates. Application rates for manure, litter, or process wastewater must minimize phosphorus and nitrogen transport from the field to surface waters in accordance with the Section III.A.2.h.

4. Site-specific conservation practices. Identify appropriate site-specific conservation practices to be implemented, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the United States in accordance with Section III.A.2.f.

5. Protocols to land apply manure, litter or process wastewater. Establish protocols to land apply manure, litter or process wastewater in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter or process wastewater in accordance with Section III.A.2.h.

6. Manure and soil sampling. Manure must be analyzed at least once annually for nitrogen

and phosphorus content in accordance with Section III.A.2.g.i. Soil must be analyzed annually for nitrogen and phosphorus content in accordance with Section III.A.2.g.ii. The results of these analyses must be used in determining application rates for manure, litter, and process wastewater;

7. Inspection of land application equipment for leaks. Equipment used for land application of manure, litter, or process wastewater must be inspected periodically for leaks;

8. Land application setback requirements. Unless the permittee exercises one of the compliance alternatives of this section as provided below in (a) or (b), manure, litter, and process wastewater may not be applied closer than 100 feet to any down-gradient surface waters, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to surface waters.

    a. Vegetated buffer compliance alternative. As a compliance alternative, the CAFO may substitute the 100-foot setback with a 35-foot wide vegetated buffer where applications of manure, litter, or process wastewater are prohibited.

    b. Alternative practices compliance alternative. As a compliance alternative, the CAFO may demonstrate that a setback or buffer is not necessary because implementation of alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent or better than the reductions that would be achieved by the 100-foot setback. Alternative conservation practices can include practices that are designed in consultation with a Professional Engineer licensed in the state of Idaho. Alternatively, an adequate demonstration may include the use of site-specific data using a tool such as the Idaho NRCS Water Quality Technical Note #6, Idaho Nutrient Transport Risk Assessment (INTRA) (Appendix E) or the Idaho Phosphorus Site Index (Appendix I) and associated implementation of alternative conservation practices recommended as a result of these tools.

9. No Dry Weather Discharge. There shall be no dry weather discharge of manure, litter, or process wastewater to a water of the United States from a CAFO as a result of the application of manure, litter or process wastewater to land areas under the control of the CAFO. This prohibition includes discharges to waters of the United States through tile drains, ditches or other conveyances, and irrigation return.

10. Prohibition on Land Application to Frozen, Snow-Covered and Saturated Soils. The land application of manure, litter, or process wastewater must not occur when the land application area is:

    a. Frozen and/or snow-covered soils, or

    b. When the top two inches of soil are saturated from rainfall, snow melt, irrigation, or when current or predicted weather is capable of producing such conditions.

III. Special Conditions

A. Nutrient Management Plan

The permittee shall develop, submit, and implement a site-specific Nutrient Management Plan (NMP). The NMP shall identify and describe practices that will be implemented to ensure compliance with the effluent limitations and special conditions of this permit (Sections II and III). Unless otherwise stated in this permit, the NMP must be developed in accordance with Section III.A.2 below.

1. Schedule. The completed NMP must be submitted to EPA with a NOI for CAFOs seeking coverage under this permit. The permittee shall implement its NMP upon authorization under this permit.

2. NMP Content. The NMP must include site-specific practices and procedures necessary to implement the applicable effluent limitations and standards. In addition, the NMP and each CAFO covered by this permit must, as applicable:

   a. Ensure adequate storage of manure, litter, and process wastewater including procedures to ensure proper operation and maintenance of the wastewater and manure storage structures. All wastewater and manure storage structures shall be designed, constructed, operated, and maintained in accordance with the requirements specified in Section II.A.1 of this permit.

      i. The CAFO covered by this permit must determine if existing or planned wastewater and manure storage structures are adequately sized in accordance with the requirements specified in Section II.A.1 of this permit by evaluating each wastewater or manure storage structure. The CAFO may use the Idaho Animal Waste Management (IDAWM) Software, Version 4, December 2000 (Appendix C) and accompanying spreadsheet, the NRCS Animal Waste Management Software, or demonstrate that the facility is designed with adequate storage capacity as determined by runoff and design calculations followed by an as-built survey conducted by a Profession Engineer licensed in the state of Idaho. If the evaluation determines that the CAFO's existing wastewater or manure storage structures have a storage capacity less than the minimum capacity requirements specified in Section II.A.1, the CAFO's NMP must plan for measures the CAFO will take to ensure that the storage capacity specified in Section II.A.1 is met. The NMP must include the results of the wastewater and manure storage structure evaluations, including any corrective and interim measures, and a schedule for implementation.

ii. The CAFO covered by this permit must ensure the proper operation and maintenance of wastewater and manure storage structures by confirming compliance with NRCS Appendix 10D and IDAPA 02.04.14.030.01 through a Professional Engineer, or by completing the Washington NRCS Engineering Technical Note #23, January 2013 (Appendix D), for each wastewater or manure storage structure. If the evaluation of the CAFO's wastewater or manure storage structures identifies deficiencies in the operation or maintenance of the structures, the CAFO must identify measures to address those deficiencies in its NMP. If the CAFO chooses to confirm compliance through the use of a Professional Engineer, the NMP must include the results of the engineer's evaluation. If the CAFO chooses to use Technical Note #23, the NMP must include the results of the evaluation using Washington NRCS Engineering Technical Note #23, January 2013 (Appendix D).

b. Ensure proper management of mortalities (i.e. dead animals) to ensure that they are not disposed of in a liquid manure, storm water, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities. Mortality handling practices must be in accordance with all applicable Federal, State, and local regulatory requirements.

The CAFO covered by this permit must include information in its NMP that addresses both typical and catastrophic mortalities. At a minimum, the NMP must identify the following:

i. Schedules for collecting, storing, and disposing of carcasses;
ii. Description of on-site storage before disposal;
iii. Description of final disposal method;
iv. Additional management practices to protect waters of the United States for on-site disposal including composting or burial; and
v. Contingency plans for mass mortalities.

c. Ensure that clean water is diverted, as appropriate, from the production area. Any clean water that is not diverted and comes into contact with raw materials, products, or byproducts including manure, litter, process wastewater, feed, milk, eggs, or bedding is subject to the effluent limitations specified in Section II.A of this permit. Where clean water is not diverted from the production area, the wastewater or manure storage structure shall include adequate storage capacity for the additional clean water. Clean water includes, but is not limited to, snow melt and/or rain falling on the roofs of facilities and runoff from adjacent land. The NMP must identify the BMPs or engineering controls, existing or needed, to exclude clean water from the production area. The NMP must include operation and maintenance procedures required to maintain the existing BMPs or engineering controls or the timing for the construction of needed BMPs or engineering controls.

d. Prevent the direct contact of animals confined or stabled at the facility with waters of the United States. Animals confined at the CAFO must not come into direct contact with waters of the United States. At a minimum, the NMP must describe the BMPs or engineering controls the CAFO will use to prevent animals in the production area from coming into contact with waters of the United States.

e. Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals or contaminants. All wastes from dipping vats, pest and parasite control units, and other facilities utilized for the management of potentially hazardous or toxic chemicals shall be handled and disposed of in a manner sufficient to prevent pollutants from entering the manure, litter, or process wastewater storage structure or waters of the United States. The NMP must include references to any applicable chemical storage and handling protocols and incorporate specific BMPs and actions that will be taken to prevent the improper disposal of chemicals and other contaminants into any manure, litter, process wastewater, or storm water storage or treatment system. The NMP should also consider chemical handling plans for the protection of wells, water supplies, and any drainage ways that are close to chemical storage and handling areas.

f. Identify appropriate site-specific conservation practices to be implemented on the land application areas, including as appropriate buffers or equivalent practices as stipulated in Section II.B.8, to control runoff of pollutants to waters of the United States. The NMP must include appropriate conservation practices identified by evaluating each land application area using the Idaho NRCS Water Quality Technical Note #6, Idaho Nutrient Transport Risk Assessment (INTRA) (Appendix E). CAFOs may opt to utilize the Idaho Phosphorus Site Index (P Index) (Appendix I). The NMP must include the results of the INTRA or P Index evaluations. All CAFOs must follow guidance provided by INTRA and the P Index. If the site-specific conservation practices are NRCS conservation practice standards, the NMP must include provisions to operate and maintain those site-specific conservation practices according to the specific NRCS conservation practices standard. If the owner/operator proposes alternative practice or performance standards, the NMP must describe and cite those standards so that EPA can perform an adequate review. In addition, the NMP must include a schedule for implementation of site-specific conservation practices and proper operation and maintenance procedures.

g. Protocols for appropriate testing of manure, litter, process wastewater, and soil.

   i. Manure must be analyzed at least once annually for nitrogen and phosphorus content in accordance with the University of Idaho

Manure and Wastewater Sampling CIS 1139 (Appendix F). The results of these analyses must be included in the NMP and be used in determining application rates for manure, litter, and process wastewater as described in Section III.A.2.h.

ii. Soil samples must be taken from every field to which manure, litter and process wastewater will be applied. Soil must be analyzed annually in accordance with University of Idaho Bulletin 704 (Appendix G). At a minimum, soil samples must be analyzed for the following constituents: pH, soil organic matter (SOM), Nitrate-Nitrogen (NO_3-N), Ammonium-Nitrate (NH_4-N), and phosphorus (P). The results of these analyses must be included in the NMP and used in determining application rates for manure, litter, and process wastewater as described in Section III.A.2.h.

iii. Soil samples must be analyzed by a laboratory certified by the North American Proficiency Testing Program (NAPT). Manure samples must be analyzed by a certified Manure Analysis Proficiency Laboratory.

h. Establish protocols to land apply manure, litter, or process wastewater in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater.

Annual nutrient budgets must be generated to determine land application rates for each field where manure, litter, or process wastewater is applied. The annual budget must be included in the NMP and be developed in accordance with the University of Idaho Fertilizer Guides or related University of Idaho Crop Production Guide. In the absence of an appropriate University of Idaho Fertilizer or Crop Production Guide, a fertilizer or production guide from a Pacific Northwest Land Grant University may be used (i.e. Oregon State University or Washington State University). In the absence of specific Land Grant University fertilizer or production guides, the NMP must identify and include the best available data used to determine specific land application rates for the crop. The NMP must express land application rates of nutrients in pounds per acre; and volume of manure, litter, and process wastewater in tons, gallons or cubic feet. Ensuring accurate application rates reduces probability of off-site transport. The NMP developed to meet the requirements of this permit, and submitted to the permitting authority for review, must include all necessary calculations. Thereafter, for the remainder of the permit term, application rates may be calculated annually, or immediately prior to land application, if all data and calculations are appropriately documented in the NMP.

i. Identify and maintain site specific records to document the implementation and management of the minimum elements described in Sections III.A.2.a-h and in compliance with the permit

3. Signatory. The NMP shall be signed by the owner/operator or other signatory authority in accordance with Section V.C.5 (Signatory Requirements) of this permit.

4. NMP Availability**.** A current copy of the NMP shall be kept on site at the permitted facility in accordance with Section IV.A of this permit and provided to the permitting authority upon request.

5. Changes to the NMP

    a. When a CAFO owner or operator covered by this permit makes changes to the CAFO's NMP previously submitted to EPA, the CAFO owner or operator must provide EPA with the most current version of the CAFO's NMP and identify changes from the previous version
    b. When changes to a NMP are submitted to EPA, EPA will review the revised NMP to ensure that it meets the requirements of Section II and Section III.A.2. If EPA determines that the changes to the NMP necessitate revision to the terms of the NMP incorporated into the permit issued to the CAFO, EPA will determine whether such changes are substantial as defined by 40 CFR 122.42(e)(6). Substantial changes to the terms of a NMP incorporated as terms and conditions of a permit include, but are not limited to:

        i. Addition of new land application areas not previously included in the CAFO's NMP;
        ii. Changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop;
        iii. Addition of any crop or other uses not included in the terms of the CAFO's NMP; and
        iv. Changes to site specific components of the CAFO's NMP, where such changes are likely to increase the risk of nitrogen and phosphorus transport to waters of the United States.

    c. If EPA determines that the changes to the terms of the NMP are not substantial, EPA will make the revised NMP publicly available and include it in the permit file, revise the terms of the NMP incorporated into the permit, and notify the permittee and the public of any changes to the terms of the NMP that are incorporated into the permit.

    d. If EPA determines that the changes to the terms of the NMP are substantial, EPA will provide the public with the opportunity to comment upon the changes to the NMP and the information submitted by the CAFO owner or operator as set forth in Section III.A.2. of this permit. EPA will respond to all significant comments received during the comment period. The process for public comments, hearing requests and the hearing process, if a hearing is held, will follow the procedures set forth in 40 CFR 124.11 through 124.13.

EPA may require the permittee to further revise the NMP, if necessary. Once EPA incorporates the revised terms of the NMP into the permit, EPA will notify the permittee of the revised terms and conditions of the permit.

B. Lagoon Liner Requirements

Liner Requirements: CAFOs constructing new wastewater or manure storage structures or modifying existing wastewater or manure storage structures shall have a liner that is constructed and maintained in accordance with Idaho NRCS practice standards. Any damage to the liner must be evaluated by a Professional Engineer and corrected within thirty (30) days of the damage, unless the Permitting Authority approves an alternative schedule. The permittee must submit the request within thirty (30) days of the damage, and it must include the Professional Engineer's evaluation of the risks of pollutant releases if the liner is not repaired immediately. All documentation of liner maintenance shall be kept with the NMP.

C. Facility Closure

The following conditions shall apply to the closure of lagoons and other earthen or synthetic lined basins and other manure, litter, or process wastewater storage and handling structures:

1. Closure of Lagoons and Other Surface Impoundments

   a. No lagoon or other earthen or synthetic lined basin shall be permanently abandoned.

   b. Lagoons and other earthen or synthetic lined basins shall be maintained at all times until closed in compliance with this section.

   c. All lagoons and other earthen or synthetic lined basins that are no longer needed as a part of a waste management system and are to be permanently decommissioned or converted for another use must be properly closed consistent with the Idaho NRCS Practice Standard Code 360 contained in Natural Resources Conservation Service Field Office Technical Guide (Appendix B). Consistent with this standard the permittee shall remove all waste materials to the maximum extent practicable and dispose of them in accordance with the permittee's NMP, unless otherwise authorized by EPA.

   d. For any lagoon or other earthen or synthetic lined basin that is not in use for a period of twelve (12) consecutive months but will not be permanently decommissioned or converted to another use, the permittee shall:

i. Maintain the structure as though it were actively in use in order to prevent compromise of structural integrity.

ii. The permittee shall notify EPA, in writing, of the action taken, and shall conduct routine inspections, maintenance, and record keeping as though the structure were in use. Prior to restoration of use of the structure, the permittee shall notify EPA, in writing, and provide the opportunity for inspection. The permittee shall properly handle and dispose of the water used to preserve the integrity synthetic or earthen liner during periods of non-use in accordance with the NMP.

e. Unless otherwise authorized by EPA, completion of closure for lagoons and other earthen or synthetic lined basins shall occur as promptly as practicable after the permittee ceases to operate or, if the permittee has not ceased operations, twelve (12) months from the date on which the use of the structure ceased, unless the lagoons or basins are being maintained for possible future use in accordance with the requirements above.

2. Closure Procedures for Other Manure, Litter, or Process Wastewater Storage and Handling Structure

No other manure, litter, or process wastewater storage and handling structure shall be abandoned. Closure of all such structures shall occur as promptly as practicable within twelve (12) months after the date on which the use of the structure ceased, unless the lagoons or basins are being maintained for possible future use in accordance with the requirements above. To close a manure, litter, or process wastewater storage and handling structure, the permittee shall remove all manure, litter, or process wastewater and dispose of it in accordance with the permittee's NMP, or document its transfer from the permitted facility in accordance with off-site transfer requirements specified in this permit Section III.D, unless otherwise authorized by EPA.

D. Requirements for the Transfer of Manure, Litter, and Process Wastewater

1. In cases where CAFO-generated manure, litter, or process wastewater is sold or given away, the permittee must comply with the following conditions:

a. Maintain records showing the date and amount of manure, litter, and/or process wastewater that leaves the permitted facility;

b. Record the name and address of the recipient;

c. Provide the recipient(s) with representative information on the nutrient content of the manure, litter, and/or process wastewater analyzed in accordance with Section III.A.2.g.i; and

d. Retain the records on-site, for a period of five years, and submit the records to EPA, upon request.

IV. RECORDS, REPORTING, MONITORING, AND NOTIFICATION

A. Records Management

1. Record Keeping Requirements for the Production Area

The permittee must maintain on-site for a period of five (5) years from the date they are created a complete copy of the NOI, the NMP, records to document the implementation and management of Section II.A and Section III.A.2.a-e, Section IV.D and Section IV.A.1.a-i below. The permittee must make these records available to EPA upon request.

a. Records documenting the inspections of all storage, containment and treatment structures as required under Section II.A.2.a and Section III.A.2.a;

b. Weekly records of the depth of the manure and process wastewater in storage, containment and/or treatment structure(s), as applicable, as indicated by the depth marker under Section II.A.2.b;

c. Documentation of whether or not the wastewater level in all liquid waste storage structures is below the level required to maintain capacity to store the runoff and precipitation from a 25-year, 24-hour storm under Section II.A.2.b;

d. Records documenting the inspections of all stormwater diversion and channel structures under Section III.A.2.c;

e. Records documenting the inspections of all water line inspections, including drinking and cooling water lines and whether or not leaks were discovered;

f. For all structures in Section II.A.2.a.i-iii, records documenting any actions taken to correct deficiencies required under Section II.A.2.c. Deficiencies not corrected with thirty (30) days must be accompanied by an explanation of the factors preventing immediate correction;

g. Records of mortalities management and practices used by the permittee to meet the requirements of Section II.A.2.d and Section III.A.2.b;

h. Records documenting the current design of any wastewater or manure storage structure to meet the requirements of Section II.A.1.b. including volume for solids accumulation, design treatment volume, total design volume, and approximate number of days of storage capacity; and

i. Records of the date, time, and estimated volume of any overflow and additional requirements of Section IV.D.

2. Record Keeping Requirements for the Land Application Area

Each permittee must maintain on-site for a period of five (5) years from the date they are created, a complete copy of the information required by Section II.B and Section III.A.2.f-i, and the records specified in Section IV.A.2.a-f below. The permittee must make these records available to EPA upon request. For every field, provide the following information associated with the same unique field identification used in the NMP:

a. The date(s) manure, litter, or process waste water application was begun for each field, for each land application event and all methods associated with the application of the manure, litter or process wastewater, including application method, incorporation method, soil surface conditions, weather conditions, number of acres utilized, amounts of manure, litter and process wastewater, and total amounts of nitrogen and phosphorus applied under Sections II.B.2, 3 and 5 and Section III.A.2.h;

b. Documentation of all manure, litter or process wastewater sample collection and analysis protocols under Section II.B.6 and Section III.A.2.g.i;

c. Documentation of all soil sample collection and analysis protocols under Section II.B.6 and Section III.A.2.g.ii;

d. Documentation that all required setbacks, buffers or approved alternatives and conservation practices identified in the NMP were observed and/or implemented, and an explanation for any deviation from these practices under Section II.B.4 and Section II.B.8;

e. The date that the equipment used for the land application event was last inspected under Section II.B.7; and

f. Documentation for all requirements for manure, litter and process wastewater transfers under Section III.D.

B. Annual Reporting Requirements

1. The permittee shall submit an annual report by March 1st of each year. Prior to December 20, 2020 reports must be submitted electronically or in hard copy to EPA, the appropriate IDEQ district office and Idaho State Department of Agriculture. Hard copies may be submitted to the addresses below.

U.S. EPA Region 10 Attn: ICIS Data Entry Team 1200 6th Avenue, Suite 155 ECAD-101 Seattle, Washington 98101-3188	Idaho State Department of Agriculture Division of Animal Industries P.O. Box 790 Boise, Idaho 83701

After December 20, 2020 annual reports must be submitted *electronically only* to IDEQ. Annual Reports must continue also be submitted to the Idaho State Department of Agriculture.

2. The permittee may seek an electronic reporting waiver by submitting a request. Prior to July 1, 2020 this request must be submitted to EPA. Beginning July 1, 2020 this request must be submitted to IDEQ. This waiver request should contain the following details: facility name; NPDES permit number; facility address; name, address and contact information for the owner, operator, or duly authorized facility representative; and a brief written statement regarding the basis for claiming such a temporary waiver. The request will be either approved or denied within 120 days. The duration of the temporary waiver will not exceed 5 years.

3. The annual report must include all of the information detailed in the Annual Report Template in Appendix H. The permittee may use the fillable pdf template provided, or may compile all of the required information in a separate document. Completion and electronic submittal of the Annual Report template shall fulfill the electronic reporting requirements.

C. Notification of Unauthorized Discharges Resulting from Manure, Litter, and Process Wastewater Storage, Handling, On-site Transport and Application

1. If, for any reason, there is an unauthorized discharge of pollutants to a water of the United States, the permittee is required to make immediate oral notification within 24-hours to the EPA Region 10, NPDES Compliance Section, Enforcement and Compliance Assurance Division, Seattle, WA at 206-553-1846 and notify ISDA, the appropriate IDEQ regional office, and the appropriate county authorities in writing, within five (5) working days of the discharge of pollutants to a water of the United States from the facility. In addition, the permittee shall keep a copy of the notification submitted to EPA and ISDA

together with the other records required by this permit. The discharge notification shall include the following information:

a. A description of the discharge and its cause, including a description of the flow path to the receiving water body and an estimate of the flow and volume discharged; and

b. The period of non-compliance, including exact dates and times, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate and prevent recurrence of the discharge.

D. Monitoring Requirements for All Discharges from Wastewater or Manure Storage Structures

1. In the event of any overflow or other discharge of pollutants to waters of the United States from a manure or wastewater storage structure, whether or not authorized by this permit the following actions shall be taken:

    a. All discharges from wastewater or manure storage structures to waters of the United States shall be sampled and analyzed. Samples must, at a minimum, be analyzed for the following parameters: total nitrogen, nitrate nitrogen, ammonia nitrogen, total phosphorus, *E. coli*, five-day biochemical oxygen demand (BOD5), total suspended solids, pH, and temperature. The discharge must be analyzed in accordance with approved EPA methods for water analysis listed in 40 CFR Part 136;

2. Record an estimate of the volume of the release and the date and time;

3. Samples shall consist of grab samples collected from the point of overflow or discharge from the waste impoundment or production area. A minimum of one sample shall be collected within 30 minutes of the detection of the overflow or discharge and the sample(s) of the overflow or discharge must be collected and analyzed in accordance with EPA approved methods for water analysis listed in 40 CFR Part 136. The sample(s) collected from the overflow or discharge must be representative of the overflow or discharge;

4. If conditions are not safe for sampling, the permittee must provide documentation of why samples could not be collected and analyzed. For example, the permittee may be unable to collect samples during dangerous weather conditions (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.). However, once dangerous conditions have passed, the permittee shall collect a sample from the wastewater or manure storage structure from which the discharge occurred; and

5. The analytical results of the representative sample(s) taken from the overflow or discharge must be submitted to EPA Region 10, Enforcement and Compliance Assurance Division, within thirty (30) days of the overflow or discharge. Copies of the analytical results shall also be submitted to ISDA and the IDEQ state and appropriate regional office at the addresses listed in Section I.B.3. of this permit.

E. Spills / Releases in Excess of Reportable Quantities

1. This permit does not relieve the permittee of the federal reporting requirements of 40 CFR §§ 110, 117 and 302 relating to spills or other releases of oils or hazardous substances.

   Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR § 110, 40 CFR § 117 or 40 CFR § 302, occurs during a 24-hour period:

   a. The permittee must provide notice to the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area, call 202–267–2675) in accordance with the requirements of 40 CFR §§ 110, 117 and 302 as soon as site staff have knowledge of the discharge; and

   b. The permittee must, within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. The permittee must also implement measures to prevent the reoccurrence of such releases and to respond to such releases.

2. Any spill of hazardous material must be immediately reported to the appropriate IDEQ regional office (see table below). Spills of petroleum products that exceed 25 gallons or that cause a visible sheen on nearby surface waters should be reported to IDEQ within 24-hours. Petroleum product spills of less than 25 gallons that do not cause a sheen on nearby surface waters shall only be reported to IDEQ if clean-up cannot be accomplished within 24-hours.

   IDEQ Regional Office contact information for reporting spills

Regional Office	**Phone #**	**Regional Office**	**Phone #**
Boise	(208) 373-0550	Lewiston	(208) 799-4370
Coeur d’Alene	(208) 769-1422	Pocatello	(208) 236-6160
Idaho Falls	(208) 528-2650	Twin Falls	(208) 736-2190

   Outside of regular business hours, qualified spills should be reported to the IDEQ 24-hour reporting hotline at 1-833-IPDES24.

V. STANDARD PERMIT CONDITIONS

A. General Monitoring, Recording, and Reporting Requirements

1. Representative Sampling

   Samples and measurements must be representative of the volume and nature of the monitored discharge.

2. Reporting of Monitoring Results

   If applicable, the permittee must submit the legible originals of the monitoring results to the Director of the Enforcement and Compliance Assurance Division with copies to ISDA at the following addresses:

   US EPA Region 10
   Attn: ICIS Data Entry Team
   1200 Sixth Avenue, Suite 155
   ECAD 20-C04
   Seattle, Washington 98101-3140

   Idaho State Department of Agriculture
   Division of Animal Industries
   P.O. Box 790
   Boise, ID 83701

3. Monitoring Procedures

   Monitoring must be conducted according to test procedures approved under 40 CFR § 136, unless other test procedures have been specified in this permit or approved by EPA as an alternate test procedure under 40 CFR § 136.5.

4. Additional Monitoring by Permittee

   If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR § 136 or as specified in this permit, the permittee must include the results of this monitoring in the calculation and reporting of the data submitted to EPA.
   Upon request by EPA, the permittee must submit results of any other sampling, regardless of the test method used.

5. Records Contents.

   Records of monitoring information must include:

a. The date, exact place, and time of sampling or measurements;

b. The name(s) of the individual(s) who performed the sampling or measurements;

c. The date(s) analyses were performed;

d. The names of the individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

6. Retention of Records

The permittee must retain records of all monitoring information, including, all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, a copy of the NPDES permit, and records of all data used to complete the application for this permit, for a period of at least five years from the date of the sample, measurement, report or application. This period may be extended by request of EPA or State/Tribal agency at any time.

7. Other Noncompliance Reporting

The permittee must report all instances of noncompliance, not required to be reported within 24 hours, at the time that monitoring reports for Section V.A.2 (Reporting of Monitoring Results) are submitted. The reports must contain the information listed in Section IV.B of this permit ("Notification of Discharges Resulting from Manure, Litter, and Process Wastewater Storage, Handling, On-site Transport and Application").

8. Changes in Discharge of Toxic Pollutant

The permittee must notify the Director of the Water Division and IDEQ as soon as it knows, or has reason to believe:

a. That any activity has occurred or will occur that would result in the discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in the permit, if that discharge may reasonably be expected to exceed the highest of the following "notification levels":

i. One hundred micrograms per liter (100 ug/l);

ii. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR § 122.21(g)(7); or

iv. The level established by EPA in accordance with 40 CFR § 122.44(f).

b. That any activity has occurred or will occur that would result in any discharge, on a non-routine or infrequent basis, of any toxic pollutant that is not limited in the permit, if that discharge may reasonably be expected to exceed the highest of the following "notification levels":

i. Five hundred micrograms per liter (500 ug/l);

ii. One milligram per liter (1 mg/l) for antimony;

iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR § 122.21(g)(7); or

iv. The level established by EPA in accordance with 40 CFR § 122.44(f).

c. The permittee must submit the notification to the Water Division at the following address:

US EPA Region 10
Attn: NPDES Permits Section Manager
1200 Sixth Avenue, Suite 155, 19-C04
Seattle, Washington 98101-3188

B. Compliance Responsibilities

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

a. Civil and Administrative Penalties. Pursuant to 40 CFR § 19 and the Act, any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently $53,484 per day for each violation).

b. Administrative Penalties. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Pursuant to 40 CFR 19 and the Act, administrative penalties for Class I violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently $21,393 per violation, with the maximum amount of any Class I penalty assessed not to exceed $53,484). Pursuant to 40 CFR 19 and the Act, penalties for Class II violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently $21,393 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $267,415).

c. Criminal Penalties:

i. Negligent Violations. The Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both.

ii. Knowing Violations. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

iii. Knowing Endangerment. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the Act, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

iv. False Statements. The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. The Act further provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

3. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this permit.

4. Duty to Mitigate

The permittee must take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

5. Proper Operation and Maintenance

The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

6. Bypass of Treatment Facilities

a. Bypass not exceeding limitations. The permittee may allow any bypass to occur that does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs b and c of this Part.

b. Notice.

i. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it must submit prior written notice, if possible at least 10 days before the date of the bypass.

ii. Unanticipated bypass. The permittee must submit notice of an unanticipated bypass as required under Section IV.C. ("Notification of Discharges Resulting from Manure, Litter, and Process Wastewater Storage, Handling, On-site Transport and Application").

c. Prohibition of bypass.

i. Bypass is prohibited, and the Director of the Enforcement and Compliance Assurance Division may take enforcement action against the permittee for a bypass, unless:

(A) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

(C) The permittee submitted notices as required under paragraph b of this Section.

ii. The Director of the Enforcement and Compliance Assurance Division may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph c.i. of this Part.

7. Upset Conditions

a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee meets the requirements of paragraph b of this Section. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. Conditions necessary for a demonstration of upset. To establish the affirmative defense of upset, the permittee must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

i. An upset occurred and that the permittee can identify the cause(s) of the upset;
ii. The permitted facility was at the time being properly operated;
iii. The permittee submitted notice of the upset as required under Section IV.B.6.b, "Notification of Discharges Resulting from Manure, Litter, and Process Wastewater Storage, Handling, On-site Transport and Application;" and
iv. The permittee complied with any remedial measures required under Section V.B.4, "Duty to Mitigate."

c. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

8. Toxic Pollutants

The permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

9. Planned Changes

The permittee must give written notice to the Director of the Water Division as specified in Section III.A.5.b. as soon as possible of any planned physical alterations or additions to the permitted facility whenever:

a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source as determined in 40 CFR § 122.29(b); or

b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are subject neither to effluent limitations in the permit, nor to notification requirements under Section V.A.8. ("Changes in Discharge of Toxic Substances").

10. Anticipated Noncompliance

The permittee must give written advance notice to the Director of the Enforcement and Compliance Assurance Division any planned changes in the permitted facility or activity that may result in noncompliance with this permit.

C. General Provisions

1. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause as specified in 40 CFR §§ 122.62, 122.64, or 124.5. The filing of a request by the permittee for a permit modification, revocation and reissuance, termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

2. Duty to Reapply

If the permittee intends to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. In accordance with 40 CFR § 122.21(d), and unless permission for the application to be submitted at a later date has been granted by the Regional Administrator, the permittee must submit a new application at least 180 days before the expiration date of this permit.

3. Duty to Provide Information

The permittee must furnish to EPA, within the time specified in the request, any information that EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee must also furnish to EPA, upon request, copies of records required to be kept by this permit.

4. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or that it submitted incorrect information in a permit application or any report to EPA, it must promptly submit the omitted facts or corrected information in writing.

5. Signatory Requirements

All applications, reports or information submitted to EPA must be signed and certified as follows.

a. All permit applications must be signed as follows:

   i. For a corporation: by a responsible corporate officer.
   ii. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.
   iii. For a municipality, state, federal, Indian tribe, or other public agency: by either a principal executive officer or ranking elected official.

b. All reports required by the permit and other information requested by EPA must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   i. The authorization is made in writing by a person described above;
   ii. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company; and
   iii. The written authorization is submitted to the Director of the Enforcement and Compliance Assurance Division.

c. Changes to authorization. If an authorization under Section V.C.5.b is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Section V.C.5.b must be submitted to the Director of the Enforcement and Compliance Assurance Division and the Idaho State Department of Agriculture prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. Certification. Any person signing a document under this Section must make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

6. Availability of Reports

In accordance with 40 CFR § 2, information submitted to EPA pursuant to this permit may be claimed as confidential by the permittee. In accordance with the Act, permit applications, permits and effluent data are not considered confidential. Any confidentiality claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice to the permittee. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR § 2, Subpart B (Public Information) and 41 Fed. Reg. 36902 through 36924 (September 1, 1976), as amended.

7. Inspection and Entry

The permittee must allow the Director of the Enforcement and Compliance Assurance Division, EPA Region 10; State/Tribal agency; or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

8. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, nor any infringement of federal, tribal, state or local laws or regulations.

9. Transfers

This permit is not transferable to any person except after written notice to the Director of the Water Division as specified in Section I.f. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act. (See 40 CFR § 122.61; in some cases, modification or revocation and reissuance is mandatory).

10. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

VI. DEFINITIONS

Animal feeding operation (AFO) means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of forty-five (45) days or more in any twelve (12) month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

Application means the EPA standard national forms for seeking coverage under for an NPDES permit, including any additions, revisions or modifications to the forms; or forms approved by EPA for use in "approved States," including any approved modifications or revisions [e.g. for NPDES general permits, a written "notice of intent" pursuant to 40 CFR § 122.28; for NPDES individual permits, Form 1 and 2B pursuant to 40 CFR § 122.1(d)].

Concentrated animal feeding operation (CAFO) means an AFO which is defined as a Large CAFO or Medium CAFO by 40 CFR § 122.23 (b)(4) and (b)(6), or that is designated as a CAFO per 40 CFR § 122.23(b)(9)(c).

Grab sample means a sample which is taken from a waste stream on a one-time basis without consideration of the flow rate of the waste stream and without consideration of time.

Land application means the application of manure, litter, or process wastewater onto or incorporated into the soil.

Land application area means land under the control of a CAFO owner or operator, whether it is owned, rented, or leased, to which manure, litter, or process wastewater from the production area is or may be applied.

Large CAFO means an AFO that stables or confines as many as or more than the numbers of animals specified in any of the following categories: (i) 700 mature dairy cattle, whether milked or dry; (ii)1,000 veal calves; (iii)1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs; (iv) 2,500 swine each weighing 55 pounds or more; (v)10,000 swine each weighing less than 55 pounds; (vi) 500 horses; (vii) 10,000 sheep or lambs; (viii) 55,000 turkeys; (ix) 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system; (x)125,000 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system; (xi) 82,000 laying hens, if the AFO uses other than a liquid manure handling system; (xii) 30,000 ducks (if the AFO uses other than a liquid manure handling system); or (xiii) 5,000 ducks (if the AFO uses a liquid manure handling system).

Liquid manure handling system means a system that collects and transports or moves waste material with the use of water, such as in washing of pens and flushing of confinement facilities. This would include the use of water impoundments for manure and/or wastewater treatment.

Manure is defined to include manure, litter, bedding, compost and raw materials or other materials commingled with manure or set aside for land application or other use.

Medium CAFO means any AFO that stables or confines as many or more than the numbers of animals specified in any of the following categories: (i) 200 to 699 mature dairy cattle, whether milked or dry cows; (ii) 300 to 999 veal calves; (iii) 300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs; (iv) 750 to 2,499 swine each weighing 55 pounds or more; (v) 3,000 to 9,999 swine each weighing less than 55 pounds; (vi)150 to 499 horses, (vii) 3,000 to 9,999 sheep or lambs, (viii) 16,500 to 54,999 turkeys, (ix) 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system; (x) 37,500 to 124,999 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system; (xi) 25,000 to 81,999 laying hens, if the AFO uses other than a liquid manure handling system; (xii) 10,000 to 29,999 ducks (if the AFO uses other than a liquid manure handling system); or (xiii) 1,500 to 4,999 ducks (if the AFO uses a liquid manure handling system) **and** either one of the following conditions are met (a) pollutants are discharged into waters of the United States through a man-made ditch, flushing system, or other similar man-made device; or (b) pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

Notice of Intent (NOI) is a form submitted by the owner/operator applying for coverage under a general permit. It requires the applicant to submit the information necessary for adequate program implementation, including, at a minimum, the legal name and address of the owner or operator, the facility name and address, type of facility or discharges, and the receiving stream(s). [40 CFR § 122.28(b)(2)(ii)].

Process wastewater means water directly or indirectly used in the operation of the CAFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other AFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater also includes any water which comes into contact with or is a constituent of raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding.

Production area means that part of an AFO that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal containment area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment area includes but is not limited to settling basins, and areas within berms and diversions which separate uncontaminated storm water. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of mortalities.

Small CAFO means an AFO that is designated as a CAFO and is not a Medium CAFO.

Setback means a specified distance from waters of the United States or potential conduits to waters of the United States where manure, litter, and process wastewater may not be land applied. Examples of conduits to surface waters include but are not limited to: Open tile line intake structures, sinkholes, and agricultural well heads.

The Act means Federal Water Pollution Control Act as amended, also known as the Clean Water Act as amended, found at 33 USC 1251 et seq.

Vegetated buffer means a narrow, permanent strip of dense perennial vegetation established parallel to the contours of and perpendicular to the dominant slope of the field for the purposes of slowing water runoff, enhancing water infiltration, and minimizing the risk of any potential nutrients or pollutants from leaving the field and reaching waters of the United States.

Waters of the United States means: waters as defined in 40 CFR Part 122.2.

APPENDIX A - Notice of Intent - EPA Form 2B

United States Environmental Protection Agency | Office of Water Washington, D.C. | EPA Form 3510-2B Revised March 2019

Water Permits Division

EPA

Application Form 2B

Concentrated Animal Feeding Operations and Concentrated Aquatic Animal Production Facilities

NPDES Permitting Program

Note: Complete this form ***and*** Form 1 if your facility is a new or existing concentrated animal feeding operation or concentrated aquatic animal production facility.

Paperwork Reduction Act Notice

The U.S. Environmental Protection Agency (EPA) estimates the average burden for concentrated animal feeding operation respondents to collect information and complete Form 2B to be 9.2 hours (8.7 hours to complete and submit the application and 0.5 hours to complete and submit a nutrient management plan). EPA estimates the average burden for concentrated aquatic animal production respondents to collect information and complete Form 2B to be 5.5 hours. These estimates include time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the collection of information. Send comments about the burden estimates or any other aspect of this collection of information to the Chief, Information Policy Branch (PM-223), U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW, Washington, DC 20503, marked "Attention: Desk Officer for EPA."

FORM 2B—INSTRUCTIONS

General Instructions

Who Must Complete Form 2B?

You must complete Form 2B if you answered "Yes" to Item 1.2.1 on Form 1—that is, if you are a concentrated animal feeding operation (CAFO) or a concentrated aquatic animal production (CAAP) facility.

Where to File Your Completed Form

Submit your completed application package (Forms 1 and 2B) to your National Pollutant Discharge Elimination System (NPDES) permitting authority. Consult Exhibit 1–1 of Form 1's "General Instructions" to identify your NPDES permitting authority.

Public Availability of Submitted Information

The U.S. Environmental Protection Agency (EPA) will make information from NPDES permit application forms available to the public for inspection and copying upon request. You may not claim any information on Form 2B (or related attachments) as confidential.

You may make a claim of confidentiality for any information that you submit to EPA that goes beyond the information required by Form 2B. Note that NPDES authorities will deny claims for treating any effluent data as confidential. If you do not assert a claim of confidentiality at the time you submit your information to the NPDES permitting authority, EPA may make the information available to the public without further notice to you. EPA will handle claims of confidentiality in accordance with the Agency's business confidentiality regulations at Part 2 of Title 40 of the *Code of Federal Regulations* (CFR).

Completion of Forms

Print or type in the specified areas only. If you do not have enough space on the form to answer a question, you may continue on additional sheets, as necessary, using a format consistent with the form.

Provide your EPA Identification Number from the Facility Registry Service, NPDES permit number, and facility name at the top of each page of Form 2B and any attachments. If your facility is new (i.e., not yet constructed), write or type "New Facility" in the space provided for the EPA Identification Number and NPDES permit number. If you do not know your EPA Identification Number, contact your NPDES permitting authority. See Exhibit 1–1 of the "General Instructions" of Form 1 for contact information.

Do not leave any response areas blank unless the form directs you to skip them. If the form directs you to respond to an item that does not apply to your facility or activity, enter "NA" for "not applicable" to show that you considered the item and determined a response was not necessary for your facility.

The NPDES permitting authority will consider your application complete when it and any supplementary material are received and completed according to the authority's satisfaction. The NPDES permitting authority will judge the completeness of any application independently of the status of any other permit application or permit for the same facility or activity.

Definitions

The legal definitions of all key terms used in these instructions and Form 2B are in the "Glossary" at the end of the "General Instructions" in Form 1.

Line-by-Line Instructions

Section 1. General Information

Item 1.1. Mark whether your facility/business type is a CAFO or a CAAP.

- For a CAFO, you must complete Sections 1 through 6 and Section 8.
- For a CAAP, you must complete Sections 1, 7, and 8.

Item 1.2. Indicate whether your facility is an existing or proposed facility. Mark "Proposed Facility" if your facility is presently not in operation or is expanding to meet the definition of a CAFO in accordance with the regulations at 40 CFR 122.23.

Section 2. CAFO Owner/Operator Contact Information

Item 2.1. Provide the name, title, telephone number, and email address of the owner/operator of the facility/business.

Item 2.2. Provide the complete mailing address of the owner/operator of the facility/business.

Section 3. CAFO Location and Contact Information

Item 3.1. Provide the legal name and location (complete mailing address) of the facility. Also indicate whom the NPDES permitting authority should contact about the application, including a telephone number and email address.

Item 3.2. Provide the latitude and longitude of the entrance to the production area (i.e., the part of the operation that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas). Latitude and longitude coordinates may be obtained in a variety of ways, including use of hand held devices (e.g., a GPS enabled smartphone), internet mapping tools (e.g., https://mynasadata.larc.nasa.gov/latitudelongitude-finder/), geographic information systems (e.g., ArcView), or paper maps from trusted sources (e.g., U.S. Geological Survey or USGS). For further guidance, refer to http://www.epa.gov/geospatial/latitudelongitude-data-standard.

Item 3.3. If the facility uses a contract grower, provide the name and complete mailing address of the integrator.

Section 4. CAFO Topographic Map

Item 4.1. Provide a topographic map of the geographic area in which the facility is located, showing the specific location of the production area(s). You are not required to provide the topographic map required by Section 7 of Form 1.

On each map, include the map scale, a meridian arrow showing north, and latitude and longitude to the nearest second. Latitude and longitude coordinates may be obtained in a variety of ways, including use of hand held devices (e.g., a GPS enabled smartphone), internet mapping tools (e.g., https://mynasadata.larc.nasa.gov/latitudelongitude-finder/), geographic information systems (e.g., ArcView), or paper maps from trusted sources (e.g., USGS).

On all maps of rivers, show the direction of the current. In tidal waters, show the directions of ebb and flow tides.

You may develop your map by going to the United States USGS's National Map website at http://nationalmap.gov/. (For a map from this site, use the traditional 7.5-minute quadrangle format. If none is available, use a USGS 15-minute series map.) You may also use a plat or other appropriate map. Briefly describe land uses in the map area (e.g., residential, commercial.). Note that you have completed your topographic map and attached it to the application.

Section 5. CAFO Characteristics

Supply all information in Section 5 if you checked "Existing facility" in response to Item 1.2.

Item 5.1. Provide the maximum number of each type of animal in open confinement or housed under roof (either partially or totally) that are held at your facility for a total of 45 days or more in any 12-month period. Provide the total number of animals confined at the facility.

Item 5.2. Identify the applicable types of containment and storage for manure, litter, and process wastewater at the facility and indicate the capacity of storage in days and gallons or tons.

Item 5.3. Indicate the total number of acres that are drained and collected in the containment and storage structure(s).

Item 5.4. Specify the tons of manure or litter and the gallons of process wastewater generated at the facility on an annual basis.

Item 5.5. Indicate whether the manure, litter, and/or process wastewater is land applied. If yes, continue to Item 5.6. If no, skip to Item 5.8.

Item 5.6. Indicate the number of acres of land under the control of the applicant that are available for land application of the manure, litter, or process wastewater.

Item 5.7. Check any of the identified best management practices that are being implemented at the facility to control runoff and protect water quality.

Item 5.8. Indicate if the manure, litter, and/or process wastewater is transferred to any other persons. If yes, continue to Item 5.9. If no, skip to Item 5.10.

Item 5.9. Specify the tons of manure or litter or the gallons of process wastewater transferred annually to other people.

Item 5.10. Describe any alternative uses of manure, litter, or process wastewater, if any (e.g., composting, pelletizing, energy generation).

Section 6. CAFO Nutrient Management Plans

Item 6.1. Indicate if you have submitted a nutrient management plan that satisfies the requirements at 40 CFR 122.42(e) and, if applicable, the requirements at 40 CFR 412.4(c).

Item 6.2. If you have not yet submitted a nutrient management plan, explain why not.

Item 6.3. Indicate if a nutrient management plan is being implemented at the CAFO. If not land applying, describe the alternative uses of the manure, litter, and wastewater (e.g., composting, pelletizing, energy generation).

Item 6.4. Indicate the date of the last review or revision of the nutrient management plan.

Note: A permit application is not complete until a nutrient management plan is submitted to the NPDES permitting authority.

Section 7. CAAP Facility Characteristics

Item 7.1. Indicate if the CAAP facility is located on land. If the facility is located in water (e.g., a net pen or submerged cage system), check "No" and skip to Item 7.3. If yes, continue to Item 7.2.

Item 7.2. Provide the maximum daily and maximum average monthly discharge at the CAAP facility by outfall number. Outfall numbers should correspond with the outfall numbers provided on the map submitted in Section 7 of Form 1. Values given for flow should be representative of your normal operation. The maximum daily flow is the maximum measured flow occurring over a calendar day. The maximum average monthly flow is the average of measured daily flow over the calendar month of highest flow.

Item 7.3. Indicate the number of ponds, raceways, net pens, submerged cages, or similar structures at your facility that result in discharges to waters of the United States. Describe each type and provide the name of the associated receiving water and intake water source.

Item 7.4. List the species of fish or aquatic animals held and fed at your facility. Distinguish between cold-water and warm-water species. The names of fish species should be proper, common, or scientific names as given in Special Publication 34 of the American Fisheries Society, *Common and Scientific Names of Fishes from the United States, Canada, and Mexico*.

For each species, provide the total harvestable weight in pounds (lbs.) for a typical calendar year. Also indicate the maximum weight present at any one time at your facility.

Item 7.5. Indicate the maximum monthly pounds of food given at your facility. Also indicate the month given. The amounts should be representative of your normal operations.

Section 8. Checklist and Certification Statement

Item 8.1. Review the checklist provided. In Column 1, mark the sections of Form 2B that you have completed and are submitting with your application. For each section in Column 2, indicate whether you are submitting attachments.

Item 8.2. The Clean Water Act provides for severe penalties for submitting false information on this application form. CWA Section 309(c)(2) provides that, "Any person who knowingly makes any false statement, representation, or certification in any application, …shall upon conviction, be punished by a fine of no more than $10,000 or by imprisonment for not more than six months, or both."

FORM 2B—INSTRUCTIONS CONTINUED

FEDERAL REGULATIONS AT 40 CFR 122.22 REQUIRE THIS APPLICATION TO BE SIGNED AS FOLLOWS:

A. For a corporation, by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

B. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively.

C. For a municipality, state, federal, or other public facility, by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes: (1) The chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

END

Submit your completed Form 1, Form 2B, and all associated attachments (and any other required NPDES application forms) to your NPDES permitting authority.

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EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004

Form 2B NPDES	EPA	U.S. Environmental Protection Agency Application for NPDES Permit to Discharge Wastewater CONCENTRATED ANIMAL FEEDING OPERATIONS and CONCENTRATED AQUATIC ANIMAL PRODUCTION FACILITIES

SECTION 1. GENERAL INFORMATION (40 CFR 122.21(I)(1))

General Information		
	1.1	Indicate the facility/business type. (Check only one response.) ☐ CAFO ➔ Complete Sections 1 through 6 and Section 8. ☐ CAAP ➔ Complete Sections 1, 7, and 8.
	1.2	Indicate the operational status of the facility. (Check one.) ☐ Existing facility ☐ Proposed facility

SECTION 2. CAFO OWNER/OPERATOR CONTACT INFORMATION (40 CFR 122.21(f)(2) and (4) and 122.21(i)(1)(i))

CAFO Owner/Operator Contact Information				
	2.1	**Owner/Operator Contact**		
		Name (first and last)	Title	
		Phone number	Email address	
	2.2	**Owner/Operator Mailing Address**		
		Street or P.O. box		
		City or town	State	Zip code

SECTION 3. CAFO LOCATION AND CONTACT INFORMATION (40 CFR 122.21(i)(1)(ii and iii))

CAFO Location and Contact Information				
	3.1	**CAFO Location and Contact**		
		Name		
		Address (street, route number, or other specific identifier)	County	
		City or town	State	Zip code
		Facility contact name	Phone number	Email address
	3.2	**Latitude/Longitude of Entrance to Production Area** (see instructions)		
		Latitude	**Longitude**	
		° ′ ″	° ′ ″	

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004

CAFO Location and Contact Information Continued

3.3 **Integrator Name and Address**

Name		
Street address		
City or town	State	Zip code

SECTION 4. CAFO TOPOGRAPHIC MAP (40 CFR 122.21(i)(1)(iv))

CAFO Topographic Map

4.1 Have you attached a topographic map containing all required information to this application? (See instructions for specific requirements.)

☐ Yes ➔ SKIP to Section 5. ☐ No

SECTION 5. CAFO CHARACTERISTICS (40 CFR 122.21(i)(1)(v ix))

CAFO Characteristics

5.1 Provide information on the type and number of animals in the table below.

Animal Type	Number in Open Confinement	Number Housed Under Roof	Animal Type	Number in Open Confinement	Number Housed Under Roof
☐ Mature dairy cows			☐ Sheep or lambs		
☐ Dairy heifers			☐ Chickens (broilers)		
☐ Veal calves			☐ Chickens (layers)		
☐ Cattle (not dairy or veal calves)			☐ Ducks		
☐ Swine (55 lbs. or more)			☐ Other (specify)		
☐ Swine (under 55 lbs.)			☐ Other (specify)		
☐ Horses			☐ Other (specify)		
☐ Turkeys			**Total Animals**		

5.2 Indicate the type of containment and storage, total number of days, and total capacity for manure, litter, and process wastewater storage in the table below.

Type of Containment and Storage	Total Number of Days	Total Capacity (specify gallons or tons)	Type of Containment and Storage	Total Number of Days	Total Capacity (specify gallons or tons)
☐ Anaerobic lagoon			☐ Belowground storage tanks		
☐ Evaporation			☐ Roofed storage shed		
☐ Aboveground storage tanks			☐ Concrete pad		
☐ Storage pond			☐ Impervious soil pad		
☐ Underfloor pit			☐ Other (specify)		

5.3 Indicate the total number of acres drained and collected in the containment and storage structure(s) reported under Item 5.2.

____________ acres

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004

CAFO Characteristics Continued

Manure, Litter, and/or Process Wastewater Production and Use

5.4	How many tons of manure or litter and gallons of process wastewater are generated annually at the CAFO?		
	Manure		tons
	Litter		tons
	Process wastewater		gallons
5.5	Is manure, litter, and/or process wastewater generated at the CAFO land applied? ☐ Yes ☐ No ➔ SKIP to Item 5.8.		
5.6	How many acres of land under the control of the applicant are available for applying the CAFO's manure, litter, or process wastewater? ______________ acres		
5.7	Check all land application best management practices that are being implemented. ☐ Buffers ☐ Infiltration field ☐ Setbacks ☐ Grass filter ☐ Conservation tillage ☐ Terrace ☐ Constructed wetlands ☐ Other (specify)		
5.8	Is manure, litter, and/or process wastewater transferred to any other persons? ☐ Yes ☐ No ➔ SKIP to Item 5.10.		
5.9	How many tons of manure or litter and gallons of process wastewater, produced by the CAFO, are transferred annually to other people?		
	Manure		tons
	Litter		tons
	Process wastewater		gallons
5.10	Describe alternative use(s) of manure, litter, or process wastewater, if any.		

SECTION 6. CAFO NUTRIENT MANAGEMENT PLANS (40 CFR 122.21(i)(1)(x))

CAFO Nutrient Management Plans

6.1	Has the applicant attached a nutrient management plan that satisfies the requirements at 40 CFR 122.42(e) and, if applicable, the requirements at 40 CFR 412.4(c)? **Note:** A permit application is not complete until a nutrient management plan is submitted to the NPDES permitting authority. ☐ Yes ➔ SKIP to Item 6.3. ☐ No
6.2	Explain why a nutrient management plan is not attached to the application.
6.3	Is a nutrient management plan being implemented at the CAFO? ☐ Yes ☐ No
6.4	What was the date of the last review or revision of the nutrient management plan? Date ______________________________

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004

SECTION 7. CAAP FACILITY CHARACTERISTICS (40 CFR 122.21(i)(2))

CAAP Facility Characteristics

7.1 Is the CAAP facility located on land?

☐ Yes ☐ No → SKIP to Item 7.3.

7.2 Provide the maximum daily and maximum average monthly discharge at CAAP by outfall.

Outfall Number	Discharge	
	Maximum Daily Discharge	Maximum Average Monthly Discharge
	gpd	gpd
	gpd	gpd
	gpd	gpd

7.3 Indicate the type and number of discharge structures at the CAAP. Provide a brief description of each structure. Also note the name of the receiving water and the source of the intake water for each structure.

Structure Type	Number of Each	Description	Receiving Water Name	Source of Intake Water
Ponds				
Raceways				
Net pens				Not applicable
Submerged cages				Not applicable
Similar structures (specify) ______				

7.4 List the cold-water and/or warm-water aquatic species raised/produced in the table below. For each species listed, indicate the total yearly and maximum harvestable weight (in pounds).

Cold Water Species			Warm Water Species		
Species	Harvestable Weight		Species	Harvestable Weight	
	Total Yearly	Maximum		Total Yearly	Maximum
	lbs.	lbs.		lbs.	lbs.
	lbs.	lbs.		lbs.	lbs.
	lbs.	lbs.		lbs.	lbs.
	lbs.	lbs.		lbs.	lbs.

7.5 Indicate the calendar month of maximum feeding and the total mass of food fed (in pounds) during that month.

Month of Maximum Feeding	Total Mass of Food Fed
	lbs.

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004

SECTION 8. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

8.1 In Column 1, below, mark the sections of Form 2B that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2
☐ Section 1: General Information	☐ w/ attachments
☐ Section 2: CAFO Owner/Operator Contact Information	☐ w/ attachments
☐ Section 3: CAFO Location and Contact Information	☐ w/ attachments
☐ Section 4: CAFO Topographic Map	☐ w/ topographic map ☐ w/ additional attachments
☐ Section 5: CAFO Characteristics	☐ w/ attachments
☐ Section 6: CAFO Nutrient Management Plans	☐ w/ nutrient management plan ☐ w/ attachments
☐ Section 7: CAAP Facility Characteristics	☐ w/ attachments
☐ Section 8: Checklist and Certification Statement	☐ w/ attachments

8.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name)	Official title
Signature	Date signed

APPENDIX B - ID NRCS Conservation Practice Standard Code 360

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CLOSURE OF WASTE IMPOUNDMENTS

(No.)

CODE 360

DEFINITION

The closure of waste impoundments (treatment lagoons and liquid storage facilities), that are no longer used for their intended purpose, in an environmentally safe manner.

PURPOSE

- Protect the quality of surface water and groundwater resources
- Eliminate a safety hazard for humans and livestock
- Safeguard the public health

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to agricultural waste impoundments that are no longer needed as a part of a waste management system and are to be permanently closed or converted.

The structure must be constructed to meet NRCS standards or show structural integrity if these impoundments are to be converted to fresh water storage ponds. Investigations for structural integrity must be conducted as specified in the National Engineering Manual (NEM) 501.23.

CRITERIA

General Criteria Applicable to All Purposes

The closure shall comply with all federal, state and local laws, rules and regulations including pollutant discharge elimination system requirements.

All structures used to convey waste to waste impoundments or to provide drainage from the impoundment area shall be removed and replaced with compacted earth material or otherwise rendered unable to convey waste.

Liquid and slurry wastes shall be agitated and pumped to the extent conventional pumping will allow. Clean water shall be added as necessary to facilitate the agitation and pumping. The wastewater shall be utilized in accordance with Waste Utilization (633), as well as Nutrient Management (590). The sludge remaining on the bottom and sides of the waste treatment lagoon or waste storage facility may remain in place if it will not pose a threat to the environment. If leaving the sludge in place would pose a threat, it shall be removed to the fullest extent practical and utilized in accordance with Waste Utilization (633), as well as Nutrient Management (590).

Land Reclamation. Impoundments with embankments may be breached so that they will no longer impound water, and excavated impoundments may be backfilled so that these areas may be reclaimed for other uses. Waste impoundments that have water impounded against the embankment are considered embankment structures if the depth of water is three feet or more above natural ground.

(1) Embankment Impoundments. Waste shall be removed from the site before the embankment is breached. The slopes and bottom of the breach shall be stable for the soil material involved; however, the side slopes shall be no steeper than three horizontal to one vertical (3:1).

(2) Excavated Impoundments. The backfill height shall exceed the design finished grade by 5 percent to allow for settlement. The top one foot of the backfill shall be constructed of soil with greater than 20% clay content and mounded to shed rainfall

runoff. Incorporate available topsoil where feasible to aid establishment of vegetation.

Closed waste storage structures shall be demolished or disassembled or otherwise altered to such an extent that no water can be impounded. Disassembled materials such as pieces of metal shall be temporarily stored until their final disposition in such a manner that they do not pose a hazard to animals or humans.

Demolished materials shall be buried on-site, as allowed by local regulation of landfills or moved off-site to locations designated by state or local officials. If buried on-site, the materials are to be covered with soil to a settled depth of one foot, and the backfill be sufficiently mounded such that runoff will be diverted from the site after the backfill settles.

Conversion to Fresh Water Storage. The converted impoundment shall meet the requirements as set forth in the appropriate NRCS practice standard for the intended purpose.

Safety. When sludge is not removed from a waste impoundment that is being converted to fresh water storage, the impoundment shall not be used for fish production, swimming or livestock watering until water quality is adequate for these purposes. Precautions such as fencing and warning signs shall be used to ensure that the facility is not used for purposes incompatible with the current quality of water.

Personnel shall not enter an enclosed waste impoundment without breathing apparatus or taking other appropriate measures.

Protection. All disturbed areas shall be re-vegetated or other suitable measures used to control erosion and restore the esthetic value of the site. Sites not suitable for re-vegetation through normal cropping practices shall be vegetated using Critical Area Planting (342).

Measures shall be taken during construction to minimize site erosion and pollution of downstream water resources. This may include such items as silt fences, hay bale barriers, temporary vegetation and mulching.

CONSIDERATIONS

Reduce pumping effort to empty waste impoundments where the surface is covered by a dense mat of floating vegetation by first applying herbicide to the vegetation and then burning the residue. Appropriate permits must be obtained before burning.

Minimize the impact of odors associated with emptying and land applying wastewater and sludge from a waste impoundment by using an incorporation application method at a time when the humidity is low, winds are calm and wind direction is away from populated areas.

Soil to fill excavated ponds should not come from important farmlands (prime, statewide, local and/or unique).

Breeched embankments may detract from the overall esthetics of the operation. Embankments should be removed and the site returned to its original grade.

Keep sludge left in place covered with water to prevent its aerobic decomposition with the potential release of nutrients to surface and ground water.

Disassembled structural facilities may be suitable for assembly at another site. Care should be taken during closure to minimize damage to the pieces of the facility, particularly coatings that prevent corrosion of metal pieces.

PLANS AND SPECIFICATIONS

Plans and specifications for closure of abandoned waste treatment lagoons and waste storage facilities shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall also be consistent with the requirements of that standard.

OPERATION AND MAINTENANCE

The proper closure of a waste treatment lagoon or waste storage facility should require little or no operation and maintenance; however, if it is converted to another use, such as a fresh water facility, operation and maintenance shall be in accordance with the needs as set forth in the appropriate NRCS conservation practice standard for the intended purpose.

APPENDIX C - ID NRCS IDAWM

United States Department of Agriculture
Natural Resource Conservation Service

IDAWM
Computer Program

Version 4.00 DECEMBER 2000

Computer Program for Animal Waste Computations
Title: IDAWM Version: 4.00
Date: May 1991 Last Revision: December 2000

Programmed by: Bruce D. Wilson
NRCS Assistant State Conservation Engineer
Portland, Oregon

Modified for Idaho by: Clare J. Prestwich, NRCS
Idaho State Irrigation Engineer

References:

- Oregon Department of Agriculture, Natural Resources Division, Oregon Animal Waste Installation Guidebook, Salem, Oregon, March, 1991
- USDA NRCS, Agricultural Waste Management Field Handbook, US Government Printing Office, Washington, D.C., 1991.
- Economic Worksheet for Animal Waste Utilization, Hal Gordon, NRCS State Economist, Portland, OR, 1992
- Idaho Department of Health and Welfare, Division of Environmental Quality, Idaho Waste Management Guidelines for Confined Feeding Operations, 1993.
- USDA, NRCS, Idaho FOTG Practice Standards 313, 359 and 590.

Table of Contents Page

Idawm

A. PROGRAM DESCRIPTION

This program can be used as a tool for computing animal waste volumes, nutrient amounts, sizing storage facilities, and/or determining nutrient application area requirements based upon plant uptake. The program uses data and procedural guidelines from the Idaho Waste Management Guidelines for Confined Feeding Operations (IDWMG) and the NRCS Agricultural Waste Management Field Handbook. The data input screens will display reference page numbers in the IDWMG where a description of data and procedures used can be found.

The program was created using version 4.5 of the Microsoft QuickBASIC interpreter. The program consists of 13 executable modules. Each module represents an input screen of the program. Since the program consists of executable modules, the program requires the BRUN45.EXE program file be in the same directory as the program modules in order to run properly.

Four data files are also needed to run the program. The data files consist of animal, crop, climatic and default information. The information in the data files from the OAWG (Oregon Animal Waste Guidebook) was modified for Idaho and can be updated as needed. The default data file has been created but can be altered to save the following information:

--landowner/operator
--climatic station
--type of operation
--animal descriptions
--animal weights
--months of animal confinement
--days animals are confined
--days animals are grazed
--liquid storage period
--solid storage period
--crops selected for nutrient uptake
--nutrient on which to base acreage calculations
--dollar value of nutrients
--selected printer for printing data
--data path and disk drive and path where data is to be stored.

The economics of determining the break even cost and nutrient balance of waste application was develop by Hal Gordon, NRCS Oregon State Economists, and adapted to this program.

B. EQUIPMENT

This program is designed to run on the AT&T PC 6300 series computer or compatible with 640K or RAM memory and running MS-DOS version 2.11 or higher. A single disk drive is required to run the program and a printer is required to print a paper copy of the program output. The program can be provided on 360K, 1.2 MB 5 1/4 inch diskettes or 720K/1.44MB 3 ½ inch diskettes.

C. INSTRUCTIONS TO LOAD AND RUN PROGRAM

If your computer is equipped with a hard disk, you can load the program onto the hard disk by creating a subdirectory and copying all the files from the diskette or diskettes into the subdirectory created on the hard disk or by downloading the program from the NRCS Idaho web page <http://id.nrcs.usda.gov> and clicking on "TECHNICAL RESOURCES", "ENGINEERING TECHNICAL RESOURCE DOWNLOAD PAGE", "COMPUTER PROGRAMS", then "idawm". To run the program from the subdirectory, simply use the change directory command (CD) to change to the subdirectory and type Idawm followed by the enter key. To avoid problems loading or saving data files add the following to the auotexec.bat file in the c:\ directory " path=c:\subdirectory where you loaded the program". If the path statement already exists just add it on to the end of the line. This can be done using any text editor.

If you wish to run the program using the floppy drive, insert diskette number one into the A: or B: disk drive, type

A: or **B:** for the drive the diskette is located in and press the enter key. Type Idawm followed by the enter key to run the program. If you are prompted to "Input run-time module path:", type **A:** or **B** for the disk drive containing the program diskette and press the enter key.
Important-- The first time you run the program;
1. Press the [F3] key to save the default settings.
2. Follow the instructions on page 13 to customize the data for the default screens paying special attention to the printer type and data storage disk drive and data path. Save the defaults by pressing the [PgDn] key at the last input screen so the next time you run the program the defaults will be set up the way you want them for your computer. The program is initially set up to use the Genicom Dot Matrix printer for printouts and the A: disk drive for data storage.

If you have trouble running the program on your computer, call your IRM staff to insure you have the proper equipment and MSDOS version described in section B.

D. USER INSTRUCTIONS
The Idawm program is "user friendly" to the extent that all the input data needed is asked for in a logical manner. The data field that is activated for the user to enter new or to change default data is identified by that data field being shaded. The entire data field is shaded when the data field is empty and the length of the shaded area is reduced as each character is entered. If the data field is full, the program will provide one extra shaded space to indicate the current location for data input.

The following is a description of editing keys that can help enter and manipulate data in the program:

[ESC]	Pressing the escape key in any input field in the program will allow the user to save data entered and exit the program returning to the DOS operating system. See page 13 for instructions on saving data.
[DEL]	Pressing the delete key will clear all of the data from the data field in which the cursor is located .
[<---]	Pressing the backspace key will delete on character to the left of the shaded area.
[Tab]	Pressing the tab key will move the cursor from current data field to the next.
Shift [Tab]	Pressing the shift key along with the tab key will move the cursor from the current data field to the previous data field.
[PgDn]	Pressing the page down key will move the cursor to the next data entry screen in the program.
[PgUp]	Pressing the page up key will move the cursor to the previous data entry screen in the program.
[->]	Pressing the right cursor key will move the cursor to the next data field to the right.
[<-]	Pressing the left cursor key will move the cursor to the next data field to the left.
[UP]	Pressing the up cursor key will move the cursor to the next data field above the current data field.
[DOWN]	Pressing the down cursor key will move the cursor to the next data field below the current data field location.
[Enter]	Pressing the enter key or carriage return key (<CR>) will move to the next data field.
[Ctrl] [L]	Pressing the [Ctrl] and [L] keys together where indicated will provide a list of items from which to select.
[F1]	Pressing the [F1] function key will allow the user to load a previously saved data file. See page 13 for instructions on how to load a data file.
[F2]	Pressing the [F2] function key will allow the user to save entered data to a data file. See page 13 for instructions on how to save data to a file.
[F3]	Pressing the [F3] function key will allow the user to save data to a default data file that is used each time the program is run. See pages 13-15 for instructions on how to enter and save default data.
[F4]	Pressing the [F4] function key in the solids storage facility or liquid storage facility input screen allows the user to print the graphic display to a dot matrix printer. The user must have loaded the graphics print routine by typing **GRAPHICS** before running the program and selecting this option. If you are running the program through SIMULTASK on a UNIX operating system, this option may not give the desired results. This option is not available if you have specified a laser printer for the printer type in the default settings.

D. User Instructions Continued

The following provides a description of each data entry screen in the program:

SCREEN 1, PROGRAM DEVELOPMENT INFORMATION

The program will display information about the version of the program and a telephone number for help. No data entry is required on SCREEN 1. Press any key to proceed to SCREEN 2. The program will indicate that it is loading data from the default data file. The program will automatically proceed to SCREEN 2 once all of the necessary data is loaded. If the required data files are missing the program will not run.

SCREEN 2, ANIMAL WASTE MANAGEMENT PLANNING WORKSHEET

OPERATOR/LANDOWNER

Enter the name of the operator or landowner. As a default the file will be saved under this input. This data field will accept 1-40 characters. If manure for different animal groups is handled differently in storage or utilization you should make a separate idawm computer evaluation for the different groups. Example – milking cows manure stored and land applied, heifers and calves manure stored in corral in manure pack for several years; evaluate with separate analysis. Multiple computer runs can be used to evaluate alternatives for handling and/or utilizing the manure. Options for runs i.e. John Smith storage milkers, John Smith all animals.

LOCATION

Enter the location of the confined animal feeding operation (CAFO). This data field will accept 1-40 characters.

ASSISTED BY

Enter the name of the person providing assistance to the landowner. This data field will accept 1-40 characters.

CLIMATIC STATION

Enter the climatic station that best represents the location of the CAFO operation. Pressing [Ctrl] [L] will display an alphabetical list of 79 climatic stations to choose from (2 pages). Use the up and down cursor keys to choose the climatic station you want and press [Enter]. A correct entry in this data field is required to move to the next data entry screen. This data field will accept 1-20 characters. Other climatic station can be added by editing the file rf.awm with any text editor. The format is given at the top of the file. Data must be entered in this format. The 1 in 5 monthly precipitation is used for determining runoff from corrals/barns during the December through March period and the average monthly precipitation for the April through November period.

TYPE OF OPERATION

Enter the type of CAFO. Pressing [Ctrl] [L] will display a list of CAFO's to choose from. Use the up and down cursor keys to select the type of CAFO desired and press [Enter]. A correct entry is required in this data field to move to the next data field. This data field will accept 1-9 characters.

DATE

If the date displayed is not correct it may be edited to enter the correct month, day, and year. This data field will accept 1-2 characters.

DESCRIPTION

The animal descriptions displayed may be edited to reflect a more accurate description of the breed and other characteristics of the animals. Care must be taken to maintain similar descriptions or the related volume and nutrient production factors will not be correct. Press [Ctrl] [C] to copy the line of the current data field to the next line. Press [Ctrl] [D] to delete a line that has been copied. The default data lines may not be deleted. These data fields will accept 1-24 characters.

NUMBER

Enter the number of animals associated with each animal description. An entry into at least one of the data fields is required in order to move to the next data entry screen of the program. These data fields will accept 1-6 characters.

WEIGHT LBS

Enter the average weight of each animal described. An entry into at least one of the data fields is required in order to move to the next data entry page of the program. These data fields will accept 1-4 characters.

CONFINEMENT-START

Select the first month of confinement by pressing the [Shift] and the [<] or [>] keys together. If the animals are not confined, use the [Shift] and the [<] keys to select NONE. This data field will not allow data to be entered directly. . To copy the entry to the data field directly below, press [Ctrl] [C].

CONFINEMENT-END

Select the last month of confinement by pressing the [Shift] and the [<] or [>] keys. If the animals are not confined, use the [Shift] and the [<] keys to select none. This data field will not allow data to be entered directly. To copy the entry to the data field directly below, press [Ctrl] [C].

CONFINEMENT-DAYS
This is an automatic calculation by the program. For a JAN starting month and a DEC ending month of a confinement period of 365 days is used. If NONE is entered for both the starting and ending confinement period, 0 days are used for the confinement. Partial month confinement can be reflected by entering two lines for the animal group and adjusting the number of animals per line to reflect partial month conditions. As an example a Oct 15 to April 30 confinement period can be reflected by showing one-half of the animals being confined Oct-Apr and one-half confined Nov-Apr.
DAYS GRAZED
This is an automatic program calculation = 365 days – confinement days.
DAYS LIQUID STORAGE
Enter the planned liquid storage period in days not to exceed 365. To copy the current entry to the data field directly below, press [Ctrl] [C]. This data field will accept 1-3 characters.
DAYS SOLID STORAGE
Enter the planned solid storage period in days not to exceed 365. If all of the waste is handled as a liquid, enter 0. To copy the current entry to the data field directly below, press [Ctrl] [C]. This data field will accept 1-3 characters.

<u>**SCREEN 3, DAILY BEDDING FACTOR**</u>
This table shows typical daily bedding factors (first value) and calculates daily volume of bedding for the confined animal units (second value). When actual bedding use is known equate use to a daily animal unit rate. Bedding increases the size of the storage required for holding solid waste.
TYPE
Enter the type of bedding material used (informational description only). This description is printed on the output. This data field will accept 1-30 characters.
SELECTED FACTOR
Enter the appropriate bedding factor using the displayed list as a guide or enter an appropriate bedding factor for the type and volume of bedding used. Leave blank if a separator factor is to be entered which accounts for all solids and bedding separated. If bedding is planned to be used that will not be processed over the separator, enter the appropriate value. This data field will accept 1-5 characters.
SOLID SEPARATION FACTORS
SELECTED SEPARATOR FACTOR OR PERCENT OF TOTAL MANURE TREATED AS A SOLID
One of the first three lines is applicable if a separator structure is used. Enter the appropriate separator factor using the displayed list as a guide <u>**or**</u> manufacture ratings for separator type. Where manure is handle by scraping of waste to a stockpiled or allowed to accumulate in a corral move to the next data field and enter the total percentage of manure treated or handled as a solid. These data fields will accept 1-5 or 3 characters respectively. **The program will not allow entries into both data fields.** Refer to IWMG, Table 2 for general information on where manure is deposited.
Does Feed Seepage Enter Liquid Storage Facility (Y/N)-? YES If feed seepage enters the liquid storage facility, enter Y for yes. If feed seepage does not enter the liquid storage facility, enter "N" for no. Feed seepage is estimated by assuming 30 cubic feet of seepage per 1000-pound animal unit per year. This data field will accept 1-3 characters.

<u>**SCREEN 3A, SOLID OPTIONS**</u>
If the type of operation is a dairy, then another screen is shown to allow the user to designate how the manure is handled individually for milkers, dry cows, heifers and calves.

<u>**SCREEN 4, VOLUME WASH WATER**</u>
Note: If the type of operation is not a dairy, not all of the data entry fields described below will be displayed. For operations other than dairies simply refer to the data fields below displayed on the data entry screen. Refer to the IDWMG or the AWMFH for more information on volumes of wash water.
Cow Preparation Manual
If manual wash cow preparation is used, enter the daily wash volume per cow in gallons or cubic feet per day. These data fields will accept 1-6 characters.

Automatic Stall Wash
If automatic stall wash cow preparation is done, enter the daily wash volume per cow in gallons or cubic feet per day. These data fields will accept 1-6 characters.

Sprinkler
If automatic sprinkler wash cow preparation is done, enter the daily wash volume per cow in gallons or cubic feet per day. These data field will accept 1-6 characters.
Total Daily Volume= (number) **Cows X Total Selected Amount=**
The default number of cows for the daily volume of wash water is based on the animal numbers from screen 3, inventory data. If you wish to change the number of cows the daily volume of wash water is based on, simply press the left cursor key while in the sprinkler wash field and enter the desired number. Editing this field will not affect the numbers shown on data entry screen 3, inventory data. This data field will accept 1-6 characters. The program computes the total amount of wash water based on the number of cows washed per day and displays the amount.
Bulk Tank-Automatic
If a automatic bulk tank wash is used, enter the gallons or cubic feet used per wash. These data fields will accept 1-6 characters.
Manual
If a manual bulk tank wash is used, enter the gallons or cubic feet used per wash. These data fields will accept 1-6 characters.
Miscellaneous Equipment
Enter the daily amount of wash water used for miscellaneous equipment in gallons or cubic feet per wash. These data fields will accept 1-6 characters.
Pipelines
Enter the daily amount of wash water used for flushing pipelines in gallons or cubic feet per wash. These data fields will accept 1-6 characters.
Milkhouse And Parlor
Enter the daily amount of wash water used for the milkhouse and parlor in gallons or cubic feet per wash. These data fields will accept 1-6 characters.
Holding Area
Enter the daily amount of wash water used for washing the holding area in gallons or cubic feet per wash. These data fields will accept 1-6 characters.
Total Daily Volumes = {number} **Washes X Total Selected Amount** = If the number of washes shown is not correct, simply press the left cursor key while in the holding area data field and enter the correct number of washes used per day. This data field will accept 1-2 characters. The program will compute the total amount of wash water based on the number of washes per day and display the amount. When categories have different numbers of wash cycles per day, adjust the wash water per category to total water per day and change the number of washes to 1 per day.
LOT RUNOFF AREA
Roof
Enter the roof area, in square feet, that drains into the liquid storage facility. This data field will accept 1-7 characters.
Concrete Slab, Scraped Daily (Y/N) ? YES
Enter the unroofed concrete slab area, in square feet, that drains into the liquid storage facility. This data field will accept 1-7 characters. The default response for the unroofed concrete slab area being scrapped daily is yes. If the unroofed concrete slab area is not scraped daily, simply press the left cursor key while in the concrete slab area data field and press 'N" for no. If the concrete slab is scraped daily, the program will assume 100% of the monthly rainfall as runoff from the slab. If the concrete slab is not scraped daily, the program will apply concrete slab runoff factors to compute the runoff from the slab. This data field will accept 1-3 characters. Concrete and roof runoff have been disabled to match values given in IDWMG.
Unsurfaced Lot
Enter the unroofed unsurfaced lot area, in square feet, that drains into the liquid storage facility. This data field will accept 107 characters.
Total
The program will compute the total amount of surface area contributing to the liquid storage facility and display the amount. For the months of December through March the 1 in 5 year precipitation values are used to calculate runoff. Average Precipitation is used for April through November. Refer to pages 65-67 of the IDWMG.

SCREEN 5, RUNOFF OPTIONS
This screen allows the user to select whether to use the maximum or just the winter precipitation for the design storage period. Use the right or left arrow keys to toggle back and forth and make a selection. Winter precipitation is the default value.

SCREEN 6, IDAHO ANIMAL WASTE OPTION PAGE

At this page the user can (1) recycle through inventory input (2) proceed to storage facility sizing screens (3) proceed to the nutrient evaluation screens. Arrow down to desired option and [Enter] or [PgDn].

SCREEN 7, SOLIDS STORAGE AREA

Width, W= FT

Enter the width of the solid storage facility desired in feet. **For in corral storage, W=0**. This data field will accept 1-3 characters.

Height, H= FT

Enter the total height of the solid storage stack in feet. **For in corral storage, H=0**. This data field will accept 1-4 characters.

Wall Height, h= FT

Enter the wall height of the solid storage facility desired in feet. This data field will accept 1-4 characters.

Stack Slope, z= 2;1

The default stack slope ratio is 2. If a different stack slope ratio is desired, delete the default value and enter the desired stack slope ratio. This data field will accept 1-3 characters.

Covered, (Y/N) ? NO

The default response to the question of whether the tank is covered or not is NO. If the solids storage facility is covered, enter "Y" for yes. If the response is NO, the program will add the surface area of the solids storage facility to the lot runoff area when computing the total runoff entering the liquid storage facility. This data field will accept 1-3 characters.

Note: Press [Ctrl] [X] keys at the same time to compute the length of the solids storage facility "L" in feet and required storage capacity in cubic feet. The program will add 1 gallon per day of seepage per 100-pound animal unit from the solids storage facility to the total seepage entering the liquid storage facility. Refer to page 35 of the IDWMG for more information on seepage from solid storage facilities.

SCREEN 8, SELECT LIQUID STORAGE FACILITY

1- ANAEROBIC LAGOON
2- WASTE HOLDING POND
3- TWO CELL WASTE HOLDING POND
4- CIRCULAR HOLDING TANK
5- EVAPORATION POND

Press the number associated with the type of liquid storage facility desired. If there is not enough annual evaporation to size an evaporation pond, the program will display NOT ENOUGH EVAPORATION TO DESIGN POND and return to this data input screen.

CHOICE->

OK-? (Y/N)

If you have previously made a liquid storage facility selection, the program will show the choice you have made. If you wish to select another type of liquid storage facility, press "N" and then the number of the storage facility desired. If the highlighted type of liquid storage facility is okay, press "Y", [PgUp] or [PgDn] to continue.

SCREEN 9A, ANAEROBIC LAGOON or WASTE HOLDING POND or EVAPORATION POND

SCREENS 9B and 9C, TWO CELL WASTE HOLDING POND

Side Slope, Z=3:1

The default side slope ratio is 3. If a different side slope ratio is desired, delete the default value and enter the side slope ratio desired. This data field will accept 1-3 characters.

Bottom Width, BW = ft

Enter the bottom width planned or estimated for the holding pond. This data field will accept 1-3 characters.

Bottom Length = ft

Enter the bottom length planned or estimated for the holding pond. This data field will accept 1-4 characters.

Sludge Duration = 10 Yrs

The default duration for sludge accumulation is 10 years. If a different duration is desired, delete the default value and enter the desired duration for sludge accumulation in years. Sludge accumulation is based on a percentage of total solids produced annually per 1000-pound animal unit. This data field will accept 1-2 characters.

Existing Storage = O AF

The default value for the amount of existing storage available is 0 acre-feet. If there is existing storage available, delete the default value and enter the amount in acre feet of existing storage. This data field will accept 1-5 characters.

Surface Area = O SF
The default value for the surface area of the existing storage is 0 square feet. If there is an existing storage facility that is not covered, delete the default value and enter the surface area in square feet of the existing storage facility. This data field will accept 1-7 characters.
Note: Press the [Ctrl] [X] keys to compute the capacity in acre feet, depth of pond needed, "d" in feet, the top width "TW" in feet, and the top length in feet.

SCREEN 9D, CIRCULAR HOLDING TANK
Diameter, DIA= FT
Enter the desired inside diameter of the circular holding tank in feet. This data field will accept 1-4 characters.
Tank Covered (Y/N) ? YES
The default value for the tank being covered is yes. If the tank is not covered, enter "N" for no. If the tank is not covered, the amount of rainfall storage needed in inches and feet will be displayed. This data field will accept 3 characters.
Existing Storage = O CF
The default value for the amount of existing storage available is 0 cubic feet. If existing storage exists, enter the amount in cubic feet. This data field will accept 1-7 characters.
Surface Area = O SF
The default value for the surface area of the existing storage is 0 square feet. If there is an existing storage facility that is not covered, delete the default value and enter the surface area in square feet of the existing storage facility. This data field will accept 1-7 characters.
NOTE: press the [Ctrl] [X] keys to compute the depth of the circular holding tank "d" in feet and the volume of the tank in cubic feet. If the tank depth is greater than 20 feet, the program will indicate that the tank depth computed is unrealistic.

SCREEN 10, IDAHO ANIMAL WASTE OPTION PAGE
This is a repeat of SCREEN 7. At this page the user can (1) recycle through inventory input (2) proceed to storage facility sizing screens (3) proceed to the nutrient evaluation screens. Arrow down to desired option and [Enter] or [PgDn].

SCREEN 11, NUTRIENT LOSSES DURING STORAGE FOR XXXXX
SELECTED VALUES
***LIQUIDS>>>**
SOLIDS>>>
GRAZING>>>
Use the up and down cursor keys to select the storage method category for the type of waste indicated by the asterisk (*LIQUIDS>>>). Pressing the key that represents the first letter of the type of waste stored displays the storage loss category for that type of waste (e.g. [L] for liquids, [S] for solids). There are no storage losses for grazing. Pressing the [Enter] key while selecting a storage method category will allow the user to edit the percent retained values for nitrogen, phosphorous and potassium. These data fields will allow up to 3 characters. The program will not allow the data fields for grazing to be edited. To return to the loss category selection process, use the up cursor key.

SCREEN 12, NUTRIENT LOSSES DURING APPLICATION
SELECTED VALUES;
***LIQUIDS>>>**
SOLIDS>>>
GRAZING>>>

Use the up and down cursor keys to select the application category for the application method for the type of waste indicated by an asterisk (*LIQUIDS>>>). Pressing the key that represents the first letter of the type of waste stored displays the storage loss category for that type of waste (e.g. [L] for liquids, [S] for solids). The application category for grazing cannot be edited. Pressing the [Enter] key while selecting a application method category will allow you to edit the percent retained values for nitrogen, phosphorous and potassium. These data fields will allow up to 3 characters. To return to the loss category selection process, use the up cursor key.

SCREEN 13, DENITRIFICATION LOSSES FOR XXXXX
SELECTED VALUES;
***LIQUIDS>>>**

SOLIDS>>>
GRAZING>>>
In the Soil Drainage Class**,** section use the up and down cursor keys to select the soil drainage class for the type of waste indicated by a asterisk (*LIQUIDS>>>). Pressing the key that represents the first letter of the type of waste stored displays the storage loss category for that type of waste (e.g. [L] for liquids, [S] for solids, [G] for grazing). Pressing the [Enter] key while selecting a soil drainage class will allow you to edit the percent retained values for nitrogen. These data fields will allow up to 3 characters. To return to the drainage class selection process, use the up cursor key.

SCREEN 14, CROP INVENTORY AND TARGET YIELDS FOR XXXXX

Crop
If the crops grown are not displayed, press the [Ctrl] [L] keys to display the crop selection list. The hay/pasture crops include options for evaluating the nutrients based upon stage of growth at harvest. Use the up and down cursor keys to move through the list to find the crops desired. The [PgDn] and [PgUp] keys can be used to go from page to page of the crop list. A crop can be selected by pressing the [Enter] key. A selected crop is indicated by it being highlighted and can be unselected by pressing the [Ctrl] [D] keys. The last page of the crop selection list allows you to enter additional crops that are not listed in the *Idawm*. Be careful to enter nutrient uptake values in their elemental form for any additional crops added. Refer to NRCS Agricultural Waste Management Field Handbook, Chapter Six for information on the crops listed. To return to the data input screen once all of the desired crop shave been selected, press the [Ctrl] [X] key. For some crops several values are shown. Use the values which represent the planned harvest time in relation to stage of growth/maturity of crop. Only include grain straw as a crop when the straw is exported from the farm (not reused in the corrals and recycled back to the fields). The crops applicable to the utilization of the nutrients from the liquids, solids and grazing are entered separately for each of these categories.

Target Yield
Move to the data field adjacent to the crop desired and enter the yield in the units for the crop selected. This data field will accept 1-5 characters.

Years In Rotation
The program defaults to a rotation of 1 year for each crop listed. Edit year of respective crops to reflect the actual crop rotation. The nutrient utilization is based upon the crop, yield and years in the rotation.

SCREEN 15, CONTROLLING NUTRIENTS AND ECONOMICS

Nutrient-
Use the left and right arrow keys to select the nutrient on which the nutrient balance will be computed and press enter. Phosphorous is the default nutrient for the nutrient budget. The nutrient selected is used to compute application management data and acres needed for the crops previously selected for nutrient utilization. For information on nutrient uptake data, refer the NRCS Agricultural Waste Management Field Handbook, Chapter Six.

Value in Dollars-
If the default dollar values for nitrogen, phosphorous and/or potassium are incorrect, use the left and right arrow keys to move to the proper input field and enter the correct dollar value. The data field will accept 1-5 characters.

Fertilizer Application Cost-
If the default value for fertilizer application cost is incorrect, enter the correct dollar value. This data filed will accept 1-5 characters.

Manure Application Cost-
If the default value for manure application cost is incorrect, enter the correct dollar value. This data field will accept 1-5 characters.

System Life-
If the default value for the overall waste management system life is incorrect, enter the correct value for the expected life of the waste management system. This data field will accept 1-5 characters.

Annual Percentage Rate-
If the default value for the annual percentage rate at which money can be borrowed is incorrect, enter the correct annual percentage rate. This data field will accept 1-5 characters.

SCREEN 16, ACRES NEEDED FOR UTILIZATION BASED UPON XXXXX

The program calculates the required acres for the crop rotation specified to utilize the nutrients in the liquid and solid wastes and waste deposited from grazing animals. This computation is based on the utilization of the nutrient indicated. The default analysis proportions the nutrients by the number of years that each crop is in the rotation. **The manure distribution can be altered or adjusted for numerous management/cropping alternatives.**

The break even cost value for dollars invested into a waste management system and nutrient balance will be computed and displayed. The break even cost value is based on nutrient dollar values as they relate to commercial fertilizer costs needed to produce the target yields for the crop grown and take into account differences in application costs for commercial fertilizer and manure.

A nutrient balance will be computed for the nutrient selected and the total acres needed, nutrients utilized, nutrients in excess or still needed will be displayed along with cost data. Negative values indicate excess nutrients are available and positive values indicate additional nutrients may be needed to meet target yields.

SCREEN 17, WHICH TYPE OF IRRIGATION SYSTEM DO YOU USE
Use the arrow key to select the appropriate type of sprinkler, center pivot, Big Gun, wheel line, hand line. This screen appears when sprinkler application of liquid waste is selected in SCREEN 12, if broadcast application is selected SCREEN 19B will appear.

SCREEN 18A, XXXXXX
Enter requested data for the type of sprinkler system being used and/or planned.

SCREEN 19A, MANAGEMENT CRITERIA FOR SPRINKLING APPLICATION OF LIQUIDS
XXXXX Concentration in Storage = XXX PPM or X.XX LBS/ 1000 GAL
The program will compute and display the nutrient concentration in parts per million and pounds per thousand gallons in storage for the nutrient specified for uptake calculations. If the nutrient concentration in storage is known in either parts per million or pounds per 1000 gallons, move to the appropriate data field, delete the displayed value and enter the known value. These data fields will accept 1-5 characters.
Application
(LBS)
XXX
The maximum pounds to be applied of the nutrient specified for uptake calculations will be displayed along with other application data. If the pounds applied per application is incorrect, delete the amount displayed and enter the correct amount in pounds. This data field will accept 1-4 characters.

SCREEN 19B, MANAGEMENT CRITERIA FOR Broadcast APPLICATION OF LIQUIDS
Tank Wagon Capacity = 4000 Gallons
The default value for the tank wagon capacity is 4000 gallons. If the default value is incorrect for the equipment used, delete the default value and enter the correct capacity in gallons. This data field will accept 1-5 characters.
Spread Width = 15 Feet

The default value for the spread width of a tank wagon is 15 feet. If the default value is incorrect for the equipment being used delete the default value and enter the correct spread width in feet. This data field will accept 1-3 characters.

XXXXX Concentration in Storage = XXX PPM or X.XX LBS/1000 Gal
The program will compute and display the nutrient concentration in parts per million and pounds per thousand gallons in storage for the nutrient specified for uptake calculations. If the nutrient concentration in storage is known in either parts per million or pounds per 1000 gallons, move to the appropriate data field, delete the displayed value and enter the known value. These data fields will accept 1-5 characters.
Application
(LBS)
XXX
The maximum pounds to be applied of the nutrient specified for uptake calculations will be displayed along with other application data. If the pounds applied per application is incorrect, delete the amount displayed and enter the correct amount in pounds. This data field will accept 1-4 characters.

SCREEN 20, MANAGEMENT CRITERIA FOR XXXXXXXX APPLICATION OF SOLIDS
Management data will be presented for the application method chosen for solids.
For Tractor Spreader Application of Solids

Tractor Spreader Capacity = 160 Bushels or 199 Cubic Feet
The default value for the tractor spreader capacity is 160 bushels or 200 cubic feet. If the default values are incorrect for the equipment used, move to the appropriate data field, delete the default value and enter the correct capacity in bushels or cubic feet. These data fields will accept 1-4 characters.
Spread Width = 15 Feet
The default value for the spread width of the tractor spreader is 15 feet. If the default value is incorrect for the equipment being used, delete the default value and enter the correct spread width in feet. This data field will accept 1-3 characters.
XXXXX Concentration in Storage = XXX PPM or X.XX LBS/1000 Gal
The program will compute and display the nutrient concentration in parts per million and pounds per thousand gallons in storage for the nutrient specified for uptake calculations. If the nutrient concentration for uptake calculations. If the nutrient concentration in storage is known in either parts per million or pounds per 1000 gallons, move to the appropriate data field, delete the displayed value and enter the known value. These data fields will accept 1-5 characters.
Application
(LBS)
XXX
The maximum pounds to be applied of the nutrient specified for uptake calculations will be displayed along with other application data. If the pounds applied per application is incorrect, delete the amount displayed and enter the correct amount in pounds. This data field will accept 1-4 characters.

SCREEN 21, IDAHO ANIMAL WASTE OPTION PAGE
This is a repeat of SCREEN 7. At this page the user can (1) recycle through inventory input (2) proceed to storage facility sizing screens (3) proceed to the nutrient evaluation screens. Arrow down to desired option and [Enter] or [PgDn].

SCREEN 22, PRINT OUT OPTIONS
Press [I] To print only the Inventory
Press [S] To print Inventory plus Sizing
Press [N] To print Inventory plus Nutrient Use
Press[A] To print All

SCREEN 23, Printed Output-
Press [S] To Send Output to Screen
Press [P] to Send Output to Printer
Press [F] to Send Output to a File

To send the output to the screen, press the [S] key. Use the [PgUp] and the [PgDn] keys to move between output screens.

To send the output to an attached printer, press the [P] key. The type of printers the program supports will be display with the default printer highlighted. If you wish to print to a printer other than the default printer highlighted, use the up and down cursor keys to select the printer desired and press the [Enter] key.
To send the output to a file, press the [F] key. Indicate the data path the program will use to store the output file to. The output file will have a .OUT extension and will be formatted as an ASCII file.

[F1] DATA FILE RETRIEVAL-
Note: The program may automatically go to the save input data screen on page 13 if the input data had not been previously saved before selecting to retrieve data.
SCREEN #1, ENTER DISK DRIVE AND PATH TO RETRIEVE DATA FROM:
DATA FILE PATH . . .
The default disk drive and data path where data files are stored is displayed. If the data files are not stored in the default data path, enter the disk drive and data path where data files are to be retrieved from. Press the [Enter] key to retrieve the data files.
SCREEN #2, FILE NAME
Use the [PgDn] and [PgUp] keys to search for the data file to retrieve input data from and use the [Up] and [Down] cursor keys to move between data files. Press the [Enter] key to select the highlighted data file for data retrieval.

The program will indicate that it is loading data and return to input data screen 3.

[F2] SAVE INPUT DATA-
SCREEN#1, ENTER DATA PATH AND FILE NAME TO STORE DATA TO:
DATA FILE PATH . . .
The default data path is displayed. To save the input data to a data path other than the default data path, delete the default data path and enter the disk drive and path desired. Press the [Esc] key to exit this data entry screen without making changes or saving data.
DISK FILENAME . . .
To change the displayed disk filename, press the [,--] key to remove the unwanted characters or the [Del] key to clear the entire data entry field. This data field will accept 8 characters. Press the [Esc] key to exit this data entry screen without making changes or saving data.
LANDOWNER/OPERATOR . . .
To accept the landowner/operator name displayed and save data, press the [PgDn] key. To change the landowner/operator name displayed, press the [Backspace] key to remove unwanted characters or the [Del] key to clear the entire data entry field and enter the landowner/operator name desired. This data field will accept 40 characters. Press [Esc] to exit this data entry screen without making changes or saving data. Press the [PgDn] key to save the input data to a data file.
Saving Data . . .
The program will indicate it is saving the data and return to the input data screen from which the [F2] key was pressed or continue to the operation selected if the input data had not previously been saved.

[F3] DEFAULT DATA ENTRY-
Note: Press the [PgDn] and [PgUp] keys to move between default data entry screens. The program may automatically go to the save input data screen if the input data had not been previously saved before pressing [F3] to save defaults.
SCREEN #1, ENTER AND/OR SELECT DEFAULTS
ASSISTED BY:
Enter the name of the person who will be using the program the most. This data field will accept 1-40 characters.
CLIMATIC STATION:
Enter the climatic station that best represents the location of the CAFO operation to be assisted as shown on page 150 of the IDAWM. Pressing [Ctrl] [L] will display a list of climatic stations to choose from. Use the up and down cursor keys to choose the climatic station you want and press [Enter]. A correct entry in this data field is required to move to the next data entry screen. This data field will accept 1-20 characters.
TYPE OF OPERATION:
Enter the type of CAFO as describe on pages 71 of the IDWMG that best represents the majority of CAFO's to the assisted. Pressing [Ctrl] [L] will display a list of CAFO's to choose from. Use the up and down cursor keys to choose the type of CAFO you want and press [Enter]. A correct entry is required in this data field to move to the next data entry screen. This data field will accept 1-9 characters.
DESCRIPTION
The animal descriptions displayed may be edited to reflect a more accurate description of the breed and other characteristics of the CAFO. Care must be taken to maintain similar descriptions as described on page 71 in the IDWMG or the related volume and nutrient production factors will not be correct. Press [Ctrl] [C] to copy the line of the current data field and insert it directly below the current line. Press [Ctrl] [D] to delete a line that has been copied. The default data lines may not be deleted. These data fields will accept 1-24 characters.
WEIGHT LBS
Enter the average weights desired for the defaults of each animal described. These data fields will accept 1-4 characters.
CONFINEMENT-START
Select the first month of confinement by pressing the [Shirt] and the [<] or [>] keys. If the animals are not confined, select NONE. This field will not allow data to be entered directly.
CONFINEMENT-END
Select the last month of confinement by pressing the [Shift] and the [<] or [>] keys. If the animals are not confined, select NONE. This field will not allow data to be entered directly.
DAYS LIQUID STORAGE
Enter the planned liquid storage period in days not to exceed 365. To copy the current entry to the data field directly below, press [Ctrl] [C]. This data field will accept 1-3 characters.
DAYS SOLID STORAGE

Enter the planned solid storage period in days not to exceed 365. If all of the waste is handled as a liquid, enter 0. To copy the current entry to the data field directly below, press [Ctrl] [C]. This data field will accept 1-3 characters

SCREENS #2, 3, 4,5, SELECT CROPS FOR NUTRIENT DISPOSAL

Use the up and down cursor keys to move through the crop list to find the crops to be used as the defaults. The [PgDn] and {PgUp] keys can be used to go from page to page of the crop list. A crop can be selected by pressing the [Enter] key. A selected crop is indicated by it being highlighted and can be unselected by pressing the [Ctrl] [D] keys together. The last page of the crop selection list allows you to enter additional crops that are not listed in the IDWMG. Be careful to enter nutrient uptake values in their elemental form for any additional crops added. Refer to NRCS Agricultural Waste Management Field Handbook, Chapter Six for information on the Crop Uptake Nutrient.

CROP

Enter the crop names for the crops planned as defaults that are not listed on the previous screens. This data field will accept 1-25 characters.

CONDITION

Enter the condition of the crops planned to be used as defaults. This data field will accept 1-15 characters.

YIELD UNITS

Enter the yield units (ton, bu) for each crop entered as a default. This data field will accept 1-3 characters.

N

Enter the elemental nitrogen uptake value in pounds per yield unit previously entered for each default crop. This data field will accept 1-5 characters.

P

Enter the elemental phosphorous uptake value in pounds per yield unit previously entered for each default crop. Make sure the value entered is in the elemental form as the value entered will be converted to P_2O_5 by the program. This data field will accept 1-5 characters.

K

Enter the elemental potassium uptake value in pounds per yield unit previously entered for each default crop. Make sure the value entered is in the elemental for as the value entered will be converted to K_20 by the program. This data field will accept 1-5 characters.

SCREEN 6, ENTER CROP DATA FOR NUTRIENT DISPOSAL NOT ON LIST

Input items listed above for screens 2-5 for crop, condition, yield units, N, P and K.

SCREEN #7, ENTER DEFAULT NUTRIENT FOR THE NUTRIENT BALANCE AND COST FACTORS

Nutrient

Use the left and right arrow keys to select the nutrient on which the nutrient balance and management data will be computed and press enter. Phosphorous is the typical default nutrient.

Value in Dollars

Use the left and right arrow keys to move to the proper input field and enter the default dollar value to be used for the corresponding nutrient. The data fields will accept 1-5 characters.

Fertilizer Application Cost

Enter the default dollar value to be used for fertilizer application cost. This data field will accept 1-5 characters.

Manure Application Cost

Enter the default dollar value to be used for manure application cost. This data field will accept 1-5 characters.

System Life

Enter the default value to be used for the overall waste management system life. This data field will accept 1-5 characters.

Annual Percentage Rate

Enter the default value to be used for the annual percentage rate at which money can be borrowed. This data field will accept 1-5 characters.

SCREEN #8, CHOOSE PRINTER

Select Printer

Use the up and down cursor keys to move through the list to find the printer that best represents the printer to be used to get printouts from the program. Press the [Enter] key to select the highlighted printer as the default.

Data File Path . . .

Enter the default disk drive and data path where data files are to be saved. Press the [PgDn] key to save the default data as entered.

Saving Data . . .

The program will indicate it is saving the default data and return to the screen where the [F3] key was selected.

E. PROGRAM LIMITS

SCREEN 2 -

A valid climatic station, a valid type of operation and at least one animal number data field must have data in order to proceed to the next data entry screen.

Only a total of 10 different animal descriptions may be entered.

The program uses the either the maximum or winter rainfall period based on the liquid storage days entered to compute storage requirements. The program also computes the seepage storage requirements based on the maximum liquid storage days entered. Per State of Idaho requirements a 1 in 5 year winter precipitation is used instead of the average precipitation for the months of Dec through March.

SCREEN 3 -
If a separator factor is entered, the program assumes that the factor includes manure and bedding separated. If a bedding factor is also included, the program will add the bedding volume to the separated volume for the solids produced during the storage period selected on screen 3.

SCREEN 7
A reduction of approximately 30 percent in total sludge volumes is made when a separator factor is used. For anaerobic lagoons, no consideration for a reduction in total solids is made when a solid separator factor is used. If the tank depth computed exceeds 20 feet a warning statement will be displayed indicating that the depth is not practical.

SCREEN 14
Only 10 crops may be selected for nutrient utilization.

F. Example #1

Animal Waste Management System Inventory Worksheet for Dairies

Name of Landowner/Operator Don Green

Street Address P.O. Box 5000

City Meridian, or Zip Code 00000

Phone Number 208 555-1212

Assisted by Ed Helpful Date Sometime very soon

General Description of Operation

Current Mr. Green is currently milking 200 Holstein cows and has 40 dry cows, 40 heifers and 50 calves. Concrete slabs are scraped daily. He has 400 acres available for waste application which is in corn for silage and irrigated grass legume pasture and hayland. Alfalfa hay typically cut early bloom.

Planned Mr. Green would like to expand his herd size to 300 Holstein milking cows and improve on his waste management system. He would like a waste holding pond for storing liquid wastes and a solid stack area for solids.

Problems Roofs are not guttered, roofs and open lot areas contribute runoff to liquid storage facility.

Livestock Data Current-

Description	Number	Average Weight Pounds	Days Confined	Days Grazed	Days Storage Liquids	Days Storage Solids
Milkers	200	1400	365	0	10	10
Dry	40	1200	365	0	10	10
Heifers	40	850	212	153	10	10
Calves	50	250	365	0	10	10

Livestock Data Planned-

Description	Number	Average Weight Pounds	Days Confined	Days Grazed	Days Storage Liquids	Days Storage Solids
Milkers	300	1400	365	0	180	120
Dry	40	1200	365	0	180	120
Heifers	50	850	212	153	180	120
Calves	60	250	365	0	180	120

Storage Component Volumes

Cow Prep (Auto Single Cow: 5-15 gal/milker/day)
(Auto Multiple Cow: 25-40 gal/milker/day)
(Manual: 3-7 gal/milker/day) Manual - 4

Bulk Tank (Manual: 30-50 gal/wash)
(Auto: 60-110 gal/wash) Manual - 50 No. Washes 2
Pipeline (75-150 gal/wash) 150 No. Washes 2
Miscellaneous (25-35 gal/wash 30 No. Washes 2
Milkhouse (300-700 gal/wash) 300 No. Washes 2
Holding Area (500-1200 gal/wash) ________________ No. Washes 2
Contributing Drainage Area, Acres
Contributing Roof Runoff Area, Sq. Ft. O, All building will be guttered
Contributing Lot Runoff Area, Sq. Ft Surfaced 2,000 roof, 1000 concrete (scraped daily)
Unsurfaced 15000
Type of Bedding Sawdust
Volume, CY/Day Current-150 CF/day Planned-160 CF/day

From milking and dry cows 95 % of waste to be handled as a solid from heifers and calves 100% of waste handled as a solid.

General Notes

Soils in the utilization area consist of moderately well drained silt loam soils.

Mr. Green uses a traveling "Big Gun" to apply liquids to the fields for utilization. The "Big "Gun operates at 300 GPM with a wetted diameter of 250 feet.

Mr. Green uses a 160 Bushel tractor spreader to spread solids in 15 foot wide strips to field for utilization.

Mr. Green stated he may apply for EQIP.

Assumptions for nutrient evaluations: for liquids a storage pond > than 50% dilution, for solids unroofed storage area, sprinkler application of liquids, spreader application of solids with incorporation within 3 days.

Animal Waste Management

Planning Worksheet

G. Example #2

Animal Waste Management System Inventory Worksheet for Beef

Name of Landowner/Operator Mr. White

Street Address P.O. Box 6000

City Council, Idaho, or Zip Code 83-----

Phone Number 208 555-1212

Assisted by Ed Helpful Date Sometime very soon

General Description of Operation

Current Mr. White has a beef operation in which he feeds approximately 100 – 850 pound ave wt steers. He has 500 acres of alfalfa hay and wheat for disposal of wastes. During summer months animals are grazed or not on property. Alfalfa hay cut when mature.

Planned Mr. White is not planning to expand his herd, but would like to improve on his waste management system. He would like to add some type of waste storage facility to stop storm runoff onto neighbor. Solid wastes will be manure pack in corral. Wants to use a big gun sprinkler for applying liquids. Concrete pad is not scraped on a daily basis. Does not plan on using any wash water.

Problems The existing waste management system does not have any storage. Storm water in winter spring flows into nearby stream.

Livestock Data Current-

Description	Number	Average Weight Pounds	Days Confined	Days Grazed	Days Storage Liquids	Days Storage Solids
Feeders-forage	100	850	243	122	0	0
Feeders					0	0
Cows					0	0
Calves					0	0

Livestock Data Planned-

Average Days

Description	Number	Weight Pounds	Days Confined	Days Grazed	Storage Liquids	Storage Solids
Feeders-forage	100	850	243	122	180	243
Feeders					0	0
Cows					0	0
Calves					0	0

Storage Component Volumes

Holding Area (500-1200 gal/wash) ________________ No. Washes

Contributing Drainage Area, Acres None

Contributing Roof Runoff Area, Sq. Ft. None

Contributing Lot Runoff Area, Sq. Ft Surfaced 1500 SF roofs, 1000 SF concrete slab

Unsurfaced 18000

Type of Bedding Wheat Straw

Volume, CY/Day 142 CF/day Currently and Planned

Utilization Area

Field Number	Crop	Acres	Yield Units/Acre Present	Yield Units/Acre Target	(Good, Fair, Poor) Crop Condition	(Good, Fair, Poor) Management Level
1 & 2	Grass/Legume Past	50	4 ton	4 ton	Good	Good
4 &6	Alfalfa, Hay	60	4 ton	5 ton	Good	Good
3	Wheat	50	75 bu	75 bu	Good	Good

General Notes

Soils in the utilization area consist of moderately well drained silt to silty loam soils. Depth to water table is greater than 4 feet.

No seepage entering liquid storage facility from feed storage area.

Mr. White has a "Big Gun" sprinkler that can be used to apply liquid waste to the utilization area. The "Big Gun" sprinkler has a flow rate of 165 gallons per minute and a wetted diameter of 200 feet. Mr. White also uses a 160 bushel spreader that spreads the solid waste in 20 foot wide strips to the utilization area.

APPENDIX D - WA NRCS Engineering Technical Note #23

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

ENGINEERING #23 **SPOKANE, WASHINGTON**

January, 2013

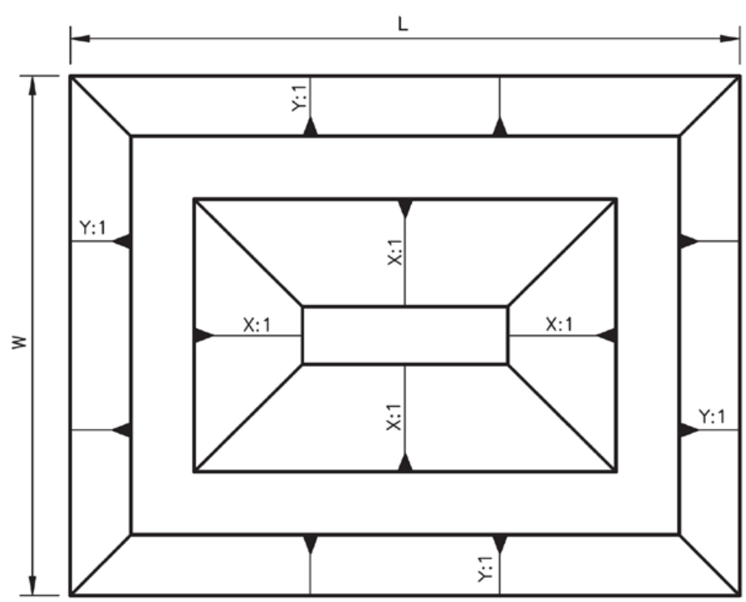
NRCS ASSESSMENT PROCEDURE

FOR

EXISTING WASTE STORAGE PONDS (WSP)

This Technical Note prescribes a consistent review and assessment process for assigning one of four rating categories and subcategories to a waste storage pond (WSP) according to observed factors that may contribute to the risk of contamination of water resources.

The NRCS assessment should not be construed to provide **ANY** regulatory certainty from State regulatory agencies. State of Washington laws and rules prohibit pollution of waters of the state, including ground water. The state requires a permit for discharge of wastewater to waters of the state. This document does not supersede these requirements.



PLAN VIEW

Table of Contents

FORMS

APPENDIX

EXISTING WASTE STORAGE POND (WSP) ASSESSMENT PROCEDURE

INTRODUCTION

NRCS works with Dairy operators across Washington State to provide technical and financial assistance to further their effort in the implementation of practices that serve to protect water resources. Waste storage ponds (WSPs) encountered by NRCS staff, while providing assistance, may have been constructed to an outdated standard or constructed to no standard.

This technical note contains a site inventory and assessment procedure for evaluating existing WSPs. This procedure requires collecting existing WSP site information and conducting an assessment of the WSP and Site, to establish an overall assessment of a WSP according to observed factors that may contribute to the risk of water resources. The assessments in this technical note are qualitative in nature and are not intended to quantify seepage amounts occurring from existing WSP's.

BACKGROUND

Waste storage ponds (WSPs) are used in animal production agriculture for the purpose of containing liquid animal waste until such time that the waste can be utilized as a soil nutrient amendment for crop production. The Washington State Department of Agriculture (WSDA) is assigned the responsibility of statewide inspection and enforcement of Dairy facilities. If WSDA identifies a water quality concern, the operator is directed to NRCS and/or the local Conservation District (CD) for technical assistance. On a voluntary basis, NRCS and/or the CD collaborate with the Dairy operator to address the identified water quality concerns.

A WSP is a common component of a Dairy waste management system. Most often the existing WSP structure condition and performance is unknown. Information is needed in order to develop technically sound comprehensive nutrient management plan alternatives for the dairy operation. This technical note provides a standardized procedure for completing a assessment of, and recommendations for existing WSP's.

PROCEDURE

Through this procedure, NRCS personnel will establish an overall assessment category of a WSP according to observed factors that may contribute to the risk of water resource degradation. NRCS personnel will assign one of four rating categories and corresponding subcategory.

This Technical Note describes a three phase procedure that must be completed in order to assign an overall rating category to an existing WSP. Phase 1 consists of documenting the existing WSP and physical site features and includes a series of forms listed in the table below. Phase 2 documents whether the WSP complies with NRCS practice standard criteria. Phase 3 consists of assessment procedures.

The series of forms have been developed for conducting the assessment of the:

- Existing WSP
- Site
- The combined WSP/Site

Phases 1 and 2 must be completed before conducting Phase 3.

Table 1. Overview of Phase 1, 2 and 3 activities

Phase	Form	Name	Subparts
1	**SSIF**	WSP Site and Structure Inventory Forms	1. General Site Information Form 2. Site Soils Form 3. Site Attributes Form 4. Structure Attributes Form 5. Structure Condition Form 6. Operation and Maintenance Form 7. Structure Modification Form
2	**PSCRF**	Practice Standard Compliance Report Form	None
3	**AF**	Assessment Forms	1. Site Assessment Form 2. Structure Assessment Form 3. Overall Assessment Form

PHASE 1 – WSP SITE AND STRUCTURE INVENTORIES

*WSP Site and Structure Inventory Forms (**SSIF**)*

Purpose: These forms document the current WSP site and structure conditions.

1. General Site Information: This form is used to document the general information regarding the existing WSP (e.g.: landowner, Address, Location, etc.). General weather and field surface conditions are documented as the accuracy of the data collection effort may be hampered depending on these conditions.
2. Site Soils Form: This form is used to inventory and record the natural ground site soil properties and water table conditions.
3. Site Attributes Form: This form is used to collect and document the WSP site information.
4. Structure Attributes Form: This form is used to document the physical characteristics of the existing WSP. Information collected for this step include a measure of the; embankment height, side slopes, top width, pond depth, etc. It may be necessary to utilize survey equipment to gather this information. The review person should document how the data was collected so that the users of the information can determine if further data collection would be needed in the future.
5. Structure Condition Form: This form is used for the “Near Full” or “Near Empty” condition to document waste storage pond observations made during a site visit such as; erosion, liner and embankment condition.
6. Operation and Maintenance Inventory Form: This form is used for the “Near Full” or “Near Empty” condition to document waste storage pond O&M activities and the resulting effectiveness. Document whether or not there are minor or major repair needs.
7. Structure Modification Form: This form is used to document modifications that have been made to the WSP either through visual inspection or conversation with the operator.

PHASE 2 – PRACTICE STANDARD COMPLIANCE

*Practice Standard Compliance Report Form (**PSCRF**)*

Purpose: This form is used to compare the existing WSP or the most recent structure modification against NRCS criteria in place at the time of construction. The current NRCS design criteria for this practice is found in the NRCS Practice Standard 313-Waste Storage Facility. The preceding standard for this practice was the NRCS Practice Standard 425 - Waste Storage Pond. A table listing critical changes to the NRCS Practice Standard design criteria for all of the pertinent revisions is located in Appendix 1.

When completing the form, document whether or not the WSP is performing in accordance with NRCS practice standard in place at the time of construction.

PHASE 3 – ASSESSMENT

*Assessment Forms (**AF**)*

Purpose: These series of forms are used to complete the Site, Structure and Overall assessments.

1. Site Assessment Form: The Site Assessment takes into consideration the existing saturated hydraulic conductivity, presence of wells, distance to the nearest body of water, EPA Region 10 sole source aquifer designations and the WSDA Aquifer Susceptibility Maps. Risk ratings of “Low”, “Medium” or “High” are assigned and are defined as:

   “Low Risk” - Located in an area that is highly unlikely to have water resources affected by the WSP.

   “Medium Risk” - Located in an area that may have water resources that could be affected by the WSP, however the site could be modified to protect water resources.

   “High Risk” - Located in an area where water resources are highly vulnerable to contamination and the site cannot be easily modified to protect water resources.

2. Structure Assessment Form: The Structure Assessment takes into account compliance with the NRCS practice standard in place at the time of construction and the inherent associated risk to the protection of water resources. Risk ratings of “Low”, “Medium” or “High” are assigned and are defined as:

   “Low Risk” - Waste Storage Pond complies with the NRCS practice standard in use at the time when constructed.

   “Medium Risk” - Waste Storage Pond complies with the NRCS practice standard in use at the time when constructed, however there are minor corrective actions necessary in order to restore the WSP to full functionality.

   “**High Risk”** - Waste Storage Pond does not comply with the NRCS practice standard in use at the time when constructed. Major corrective actions are necessary in order to restore the WSP to full functionality.

3. Overall Assessment Form: The Overall Assessment takes into account the Site and Structure assessment. There are four Categories with subcategories that are defined as:

   Category 1A - NRCS recommends utilizing the WSP for the purpose of waste storage.

   Category 1B - NRCS recommends utilizing the WSP for the purpose of waste storage, however the site may benefit from additional practices to reduce discharge potential in the situation of a structure failure.

   Category 2A - NRCS recommends utilizing the WSP for the purpose of waste storage, however the site would benefit from additional practices to reduce discharge potential in the situation of a structure failure.

   Category 2B - NRCS recommends discontinued use of the WSP for the purpose of waste storage until minor repairs and/or improvements have been completed in accordance with the NRCS practice standard in place at the time of construction and the site may benefit from additional practices to reduce discharge potential in the situation of a structure failure.

   Category 2C - NRCS recommends discontinued use of the WSP for the purpose of waste storage until minor repairs and/or improvements have been completed in accordance with the NRCS practice standard in place at the time of construction.

   Category 3A - NRCS recommends discontinued use of the WSP for the purpose of waste storage until major repairs or possible replacement of the existing WSP meeting the current NRCS Conservation Practice Standard – 313, Waste Storage Facility.

   Category 3B - NRCS recommends discontinued use of the WSP for the purpose of waste storage until major repairs or possible replacement of the existing WSP meeting the current NRCS Conservation Practice Standard – 313, Waste Storage Facility and the site may benefit from additional practices to reduce discharge potential in the situation of a structure failure.

   Category 3C - NRCS recommends discontinued use of the WSP for the purpose of waste storage until minor repairs and/or improvements have been completed for the waste storage pond structure and the site would benefit from additional practices to reduce discharge potential in the situation of a structure failure with structure relocation being considered.

   Category 4 - NRCS recommends discontinued use of the WSP for the purpose of waste storage until major repairs or possible replacement of the existing WSP meeting the current NRCS Conservation Practice Standard – 313, Waste Storage Facility and the site would benefit from additional practices to reduce discharge potential in the situation of a structure failure with structure relocation being considered.

OTHER CONSIDERATIONS/ CRITERIA

An existing WSP that stores more than 10 acre-feet above the ground surface must also be evaluated in accordance with the Washington Department of Ecology (DOE), Dam Safety Office (DSO) regulatory requirements. The DOE Dam Safety Office schedule regular review and inspection of jurisdictional WSP projects focused on configuring the WSP to survive suitable design floods and earthquakes. The DSO does not evaluate the adequacy of jurisdictional WSP's in meeting ground water quality performance requirements.

This Technical Note does not evaluate compliance with WA DOE Dam Safety criteria. If the WSP is a state regulated structure the DSO criteria will need to be met in addition to NRCS criteria.

REFERENCES:

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2. “Seepage Evaluation of Older Swine Lagoons in North Carolina,” By R.L. Huffman, 2004 American Society of Agricultural Engineers, Vol. 47(5): pp 1507-1512.

3. “Measurement of Seepage from Earthen Waste Storage Structures in Iowa”, T.D. Glanville, J.L. Baker, S.W. Melvin and M.M. Agua, 1999, Department of Agricultural & Biosystems Engineering, Iowa State University, Ames, Iowa 50011

4. DISCUSSION OF “Literature Review and Model (COMET) for Colloid/Metals and Transport in Porous Media”, By W. B. Mills, S. Liu, and F.K. Fong, Groundwater, March-April 1991 issue, v. 29, no. 2, pp 199-208.

5. “Geologic and Ground Water Considerations,” Chapter 7, Agricultural Waste Management Field Handbook, National Engineering Handbook (NEH),Part 657.07, Natural Resources Conservation Service, June, 1999.

6. “Agricultural Waste Management System Component Design,” Chapter 10, Agricultural Waste Management Field Handbook, Amendment 31, National Engineering Handbook (NEH),Part 657.07, Natural Resources Conservation Service, August 2009.

7. “Design and Construction Guidelines for Impoundments Lined with Clay or Amendment-treated Soil,” Appendix 10D, Agricultural Waste Management Field Handbook, Amendment 31, National Engineering Handbook (NEH),Part 657.07, Natural Resources Conservation Service, August 2009.

8. “Ground Water/Surface Water Interactions and Quality of Discharging Ground Water in Streams of the Lower Nooksack River Basin, Whatcom County, Washington”, Stephen E. Cox, USGS; William Simonds, USGS; Llyn Doremus, Nooksack Indian Tribe, et. al. Scientific Investigations Report 2005-5255, U.S. Department of the Interior, U.S. Geological Survey.

9. “Liquid Animal Waste System Operation & Inspection Guide”, Alabama Cooperative Extension System, BSEN – 01C4 (REV JUN 03), By Ted W. Tyson, P.E., C.I.D., Extension Biosystems Engineer & Professor, Auburn University.

10. “Guidance for the Evaluation of Existing Storage Structures”, Michigan Department of Environmental Quality, Water Bureau, December 2, 2005.

11. “Subsurface Investigations for Waste Storage Facilities”, 04/22/2009, Michigan NRCS, Animal Waste Management website. http://www.mi.nrcs.usda.gov/technical/engineering/animal_waste.html

12. “An AEM Tool for the Evaluation of Un-Designed Waste Storage Facilities”, Agricultural Environmental Management, New York State, Soil & Water Conservation Committee, Department of Agriculture and Markets.

13. “Evaluation of Existing Waste Storage Facilities”, William Reck PE, Darren Hickman PE, William Boyd PE, USDA-NRCS National Technical Service Center(s), 2006.

14. “Water Quality Indicator Tools”, Water Quality Technical Note 1, Washington State NRCS, July 2000.

15. “Waste Storage Facility, Conservation Practice Standard, Code 313”, USDA-NRCS, Washington State.

16. EPA Region 10 Sole Source Aquifer Maps, http://yosemite.epa.gov/r10/water.nsf/Sole+Source+Aquifers/ssamaps

NRCS (SSIF -1/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

INSTRUCTIONS: The Site and Structure Inventory Forms are used to document the existing condition, physical features, evidence of operation / maintenance activities and the physical attributes of the WSP. The information collected through this process is used to complete the assessments for an existing WSP.

GENERAL SITE INFORMATION FORM:

Step 1: Document the landowner/farm name, address and the specific WSP location.

Step 2: Check the appropriate box for the review being completed, "WSP is near FULL or "WSP is near EMPTY".

Step 3: Complete the climatic condition section. This data is very important as it conveys the limitations present during the inventory process.

SITE SOILS FORM:

The Site Soils Form is used to document the existing WSP Site Soils. If there are different site soil types, it may be necessary to complete multiple reports.

SITE ATTRIBUTES FORM:

Information is either measured in the field, from maps, appendices of this technical note or from other previously completed forms of this technical note.

STRUCTURE ATTRIBUTES FORM:

Information is measured during the site visit or gathered from as-built documents. Provide comments pertinent to the site or structure for consideration during the assessment phase.

STRUCTURE CONDITION FORM:

Responses are either yes, no or N/A. The form was set up to address the Full or Empty condition, some of the questions may not apply depending on which condition is being evaluated.

NRCS (SSIF -2/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

INSTRUCTIONS: (Continued)

OPERATION AND MAINTENANCE INVENTORY FORM:

Read each question and provide the appropriate response. Responses are either yes, no or N/A. The form was set up to address the Full or Empty condition, some of the questions may not apply depending on which condition is being evaluated.

WSP - MODIFICATIONS:

All WSP modifications shall be documented and an impact assessment shall be included.

SIGNATURE BLOCK:

The technically responsible staff person completing the forms shall print and sign their name. The Engineering Job Approval Authority for PS 313, “Design” will be included when completed by NRCS staff.

NRCS

(SSIF -3/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

GENERAL SITE INFORMATION FORM

LANDOWNER/FARM NAME: ____

ADDRESS:__________________________________ STATE:______ ZIP: ___________

WSP LOCATION: Sec _________ T ____ R ____ **(or)** Lat ___________ Long ___________

NRCS JOB CLASS: _____________

CHECK REVIEW CONDITION BELOW:

☐ WSP is FULL (Typically late winter or early spring)

☐ WSP is near EMPTY (Typically late summer or early fall)

MANURE/ EFFLUENT LEVEL and Other Observations: __________________________

____

TODAY: Liquid Level BELOW Top of Embankment or Spillway Elevation: ________ FT.

CLIMATIC CONDITIONS	
Weather:	Temperature:
Soil Surface Conditions (circle all that apply): Dry / Moist / Wet / Saturated / Standing Water/ Frozen/ Snow Covered	
Additional Information:	

NRCS (SSIF -4/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

SITE SOILS FORM

INSTRUCTIONS: The Site Soils Report Form is used to document the existing WSP Site Soils. If there are different site soil types within the footprint of the structure or nearby it may be necessary to complete multiple reports.

Step 1: The landowner/farm name, address as well at the specific WSP location shall be documented.

Note: Attaching a soils map with the WSP location for documentation purposes is recommended.

Step 2: The soil type and soil profile propertied are retrieved from the NRCS Web Soil Survey (WSS). Aerial photos may also be used to document the surface water section of the site soils report.

It will be necessary to document the USCS classification for soils below the pond bottom surface. If there are two or more soil permeability rate values below the pond bottom surface, it is recommended to use the greatest permeability rate.

Step 3: Upon conducting a site visit it is recommended to verify any data obtained electronically when at the site. This is completed by digging soil pits or using a hand held soil auger.

SITE SOILS COMMENTS / NOTES

NRCS (SSIF -5/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

Site Soils Report

Dominant Soil Type

Soil Survey Area Name

Map Unit Symbol

Map Unit Name

Soil Profile

Top Depth (in)	Bottom Depth (in)	Unified Soil Classification	K_{sat} low (µm/sec)	K_{sat} high (µm/sec)

Maximum Hydraulic conductivity (K_{sat}) below WSP bottom surface (µm/sec)

Depth to water table (in)

NRCS (SSIF -6/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

WSP - SITE ATTRIBUTES FORM

SITE INVENTORY QUESTIONS	RESPONSE
1. Saturated Hydraulic Conductivity (K_{sat}) of the Existing WSP site soils below the WSP surface **(Refer to SSRF)**	
2. Distance from the nearest edge of WSP to the nearest groundwater water supply wells	
a. Depth to groundwater source if distance is less than 100 feet from the nearest edge of the WSP. **(Refer to DOE well log data sheet or estimate from the landowner)**	
3. Distance from nearest toe of WSP to nearest surface water flow or body	
a. If distance is less than 300 feet is there a natural secondary barrier or containment dike between the WSP and the Surface water of concern?	
4. WSP located within an EPA Region 10 Sole Source Aquifer or Source Area? **(Refer to Appendix 3 for Regional Map. For more detailed maps visit EPA Region 10 website at:** http://yosemite.epa.gov/r10/water.nsf/Sole+Source+Aquifers/ssamaps)	(Circle One) **Yes / No**
5. WSDA Aquifer Susceptibility Rating? **(Refer to Appendix 2 for State Map.)**	(Circle One) **Very Low** **Low** **Medium** **High**

NRCS (SSIF -7/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

WSP - STRUCTURE ATTRIBUTES FORM

WSP STRUCTURE ATTRIBUTES	NOTES
1. WSP - Inside Top – Average Width (ft)	
2. WSP - Inside Top – Average Length (ft)	
3. WSP Storage Capacity (cu ft)	
4. Embankment - Inside SS (X:1)	
5. Embankment - Outside SS (Y:1)	
6. Embankment – Top Width (ft)	
7. Combined Side Slope (Outside SS + Inside SS)	
8. Embankment – Maximum Fill Height (ft)	
9. Maximum Excavation Depth (ft)	
10. Total Pond Depth (ft)	
11. Liner Type and Thickness (in)	
12. Inlet Type and Location	
13. WSP Interior-Outlet Ramp Slope (z:1)	
14. Distance to Nearest Well / Water Depth in well(ft)	
15. Failure Impacts; Farm Building, Homes, Roads, Water Course	
16. Emptying Feature is provided to protect against accidental release. (yes/no) If yes please describe in the note section.	
17. Distance to Nearest Home/Dwelling (ft)	
18. Distance to Nearest Water Course (ft)	

WSP – STRUCTURE COMMENTS / NOTES

NRCS (SSIF -8/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

WSP - STRUCTURE CONDITION FORM

If any boxes checked **"YES"**; make notes of items for concern, possible extent of damage, identify options to repair, stabilize or address in the **REPORT** section.

	SITE INVENTORY QUESTIONS	YES	NO	NA
Liner	Liner type: None / Compacted Clay / Flexible Membrane / Bentonite Amendment **(Circle One)**			
	Evidence of liner slumps, bulges, boils, or whales?			
	If applicable; Are perimeter drain(s) plugged or blocked?			
Embankment – Crest, Exterior Slope and Toe[1]	Evidence of cracks in embankment soils?			
	Damp, soft, or slumping areas?			
	Evidence of seepage on the embankment slope?			
	Evidence of seepage around pipes through berm?			
	Evidence of differential (uneven) settlement?			
	Evidence of seepage at the toe of the embankment?			
	Evidence of sand boils on the slope, along the toe or near the toe?			
WSP – Interior Surface	Interior erosion due to wave action?			
	Interior erosion from rainfall?			

[1] Complete inventory questions appropriate to structure, *if no embankment, as in a pit pond, show NA.*

NOTES:

NRCS (SSIF -9/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

WSP - OPERATION AND MAINTENANCE INVENTORY FORM

If any boxes checked **"YES"**; make notes of location and identify O & M task to improve management in **REPORT** section.

SITE INVENTORY QUESTIONS		YES	NO	NA
Embankment – Crest, Exterior Slope and Toe[1]	Damage from burrowing animals?			
	Evidence of overtopping of embankment?			
	Evidence of soil erosion or gully on embankment?			
	Pond transfer pipe/structure is obstructed?			
	Presence of trees or woody vegetation?			
	Waste storage pond access is not fenced and properly marked? If not required for structure then n/a.			
WSP Interior/Liner	Interior erosion in vicinity of waste inlet structure?			
	Interior erosion near agitation equipment access points?			
	General erosion of liner material?			
	Damaged liner material (holes, tears, seams)?			
Waste Transfer	Any pumps or transfer pipes are not functional?			
	Any recycling pumps or transfer pipes are not functional?			
Odor	Downwind odor from WSP is strong or unbearable?			

[1] Complete inventory questions appropriate to structure, *if no embankment, as in a pit pond, show NA.*

NOTES:

STRUCTURE and O&M CONDITION CONCERNS	YES	NO
Was any abnormal condition or practice observed that requires corrective action (If yes then answer 1 and 2 below):		
1. Minor repair or change in practice would bring the WSP into compliance with accepted practice.		
2. Major repair or change in practice would bring the WSP into compliance with accepted practice.		

NRCS (SSIF -10/10)

SITE AND STRUCTURE INVENTORY FORMS (SSIF)

WSP - STRUCTURE MODIFICATION FORM				
			Yes	**No**
HAS THE WSP BEEN STRUCTURALLY MODIFIED? *(If "Yes" complete 1 through 5 below)*				
1	Was the WSP modification designed by a qualified individual?			
	Date design of modification			
	Designer (If applicable)			
2	Date of modification construction			
3	Description of structural modification:			
	Did the modification meet the NRCS practice standard in place at the time of construction?			
4	Describe impact of the modification on structural integrity:			
5	Describe impact of the modification on storage depth and storage volume:			

WSP Inventory Completed by			
Name:		JAA	
Signature:		Date:	

NRCS

(PSCRF -1/3)

PRACTICE STANDARD COMPLIANCE REPORT FORM (PSCRF)

INSTRUCTIONS: The Practice Standard Compliance Report Form compares the WSP inventory data to the benchmark condition.

PRACTICE STANDARD COMPLIANCE REPORT FORM:

Step 1: Document the landowner/farm name, address as well at the specific WSP location.

Step 2: Fill in all fields if applicable otherwise place N/A.

Step 3: Complete the physical attributes table for "Current Conditions" by copying forward information from the "WSP Physical Attributes Table".

Step 4: Complete the NRCS Practice Standard Criteria section referring to Appendix 1, NRCS practice standard criteria for WSP's. Place the relative NRCS criteria based on the year the WSP was constructed or when the last modification was completed. If the WSP was constructed prior to 1979, then the 1979 criteria shall apply.

SIGNATURE BLOCK:

The technically responsible staff person completing the forms shall print and sign their name. The Engineering Job Approval Authority for PS 313, "Design" will be included when completed by NRCS staff.

NRCS (PSCRF -2/3)

PRACTICE STANDARD COMPLIANCE REPORT FORM (PSCRF)

WSP PRACTICE STANDARD COMPLIANCE REPORT FORM

LANDOWNER/FARM NAME: ____

ADDRESS:______________________________________ STATE:______ ZIP: __________

WSP LOCATION: Sec __________ T _____ R _____ **(or)** Lat ___________ Long __________

DATE ORIGINAL WASTE STORAGE POND or MODIFICATION COMPLETED: ____________

NRCS Practice Standard 313 Compliance Check			
PHYSICAL WSP ATTRIBUTES	CURRENT CONDITIONS	NRCS Practice Standard criteria[1]	Complies NRCS Practice Standard Criteria? (Circle One)
1. Embankment height. (Ref SSIF 7/10 – 8.0)			Yes - No - N/A
2. Failure of WSP would result in damages limited to farm buildings, ag-land, or country roads. (Ref SSIF 7/10 - 15.0)			Yes - No - N/A
3. WSP embankment elevation above 25 yr. floodplain. (Estimated)			Yes - No - N/A
4. Inlet permanent and resists; corrosion, plugging, freeze damage and is UV protected. (Ref SSIF 7/10 - 12.0)			Yes - No - N/A
5. Emptying features are provided and are protected against erosion and accidental release. (Ref SSIF 7/10 - 16.0)			Yes - No - N/A
6. Slurry or solid storage ramp slope. (Ref SSIF 7/10 – 13.0)			Yes - No - N/A
7. Fencing necessary for protection of humans and livestock. (Ref SSIF 9/10)			Yes - No - N/A
8. WSP embankment protected against erosion. (Ref SSIF 8/10 & 9/10)			Yes - No - N/A
9. Separation distance from WSP bottom and SHGWT. (Ref SSIF 5/10)			Yes - No - N/A
10. Liner. (Ref SSIF 8/10 & 9/10)			Yes - No - N/A
11. Liner type (Ref PS 521). (Ref SSIF 8/10)			Yes - No - N/A
12. If no liner, foundation soils permeability. (Ref SSIF 5/10)			Yes - No - N/A

[1] Appendix 1: Refer to the NRCS practice standard design criteria by date of adoption for current and archived NRCS practice standards used for Waste Storage Pond design and construction in WA State.

NRCS (PSCRF -3/3)

PRACTICE STANDARD COMPLIANCE REPORT FORM

NRCS Practice Standard 313 Compliance Check (***Continued***)			
PHYSICAL WSP ATTRIBUTES	CURRENT CONDITIONS	NRCS Practice Standard criteria[2]	Complies NRCS Practice Standard Criteria?
13. Embankment inside side slope. (Ref SSIF 7/10 – 4.0)			Yes - No - N/A
14. Embankment outside side slope. (Ref SSIF 7/10 – 5.0)			Yes - No - N/A
15. Combined embankment side slope. (Ref SSIF 7/10 – 7.0)			Yes - No - N/A
16. WSP above ground volumetric storage. (Estimated)			Yes - No - N/A
17. Minimum distance to dwellings. (Ref SSIF 7/10 – 17.0)			Yes - No - N/A
18. Embankment top width. (Ref SSIF 7/10 – 6.0)			Yes - No - N/A
19. Minimum distance to water well. (Ref SSIF 7/10 – 14.0)			Yes - No - N/A
20. Minimum distance to water course. (Ref SSIF 7/10 – 18.0)			Yes - No - N/A

Compliance Check Results	YES	NO
Does the WSP comply with NRCS practice standards at the time of construction or modification?		

WSP Compliance Review Completed by (Print): ______________________ JAA: _____

Signature ____Date:_____________

[2] Appendix 1: Refer to the NRCS practice standard design criteria by date of adoption for current and archived NRCS practice standards used for Waste Storage Pond design and construction in WA State.

NRCS

(AF -1/6)

WSP ASSESSMENT FORMS (AF)

INSTRUCTIONS: The assessment forms provide a standardized procedure for assigning a category that ranks a WSP according to observed factors that may contribute to the risk of degradation to water resources.

SITE ASSESSMENT FORM:

The information that is utilized for the Site Assessment is the completed data located on the Site and Structure Inventory Form.

Step 1: Carefully read each question and check corresponding box.

Step 2: Record the score points in the right hand column for each question.

Step 3: Total the score points and assign the corresponding risk rating.

STRUCTURE ASSESSMENT FORM:

The information that is utilized for the Structure Assessment is the completed data located on the Site and Structure Inventory Form and the Practice Standard Compliance Report Form.

Step 1: Carefully read each question and check corresponding box.

Step 2: Record the score points in the right hand column for each question.

Step 3: Total the score points and assign the corresponding risk rating.

OVERALL ASSESSMENT FORM:

The Overall Assessment Form is completed utilizing the results on the Site and Structure Assessment Forms.

Step 1: On the “Risk Probability Matrix for Water Resource Degradation” plot the “Site Risk” rating and the “Structure Risk” rating.

Step 2: Circle the resulting combined risk factor on the matrix.

Step 3: From the Risk Probability Matrix for Groundwater Degradation check the corresponding box to document recommended actions for the Existing Waste Storage Pond.

SIGNATURE BLOCK:

The technically responsible staff person completing the forms shall print and sign their name. The Engineering Job Approval Authority for PS 313, “Design” will be included when completed by NRCS staff.

NRCS

(AF -2/6)

WSP ASSESSMENT FORMS

SITE ASSESSMENT FORM				
Consideration	**Categories (Check appropriate box for each consideration and record points in the right hand column)**			**Score**
Saturated Hydraulic Conductivity (K_{sat}) of the soils below the WSP bottom surface	Less than 2 μm/sec	Between 2 and 20 μm/sec	Greater than 20 μm/sec	
	☐ **0 points**	☐ **1 points**	☐ **3 points**	
Shallow (< 145 feet deep) groundwater water supply wells within 100 feet of the nearest edge of the WSP	No	Yes, but it **is** technically feasible to decommission or relocate the shallow groundwater well	Yes, but it **is not** technically feasible to decommission or relocate the shallow groundwater well	
	☐ **0 points**	☐ **1 points**	☐ **3 points**	
Distance from the nearest surface water flow or body to the toe of the WSP	Greater than 300 ft	Less than 300 ft. but technically feasible to construct a secondary barrier or containment dike between the WSP and the surface water of concern.	Less than 300 ft. but not technically feasible to construct a secondary barrier or containment dike between the WSP and the surface water of concern.	
	☐ **0 points**	☐ **1 points**	☐ **3 points**	
Location with respect to an EPA Region 10 Sole Source Aquifer or Source Area **and** Medium to High Aquifer Susceptibility according to the WSDA Aquifer Susceptibility Map	Not located in either	Located in one, but not the other	Located in both.	
	☐ **0 points**	☐ **3 points**	☐ **6 points**	
			Total Score	
			Risk	

Total Score	**Risk Rating**
2 points or less =	**Low Risk**
3 to 5 points =	**Medium Risk**
6 points or more =	**High Risk**

NRCS

(AF -3/6)

WSP ASSESSMENT FORMS

STRUCTURE ASSESSMENT FORM				
Consideration	**Categories (Check appropriate box for each consideration and record points in the right hand column)**			**Score**
WSP complies with NRCS practice standard criteria (PSCRF 3/3)	Yes		No	
	☐ **0 points**	**N/A**	☐ **6 points**	
Earthen structural condition questions (SSIF 8/10)	All questions answered "NO" or "NA"	One or more of the questions answered "YES"; repairs require **minor** restoration effort[1].	One or more of the questions answered "YES"; repairs require **major** restoration effort[2].	
	☐ **0 points**	☐ **3 points**	☐ **6 points**	
Operation and maintenance questions (SSIF 9/10)	All questions answered "NO" or "NA"	One or more of the questions answered "YES"; repairs require **minor** restoration effort[1].	One or more of the questions answered "YES"; repairs require **major** restoration effort[2].	
	☐ **0 points**	☐ **2 points**	☐ **4 points**	
Structural modifications	Constructed in accordance with NRCS practice standard criteria	Not constructed in accordance with NRCS practice standard criteria in place at the time; repairs require **minor** restoration effort[1].	Not constructed in accordance with NRCS practice standard criteria in place at the time; repairs require **major** restoration effort[2].	
	☐ **0 points**	☐ **3 points**	☐ **6 points**	
			Total Score	
			Risk Rating	

<u>Total Score</u>	<u>Risk Rating</u>
2 points or less =	**Low Risk**
3 to 5 points =	**Medium Risk**
6 points or more =	**High Risk**

1. Minor restoration effort – Restorative activities <u>can</u> be completed without significant disturbance to the WSP.

2. Major restoration effort – Restorative activities <u>cannot</u> be completed without significant disturbance to the WSP.

NRCS

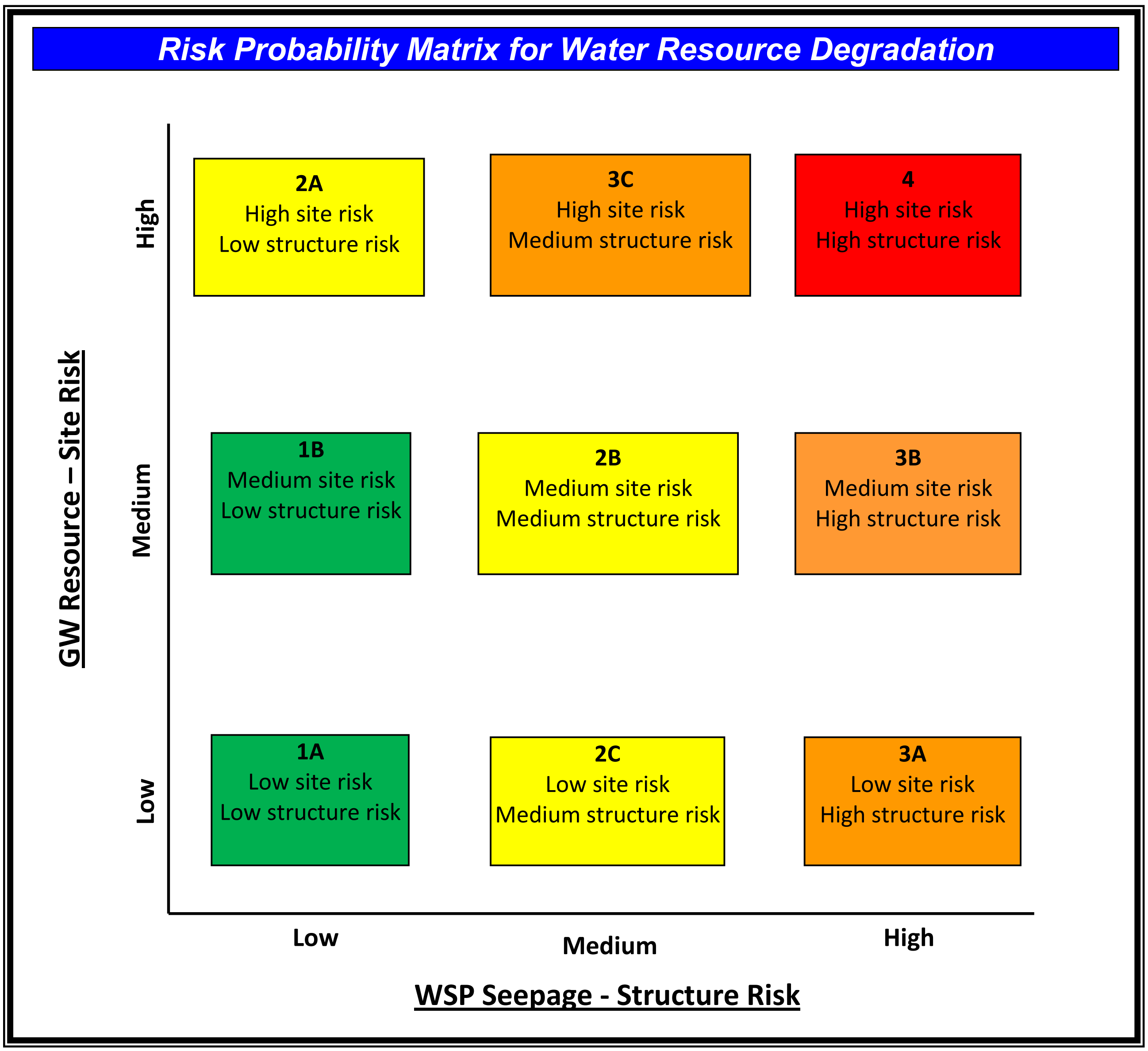
(AF -4/6)

WSP ASSESSMENT FORMS

OVERALL ASSESSMENT FORM

Instructions: On the “Risk Probability Matrix for Water Resource Degradation” plot the following factors and circle the resulting combined risk factor on the matrix.

1. ***Ground Water Resource - Site Risk*** on the Y axis
2. ***WSP Seepage - Structure Risk*** on the X axis



NRCS

(AF -5/6)

WSP ASSESSMENT FORMS

Instructions: From the Risk Probability Matrix for Water Resource Degradation check the corresponding box to document recommended actions for the existing Waste Storage Pond.

Category 1

	A	B
☐	Low site risk Low structure risk	Medium site risk Low structure risk

Category 1A - NRCS recommends utilizing the WSP for the purposes of waste storage.

Category 1B - NRCS recommends utilizing the WSP for the purposes of waste storage, however the site may benefit from additional practices to reduce discharge potential in the situation of a structure failure.

Category 2

	A	B	C
☐	High site risk Low structure risk	Medium site risk Medium structure	Low site risk Medium structure risk

Category 2A - NRCS recommends utilizing the WSP for the purposes of waste storage, however the site would benefit from additional practices to reduce discharge potential in the situation of a structure failure.

Category 2B - NRCS recommends discontinued use of the WSP for the purposes of waste storage until minor repairs and/or improvements have been completed in accordance with the NRCS practice standard in place at the time of construction and the site may benefit from additional practices to reduce discharge potential in the situation of a structure failure.

Category 2C - NRCS recommends discontinued use of the WSP for the purposes of waste storage until minor repairs and/or improvements have been completed in accordance with the NRCS practice standard in place at the time of construction.

*****CONTINUED NEXT PAGE*****

NRCS

(AF -6/6)

WSP ASSESSMENT FORMS

CONTINUED FROM PREVIOUS PAGE

Category 3

	A	B	C
☐	Low site risk High structure risk	Medium site risk High structure risk	High site risk Medium structure

Category 3A - NRCS recommends discontinued use of the WSP for the purposes of waste storage until major repairs or possible replacement of the existing WSP meeting the current NRCS Conservation Practice Standard – 313, Waste Storage Facility.

Category 3B - NRCS recommends discontinued use of the WSP for the purposes of waste storage until major repairs or possible replacement of the existing WSP meeting the current NRCS Conservation Practice Standard – 313, Waste Storage Facility and the site may benefit from additional practices to reduce discharge potential in the situation of a structure failure.

Category 3C - NRCS recommends discontinued use of the WSP for the purposes of waste storage until minor repairs and/or improvements have been completed for the waste storage pond structure and the site would benefit from additional practices to reduce discharge potential in the situation of a structure failure with structure relocation being considered.

Category 4

☐ High site risk
High structure risk

Category 4 - NRCS recommends discontinued use of the WSP for the purposes of waste storage until major repairs or possible replacement of the existing WSP meeting the current NRCS Conservation Practice Standard – 313, Waste Storage Facility and the site would benefit from additional practices to reduce discharge potential in the situation of a structure failure with structure relocation being considered.

SIGNATURE BLOCK

THE WSP INTEGRITY ASSESSMENT REPORT WAS COMPLETED BY:

Evaluating Personnel: ________________________________ **Date:** ____________

Agency: ____

PS 313 Assigned Job Approval Authority for "WSP Review Assessment": ___________

Appendix 1

WSP Practice Standard Criteria Reference Documents

Table outline for – NRCS Practice Standard Criteria Revisions and WA State Supplements

Waste Storage Pond, PS-425, Dated: 1979 -1994

Waste Storage Facility, PS-313, Dated 2000 - Current

Washington State NRCS REVISION and Supplement Dates:

- April 1979 -
- February 1987 – State Supplement
- January 1994 – State Supplement
- February 2000
- June 2001
- December 2004

Earth pond construction dimension criteria for all WSP practices and all revisions: April 1979 to December 2004						
Practice Standard Code/Name	PS 425 Waste Storage pond			PS 313 Waste Storage Facility		
Release Date	1979, April			2000, February	2001, June	2004, December
Supplement Release Date		1987, February	1994, January			
1. Embankment Height.	35 feet or Less	35 feet or Less	35 feet or Less	35 feet or Less	35 feet or Less	35 feet or Less
2. Failure of WSP would result in damages limited to farm buildings, Ag-Land, or country roads.	N/A	N/A	N/A	Yes	Yes	Yes
3. WSP Embankment Elevation above Floodplain?	25 Yr	25 Yr	25 Yr	25 Yr	25 Yr	25 Yr
4. Inlet permanent and resists; corrosion, plugging, freeze damage and is UV protected?	Yes	Yes	Yes	Yes	Yes	Yes
5. Emptying features are provided and are protected against erosion and accidental release?	Yes	Yes	Yes	Yes	Yes	Yes
6. Liquid Storage Ramp slope.	4:1	4:1	4:1	4:1	4:1	4:1
7. If the WSP creates a safety hazard fencing is necessary for protection of Humans and livestock.	Yes	Yes	Yes	Yes	Yes	Yes
8. WSP Embankment protected against erosion.	Yes	Yes	Yes	Yes	Yes	Yes
9. Separation distance from WSP Bottom and SHGWT.	0 Inches	6 inches	6 inches	24 inches	24 inches	24 inches
10. Liner	Only if Self Sealing is not anticipated	Required for all foundation material, except glacial till, when closer than 300 feet to a domestic well.	Required for all WSP's	Required for all WSP's	Required for all WSP's if wetted surface permeability rate is less than $1x10^{-6}$ cm/s	Required for all WSP's if wetted surface permeability rate is less than $1x10^{-6}$ cm/s

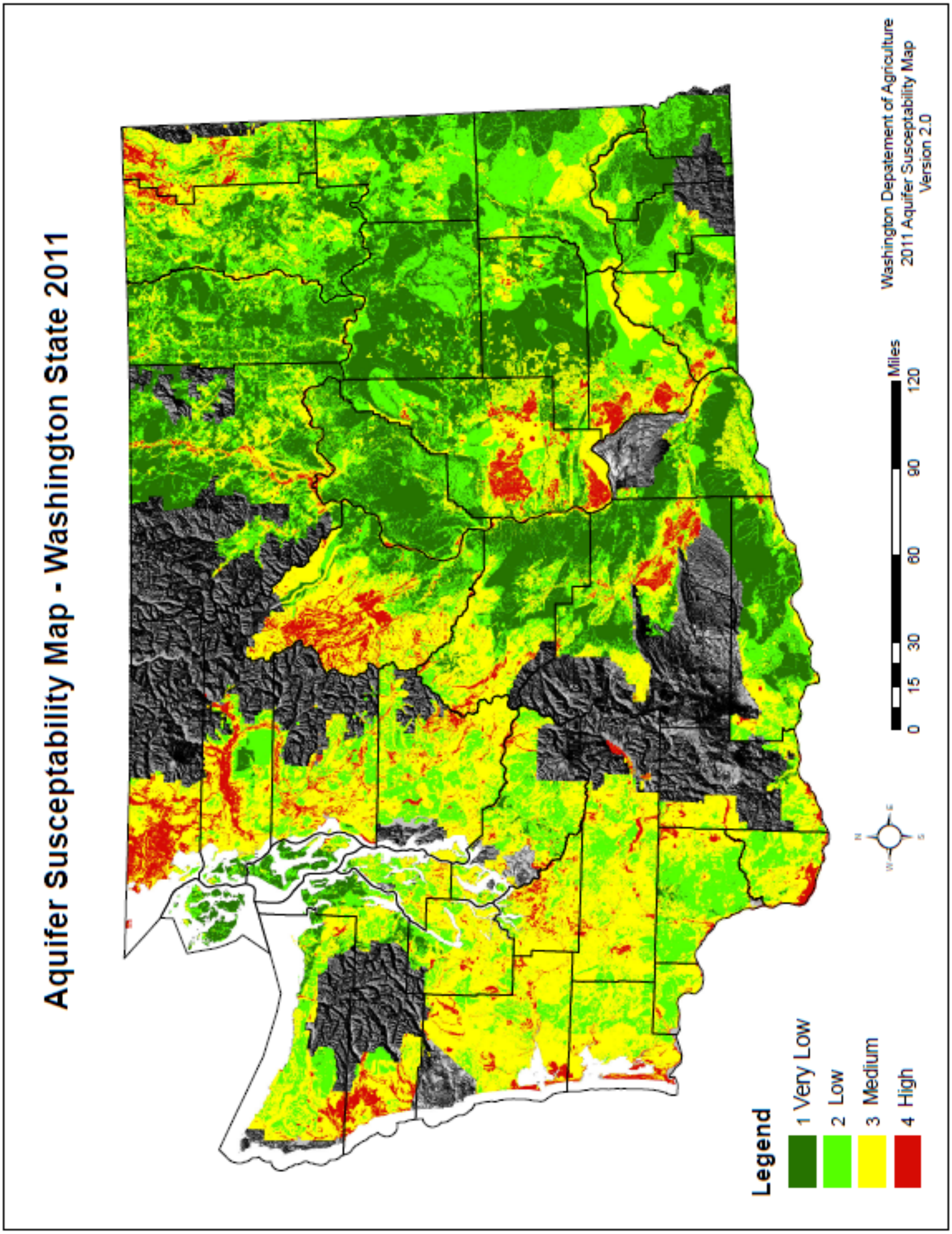
****(CONTINUED)****

Earth pond construction dimension criteria for all WSP practices and all revisions: April 1979 to December 2004						
Practice Standard Code/Name	PS 425 Waste Storage pond			PS 313 Waste Storage Facility		
Release Date	1979, April			2000, February	2001, June	2004, December
Supplement Release Date		1987, February	1994, January			
11. Liner type (Ref PS 521)	If Required	Minimum <u>Requirements</u> GM – 12" thick GC – 9" thick SM – 12" thick SC – 9" thick ML – 12" thick CL – 6" thick CH – 6" thick	12" Minimum thickness & soils requirement GM-w/20% fines GC-w/20% fines SM-w/20% fines SC-w/20% fines (or Amended) ML MH CL CH	12" Minimum thickness & soils requirement GM-w/20% fines GC-w/20% fines SM-w/20% fines SC-w/20% fines (or Amended) ML MH CL CH	12" Minimum thickness & soils requirement of permeability rate is less than 1x10^{-6} cm/s	12" Minimum thickness & soils requirement of permeability rate is less than 1x10^{-6} cm/s
12. If no liner, foundation soils permeability.	Low to Moderate	Low to Moderate	Must be equivalent to liner requirement	Must be equivalent to liner requirement	Must be equivalent to liner requirement	Must be equivalent to liner requirement
13. Maximum operating level marker	N/A	N/A	N/A	N/A	Yes	Yes
14. Embankment Top Width (minimum)	8 feet	8 feet	8 feet	8 feet	Embankment <u>Height / Width</u> 15' or Less / 8' 15'-20' / 10' 20'-25' / 12' 25'-30' / 14' 30'-35' / 15'	Embankment <u>Height / Width</u> 15' or Less / 8' 15'-20' / 10' 20'-25' / 12' 25'-30' / 14' 30'-35' / 15'
15. Embankment Inside Side Slope	N/A	N/A	N/A	No Steeper Than 2:1	No Steeper Than 2:1	No Steeper Than 2:1
16. Embankment Outside Side Slope	N/A	N/A	N/A	No Steeper Than 2:1	No Steeper Than 2:1	No Steeper Than 2:1
17. Combined Embankment Side Slope (minimum)	5:1	5:1	5:1	5:1	5:1	5:1
18. WSP Above Ground Volumetric Storage[3]	If over 10 ac-ft above ground storage refer to DOE Dam Safety Criteria	If over 10 ac-ft above ground storage refer to DOE Dam Safety Criteria	If over 10 ac-ft above ground storage refer to DOE Dam Safety Criteria	If over 10 ac-ft above ground storage refer to DOE Dam Safety Criteria	If over 10 ac-ft above ground storage refer to DOE Dam Safety Criteria	If over 10 ac-ft above ground storage refer to DOE Dam Safety Criteria
19. Minimum Distance to Dwellings	100 feet	100 feet	100 feet	N/A	N/A	N/A
20. Minimum Distance to water well	N/A	100 ft., 200 ft. for unconfined aquifers	300 feet	300 feet	300 feet	100 feet
21. Minimum distance to water course	N/A	25 feet	25 feet	N/A	N/A	N/A

[3] The storage threshold is the theoretical volume contained in the WSP with the fluid level at the top of the embankment, not at the operating level.

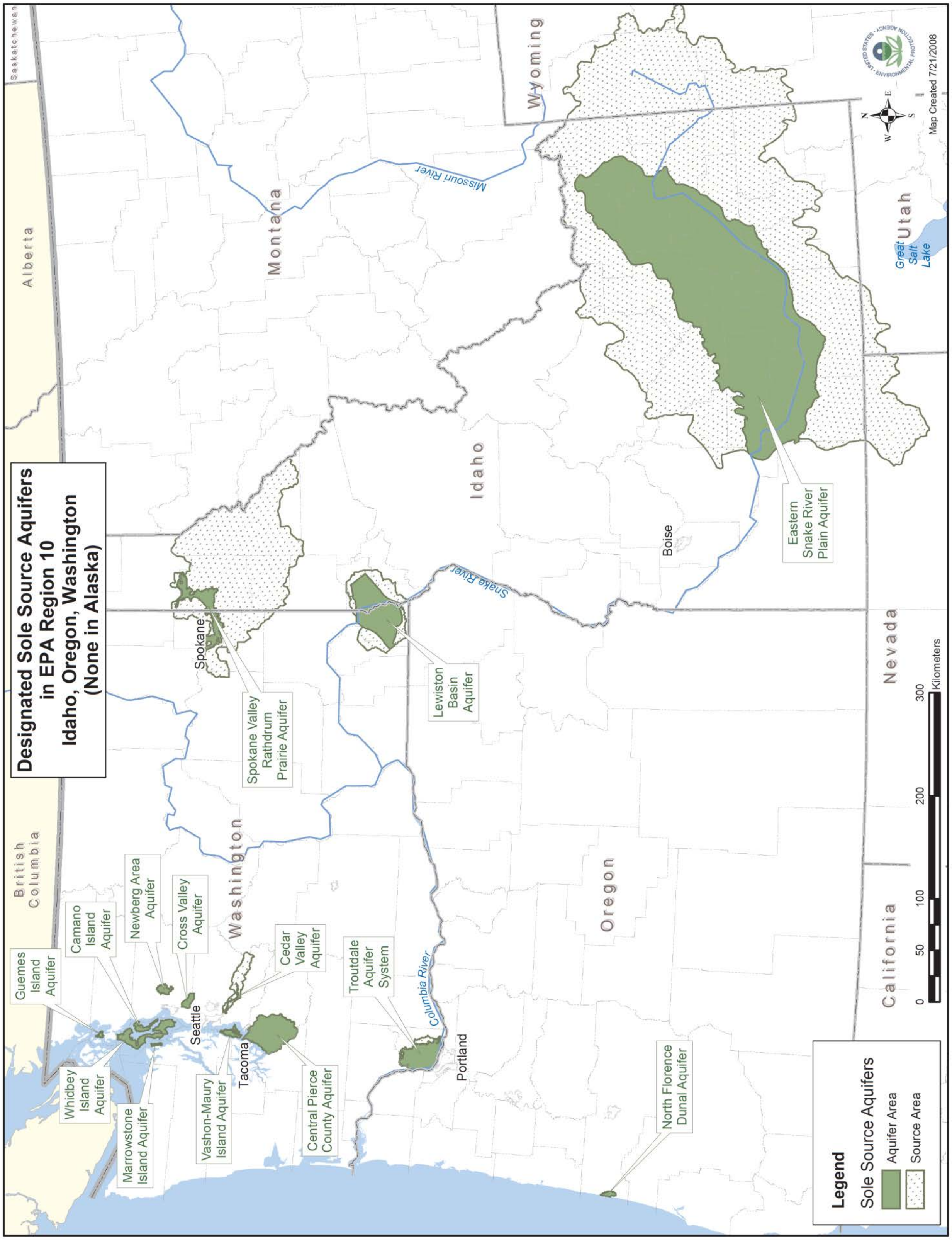
Appendix 2

WSDA Aquifer Susceptibility Map


Aquifer Susceptability Map - Washington State 2011
Legend
1 Very Low
2 Low
3 Medium
4 High
0 15 30 60 90 120
Miles
Washington Depatement of Agriculture
2011 Aquifer Susceptability Map
Version 2.0

Appendix 3

Designated Sole Source Aquifer Map for EPA Region 10


Designated Sole Source Aquifers in EPA Region 10
Idaho, Oregon, Washington
(None in Alaska)
Saskatchewan
Alberta
British Columbia
Montana
Wyoming
Idaho
Utah
Nevada
Oregon
California
Washington
Missouri River
Snake River
Columbia River
Great Salt Lake
Spokane
Seattle
Tacoma
Portland
Boise
Guemes Island Aquifer
Camano Island Aquifer
Newberg Area Aquifer
Cross Valley Aquifer
Cedar Valley Aquifer
Whidbey Island Aquifer
Marrowstone Island Aquifer
Vashon-Maury Island Aquifer
Central Pierce County Aquifer
Troutdale Aquifer System
Spokane Valley Rathdrum Prairie Aquifer
Lewiston Basin Aquifer
Eastern Snake River Plain Aquifer
North Florence Dunal Aquifer
Legend
Sole Source Aquifers
Aquifer Area
Source Area
0 50 100 200 300 Kilometers
Map Created 7/21/2008

Appendix 4

WSP Volume Estimating Spreadsheet

INSTRUCTIONS

A spreadsheet has been developed to calculate the estimated volume of a square or rectangular WSP.

SPREADSHEET INPUTS

The spreadsheet requires six inputs in order to compute the approximate volume of the WSP.

L1 and L2 are Top of Pond dimensions as shown in feet.

W1 and W2 are Top of Pond dimensions as shown in feet.

h = Depth of WSP measured from crest to pond bottom surface in feet.

SS = Internal side slope of WSP.

h_{out} = Depth of WSP above ground measured from crest to lowest outside toe in feet

SPREADSHEET COMPUTATIONS

The spreadsheet computes the volume utilizing the prismoidal formula. All formula variables can be computed from the inputs and the intermediate results are shown in the output window of the spreadsheet.

$$V = h/6\,(A_t + 4M + A_b)$$

Where:

- *V - Volume of the truncated pyramid*
- *h - WSP Depth (Crest to Bottom)*
- *A_t - Top Surface Area, WSP Crest*
- *M - Cross Section Area, Mid-Depth*
- *A_b - Bottom Surface Area, WSP Base*
- *h_{out} - Depth of pond above ground from lowest outside toe to top of crest*
- *$V_{ab\text{-}gnd}$ - Volume stored above ground*
- *SS - Internal Sideslope of the WSP*
- *L_1 and L_2 are Top of Pond dimensions as shown*
- *W_1 and W_2 are Top of Pond dimensions as shown*

SPREADSHEET OUTPUTS

The spreadsheet provides a quick assessment of the estimated WSP volume. Three examples are provided for review.

See Example #1: The user inputs the information that is captured during the SSIF forms. The volume is computed and displayed in the output window. The estimated volume can be used to populate the "WSP Structure Attributes" field for waste storage capacity on SSIF page 7/10.

See Example #2: The user inputs the information that is captured during the SSIF forms. The volume is computed and displayed in the output window. The estimated volume can be used to populate the "WSP Structure Attributes" field for waste storage capacity on SSIF page 7/10.

In addition, a note is displayed when the computed volume is greater than 10 ac-ft. If the above ground storage is greater than 10 ac-ft, the WA State Dam Safety Office has regulatory authority over the facility and the State Dam Safety Standards prevail. NRCS Technical Note 23 does not determine compliance with WA State regulated dams.

See Example #3: The user inputs the information that is captured during the SSIF forms. In this case the volume cannot be computed or displayed in the output window. If the computed length or width of the bottom of the pond is less than zero (0), the results in the intermediate computation field for l or w reports "n.g.". Either a different method will need to be utilized to compute the volume or the depth may be in error. It is recommended to verify that all of the input fields are correct.

Example 1: **Determine the estimated WSP volume**

Computation Sheet

WA NRCS-ENG-Computation

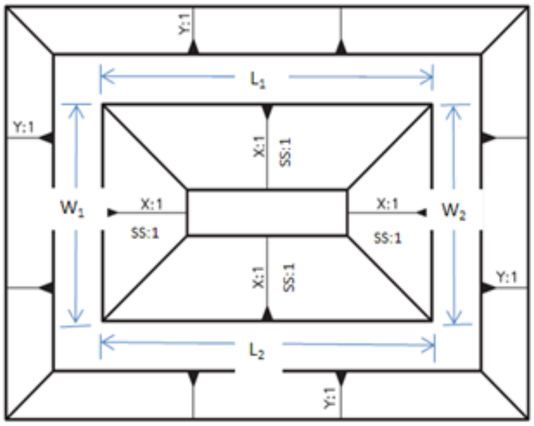
U.S. Department of Agriculture
Natural Resources Conservation Service

State		Project		
Washington		Example #1		
By	Date	Checked By	Date	Job No.
NRCS	1/4/2013			

Subject: Estimated WSP Prismoidal Volume

Sheet ________ of ________

Waste Storage Pond



PLAN VIEW

Volume of a Truncated Pyramid Prism with a Rectangular Base

with two parallel polygonal bases joined to one another by straight edges

$$V = h/6\,(A_t + 4M + A_b)$$

Where:

V - Volume of the truncated pyramid
h - WSP Depth (Crest to Bottom)
A_t - Top Surface Area, WSP Crest
M - Cross Section Area, Mid-Depth
A_b - Bottom Surface Area, WSP Base
h_{out} - Depth of pond above ground from lowest outside toe to top of crest
$V_{ab\text{-}gnd}$ - Volume stored above ground
SS - Internal Sideslope of the WSP
L_1 and L_2 are Top of Pond dimensions as shown
W_1 and W_2 are Top of Pond dimensions as shown

Definitions	Inputs		
ft. = Feet	$L_{side\,1}$ =	210	ft.
s.f. = Square Feet	$L_{side\,2}$ =	185	ft.
c.f. = Cubic Feet	$W_{side\,1}$ =	100	ft.
a.f. = Acre-Feet	$W_{side\,2}$ =	125	ft.
n.g. = Results are No Good	h =	11	ft.
	SS =	2.5	
	h_{out} =	5	

Data Input Field

Outputs					
Intermediate Computations			Estimated WSP Volume		
A_t =	22,219	s.f.	$V = h/6\,(A_t + 4M + A_b)$		
M =	14,450	s.f.			
A_b =	8,194	s.f.	V_{total} =	161,723	c.f.
$M_{ab\text{-}gnd}$ =	18,500	s.f.	V_{total} =	3.7	a.f.
$A_{b\ ab\text{-}gnd}$ =	15,094	s.f.		and	
			$V_{ab\text{-}gnd}$ =	92,760	c.f.
			$V_{ab\text{-}gnd}$ =	2.1	a.f.

Pond Storage Volume

Above Ground Pond Storage Volume

<u>Example 2:</u> Determine the estimated WSP volume

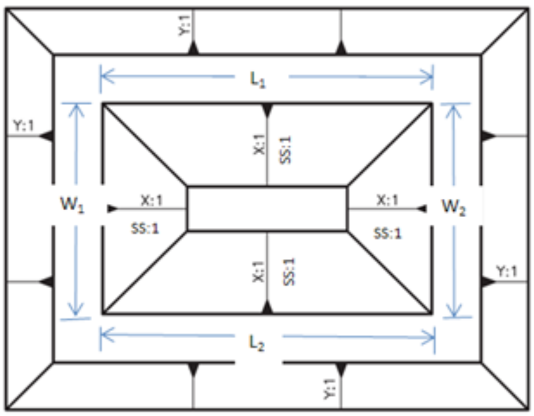
Computation Sheet

WA NRCS-ENG-Computation

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project			
Washington	Example #2			
By: NRCS	Date: 1/4/2013	Checked By	Date	Job No.
Subject: Estimated WSP Prismoidal Volume				Sheet ____ of ____

Waste Storage Pond



PLAN VIEW

Volume of a Truncated Pyramid Prism with a Rectangular Base

with two parallel polygonal bases joined to one another by straight edges

$$V = h/6\,(A_t + 4M + A_b)$$

<u>Where:</u>

V - Volume of the truncated pyramid
h - WSP Depth (Crest to Bottom)
A_t - Top Surface Area, WSP Crest
M - Cross Section Area, Mid-Depth
A_b - Bottom Surface Area, WSP Base
h_{out} - Depth of pond above ground from lowest outside toe to top of crest
$V_{ab\text{-}gnd}$ - Volume stored above ground
SS - Internal Sideslope of the WSP
L_1 and L_2 are Top of Pond dimensions as shown
W_1 and W_2 are Top of Pond dimensions as shown

Definitions	Inputs		
ft. = Feet	$L_{side\,1}$ =	300	ft.
s.f. = Square Feet	$L_{side\,2}$ =	325	ft.
c.f. = Cubic Feet	$W_{side\,1}$ =	250	ft.
a.f. = Acre-Feet	$W_{side\,2}$ =	200	ft.
n.g. = Results are No Good	h =	15	ft.
	SS =	2.5	
	h_{out} =	7.5	

Data Input Field

Outputs						
Intermediate Computations			Estimated WSP Volume			
A_t =	70,313	s.f.	$V = h/6\,(A_t + 4M + A_b)$			
M =	51,563	s.f.				
A_b =	35,625	s.f.	V_{total} =	780,469	c.f.	
$M_{ab\text{-}gnd}$ =	60,586	s.f.	V_{total} =	17.9	a.f.	
$A_{b\ ab\text{-}gnd}$ =	51,563	s.f.	and			
			$V_{ab\text{-}gnd}$ =	455,273	c.f.	
			$V_{ab\text{-}gnd}$ =	10.5	a.f.	
			NOTE: Exceeds 10 Acre-Feet stored above ground			

Pond Storage Volume

This notification is displayed when the above ground volume is greater than 10 ac-ft

Example 3: **Determine the estimated WSP volume**

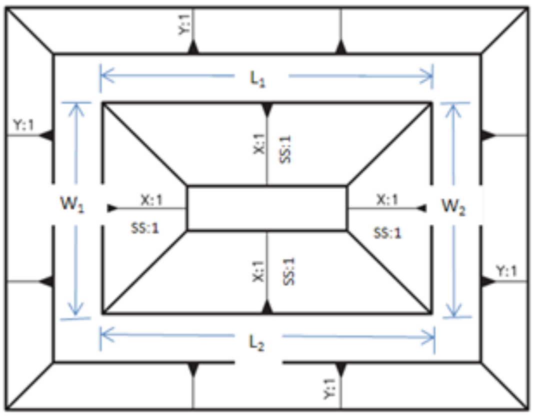
Computation Sheet

WA NRCS-ENG-Computation

U.S. Department of Agriculture
Natural Resources Conservation Service

State		Project		
Washington		Example #3		
By	Date	Checked By	Date	Job No.
NRCS	1/4/2013			
Subject				Sheet ____ of ____
Estimated WSP Prismoidal Volume				

Waste Storage Pond



PLAN VIEW

Volume of a Truncated Pyramid Prism with a Rectangular Base

with two parallel polygonal bases joined to one another by straight edges

$$V = h/6\,(A_t + 4M + A_b)$$

Where:

- *V - Volume of the truncated pyramid*
- *h - WSP Depth (Crest to Bottom)*
- *A_t - Top Surface Area, WSP Crest*
- *M - Cross Section Area, Mid-Depth*
- *A_b - Bottom Surface Area, WSP Base*
- *h_{out} - Depth of pond above ground from lowest outside toe to top of crest*
- *$V_{ab\text{-}gnd}$ - Volume stored above ground*
- *SS - Internal Sideslope of the WSP*
- *L_1 and L_2 are Top of Pond dimensions as shown*
- *W_1 and W_2 are Top of Pond dimensions as shown*

Definitions	Inputs		
ft. = Feet	$L_{side\,1}$ =	100	ft.
s.f. = Square Feet	$L_{side\,2}$ =	90	ft.
c.f. = Cubic Feet	$W_{side\,1}$ =	50	ft.
a.f. = Acre-Feet	$W_{side\,2}$ =	50	ft.
n.g. = Results are No Good	h =	9	ft.
	SS =	3	
	h_{out} =	4	

Data Input Field

Outputs					
Intermediate Computations			Estimated WSP Volume		
A_t =	4,750	s.f.	$V = h/6\,(A_t + 4M + A_b)$		
M =	1,564	s.f.			
A_b =	n.g.	s.f.	V_{total} =	n.g.	c.f.
$M_{ab\text{-}gnd}$ =	3,154	s.f.	V_{total} =	n.g.	a.f.
$A_{b\ ab\text{-}gnd}$ =	1,846	s.f.		and	
			$V_{ab\text{-}gnd}$ =	12,808	c.f.
			$V_{ab\text{-}gnd}$ =	0.3	a.f.

Output field displays "n.g." when the pond bottom length or width is <0 ft.

APPENDIX E - ID NRCS Water Quality Technical Note #6

TECHNICAL NOTES

USDA-Natural Resources Conservation Service
Boise, Idaho

TN - Water Quality No. 6 ***July 2006***

IDAHO NUTRIENT TRANSPORT RISK ASSESSMENT (INTRA)
A Water Quality Risk Assessment Tool for Conservation Planning

The Idaho Nutrient Transport Risk Assessment (INTRA) uses a limited number of landform, site and management characteristics to determine the probability of off-site transport of nutrients (primarily nitrogen and phosphorus). The purpose of the Risk Assessment is to provide planners with a tool to evaluate the various landforms and management practices for potential risk of nutrient movement to surface and ground water. The assessment tool is used during the planning process to determine if surface and/or ground water quality concerns exist. The tool is similar to the risk assessment within ONEPLAN, but is modified to use with conservation management units, not individual fields. The tool was field-tested in both northern and southern Idaho in a number of different landuse-operation scenarios. The tool provides recommendations to assist the planner in selecting appropriate conservation practices that address individual and multiple risk factors to protect or enhance water quality. These mitigating practices are required in order to meet quality criteria for nutrients and organics in surface and ground water if the final risk level is greater than LOW. A brief summary of nutrient movement in agricultural systems, primarily phosphorus and nitrogen, follows. For a more detailed description, refer to *Idaho Water Quality Technical Notes No. 4 and 5*.

Summary of Nutrient Movement in Agricultural Systems

Phosphorus

Phosphorus movement in runoff occurs as particulate P and dissolved P. Particulate P is attached to mineral and organic sediment as it moves with the runoff. Dissolved P is in the water solution. In general, particulate P is the major portion (75-90%) of the P transported in runoff from cultivated land. Dissolved P makes up a larger portion of the total P in runoff from non-cultivated lands such as pastures and fields with reduced tillage.

As runoff moves from the landscape toward surface water, phosphorus may become more bioavailable by the sorption and desorption processes, and by the preferential transport of clay-sized material as sediment moves over the landscape (enrichment). The interaction between the particulate and dissolved P in the runoff is very dynamic and the mechanism of transport is complex. Additionally, dissolved P can move laterally towards surface water bodies as subsurface flow, or downwards, as the soil reaches P saturation. Therefore, it is difficult to predict the transformation and ultimate fate of P as it moves through the landscape (Sharpley et al. 2003).

Nitrogen

Nitrogen is one of the most dynamic and mobile nutrients in the plant-soil-air continuum, with many pathways for loss. There is a large reservoir of N in soil, but most of this is in the organic form. It is estimated that only 2-3% of organic N is mineralized annually. The mineralized form of N (nitrate and ammonium) is readily available for uptake by plants. The N cycle is both spatially and temporally variable within agricultural systems. Variability of soil properties impacts nitrogen movement and loss within agricultural operations, including soil organic matter, residual nitrate, crop residue amount, crop yield variability, and changes in soil chemical and physical properties across the field. The primary loss mechanism of nitrogen in agricultural systems is leaching of nitrate below the root zone. However, losses of nitrogen to the air and by overland flow also occur.

Management plays a critical role in reducing N loss to the environment, and management is the dominant factor influencing long-term nitrate leaching (Shaffer and Delgado 2002). Soil, climate, watershed and aquifer characteristics must also be taken into account in order to minimize nitrate leaching. Loss of nitrate from agricultural systems can range from 0 - 60% of N applied (Meisinger and Delgado 2002). Leaching loss is dependent on the concentration of N in soil solution and the volume of water leached. Over-irrigation can lead to nitrate leaching, especially with shallow rooted crops. Effective management is therefore aimed at reducing transport through proper irrigation water management, and optimizing N application amounts and timing in concert with crop uptake. Crop type and cultivation are also important considerations.

The Idaho Nutrient Transport Risk Assessment: Risk Factors

The main factors influencing nutrient movement in agricultural systems can be separated into transport, source and management factors. Transport factors include the mechanisms by which nutrients move within the landscape. These are rainfall, irrigation, erosion and runoff, and deep percolation. Factors which influence the source and amount of nutrients available for transport include soil nutrient content and form of nutrient applied. Management factors include the method of application, timing and placement in the landscape as influenced by the management of application equipment and tillage.

When the factors of the assessment are analyzed, it will be apparent when an individual factor (or factors) is influencing the assessment disproportionately. These identified factors are the basis for planning corrective soil and water conservation practices and management techniques.

The soil, hydrology, climate and land management site characteristics that have a major influence on nutrient availability, retention, management and movement are listed below. The number in parentheses after each factor is the relative weighting factor.

- Soil test P (available phosphorus in soil laboratory test units relative to the 0-12” soil layer *Phosphorus Threshold* per Idaho Nutrient Management Practice Standard 590) (1.0)
- P fertilizer application rates (in pounds available phosphate per acre) (0.75)
- P fertilizer application methods (0.5)
- Organic P source application rates (in pounds available phosphates per acre) (1.0)

- Organic P source application methods (0.75)
- N fertilizer application rate (1.0)
- N application timing (1.00 if non-irrigated, 0.75 if irrigated)
- N fertilizer application method (0.75)
- Irrigation runoff index (0.5)
- Runoff class (0.5)
- Runoff conservation practices (-1.0)
- Sheet and rill and/or irrigation-induced soil erosion (in tons per acre per year) (1.0)
- Distance to the nearest receiving water body (1.0)
- Irrigation index (for deep percolation) (1.5)
- Leaching index (0.5 irrigated, 1.5 not irrigated)
- Water table depth, geologic features, and hydrologic group (1.00 if irrigated, 1.5 if non-irrigated)

Field-specific data for the site characteristics selected for this version of the Risk Assessment (Table 1) are readily available at the conservation management unit level. Some analytical testing of the soil and organic material is required to determine the rating levels. This soil and organic material analysis is considered essential as a basis for the assessment.

The factors (described below) used in the assessment are rated as VERY LOW, LOW, MEDIUM, HIGH, or VERY HIGH (and some use CRITICAL) by determining the range for each category. The sum of the site characteristic rankings provides an index for surface water quality (Table 2) and an index for ground water quality (Table 3).

Soil P Test
A soil sample (0-12") from the site is necessary to assess the relative level of "plant available P" in the surface layer of the soil. The plant available P is the level customarily given in a soil test analysis by the Cooperative Extension Service or commercial soil test laboratories. The Assessment uses ranges of soil test P. The Olsen (bicarbonate), Bray I, or Morgan (sodium acetate) soil test P methods are required by the NRCS Idaho Nutrient Management Standard depending upon the soil pH. The soil test level for "plant available P" does not ascertain the total P in the surface soil. Rather, it gives an indication of the relative amount of total P that may be present because of the general relationship between the forms of P (organic, adsorbed, and labile P) and the solution P available for plant uptake. If a soil test P result is above the phosphorus threshold as identified in the Idaho Nutrient Management Standard (590), the rating automatically defaults to CRITICAL.

P Fertilizer Application Rate
The P fertilizer application rate is the amount, in pounds per acre (lbs/ac), of commercial phosphate fertilizer (P_20_5) applied to the soil. This phosphate fertilizer does not include phosphorus from organic sources that are recorded in Organic P Sources Application Rate.

P Fertilizer Application Method
The manner in which P fertilizer is applied to the soil affects potential P movement. Incorporation implies that the fertilizer P is buried below the soil surface. If fertilizer is surface applied on a field with surface runoff (natural or from irrigation) and there is no incorporation, it is considered a significant risk and therefore the rating automatically defaults to CRITICAL.

Organic P Source Application Rate
The organic P application rate is the amount, in pounds per acre (lbs/ac), of potential phosphate (P_20_5) contained in the manure and applied to the soil. This organic phosphate source does not include phosphorus from fertilizer sources that are recorded in P Fertilizer Application Rate.

Organic P Source Application Method
The manner in which organic P material is applied to the soil can determine potential P movement. Incorporation implies that the organic P material is buried below the soil surface. If manure is surface applied on a field with surface runoff (natural or from irrigation) and there is no incorporation, it is considered to be a discharge and a violation of existing regulations. Because of this, the rating automatically defaults to CRITICAL.

Runoff Class and Irrigation Runoff Index

Runoff Class: The runoff class of the site is used to determine the risk of runoff from storm events. One method to determine the runoff class is based on the soil permeability and the percent slope of the site (USDA-NRCS Soil Survey Manual, Agricultural Handbook 18, 1993). The matrix relating soil permeability class and slope (Table 4) provides the appropriate value category. This information is available in the SSURGO soils database (physical properties report).

Runoff Index: The irrigation runoff index of the site is used for irrigated lands. For sprinkler irrigated lands, the runoff index is simply based on a user supplied assessment of whether or not runoff (overland flow) exists and, if so, whether or not it leaves the field. For surface irrigated lands, the runoff index is based on the typical percent of the irrigation set time that runoff from the furrow/field occurs; the user enters whether it is more or less than 50%.

Runoff Conservation Practices
Runoff conservation practices include any conservation practices which serve to reduce runoff and the movement of soil, thereby reducing potential for dissolved and particulate phosphorus movement across the landscape toward a receiving water body. Credit (negative point value) is applied depending on the number of conservation practices implemented, so multiple practices receive greater credit than a single practice. Also, runoff conservation practices that filter or trap nutrients (such as buffers, borders, filter strips, and grassed waterways) receive greater credit than those that simply reduce runoff. Certain practices (e.g., tail-water recovery systems with sediment basins) eliminate runoff and sediment loss from the field.

Soil Erosion (Total Water-Induced Soil Erosion)
Soil erosion is defined as the loss of soil along the slope or unsheltered distance caused by the processes of water and wind. Soil erosion is estimated from erosion prediction models including the Revised Universal Soil Loss Equation (RUSLE/RUSLE2) for water erosion from non-irrigated lands (and sprinkler irrigated lands if runoff exists) and the Surface Irrigation Soil Loss equation (SISL) for water erosion from surface irrigated lands. The Wind Erosion Equation (WEQ) is <u>not</u> used in this assessment. The value category is given in tons of soil loss per acre per year (ton/ac/yr). These soil loss prediction models <u>do not</u> predict sediment delivery rates from the end of a field to a water body. The prediction models are used in this assessment to

indicate the potential for sediment and attached nutrient movement across the slope or unsheltered distance toward surface waters.

Distance to Nearest Receiving Water Body

The distance to the nearest receiving water body is the distance in feet between the edge of the field and the nearest receiving water. This is typically a ditch, canal, waterway, drain, etc. – *any water body or water way which has connection (perennial or ephemeral) with a stream, river, pond or lake*. The closer the distance, the greater the likelihood nutrients lost from the field will reach the receiving water body.

Leaching Index

Deep percolation is dependent on numerous factors, including climate and soil type. The leaching index is based on the Nitrogen Leaching Index (Czymmek et al. 2003, Williams and Kissel 1991) which is essentially a water percolation index based on soil water storage. Slight modifications were made to some of the percolation index equations to adjust for low precipitation zones found in areas of Idaho. Total annual precipitation for specific locations is determined from local climate station data, as is winter precipitation. The percolation index is based on precipitation and hydrologic soil group. A seasonal index is calculated as the ratio of winter precipitation to annual precipitation. The leaching index is then calculated as the product of the percolation index and seasonal index. For irrigated lands, the leaching index is low if the irrigation index is low. If not, then the leaching index is based on amount of winter precipitation.

Irrigation Index

Managing irrigation water will minimize nutrient losses from leaching and surface runoff. Potential system application efficiency and irrigation water management have significant impacts on actual water movement through the root zone. Five different factors are used in the irrigation index to determine the potential for irrigation water to transport nutrients to ground water. The irrigation system is the primary rating factor, and the other variables modify that rating based on the level of management for each. These additional factors are water control and measurement, irrigation scheduling and soil moisture monitoring, use of pre- and/or post-season irrigation, and soil condition index (SCI).

N Application Index

Crop nitrogen requirement is determined based on crop yield and University of Idaho fertilizer recommendations. The nitrogen application rate is the percent nitrogen applied compared to the total crop nitrogen requirement according to the fertilizer guides prior to any credits or debits for previous crop and residual nitrogen.

N Application Timing

Timing of N application directly influences potential transport due to the high mobility of nitrate in soils. The appropriate timing of N application is complicated by the soil processes of nitrification, volitization, and mobilization, which affect N plant availability. Split applications of N throughout the growing season better match crop growth requirements, reducing the likelihood of loss. Fall application in most instances has the greatest potential for loss prior to the planting season; additional N applications are often required to meet crop demand when losses occur.

Water Table Depth/Soil Type
Soils can stop or slow nutrient movement depending on their chemical and physical characteristics. Depth of soils, depth to water tables and limiting layers such as hard pans will influence rooting depth, nitrogen movement, and leaching potential. Fine textured soils (Hydrologic Group D) have a lower potential for leaching due to reduced permeability and high water holding capacity, while coarse textured soils (Hydrologic Group A) have a higher likelihood of nitrate leaching due to low water holding capacity and the rapid infiltration and movement of water through the profile.

If a water table is present within five feet of the surface, the potential for ground water contamination is high regardless of the soil type.

Using the Idaho Nutrient Transport Risk Assessment

The Assessment applies on Cropland, Hayland, and Pasture where nutrients are applied. Use of the Risk Assessment for planning should begin during the initial field visit and interview with the producer. However, some of the information needed for the factors will be obtained from other planning tools (for instance, SISL or RUSLE2, soils database, etc.). **A field data sheet is provided in the spreadsheet, but required calculations and look-up information is performed by the spreadsheet, so entering information from the field data sheet into the spreadsheet (or taking the computer to the field) is required**. Steps for using the assessment tool are:

1) An assessment is developed for each land use, conservation management unit, or cropping system.

   Example: An operation includes 3 cropping systems or conservation management units:

   1. Hay in rotation with row crops and cereals, where commercial fertilizer is applied.
   2. Hay in rotation with row crops and cereals where animal waste is applied in addition to commercial fertilizer.
   3. Pasture where commercial fertilizer is applied.

   An assessment is required for each system/management unit.

2) Identify the critical crop in each system. The critical crop is the crop in which the highest potential for off-site transport of nutrients exists. For example, a rotation being evaluated includes winter wheat, spring barley and summer fallow. All the nitrogen for winter wheat is applied in the fall prior to planting the crop. The critical crop is winter wheat. The assessment is made using information which relates to the winter wheat crop.

3) The planner must obtain the following information from the producer.
   1. Typical rotation.
   2. For the critical crop:

a) Soil test data using the appropriate analysis method (Olson, Bray or Sodium Acetate). Note: If no soil test has been done in the last 5 years, the input value is automatically a VERY HIGH.
b) Phosphorus fertilizer application rate (lbs/ac/yr).
c) Phosphorus fertilizer application method.
d) Organic phosphorus application rate (lbs/ac/yr). Note: If the producer can not provide this information, the input value is automatically a VERY HIGH.
e) Organic phosphorus fertilizer application method.
f) Nitrogen application rate (% of Crop Requirement) requires 2 factors. The actual lbs/ac/yr of Nitrogen applied and the target yield. The program uses these 2 values to generate the rating.
g) Nitrogen fertilizer application method.
h) Runoff Index (Surface Irrigated). This value is qualitative. The planner determines the input by asking the producer whether water runs off less than or more than 50% of the set time.
i) Runoff Index (Sprinkler Irrigated). This value is qualitative. The planner determines the input with on site observation and/or asking the producer. Does water move across the field surface during irrigation? Does water leave the field via overland flow?

4) Other Information: Factors like hydrologic soil group, average field slope, permeability, soil erosion, and distance to surface waters are required and should be representative of the cropping scenario/conservation management unit being evaluated.

Requirements for Meeting Quality Criteria

- Quality Criteria is met when an overall rating of LOW is obtained. No mitigating practices are required.
- Quality Criteria is not met when an overall rating of MEDIUM or greater is obtained. Mitigating practices are required. If <u>all</u> possible mitigating practices have already been implemented, then Quality Criteria are considered met. <u>This must be documented in the plan.</u>

Identification of Mitigating Practices

The rating for each site characteristic (factor) is displayed on the Assessment Report. If any site characteristic has a MEDIUM or higher rating, then mitigating practices are required. Mitigating practices are not required for any site characteristic which has a rating of LOW, however "Recommended" practices might be suggested. "Recommended" and "Required" practices are identified on the report in the column titled "Mitigating Practices".

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Table 1. Idaho Nutrient Transport Risk Assessment for Planning (Field Sheet). The weighting for each factor is incorporated into the point value.

Surface Water Quality							
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 1	Medium 2	High 4	Very High 8	Critical 10	
Soil Test P (ppm) Olsen Method 0 – 12"	< 8	8 - 15	16 - 25	26 - 35	36 – 40 (or no soil test)	> 40	
Soil Test P (ppm) Bray Method 0 – 12"	< 10	10 - 20	21 - 40	41 - 50	51- 60 (or no soil test)	> 60	
Soil Test P (ppm) Morgan Method (NaOAc) 0 – 12"	< 1.0	1.0 – 2.0	2.1 – 4.0	4.1 – 5.0	5.1- 6.0 (or no soil test)	> 6.0	
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 0.75	Medium 1.5	High 3	Very High 6	Critical	
Phosphorus Fertilizer Application Rate ($lbs/ac\ P_2O_5$)	0	< 60	60 - 150	151- 300	> 300		
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 0.5	Medium 1.0	High 2	Very High 4	Critical 10	
Phosphorus Fertilizer Application Method	None applied	Placed with planter (banded) or injected > 2" or plowed	Incorporated > 3" by disking or chiseling, etc.	Chemigated, or incorporated < 3" by harrowing, etc.	Surface applied, no incorporation	Surface applied on a field with surface runoff (natural or from irrigation) and no incorporation	
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 1	Medium 2	High 4	Very High 8	Critical	
Organic Phosphorus Application Rate ($lbs/ac\ P_2O_5$)	0	< 40	40 - 100	101 – 200	> 200 (or unknown)		

Site Characteristic	Rating and Point Value						SELECTED RATING
	Very Low 0	Low 0.75	Medium 1.5	High 3	Very High 6	Critical 10	
Organic Phosphorus Application Method	None applied	Placed with planter (banded) or injected > 2" or plowed	Incorporated > 3" by disking or chiseling, etc.	Chemigated, or incorporated < 3" by harrowing, etc.	Surface applied, no incorporation	Surface applied on a field with surface runoff (natural or from irrigation) and no incorporation	
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 1	Medium 2	High 4	Very High 8	Critical	
Nitrogen Application Rate (% of Crop Requirement)	< 40	40 - 60	60 - 100	100 - 120	> 120		
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 0.75	Medium 1.5	High 3	Very High 6	Critical 10	
Nitrogen Fertilizer Application Method (prior to critical runoff period)	None applied	Placed with planter (banded) or injected > 2" or plowed	Incorporated > 3" by disking or chiseling, etc.	Chemigated, or incorporated < 3" by harrowing, etc.	Surface applied, no incorporation	Surface applied on a field with surface runoff (natural or from irrigation) and no incorporation	
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 0.5	Medium 1.0	High 2	Very High 4	Critical	
Runoff Index (Surface Irrigated)	No runoff occurs	-----	Water runs off the field less than 50% of the set time	-----	Water runs off the field 50% or more of the set time		
Runoff (Sprinkler Irrigated)	No runoff occurs	Water moves across the surface but not off the field	-----	Runoff leaves the field	----		
Runoff Class	Negligible	Very low or low	Medium	High	Very High		

Site Characteristic	Rating and Point Value						SELECTED RATING
	Very Low 0	Low -1	Medium -2	High -4	Very High -8	Critical	
Runoff BMPs (Only applies if runoff occurs)	No conservation practices	One or two on-field conservation practices that reduces runoff	Multiple conservation practices that reduce runoff <u>or</u> trap nutrients	Multiple conservation practices that reduce runoff <u>and</u> trap/filter pollutants	Conservation practice(s) that eliminates runoff		
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 1	Medium 2	High 4	Very High 8	Critical	
Average Total Soil Erosion due to Water (tons/ac/year)	< 1 ton/acre	1 - 5 tons/acre	5 - 10 tons/acre	10 - 15 tons/acre	> 15 tons/acre		
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 1	Medium 2	High 4	Very High 8	Critical	
Distance to Surface Water	> 2640 feet (> 0.5 mile)	2640 - 1320 feet	1319 - 600 feet	599 - 200 feet	< 200 feet		
TOTAL POINTS FOR SURFACE WATER QUALITY (Less than 12 is a LOW rating)							

Ground Water Quality							
Site Characteristic	Rating and Point Value						SELECTED RATING
	Very Low 0	Low 1	Medium 2	High 4	Very High 8	Critical	
Nitrogen Application Rate (% of Crop Requirement)	< 40	40 - 60	60 - 100	100 - 120	> 120	[redacted]	
Site Characteristic	Rating and Point Value						SELECTED RATING
Irrigated> Not Irrigated>	Very Low 0 0	Low 0.75 1	Medium 1.5 2	High 3 4	Very High 6 8	Critical	
Nitrogen Application Timing	None applied	Nitrogen applied in several applications during the primary growing season, the first application no greater than 30 days of start of primary growing season	Majority of nitrogen is applied within 30 days of, or during, the primary growing season. Nitrogen applied outside this time frame is less than 50 lbs and is applied with a nitrification inhibitor or when soil temperatures are less than 50 deg. F.	Nitrogen is applied as a single application within 90 days of the primary growing season OR a split application is made which does not meet the conditions described for LOW or MEDIUM.	Nitrogen is applied as a single application more than 90 days prior to the primary growing season.	[redacted]	

Site Characteristic	Rating and Point Value						SELECTED RATING
	Very Low 0	Low 1.5	Medium 3	High 6	Very High 12	Critical	
Irrigation Index	> 79	70 - 79	60 - 69	50-59	< 50		

This index requires information on the irrigation system type, water measurement and distribution, irrigation scheduling, SCI, and whether pre or post season irrigation is used. Circle the most appropriate selection in each category.

Irrigation System	**Irrigation Scheduling**	**Water Control and Measurement**
Surface - Graded Border	Use a set irrigation schedule each year	
Surface - Level Border (Basin)	Irrigation based on visual observation of crop stress	Poor - no water measurement AND poor control of water due to inadequate water control structures throughout the conveyance system
Surface - Graded Furrow or Corrugates	Soil moisture by NRCS feel method	
Surface - Surge	Check book scheduling, irrigation scheduler, etc.	
Surface - Controlled with contour ditch, turnouts, canvas dams, etc.	Irrigation scheduling via pan evaporation of atmometer in field	Fair - manually recorded water measurement at delivery point to farm AND poor control of water due to inadequate control structures throughout the conveyance system
Surface - Uncontrolled (wild flood, no control with turnouts, etc.)	Irrigation scheduling via regional weather network (e.g. AgriMet)	
Sprinkler - Big gun or boom	Soil moisture monitoring using Gypsum blocks, moisture probes, etc.	
Sprinkler - Periodic Move (hand line or wheel line)	Continuous measurement of soil moisture, water applied, and ET	Average - manual recordings somewhere in the system OR good control of water with effective water control structures throughout the conveyance system
Sprinkler - Solid set		
Sprinkler - Center pivot	**Pre/Post Irrigation**	
Sprinkler - Lateral/linear move	Pre- and post-season irrigations based on standard run time	Good - manual recordings somewhere in the system AND good control of water with effective water control structures throughout the conveyance system
Micro Irrigation - Sprays and Bubblers	Pre-season OR post-season irrigations based on standard run time	
Micro Irrigation - Tubing or tape w/ integrated or punched-in emitters	Pre- and post-season irrigations based on soil moisture assessment	
	Pre- OR post-season irrigations based on soil moisture assessment	Excellent - Continuous recording water measurement device(s) AND good control of water with effective water control structures throughout the conveyance system
	No irrigation outside crop growing season	

Site Characteristic	Rating and Point Value						SELECTED RATING
Irrigated> Not Irrigated>	Very Low 0 0	Low 0.5 1.5	Medium 1.0 3	High 2 6	Very High 4 12	Critical	
Leaching Index (Irrigated) (applies only if Irrigation Index > LOW)	< 9	9 - 12	13 - 16	17 - 20	> 20	[redacted]	
Leaching Index (Not Irrigated)	0	0 – 2	2 – 5	5 – 10	>10		
Site Characteristic	**Rating and Point Value**						**SELECTED RATING**
	Very Low 0	Low 1	Medium 2	High 4	Very High 8	Critical	
Water Table/Geologic Feature Depth and Soil Type	Water table or geologic feature > 5 feet from surface, Hydrologic Group D	Water table or geologic feature > 5 feet from surface, Hydrologic Group C	Water table or geologic feature > 5 feet from surface, Hydrologic Groups A, B	Water table or geologic feature < 5 feet to surface, Hydrologic Groups C, D	Water table or geologic feature < 5 feet to surface, Hydrologic Groups A, B	[redacted]	
TOTAL POINTS FOR GROUND WATER QUALITY (Less than 9 is a LOW rating)							

Table 2. Surface Water Quality Nutrient Transport Risk Assessment Index rating and sit e vulnerability.

Surface Water Risk Assessment Rating	Total	Site Vulnerability Chart
LOW	< 12	Low potential for nutrient loss if current farming practices are maintained.
MEDIUM	12 - 20	Medium potential for nutrient loss. Some remediation measures should be undertaken to minimize the probability of nutrient loss.
HIGH	21 - 40	High potential for nutrient loss and adverse effects on surface and/or ground waters. Soil and water conservation measures and phosphorus management plans are needed to reduce the probability of nutrient loss.
VERY HIGH	> 40	Very high potential for nutrient loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a nutrient management plan must be implemented to minimize nutrient loss.

Table 3. Ground Water Quality Nutrient Transport Risk Assessment Index rating and sit e vulnerability.

Ground Water Risk Assessment Index Rating	Total	Site Vulnerability Chart
LOW	< 9	Low potential for nutrient loss if current farming practices are maintained.
MEDIUM	9 - 16	Medium potential for nutrient loss. Some remediation measures should be undertaken to minimize the probability of loss.
HIGH	16 - 25	High potential for nutrient loss and adverse effects on ground water. Soil and water conservation measures and nutrient management plans are needed to reduce the probability of loss.
VERY HIGH	>25	Very high potential for nutrient loss and adverse effects on ground water. All necessary soil and water conservation measures and a nutrient management plan must be implemented to minimize loss.

Table 4. The surface RUNOFF CLASS site characteristic determined from the relationship of the soil permeability class and field slope. Adapted from NRCS Soil Survey Manual (1993) Table 3-10.

Slope (%)	Soil Permeability Class [1] *(in/hr)*				
	Very Rapid *(>20.00 in/hr)*	Moderately Rapid and Rapid *(2.00 – 20.00)*	Moderately Slow and Moderate *(0.20 – 2.00)*	Slow *(0.06 - 0.20)*	Very Slow *(< 0.06 in/hr)*
	Runoff Class [3]				
Concave [2]	N	N	N	N	N
< 1	N	N	N	L	M
1 - 5	N	VL	L	M	H
5 - 10	VL	L	M	H	VH
10 - 20	VL	L	M	H	VH
> 20	L	M	H	VH	VH

[1] Permeability class of the least permeable layer within the upper 39 inches (one meter) of the soil profile. Permeability classes for specific soils can be obtained from a published soil survey or from local USDA-NRCS field offices (soils database).
[2] Area from which no or very little water escapes by overland flow.
[3] RUNOFF CLASS: N = negligible, VL = very low, L = low, M = medium, H = high, VH = very high.

ATTACHMENT 1: Example for Conservation Planning

Benchmark condition is sprinkler irrigated potato-sugarbeet-winter wheat in southeast Idaho with manure application.

Site Characteristic and Ranking	Factor Weighting X Rating Value
Soil P test is 35 ppm using an Olsen Test =HIGH	1.0 x 4 = 4.0
P fertilizer application rate is 50 lbs/ac P_2O_5 =LOW	0.75 x 1 = 0.75
P fertilizer application method is placed with planter =LOW	0.5 x 1 = 0.5
Organic P source application rate is 210 lbs/ac =VERY HIGH	1.0 x 8 = 8.0
Organic P source application method is incorporated less than 3 inches by harrowing, etc. =HIGH	0.75 x 4 = 3.0
N fertilizer application rate is 80% of crop requirement prior to debits/credits =MEDIUM	1.0 x 2 = 2.0
N fertilizer application method is broadcast and incorporated greater than 3” =LOW	0.75 x 1 = 0.75
N fertilizer application timing is single application in spring, > 30 days prior to growing season =HIGH	0.75 x 4 = 3
Irrigation Runoff Index for sprinkler irrigated, no runoff occurs but overland flow within field does occur. = LOW	0.5 x 1 = .5
Runoff class from Table 3 is Medium =MEDIUM	0.5 x 2 = 1.0
No runoff conservation practices in place =VERY LOW	1.0 x 0 = 0

Soil erosion is 7.5 tons/ac/yr = MEDIUM	1.0 x 2 = 2.0
Distance to nearest receiving water body is 300 feet =HIGH	1.0 x 4 = 4.0
Irrigation Index calculated at 68 for center pivot with visual observation of crop stress, pre-season irrigation and average control of water =MEDIUM	1.5 x 2 = 3
Leaching Index for Pocatello =LOW	0.75 x 1 = 0.75
Water table/soils for Hydrologic Group C with no water table or geologic feature within 5 feet =LOW	1.0 x 1 = 1.0
Total Points for Surface Water Quality	**26.5**
Total Points for Ground Water Quality	**9.75**

Ranking for Surface Water - the site has a **HIGH** potential for nutrient loss and adverse effects on surface waters.

Ranking for Ground Water – the site has a **MEDIUM** potential for nutrient loss and impact to ground water.

Using the individual site characteristics, identify some factors of concern and management options that could be used to reduce this site vulnerability (mitigation):

Soil P Test – The soil P test was HIGH. Remember that the soil test level for "available P" does not ascertain the total P in the surface soil. It does, however, give an indication of the amount of total P that may be present because of the general relationship between the forms of P and the solution P available for crop uptake. Research has conclusively shown that the higher the soil test P level of a site, the proportionately higher the potential P loss will be from that site. Therefore the long-term goal should be to conduct a comprehensive soil testing program on the entire farm and implement nutrient management on individual fields using ONEPLAN. Estimates should be made to determine the time required to deplete the soil P to optimum levels.

Organic P Source Application Rate – The organic P source application rate was > 200 lbs/ac, falling in the VERY HIGH category. This particular site characteristic is especially important. Here we have a management unit with a soil test P level that is already high and very high rates of organic P are being applied. Considering the long-term management options discussed under

Soil P Test, the organic P application rate should either be reduced to crop P uptake or less, or no organic P should be applied ntil the soil P is depleted back to an optimal level. The ONEPLAN nutrient management program can help identify fields with lower soil P test and lower risk assessment values where the organic material could be applied.

Organic P Source Application Method – The organic P source application method was incorporated less than 3 inches with a harrow, etc. putting it in the HIGH category. Remember that the manner in which organic P material is applied to the soil can determine potential P movement. Since the organic P was only minimally incorporated, the organic P would still have a substantial surface exposure. Mechanical incorporation reduces the amount of nutrients in the thin mixing zone at the soil surface and/or on crop residue or foliage, thus reducing the interaction with and transfer of nutrients to runoff water. With incorporation, other environmental losses may also be reduced, and nutrient management may be improved. However, mechanical incorporation with tillage may reduce soil-protecting crop residue and increase erosion. Incorporated material may be subject to downward movement. Leaching losses may be increased, and the relative importance of the different loss pathways needs to be considered. The organic P material should be injected or plowed greater than 2 inches if possible, and applied immediately before the crop is planted.

Runoff Conservation Practices – No runoff practices are currently in place, so level of use is VERY LOW. Implementing irrigation water management and use of surface roughening (dam-dike) and buffers would help reduce runoff and sediment loss. (see Soil Erosion).

Soil Erosion – The soil erosion rate was 7.5 tons/ac/yr (MEDIUM category). Prediction models are used in the assessment to indicate a movement of soil, thus potential for sediment and attached phosphorus movement across the slope or unsheltered distance and to a water body. Conservation measures such as residue management or reduced tillage should be considered as a way to reduce erosion. In addition, other conservation measures like field borders or buffers should be considered as a means to mitigate off-site transport and improve the quality of runoff leaving the field.

Irrigation Index – Despite the use of a center pivot system, the irrigation index rated MEDIUM because of pre-season irrigation practices and a low level of irrigation scheduling. Following appropriate irrigation water management techniques could significantly improve efficient use of water and reduce the potential for leaching losses.

Nitrogen Application Timing – Applying nitrogen as a single application more than 30 days prior to the start of the growing season increases the risk of loss during spring. Apply the nitrogen closer to the growing season and consider splitting applications for better crop use efficiency.

APPENDIX F - University of Idaho CIS 1139

University of Idaho
College of Agricultural and Life Sciences

CIS 1139

Manure and Wastewater Sampling

by Ron E. Sheffield and Richard J. Norell

Nutrient concentrations vary within most types of manure. A review of samples from 42 dairies in Idaho (Table 1) showed that nitrogen (N) and phosphorus (P) in wastewater lagoons vary greatly between farms. For example, on small open lot dairies (< 1,000 head), P can range from 16 to 28 pounds/per acre-inch while on large open lot dairies (> 1,000 head), the range is 12 to 20 pounds per acre-inch.

Phosphorus concentrations on freestall flush dairies ranged from 23 to 31 pounds per acre-inch, while scraped freestall dairies ranged from 17 to 39 pounds per acre-inch. This is a broad range of nutrient levels with the maximum and minimum values differing by more than a factor of two.

These numbers should send a clear message: Average nutrient estimates may be suitable for the purposes of developing a manure utilization plan, but these averages are not adequate for calculating proper application rates.

Do not base your application rates on laboratory test results from previous years because nutrient concentrations can change significantly, particularly when the manure has been exposed to the environment. For example, nutrient levels in a lagoon or storage pond can be greatly diluted by more rainfall than normal or concentrated due to excessive summertime evaporation.

Manure should be tested as close to the date of application as practical. Preferably, the sample should be taken as near the application time as possible prior to the manure application, or within 30 days of application. However, if you urgently need to pump down a full lagoon or storage pond, you should not wait until you can sample and obtain the results. Instead, you should sample the day of irrigation. The results can later be used to determine the nutrients applied to the fields and identify the need for additional nutrients to complete crop production.

Producers who do not test each manure source before or just after land application are faced with a number of questions they simply may not be able to answer:

- Am I supplying plants with adequate nutrients?
- Am I building up excess nutrients that may ultimately move to surface waters or groundwater?
- Am I applying heavy metals at levels that may be toxic to plants and permanently alter soil productivity?

Because environmental damage and losses in plant yield and quality often happen before visible plant symptoms, always have your manure analyzed by a competent lab. Certified labs in Idaho can analyze manure samples and may be able to make agronomic recommendations regarding the use of the manure as a fertilizer.

Manure sampling

Proper sampling is the key to reliable manure analysis. Although lab procedures are accurate, they have little value if the sample fails to represent the manure product.

Manure samples submitted to a lab should represent the average composition of the material that will be applied to the field. Reliable samples typically consist of material collected from a number of locations. Precise sampling methods vary according to the type of manure. The lab, county extension agent, or crop consultant should have specific instructions on sampling, including proper containers to use and maximum holding or shipping times. General sampling recommendations follow.

Preparing liquid manure for lab analysis. Liquid manure samples submitted for analysis should meet the following requirements:

- Place sample in a sealed, clean plastic container with about a 1-pint volume. Glass is not suitable because it is breakable and may contain contaminants.

Table 1. Average lagoon wastewater concentrations from various types of Idaho dairies.

Farm Type[1]	Ammonia (NH_3) lb/ac-in	Total Kjeldahl Nitrogen (TKN) lb/ac-in	Total Phosphorus (TP) lb/ac-in	Total Solids (TS) mg/l	Biochemical Oxygen Demand (BOD) mg/l
OL < 1,000 hd	40 +/- 2	119 +/- 29	22 +/- 6	29,291 +/- 12,098	21,067 +/- 20,240
OL > 1,000 hd	61 +/- 22	92 +/- 36	16 +/- 4	5,087 +/- 1,386	1,068 +/-192
FS Scrape	175 +/- 75	181 +/- 75	28 +/- 11	24,122 +/- 13,826	2,135 +/- 968
FS Flush	149 +/- 23	162 +/- 24	27 +/- 4	10,770 +/- 2,138	1,912 +/- 481

[1] Farm Type: OL = Open Lot Dairy; FS = Freestall Dairy; hd = head.
[2] Average values +/- standard error.

- Leave at least 1 inch of air space in the plastic container to allow for expansion caused by the release of gas from the manure material.
- Refrigerate or freeze samples that cannot be shipped on the day they are collected, minimizing chemical reactions and pressure buildup from gases.

Ideally, liquid manure should be sampled after it is thoroughly mixed. Because this is sometimes impractical, samples can also be taken in accordance with the suggestions that follow.

Lagoon liquid. Premixing the surface liquid in the lagoon is not needed, provided it is the only component that is being pumped. Growers with multistage systems should draw samples from the lagoon they intend to pump for crop irrigation.

Samples should be collected using a clean, plastic container similar to the one shown in **Figure 1.** One pint of material should be taken from at least eight sites around the lagoon and then mixed in the larger clean, plastic container. Effluent should be collected at least 6 feet from the lagoon's edge at a depth of about a foot. Shallower samples from anaerobic lagoons may be less representative than deep samples because oxygen transfer near the surface sometimes alters the chemistry of the solution. Floating debris and scum should be avoided. One pint of mixed material should be sent to the lab. Galvanized containers should never be used for collection, mixing, or storage due to the risk of contamination from metals like zinc in the container.

A University of Idaho study compared nutrient composition from two sampling locations: direct from storage and during land application. Nitrogen concentration averaged 15 pounds per acre-inch higher in storage samples than from land application samples. Conversely, phosphorus and potassium concentrations were similar between storage and land application samples. Nitrogen application rates may be overestimated if based on nutrient analysis from storage samples.

These recommendations are adequate for average irrigation volumes. If an entire storage structure is to be emptied by such means as furrow irrigation, more frequent sampling with many more sampling points is recommended.

Liquid slurry. Manure materials applied as a slurry (approximately 5 to 12 percent solids) from a pit, storage pond, or vacuumed from a feed alley should be mixed prior to sampling. If you agitate your pit or basin prior to sampling, a sampling device pictured in **Figure 1** can be used. If you wish to sample a storage structure without agitation, you must use a composite sampling device as shown in **Figure 2**. Manure should be collected from approximately eight areas around the pit or pond and mixed thoroughly in a clean, plastic container. An 8- to 10-foot section of 0.5- to 0.75-inch plastic pipe can also be used: extend the pipe into the pit with ball plug open, pull up the ball plug (or press your thumb over the end to form an air lock), and remove the pipe from the manure, releasing the air lock to deposit the manure in the plastic container.

Lagoon sludge. The best time to take a sludge sample is while measuring for volume of sludge in a lagoon. This allows samples to be collected from several points around the interior of the lagoon. How the sample is collected depends on how the sludge will be removed. Depending on the density and nutrient concentration of the lagoon effluent, the samples may differ by up to 100 percent from point to point.

To draw a sample, use the same type of sampler as described above for manure slurry (**Figure 2**) and lower the sampler until it almost reaches the bottom. Avoid using a commercial "sludge-judge," because experience has shown that these devices do not work well on thick manure sludge and settled solids.

Wearing plastic or latex gloves, collect a core or profile of lagoon effluent and sludge. Once the pipe is over a clean 5-gallon plastic bucket, slowly break the vacuum by removing your finger from the end of the pipe. If the entire lagoon is going to be agitated during sludge removal, the entire core of collected sludge and effluent should be sent to the laboratory. If the lagoon effluent is going to be drawn down and primarily only sludge pumped out, then just the collected sludge should be sent to the lab. If you are unsure how the sludge will be removed, take samples using both methods, label them separately, and have both analyzed.

Place several samples in the bucket and mix thoroughly before removing a sub-sample for analysis. Consider using a plastic, wide-mouth bottle when shipping samples to the laboratory.

Solid Manure. Solid manure samples should represent the manure's average moisture content. If the material varies

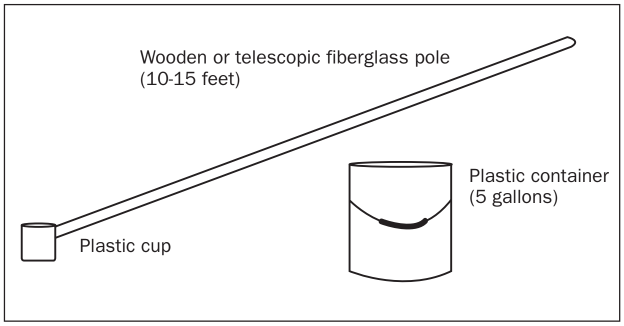

Figure 1. Liquid manure sampling devices like these can be purchased or made.

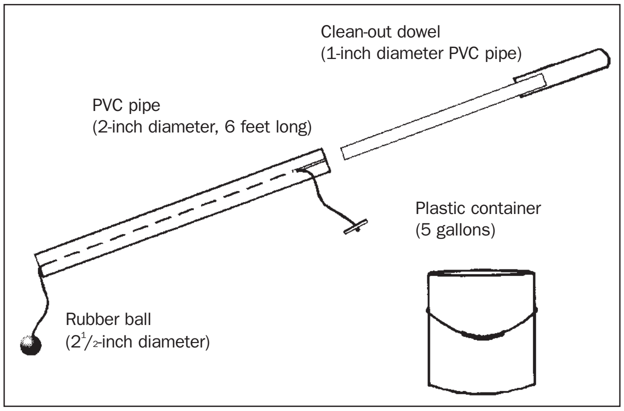

Figure 2. Composite sampler for slurries and lagoon sludge or settled solids includes a collecting PVC pipe and a clean-out dowel (smaller PVC pipe), string, and a rubber ball big enough to cover one end of the collecting pipe.

greatly in its moisture content, you should submit at least 3 samples to a laboratory and take an average of each analysis.

A 1-quart sample is adequate for analysis. Samples should be taken from approximately 8 different areas in the manure pile, placed in a clean plastic container, and thoroughly mixed. Samples should be taken wearing plastic or latex gloves and using a plastic or stainless steel hand shovel or trowel. Do not use galvanized trowels or buckets because they will likely contaminate the sample, rendering falsely high concentrations of metals like zinc in the analysis. Approximately 1 quart of the mixed sample should be placed in a plastic bag, sealed, and shipped directly to the lab. Samples stored for more than 1 day should be refrigerated.

Stockpiled manure or litter. Ideally, stockpiled manure and separated solids should be stored under cover on an impervious surface. The weathered exterior of uncovered waste may not accurately represent the majority of the material. Additionally, rainfall will move water-soluble nutrients down into the pile. If an unprotected stockpile is applied over an extended period, it should be sampled before each application.

Stockpiled manure should be sampled at a depth of at least 18 inches at 6 or more locations around the pile. The collected material should be combined in a plastic container and mixed thoroughly. The 1-quart lab sample should be taken from this mixture, placed in a plastic container or bag, sealed, and shipped to the lab for analysis. If the sample cannot be shipped within one day of sampling, it should be refrigerated.

Surface-scraped manure. Surface-scraped and piled materials should be treated like stockpiled manure. Follow the same procedures for taking samples. Ideally, surface-scraped materials should be protected from the weather unless they are used immediately.

Composted manure. Ideally, composted manure should be stored under cover on an impervious surface. Although nutrients are somewhat stabilized in these materials, some nutrients can leach out during rains. When compost is left unprotected, samples should be submitted to the lab each time the material is applied. Sampling procedures are the same as those described for stockpiled manure.

Who can analyze my manure sample?

Both public and private labs analyze manure samples. Use only labs that are certified or conduct their analysis according to the North American Proficiency Testing – Manure Assessment Program (NAPT-MAP) to test manure and wastewater, or the North American Proficiency Testing – Compost Assessment Program (NAPT-CAP) to test compost. Private labs can be found through local Cooperative Extension Service (CES) agents, state regulators, or on the NAPT-MAP Web site: *http://ghex.colostate.edu/map/*.

Deciding which lab to use depends on several factors:

- Is the lab certified or does it conduct its analysis according to NAPT-MAP or NAPT-CAP guidelines?
- What is the cost to run the sample?
- How long will it take to get your results?
- Does the lab offer all parameters needed for your operation?
- Can you get your sample to the lab in the required time?

When you have selected a lab to analyze the manure, you need to follow its specific sample requirements. Many labs offer sample containers that they ask you to use. Sample collection procedures, including holding times allowed and refrigeration and shipping requirements, must be closely followed to obtain accurate results. One standard that applies to all labs and sampling recommendations is to sample as close to the application time as possible.

Essential analyses include concentrations of essential plant nutrients, including nitrogen as ammonium (NH_4-N), and Total Kjeldahl Nitrogen (TKN), Total phosphorus (TP) and potassium (K). Additionally, you may consider sampling for nitrate (NO_3-N), dissolved phosphorus (PO_4-), calcium (Ca), magnesium (Mg), sulfur (S), iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), dry matter content or total solids (TS), pH, and electrical conductivity (for liquid samples). Where applicable, check your NPDES permit (National Pollutant Discharge Elimination System) for specific sampling requirements.

What does my manure analysis report tell me?

Lab results may be presented in a number of ways. The easiest to use is a wet, "as-is" basis in pounds of available nutrient (N, P, or K) (1) per ton; (2) per 1,000 gallons of manure or wastewater; or (3) per acre-inch of manure or wastewater.

If a lab reports results on a dry basis, you must have the moisture content of the manure to convert the results back to a wet basis. A lab may also give results as a concentration (parts per million [ppm] or milligram per liter [mg/l]), which likewise requires conversion factors to get the results into a usable form based on how you apply the manure. Finally, if a lab reports P and K as elemental P and K, you must convert them to the fertilizer basis of P_2O_5 or K_2O. This can be done with the following conversions:

P X 2.29 = P_2O_5
K X 1.20 = K_2O

Select a lab that reports an analysis on an "as-is" basis in the units of measure most useful to your operation.

Most useful information

The most useful information is predicted nutrients available for the first crop. Nutrient availability is predicted based on estimates of manure breakdown and nutrient loss according to application method. If the lab does not report plant-available nutrients, contact your nutrient management planner, a certified crop advisor, or your local extension office for assistance.

Of the total nutrients predicted to be available for the first crop, 50 to 75 percent will likely become available during the first month. It is, therefore, important to apply manure near the time nutrients are required by plants. The remaining nutrients gradually become available over the next three months. Nutrients not available for the first crop are slowly released to available forms over time. In soils that do not readily leach with heavy rainfall, nutrients may accumulate to significant quantities over time.

You should review the report to see if the analysis is within the expected ranges for your manure. It is common for manure analyses to vary between seasons, due to excess rainfall, drought, or changes in management practices. However, you should compare your results to the results from previous manure reports to ensure that they appear reasonable. If your results are significantly different from what you expected, it is advisable to resample the manure. The original sample may have been mislabeled or improperly collected, and thus not be representative of the manure.

To meet a specific plant nutrient requirement, nutrients listed in the report or calculated as "available for the first crop" should be used in determining the actual application rate. For the availability prediction to be reliable, you must have properly identified the type of manure and the application method on the information sheet submitted to the lab. It is important to understand that nutrient availability cannot be determined with 100 percent accuracy. Many variables, including the type of manure product and environmental factors (i.e., soil type, rainfall, temperature, and general soil conditions), influence the breakdown of the manure and nutrient loss. Remember, the worst sample of your manure is always better than the best book value.

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APPENDIX G - University of Idaho Bulletin #704 (Revised)

Soil Sampling

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College of Agriculture

University of Idaho
Cooperative Extension System

Soil Sampling

Environmental concerns have brought nutrient management in agriculture under increased scrutiny. A goal of sound nutrient management is to maximize the proportion of applied nutrients that is used by the crop (nutrient use efficiency). Soil sampling is a best management practice (BMP) for fertilizer management that will help improve nutrient use efficiency and protect the environment.

Soil sampling is also one of the most important steps in a sound crop fertilization program. Poor soil sampling procedures account for more than 90 percent of all errors in fertilizer recommendations based on soil tests. Soil test results are only as good as the soil sample. Once you take a good sample, you must also handle it properly for it to remain a good sample.

A good soil testing program can be divided into four operations: (1) taking the sample, (2) analyzing the sample, (3) interpreting the sample analyses, and (4) making the fertilizer recommendations. This publication focuses on the first step, collecting the soil sample.

Once you take a sample, you must send it to a laboratory for analysis. Then the Extension agricultural educator or fertilizer fieldman in your county can interpret the analysis and make specific fertilizer recommendations. Fertilizer guides from the University of Idaho Cooperative Extension System are also available to help you select the correct fertilizer application rate.

The soil sampling guidelines in this publication meet sampling standards suggested by federal, state, and local nutrient management programs in Idaho.

What is a soil test?

A soil test is a chemical evaluation of the nutrient-supplying capability of a soil at the time of sampling. Not all soil-testing methods are alike nor are all fertilizer recommendations based on those soil tests equally reliable.

Reliable fertilizer recommendations are developed through research by calibrating laboratory soil test values and correlating them with crop responses to fertilizer rates. These soil test correlation trials must be conducted for several years on a particular crop growing on a specific soil type. If soil test calibration is incomplete, fertilizer recommendations based on soil-test results still can only be best guesses.

A soil test does not measure the total amount of a specific nutrient in the soil. There is usually little relationship between the total amount of a nutrient in the soil and the amount of a nutrient that plants can obtain.

A soil test also does not measure the amount of plant-available nutrients in the soil because not all the nutrients in the soil are in a form readily usable by plants. Through research, however, a relationship can usually be established between soil test nutrient levels and the total amount of a nutrient in the soil.

What does a soil test measure?

Present soil-testing methods measure a certain portion of the total nutrient content of the soil. During testing, this portion is removed from the soil by an extracting solution that is mixed with the soil for a given length of time. The solution containing the extracted portion of the nutrient is separated from the soil by filtration, and then the solution is analyzed.

A low soil-test value for a particular nutrient means the crop will be unable to obtain enough of that nutrient from the soil to produce the highest yield under average soil and climatic conditions. A nutrient deficiency should be corrected by adding the nutrient as a fertilizer. The amount of nutrient that needs to be added for a given soil-test value is calculated based on results from the correlation research test plots.

Sampling timing

Because nutrient concentrations in the soil vary with the season, you should take soil samples as close as possible to planting or to the time of crop need for the nutrient. Ideally, take the soil samples 2 to 4 weeks before planting or fertilizing the crop. It usually requires 1 to 3 weeks to take a soil sample, get the sample to the testing laboratory, and obtain results.

Sampling very wet, very dry, or frozen soils will not affect soil test results though collecting soil samples under these conditions is difficult. Do not sample snow–covered fields. The snow makes it difficult to recognize and avoid unusual areas in the field, so you may not get a representative sample.

Sampling frequency

For best soil fertility management, especially for the mobile nutrients, sample each year and fertilize for the potential yield of the intended crop. Having an analysis performed for every nutrient each year is not necessary. Whether you need an analysis of a nutrient depends on such things as its mobility in the soil and the nutrient requirements of the crop.

Take soil samples at least once during each crop rotation cycle. Maintain a record of soil test results on each field to evaluate long-term trends in nutrient levels.

Sampling procedure

One of the most important steps in a soil testing program is to collect a soil sample that represents the area to be fertilized. If the soil sample is not representative, the test results and recommendations can be misleading.

The correct steps in soil sampling are illustrated in figure 1. Before sampling, obtain necessary information, materi–als, and equipment from the Exten–sion agricultural educator or fertilizer fieldman in your county.

Use proper soil sampling tools. A soil auger or probe is most convenient, but you can use a shovel or spade for shallow samples. You will need a plastic bucket or other container for each sample to help you collect and mix a composite sample.

Be sure that all equipment is clean, and especially be sure it is free of fertilizer. Even a small amount of fertilizer dust can result in a highly erroneous analysis. Do not use a galvanized bucket when analyzing for zinc (Zn) or a rusty shovel or bucket when analyzing for iron (Fe). If the sample will be analyzed for Fe or manganese (Mn), do not dry the soil sample before shipping.

When sampling, avoid unusual areas such as eroded sections, dead furrows, and fence lines. If the field to be sampled covers a large area with

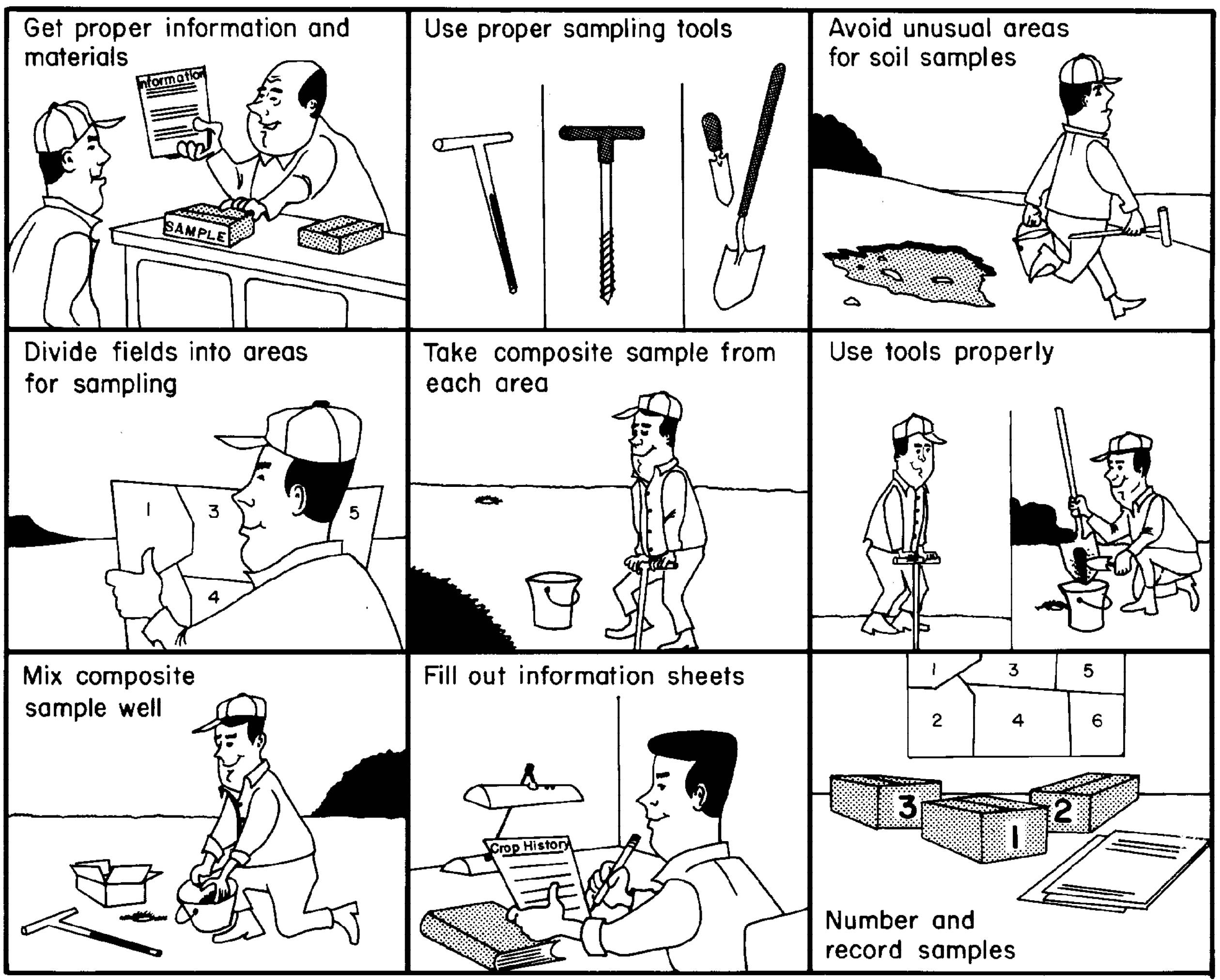

Fig. 1. Follow these steps to obtain a good sample for testing (redrawn courtesy of the National Fertilizer Institute).

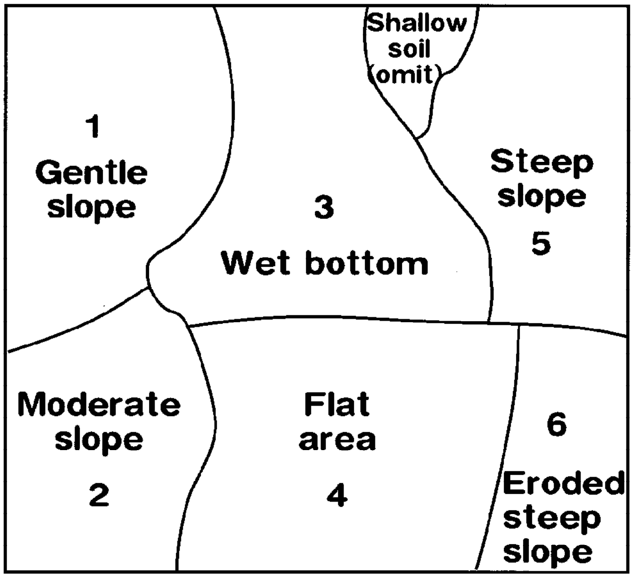

Fig. 2. A field with areas identified as sampling units.

Table 2. Effective rooting depth for some common Idaho crops.

Crop	Depth (feet)
Cereals (wheat, barley, oats)	5 to 6
Corn	5 to 6
Alfalfa, rapeseed	4 to 5
Hops, grapes, tree fruits	4 to 5
Sugarbeets	2 to 3
Peas, beans, lentils, onions, potatoes, mint	2
Vegetable seed	1 to $1^1/_2$

varied topography, subdivide it into relatively uniform sampling units (fig. 2). Sampling subdivision units that are too small to fertilize separately may be of interest, but impractical if you do not treat the small units differently from the rest of the field. Omit these areas from the sampling.

Within each sampling unit take soil samples from several different locations and mix these subsamples into one composite sample. The number of subsamples needed to obtain a representative composite sample depends on the uniformity and size of the sampling unit (table 1). Although the numbers of subsamples in table 1 give the best results, they may be unrealistic if you plan to take a great number of samples. An absolute minimum of 10 subsamples from each sampling unit is necessary to obtain an acceptable sample. The more subsamples you take, the better the representation of the area sampled.

Table 1. Number of subsamples recommended for a representative composite sample based on field size.

Field size (acres)	Number of subsamples
fewer than 5	15
5 to 10	18
10 to 25	20
25 to 50	25
more than 50	30

Take all subsamples randomly from the sampling unit, but be sure to distribute subsample sites throughout the sampling unit. Meander or zig-zag throughout each sampling unit to sample the area. Special considerations are necessary in eroded areas, furrow irrigation, under no-till, and where fertilizer is banded (see "Special Sampling").

The total amount of soil you collect from the sampling unit may be more than you need for analyses. Mix the individual subsamples together thoroughly and take the soil sample from the composite mixture. The composite sample should be at least 1 pint—about 1 pound—in size.

Sampling depth

Depth of sampling is critical because tillage and nutrient mobility in the soil can greatly influence nutrient levels in different soil zones (fig. 3). Sampling depth depends on the crop. cultural practices, tillage depth, and the nutrients to be analyzed.

Because the greatest abundance of plant roots, greatest biological activity,

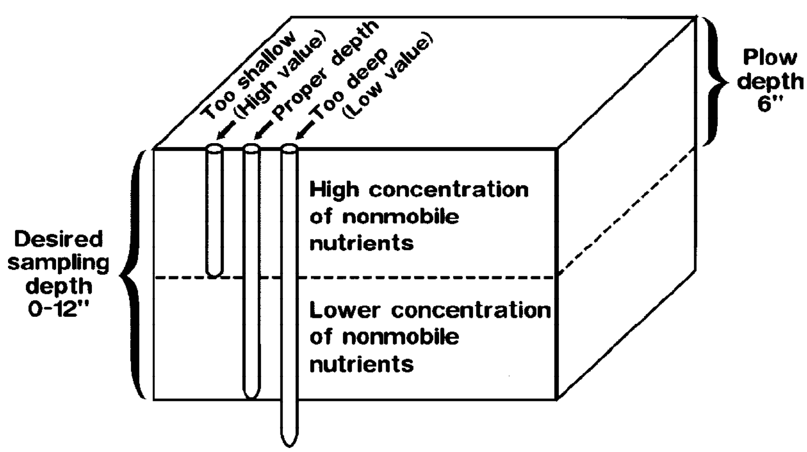

Fig. 3. Too deep or shallow a sampling depth can produce inaccurate soil test results. The plow layer is usually higher in nonmobile nutrients than the soil layers below it.

and highest nutrient levels occur in the surface layers, the upper 12 inches of soil are used for most analyses. The analyses run on the surface sample include soil reaction (pH), phosphorus (P), potassium (K), organic matter, sulfur (S), boron (B), zinc (Zn), and other micronutrients.

Sampling depth is especially critical for nonmobile nutrients such as P and K. The recommended sampling depth for nonmobile nutrients is 12 inches (fig. 3).

The tillage zone, typically 6 to 8 inches deep, usually contains a relatively uniform, high concentration of nonmobile nutrients. Below the tillage zone the concentration is usually lower. Therefore, a sample from the tillage zone will usually have a higher content of nonmobile nutrients than a sample from the desired 0- to 12-inch sample depth. This can lead to erroneous results.

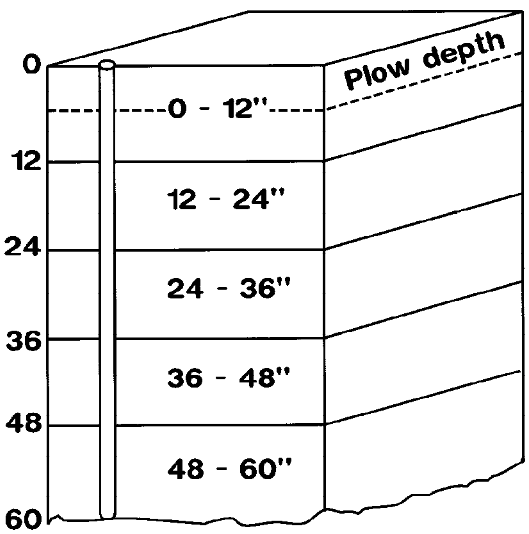

Fig. 4. Depth sampling (successive samples by 12-inch increments) for mobile nutrients (especially N) should be continued to rooting depth, which may be 5 to 6 feet for some crops.

Depth sampling

When sampling for mobile nutrients such as nitrogen (N), boron (B), and sulfur (S), take samples by 1-foot increments to the effective rooting depth of the crop (fig. 4). This can be a depth of 5 to 6 feet (table 2) unless the soil has a root-limiting layer such as bedrock or hardpan. For each foot depth, take 10 or more subsamples at random from the sampling unit.

If you plan to sample less than a year after banding or injecting fertilizer or if you have any question about fertilizer placement, use the sampling technique described under "Areas Where Fertilizer Has Been Banded." Irrigation or precipitation should disperse mobile nutrients over a period of a year.

Sample handling

Soil samples need special handling to ensure accurate results and minimize changes in nutrient levels because of biological activity. Keep moist soil samples cool at all times during and after sampling. Samples can be frozen or refrigerated for extended periods of time without adverse effects.

If the samples cannot be refrigerated or frozen soon after collection, air dry them or take them directly to the soil testing laboratory. Air dry by spreading the sample in a thin layer on a plastic sheet. Break up all clods or lumps, and spread the soil in a layer about 1/4 inch deep. Dry at room temperature. If a circulating fan is available, position it to move the air over the sample for rapid drying.

Caution: Do not dry where agricultural chemical or fertilizer fumes or dust will come in contact with the samples. Do not use artificial heat in drying. Ask the Extension agricultural educator or fertilizer fieldman in your county for more details concerning special handling of soil samples.

When the soil samples are dry, mix the soil thoroughly, crushing any coarse lumps. Take from the sample about 1 pint (roughly 1 pound) of well-mixed soil and place it in a soil sample bag or other container. Soil sample bags and soil test report forms are available from the Cooperative Extension System office in your county or from a fertilizer fieldman.

Label the bag carefully with your name, the sample number, sample depth, and field number. The field number should correspond with a field or farm map showing the areas

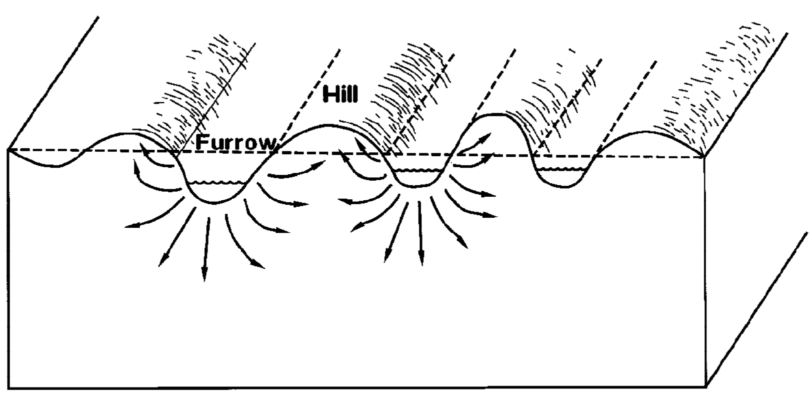

Fig. 5. Movement of mobile nutrients in furrow-irrigated fields.

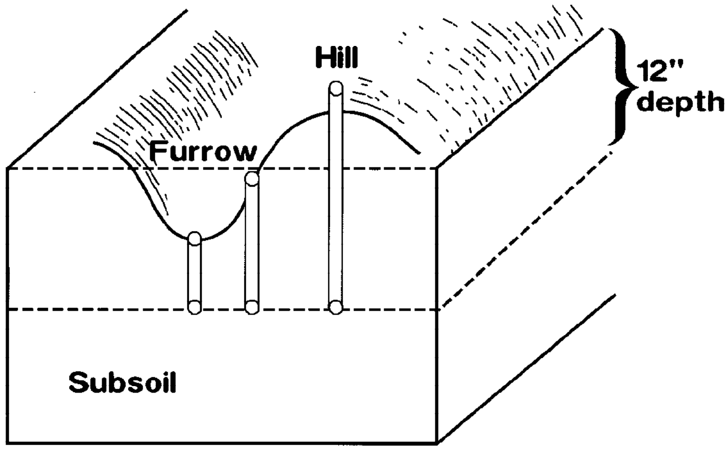

Fig. 6. Special sampling techniques are required when soil sampling furrow-irrigated fields. Take a sample from the hilltop, the furrow bottom, and at the midpoint between the hilltop and furrow bottom. The 12-inch sampling depth is based on the midpoint sampling location.

sampled. This will help you keep an accurate record of soil test reports. Provide information on crop to be grown, yield potential, recent history of crops grown, yields, fertilizer applied, and other information.

Sample analysis

Analyze regularly only for those nutrients that have been shown to be yield limiting in your area or for the crop to be grown. In general, all soils should be analyzed for N, P, K, and S . For determination of potential need for micronutrients, refer to PNW 276, *Current Nutrient Status of Soils in Idaho, Oregon, and Washington*. Occasional analyses for micronutrient concentrations may be advisable.

Special sampling

Special sampling problems occur in fields that have been leveled for irrigation, fields that have lost all or most topsoil as a result of erosion, fields that are surface (furrow) irrigated, fields that have had a fertilizer band applied, and fields that are not thoroughly tilled.

Land-leveled and eroded areas

Areas that have been eroded or artificially leveled for irrigation usually have little or no original topsoil. The soil surface may be exposed subsoil material. These areas should be sampled separately if they are large enough to be managed differently from where topsoil has not been removed. Subsoil material is usually low in organic matter and can be high in clay, calcium carbonate (lime), or both.

Furrow-irrigated fields

For a representative soil sample, sample furrow-irrigated fields before the furrowing operation. If furrowing has already been completed, follow the special sampling procedures described here.

The movement of water and dissolved plant nutrients can create unique nutrient distribution patterns in the hills between the furrows (fig. 5). To obtain a representative sample, you need to be aware of furrow direction, spacing, and location, and to take closely spaced soil samples perpendicular to the furrow (fig. 6).

Approximately 20 sites (with at least three samples per site) are needed for a representative composite soil sample. At each sampling site, take a sample from the hilltop, from the midpoint between the hilltop and furrow, and from the furrow bottom. The sampling depth at the midpoint between the hilltop and furrow bottom should be 12 inches. The bottom point of this sample should be the same as for the furrow and hilltop samples. Thus, the furrow sampling depth will be less than 12 inches, while the hilltop sampling depth will be more than 12 inches (fig. 6).

Mix the hilltop, midpoint, and furrow samples to make a composite sample for each site. Mix the site samples for a representative composite field soil

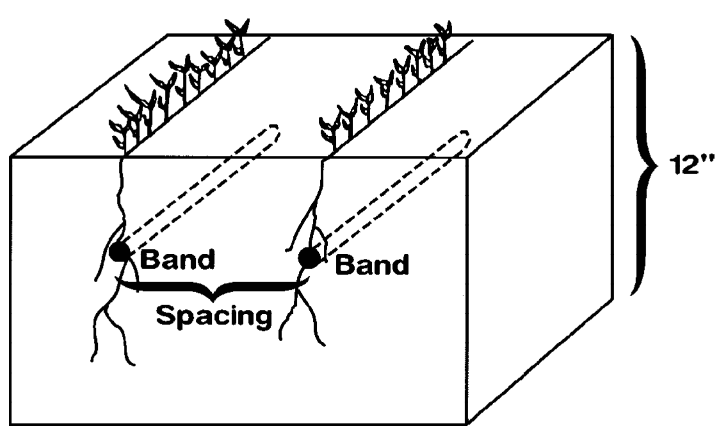

Fig. 7. Diagram of fertilizer location in soil where fertilizer has been banded.

sample to be analyzed for nonmobile nutrients (P, K, and micronutrients). Deeper profile sampling (depth sampling) is recommended for mobile nutrients (N and S).

Areas where fertilizer has been banded

Banding of fertilizers is becoming a more common practice (fig. 7). In fields where fertilizers have been banded and tillage has occurred before soil sampling, regular sampling procedures can be followed. However, if tillage has not adequately mixed the soil, special soil sampling is required. If a field has had a banded fertilizer application the previous growing season and has not been plowed, an ideal sample would be a continuous slice 1 to 2 inches thick and 12 inches deep extending from the center of one band to the center of the next band.

Little research has been conducted to determine the best method of sampling banded fields. Currently three different approaches are used widely. Each method produces a satisfactory representative sample, but the effort required to obtain these samples differs considerably.

Systematic sampling method. If you know the direction, depth, and spacing of the fertilizer band, you can obtain a representative soil sample with this sampling procedure. Take 5 to 10 soil samples perpendicular to the band row beginning in the edge of a fertilizer band and ending at the edge of an adjacent band (fig. 8). Follow this procedure on at least 20 sampling sites in each field or portion of a field being sampled. Mix and composite the soils collected from each site to obtain a representative soil sample.

Controlled sampling method. You also should know the direction, depth, and spacing of the fertilizer bands to obtain a representative soil sample with this method. Take 20 to 30 soil cores from locations scattered throughout the field or portion of the field. Avoid sampling directly in a fertilizer band.

The composite sample should adequately represent the area being sampled. This method may result in slightly lower soil test values of nonmobile nutrients (P, K, and micronutrients) than the systematic and random sampling methods.

Random sampling method. Use this sampling method when the location of the previous season's fertilizer bands is not known. Take 40 to 60 random soil cores to form a composite sample of the area being sampled.

Reduced tillage or no-till fields

You may need special approaches to soil sampling with reduced tillage or no-till fields because the soil has been disturbed so little that fertilizer, whether broadcast on the surface or banded below the surface, is not mixed into the soil. You need to know the history of fertilization, tillage, and other management practices to determine how to obtain a representative sample.

If nonmobile nutrients (P, K, and micronutrients other than B) have been surface broadcast and little or no tillage has been used since their application, remove the surface 1 inch of soil before sampling. Nutrients in the top inch of soil will probably not be available to the growing crop.

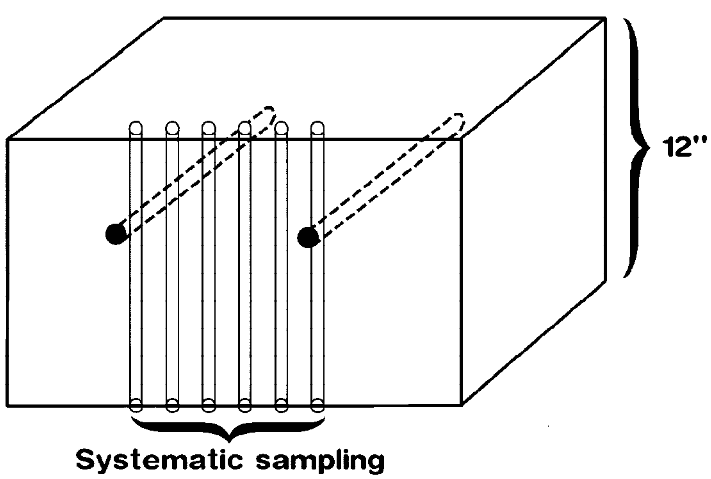

Fig. 8. Systematic soil sampling in a field where fertilizer has been banded (sampling method 1).

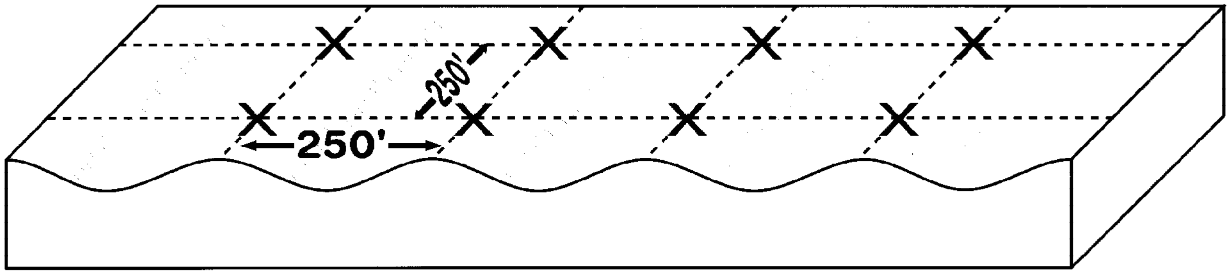

Fig. 9. Grid soil sampling pattern where samples are collected every 250 feet. Note that a complete soil sample is collected at each spot marked with an X.

If fertilizer has been banded with the no-till system, consider methods suggested in "Areas Where Fertilizer Has Been Banded." If a field has been under a continuous no-till system for a long time, determine the pH of the surface foot at 3-inch intervals (0 to 3, 3 to 6, 6 to 9, 9 to 12 inches) every 3 to 5 years. Soil pH will affect the availability of fertilizer nutrients as well as the activity of commonly used herbicides, insecticides, and fungicides.

Grid sampling in nonuniform fields

Many fields are not uniform and vary both horizontally and vertically across landscapes. Traditional soil sampling procedures average nutrient levels in soil subsamples to determine average nutrient levels in the field. The nutrient values obtained are good, but the manager must realize that many of the values in the field are either less than or greater than the values determined. When fields are broken into grids with shorter distances between the sampling points a more precise soil map can be developed to determine nutrient needs.

The technology is now available to combine grid sampling with variable rate fertilizer application to handle spatial variability within a field. These application techniques make fertilizer nutrient application more precise, resulting in greater nutrient use efficiency and reducing pollution potential.

Irrigated fields including individual pivots should be set up in a 200- to 300-foot grid for potato, sugarbeets, corn, and other potentially high-N-use crops (fig. 9). A wider grid of 400 feet may be used for small grains, beans, and other crops where N management is less intensive or under dryland conditions.

Soil nutrient needs for each segment of the grid are entered into a computer-driven system mounted on specialized commercial fertilizer application equipment. Variable rates of nutrients are then applied based on individual soil samples over the entire field.

A similar system designed for fertilizer applications through pivot sprinklers is being developed by the University of Idaho. This system has the potential to apply variable rates of nutrients and water specifically related to changes across individual fields.

The Soil Conservation Service has a digitized soil survey information system (SSIS), which when combined with the results of grid sampling provides specific information and recommendations for soils and soil types within a field. The SSIS can locate pockets of sandy or coarse-textured soils where leaching is a major concern or areas of finer-textured soils where pockets of residual N may occur. The SSIS also indicates where erosion or surface runoff may be high and where areas should be targeted for federal programs such as the Conservation Reserve Program.

Another computer-mapping technique, Geographic Information Systems (GIS), can be combined with the results of grid sampling to provide growers and land managers with information for land-use planning.

Additional information on proper soil sampling procedures can be obtained from the Extension agricultural educator or fertilizer fieldman in your county.

The authors—Robert L. Mahler, soil scientist, Moscow, and Terry A. Tindall, former Extension soil scientist, Twin Falls Research and Extension Center; both with the University of Idaho Department of Plant, Soil, and Entomological Sciences.

Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, LeRoy D. Luft, Director of Cooperative Extension System, University of Idaho, Moscow, Idaho 83844. The University of Idaho provides equal opportunity in education and employment on the basis of race, color, religion, national origin, age, gender, disability, or status as a Vietnam-era veteran, as required by state and federal laws.

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APPENDIX H - Annual Report Template

CAFO ANNUAL REPORT FORM

Submit a copy of this form to the U.S. Environmental Protection Agency (EPA), Region 10, by March 1st of each year to report data for the previous calendar year:

EPA Region 10
Attn: NPDES Compliance Unit
Office of Compliance and Enforcement
1200 6th Avenue, Suite 900
Mail Stop: OCE-133
Seattle, WA 98101

Also submit a copy of the form to the Idaho State Department of Agriculture (ISDA):

ISDA
Division of Animal Industries
P.O. Box 790
Boise, ID 83701

The reporting period for the information list below is January 1 – December 31, ____________.

1. Facility Information

a. Name of CAFO (as listed in the facility's written notification of permit coverage)

____

b. Permit Number (as listed in the facility's written notification of permit coverage)

____

Contact Information (provide the name, telephone number, and email address of the person to be contacted about the information contained in this report)

c. Name: ____

d. Telephone: (____________)______________-_________________________________

e. Email: ____

2. Animal Inventory

For each type of animal confined at this facility, whether in open confinement or housed under roof, list the type and maximum number confined during the year.

Animal Type	Number Confined

3. Manure, Litter, and Process Wastewater Generated and Transferred

Estimate the total amount of manure, litter, and process wastewater generated at this facility and transferred to other persons (i.e., for use on land not under the control of the permitted CAFO or other use or disposal not under the CAFO's control) during the reporting period. Indicate the units (tons or cubic feet) for manure and litter.

	Units	Amount Generated	Amount Transferred
Manure	☐ tons or ☐ ft^3		
Litter	☐ tons or ☐ ft^3		
Process Wastewater	☐ gallons or ☐ ft^3		

4. Production Area Discharges

For each discharge of manure, litter, or process wastewater from the production area during the reporting period, list the date, time, and approximate volume of the discharge.

Discharge date (mm/dd/yyyy)	Time (specify AM or PM)	Approximate volume (specify gallons or other units)

5. Nutrient Management Plan

Was the current version of the CAFO's NMP developed or approved by a certified nutrient management planner?

☐ Yes ☐ No

6. Acres for Land Application

a. Total number of acres for land application covered by the CAFO's nutrient management plan (NMP)

______________________ Acres

b. Total number of acres under the control of the CAFO used for land application of manure, litter, or process wastewater during the reporting period

______________________ Acres

7. Crops and Yields

For each field, list the field ID as listed in the CAFO's NMP, the actual crop(s) planted, and the actual yield for each crop harvested during the reporting period. Use multiple lines for double cropping or cover crops. In the last column, check the box to indicate whether the crop was seeded during the year prior to the period covered by this report. Use Table A.7 in Attachment A to list additional fields and crops if needed.

☐ Check here to indicate whether additional fields and crops are listed in Attachment A.

Field ID	Crop	Yield (specify units per acre, e.g., tons, bushels, cwt)	Seeded in previous year?
			■
			■
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐

8. Manure, Litter, and Process Wastewater Application

For each field, list the total amount of manure, litter, and process wastewater applied during the reporting period. Indicate the units used for manure and litter. Also list the amount of plant-available nitrogen and phosphorus from manure, litter, and process wastewater applied to each field during the reporting period. Use Table A.8 in Attachment A to list additional fields if needed.

☐ Check here to indicate whether additional fields are listed in Attachment A.

Field ID	Manure applied (☐tons/acre or ☐ft³/acre)	Litter applied (☐tons/acre or ☐ft³/acre)	Wastewater applied (gallons/acre)	Nutrients applied* (pounds/acre)	
				PAN	P

*Total pounds of plant-available nitrogen (PAN) and phosphorus (P) applied per acre. For PAN, include NO_3, NH_4, and the portion of organic N applied (if any) that is expected to be available to the current crop, determined consistent with the annual nutrient budget.

9. Soil Sample Analyses

For each field, list the analytical results for the most recent soil analysis for pH, soil organic matter (SOM), nitrate (NO_3-N), ammonium (NH_4-N), and phosphorus (P). Include units. Use Table A.9 in Attachment A to list additional fields if needed.

☐ Check here to indicate whether additional fields are listed in Attachment A.

Field ID	pH	SOM	NO_3-N	NH_4-N	P

10. Manure, Litter, and Process Wastewater Sample Analyses

For each source of manure, litter, or process wastewater land applied during the reporting period, list the analytical results for the most recent analysis. Include units.

Source of manure or wastewater (e.g., storage structure)		NH_4-N	TKN	NO_3-N	P	☐ Total Solids or ☐ Dry Matter
	Units:	______	______	______	______	______

11. Nutrient Budgets

For each field provide the calculated amount manure, litter, and process wastewater, as well as plant-available nitrogen and phosphorus to be applied (in lbs/acre), based on the annual nutrient budget included in the NMP. Indicate the units for manure and litter. Use Table A.11 in Attachment A to list additional fields if needed.

☐ Check here to indicate whether additional fields are listed in Attachment A.

Field ID	Manure (☐ tons/acre or ☐ ft^3/acre)	Litter (☐ tons/acre or ☐ ft^3/acre)	Wastewater (gallons/acre)	Nutrients * (pounds/acre)	
				PAN	P

*Total pounds of plant-available nitrogen (PAN) and phosphorus (P) planned per acre. For PAN, include NO_3, NH_4, and the portion of organic N applied (if any) that is expected to be available to the current crop, from the annual nutrient budget.

12. Certification

Print the form and sign the certification statement below before submittal.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

____

Name of Certifying Official (print or type)

____

Signature

____

Date Signed

NOTE: This report must be signed and certified by a responsible corporate officer (corporation), a general partner (partnership), or the proprietor (sole proprietorship). The report may be signed by a duly authorized representative of the corporate officer, general partner, or proprietor if:

i. The authorization is made in writing by the corporate officer, general partner, or proprietor, and
ii. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, or an individual or position having overall responsibility for environmental matters for the company; and
iii. The written authorization is submitted to the Director of EPA Region 10's Office of Compliance and Enforcement.

Attachment A – Additional Data Tables

Use the tables below if additional rows are needed to provide the information requested in the form.

Table A.7. Crops and Yields

Field ID	Crop	Yield (specify units per acre, e.g., tons, bushels, cwt)	Seeded in previous year?
			☐
			☐
			☐
			☐
			☐
			☐
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			☐

Field ID	**Crop**	**Yield** (specify units per acre, e.g., tons, bushels, cwt)	**Seeded in previous year?**
			☐
			☐
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			☐

A.8. Manure, Littler, and Process Wastewater Application

Field ID	Manure applied (☐ tons/acre or ☐ ft³/acre)	Litter applied (☐ tons/acre or ☐ ft³/acre)	Wastewater applied (gallons/acre)	Nutrients applied* (pounds/acre)	
				PAN	P

Field ID	Manure applied (☐tons/acre or ☐ft^3/acre)	Litter applied (☐tons/acre or ☐ft^3/acre)	Wastewater applied (gallons/acre)	Nutrients applied* (pounds/acre)	
				PAN	P

A.9. Soil Sample Analysis

Field ID	pH	SOM	NO_3-N	NH_4-N	P

Field ID	pH	SOM	NO_3-N	NH_4-N	P

A.11. Nutrient Budgets

Field ID	Manure (☐ tons/acre or ☐ ft^3/acre)	Litter (☐ tons/acre or ☐ ft^3/acre)	Wastewater (gallons/acre)	Nutrients * (pounds/acre)	
				PAN	P

Field ID	**Manure** (☐ tons/acre or ☐ ft^3/acre)	**Litter** (☐ tons/acre or ☐ ft^3/acre)	**Wastewater** (gallons/acre)	**Nutrients *** (pounds/acre)	
				PAN	**P**

APPENDIX I - Idaho Phosphorus Site Index

The Phosphorus Site Index:

A Systematic Approach to Assess the Risk of Nonpoint Source Pollution of Idaho Waters by Agricultural Phosphorus

Dr. April Leytem
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USDA- ARS

Dr. David Bjorneberg
Supervisory Agricultural Engineer
USDA-ARS

Dr. David Tarkalson
Research System Agronomist
USDA-ARS

2017

Table of Contents

List of Tables

INTRODUCTION

Why is phosphorus a concern for Idaho?

Water quality in Idaho has been negatively impacted by the inputs of nutrients from both point and nonpoint sources. The two nutrients of greatest concern are nitrogen (N) and phosphorus (P). Efforts to reduce nutrient enrichment of ground and surface waters have become a high priority for state and federal agencies and a matter of considerable importance to all nutrient users and nutrient generators in the state. Two actions in particular highlight the importance of this issue in Idaho:

- Total Maximum Daily Load (TMDL) Program: Section 303(d) of the Federal Clean Water Act (CWA) of 1972 requires states to develop a list of water bodies that need pollution reduction beyond that achievable with existing control measures. These water bodies are referred to as "Water Quality Limited" and are compiled by each state on a "303(d) list". States are required to develop a "total maximum daily load (TMDL)" for a number of pollutants, including nutrients for these "water quality limited" waters. A TMDL is defined as "the level of pollution or pollutant load below which a water body will meet water quality standards and thereby allow use goals such as drinking water supply, swimming and fishing, or shellfish harvesting". In ID, approximately 36% of streams were identified as not meeting water quality standards. The TMDL for the upper and middle Snake River was set at 0.075 mg total P L^{-1}.

- Idaho Statute Title 37 Chapter 4 Section 37-40, passed in 1999 requires that all dairy farms shall have a nutrient management plan approved by the Idaho State Department of Agriculture. The nutrient management plan shall cover the dairy farm site and other land owned and operated by the dairy farm owner or operator. Nutrient management plans submitted to the department by the dairy farm shall include the names and addresses of each recipient of that dairy farm's livestock waste, the number of acres to which the livestock waste is applied and the amount of such livestock waste received by each recipient. The information provided in this subsection shall be available to the county in which the dairy farm, or the land upon which the livestock waste is applied, is located. If livestock waste is converted to compost before it leaves the dairy farm, only the first recipient of the compost must be listed in the nutrient management plan as a recipient of livestock waste from the dairy farm. Existing dairy farms were required to submit a nutrient management plan to the department on or before July 1, 2001, and plans are required to be updated every 5 years.

What is a Phosphorus Site Index?

In the early 1990's the U.S. Department of Agriculture (USDA) began to develop assessment tools for areas with water quality problems. While some models such as the Universal Soil Loss Equation (USLE) for erosion, and Groundwater Loading Effects of Agricultural Management Systems (GLEAMS) for ground water pollution, were already being used to screen watersheds for potential agricultural impacts on water quality, there was no model considered suitable for the field-scale assessment of the potential movement of P from soil to water. A group of scientists from universities and governmental agencies met in 1990 to discuss the potential movement of P from soil to water, and later formed a national work group (PICT: Phosphorus Index Core Team) to more formally address this problem. Members of the PICT soon realized that despite the many scientists conducting independent research on soil P, there was a lack of integrated research that could be used to develop the field scale assessment tool for P needed by USDA. Consequently, the first priority of PICT was a simple, field-based, planning tool that could integrate through a multi-parameter matrix, the soil properties, hydrology, and agricultural management practices within a defined geographic area, and thus to assess, in a relative way, the risk for P movement from soil to water. The initial goals of the PICT team were:

- *To develop an easily used field rating system (the **Phosphorus Site Index**) for Cooperative Extension, Natural Resource Conservation Service (NRCS) technical staff, crop consultants, farmers or others that rates soils according to the potential for P loss to surface waters*

- *To relate the P Site Index to the sensitivity of receiving waters to eutrophication*. This is a vital task because soil P is only an environmental concern if a transport process exists that can carry particulate or soluble P to surface waters where eutrophication is limited by P.

- *To facilitate adaptation of the P Site Index to site specific situations*. The variability in soils, crops, climates and surface waters makes it essential that each state or region modify the parameters and interpretation given in the original P Index to best fit local conditions.

- *To develop agricultural management practices that will minimize the buildup of soil P to excessive levels and the transport of P from soils to sensitive water bodies*.

The *P Site Index* is designed to provide a systematic assessment of the risks of P loss from soils, but does not attempt to estimate the actual quantity of P lost in runoff. Knowledge of this risk not only allows us to design best management practices (BMPs) that can reduce agricultural P losses to surface waters, but to more effectively prioritize the locations where their implementation will have the greatest water quality benefits.

It has long been known that P loss depends on not only the amount of P in or added to a soil but the transport processes that control soil and water movement from fields to waterways. Therefore, when assessing the risk of P loss from soil to water, it is important that we not focus strictly on measures of P, such as agronomic soil test P value. Rather a much broader, multi-disciplinary approach is needed; one that recognizes that P loss will vary among watersheds and soils, due to the rate and type of soil amendments used, and due to the wide diversity in soils, crop management practices, topography, and hydrology. At a minimum, any risk assessment process for soil P shall include the following:

- Characteristics of the P source (fertilizer, manure, biosolids) that influence its solubility and thus the potential for movement or retention of P once the source has been applied to a soil.
- The concentration and bioavailability of P in soils susceptible to loss by erosion.
- The potential for soluble P release from soils into surface runoff or subsurface drainage.
- The effect of other factors, such as hydrology, topography, soil, crop, and P source management practices, on the potential for P movement from soil to water.
- Any "channel processes" occurring in streams, field ditches, etc. that mitigate or enhance P transport into surface waters.
- The sensitivity of surface waters to P and the proximity of these waters to agricultural soils.

In summary, when resources are limited, it is critical to target areas where the interaction of P source, P management, and P transport processes result in the most serious risk of losses of P to surface and shallow ground waters. This is the fundamental goal of the *P Site Index*.

Phosphorus Site Index

The Phosphorus Site Index

The *P Site Index* has two separate components (Table 1). Part A characterizes the risk of P loss based on site-specific soil properties and hydrologic considerations. Part B characterizes the risk of P loss based on site-specific past and current nutrient management practices that affect the concentration of P in the soil (soil test P) and the potential for P loss due to management of inorganic (fertilizer) and organic (manures, composts, etc.) P sources. Parts A and B are summarized below, followed by a detailed discussion and descriptions of each component of the two parts. Generalized interpretations of the *P Site Index* values are given in Table 2.

Part A: Phosphorus Loss Potential Due to Site and Transport Characteristics

Surface transport mechanisms, i.e. soil erosion and runoff are generally the main mechanisms by which P is exported from agricultural fields to receiving waters. In some areas, leaching of P can also be a significant method of P export, especially in areas with artificial subsurface drainage (e.g. tiles, mole drains) high water tables, or shallow soils overlying basalt. Therefore, the considerations of the methods of P transport factors affecting these transport mechanisms are critical to an understanding of P losses from watersheds. Part A includes the following four factors: (i) soil erodibility; (ii) soil surface runoff index; (iii) leaching potential; and (iv) distance from edge of field to surface water.

Part B: Phosphorus Loss Potential Due to P Source and Management Practices

Phosphorus losses are also related to the amount and forms of P at a site which can potentially be transported to ground or surface waters. The main sources of P at any site that must be considered in assessing the risk of P loss are (i) soil P (particulate and dissolved), a reflection of natural soil properties and past management practices: and (ii) P inputs such as inorganic fertilizers and organic P sources (manures, composts, biosolids). Also of importance are the management practices used for all P inputs, such as the rate, method, and timing of fertilizer and manure applications, as these factors will influence whether or not P sources will have negative impacts on water quality. Part B includes the following three factors: (i) soil test P value; (ii) P applications rate; and (iii) P application method.

Table 1. The *Phosphorus Site Index* proposed for use in Idaho

Part A: Phosphorus loss potential due to site and transport characteristics

Characteristics	**Phosphorus Loss Rating**					**Field Value**
Soil Erodibility	Very Low **0**	Low **1**	Medium **2**	High **4**	Very High **8**	
Soil Surface Runoff Index – Surface Irrigated	No Runoff **0**	Water runs off less than 50% of the irrigation set time **4**		Water runs off more than 50% of the irrigation set time **8**		
Soil Surface Runoff Index – Sprinkler or Non-Irrigated	Very Low **0**	Low **1**	Medium **2**	High **4**	Very High **8**	
Leaching Potential	Low **1**		Medium **2**	High **4**		
Distance from Edge of Field to Surface Water	> 2,640' **0**		200-2,640' **2**	< 200' **8**		

Part B: Phosphorus loss potential due to P source and management practices.

Characteristics	**Phosphorus Loss Rating**					**Field Value**
	Very Low	Low	Medium	High	Very High	
Soil Test P value	**0.05** x [Olsen Soil Test P (ppm)] **0.025** x Bray Soil Test P (ppm)]					
P Application Rate (lbs P_2O_5 applied per acre)	No Application **0**	< 60 **1**	60 – 150 **2**	151 – 300 **4**	>300 **8**	
P Application Method	None Applied **0**	Incorporated within 2 days or injected/banded below surface at least 3" **1**	Incorporated within 7 days of application **2**	Incorporated > 7 days or no incorporation when applied between February 16 and December 15 **4**	Application between December 16 and February 15 **8**	

Table 2. Generalized interpretations of the *P Site Index*.

***P Site Index* Value**	**Generalized Interpretation of the *P Site Index* Value**
< 75	**LOW** potential for P movement from this site given current management practices and site characteristics. There is a low probability of an adverse impact to surface waters from P losses from this site. Nitrogen-based nutrient management planning is satisfactory for this site. Soil P levels and P loss potential may increase in the future due to N-based nutrient management planning.
75 - 150	**MEDIUM** potential for P movement from this site given current management practices and site characteristics. Phosphorus applications shall be limited to the amount expected to be removed from the field by crop harvest (crop uptake) or soil test-based P application recommendations. Testing of manure P prior to application is required.
151 – 225	**HIGH** potential for P movement from this site given the current management practices and site characteristics. Phosphorus applications shall be limited to 50% of crop P uptake. Testing of manure P prior to application is required.
> 225	**VERY HIGH** potential for P movement from this site given current management practices and site characteristics. No P shall be applied to this site.

Usage of the Idaho *Phosphorus Site Index*

The Phosphorus Site Index is a risk assessment tool to help determine the potential for off-site transport of phosphorus from agricultural fields. It is intended to be used as an integral and interactive part of the nutrient management plan to help guide applications of manure and fertilizers to minimize potential P losses from agricultural fields, and to identify fields that may require additional management to reduce P losses even when P applications are not planned. The PSI is also a valuable educational tool to assist producers in recognizing high risk areas, allowing them to focus conservation practices where they would be of most value.

A PSI rating shall be done for each field. Fields that do not receive manure and fertilizer shall only be assessed once until there is a planned application of P. The PSI shall be calculated prior to P application for each field using the planned management and P application rate along with current soil test P results. The risk rating will determine whether or not the P application on the field is allowable, given the current management. For example, if the risk assessment was completed with inputs for the field source factors (soil test P, planned P application rates, and planned application method and timing) and the field received a low rating, then application and management can continue according to plan. If, however, the risk rating is in a medium category, P application will be limited to crop uptake. If the risk rating is in a higher category, BMPs will need to be implemented on the field in order to reduce the potential for P loss, and/or the P application rates must be limited or prohibited in order to reduce the risk of P losses from the field. Producers can receive full credit for maximum of two (2) BPMs per field at any given time. In addition, testing of manure prior to application will be required for fields having a risk rating above low.

When a perennial crop such as alfalfa is part of the rotation, or when allowable manure application rates are below a reasonable application rate (<10 tons/acre for manure and <5 tons/acre for composted manure) then a producer may be allowed to apply up to a four year application rate at one time with no further application over the remainder of the time period that the nutrients have been allocated to. For example, a field with a medium rating beginning a four-year rotation of alfalfa could apply a maximum of four times the annual excepted crop P uptake rate in the first year with no additional P application for the next three years; or a field with a high rating beginning a four-year rotation of alfalfa could apply a maximum of two times the annual expected crop P uptake rate in the first year, and the following three years of alfalfa could receive no additional P.

Phosphorus Site Index:
Part A: Phosphorus Loss Potential Due to Site and Transport Characteristics

Soil Erosion

Phosphorus is strongly sorbed by soils, therefore erosion of soil materials dominates the movement of particulate P in landscapes (Bjorneberg et al., 2002; Leytem and Westermann, 2003). Up to 90% of the P transported from surface irrigated crops is transported with eroded sediment (Berg and Carter, 1980). In contrast to rainfall, irrigation is a managed event. Runoff and soil erosion should be minimal from properly managed sprinkler irrigation or drip irrigation. Water flowing over soil during surface irrigation will detach and transport sediment. Annual soil loss from furrow irrigated fields can range from less than 1 to greater than 100 tons per acre (Berg and Carter, 1980; Koluvek et al., 1993). Typically, greater than 90% of the P in surface irrigation runoff from clean-tilled row-crop fields is transported with eroded sediment. Conversely, when erosion is minimal from crops such as alfalfa and pasture, greater than 90% of the total P is dissolved in the runoff water (Berg and Carter, 1980). Total P concentration in surface irrigation runoff correlates directly with sediment concentration (Fitzsimmons et al., 1972, Westermann et al., 2001). Dissolved reactive P concentration in surface irrigation runoff, on the other hand, correlates with soil test P concentration, but not with sediment concentration (Westermann et al., 2001). During detachment and movement of sediment in runoff, the finer-sized fractions of source material are preferentially eroded. Thus, the P content and reactivity of eroded particulate material is usually greater than the source soil (Carter et al., 1974; Sharpley et al., 1985). Therefore, to minimize P loss in the landscape, it is essential to control soil erosion. Particulate P movement in the landscape is a complex function of rainfall, irrigation, soil properties affecting infiltration and runoff of irrigation/rainfall/snowmelt, and soil management factors affecting erosion. Numerous management practices that minimize P loss by erosion are available including filter strips, contour tillage, cover crops, use of polyacrylamide and impoundments or small reservoirs.

Soil erosion can be estimated from erosion prediction models such as the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE) for water erosion and Wind Erosion Equation (WEQ) for wind erosion. However, neither USLE nor RUSLE can accurately predict irrigation erosion. Therefore, the potential for soil erosion is based on the erodibility of the soil along with the predominant slope of the field. While this factor does not predict sediment transport and delivery to a water body, it does indicate the potential for sediment and attached P movement across the slope or unsheltered distance toward a water body.

For the *Phosphorous Site Index*, the potential for soil erosion loss is determined by the erodibility of the soil (K_w factor) along with the slope of the field Table 3.

Table 3. Soil erodibility factor

Kw factor - surface mineral layer Whole Soil	Slope Gradients				
	< 2%	2 – 5%	5 – 10%	10 – 15%	> 15%
<= 0.10 Very low erodibility	Very Low	Very Low	Very Low	Very Low	Low
0.11 – 0.20 Low erodibility	Very Low	Very Low	Very Low	Low	Medium
0.21 – 0.32 Moderate erodibility	Very Low	Low	Low	Medium	High
0.33 – 0.43 High erodibility	Low	Low	Medium	High	Very High
0.44 – 0.64 Very high erodibility	Low	Medium	High	Very High	Very High

All factors shall be determined by using the NRCS soil survey data (Web Soil Survey) with field verification of the predominant slope in the field. **The soil erodibility value will range from very low to very high and shall be assigned a value of 0 (very low) to 8 (very high) and used in the calculation of the *P Site Index* (Table 1).**

Runoff Index

Dissolved P (DP) is another important source of P that is transported in surface runoff. Dissolved P exists mainly in the form of orthophosphate, which is available immediately for uptake by algae and other aquatic plants. The first step in the movement of DP in runoff is the desorption, dissolution, and extraction of P from soils, crop residues, and surface applied fertilizer and manure (Sharpley et al., 1994). These processes occur as irrigation water, rainfall, or snowmelt water interacts with a thin layer of surface soil (0.04 to 0.12 in) before leaving the field as runoff or leaching downward in the soil profile (Sharpley, 1995). The soil test P content of surface soils has been found to be directly related to DP concentrations in runoff. Field studies have shown that P losses by surface runoff are greater when soil test P values are above the agronomic optimum range (Turner et al., 2004). Laboratory research has also shown that soils with high agronomic soil test P values are more likely to have high concentrations of soluble, desorbable, and bioavailable P (Paulter and sims, 2000; Sibbensen and Sharpley, 1997; Sims, 1998b). In furrow irrigation runoff, even soil with low soil test P can have high runoff DP concentrations (Westermann et al., 2001).

For the *P Site Index*, soil runoff index is determined differently for surface irrigated vs sprinkler irrigated or fields with no irrigation. For surface irrigated fields use Table 4, for sprinkler irrigated or non-irrigated fields use Table 5.

Table 4. Runoff index for surface irrigated fields:

Criteria	Value
Fields with no runoff	0
Fields with water running off less than 50% of the irrigation set time	4
Fields with water running off 50% or more of the irrigation set time	8

Table 5. Runoff index for sprinkler or non-irrigated fields.

Hydrologic Soil Group	Slope Gradients				
	< 2%	2 – 5%	5 – 10%	10 – 15%	> 15%
A: Low Runoff Potential	Very Low	Very Low	Low	Medium	High
B: Moderately Low Runoff Potential	Very Low	Low	Medium	High	High
C: Moderately High Runoff Potential	Very Low	Medium	Medium	High	Very High
D, A/D, B/D, C/D: High Runoff Potential	Low	Medium	High	Very High	Very High

All factors shall be determined by using the NRCS soil survey data (Web Soil Survey) with field verification of the predominant slope in the field.

Leaching Potential

While surface transport processes are the major contributing factors in P transport from soil to water in most cases, leaching of P can contribute significant amounts of P to surface waters in some situations, such as in areas where there is relatively flat topography, high water tables, shallow soils over basalt and any artificial drainage system (e.g. ditches, subsurface drains). While P leaching is typically considered to be small there is potential for significant movement of P through the soil profile when soil P values increase to very high or excessive values due to long-term over-fertilization or manuring (Sims et al., 1998). Whether this leached P will reach surface waters depends on the depth to which it has leached and the hydrology of the site in question. In flat areas with shallow groundwater levels, P loss by leaching through soils contributes significantly to the phosphorus loads of streams (Culley et al., 1983; Heathwaite & Dils, 2000). Soils that are poorly drained with high water tables have a higher possibility of P loss than soils that are well drained with deep water tables. Also soils that are shallow (<24”) overlying basalt have a higher possibility of P loss than deeper soils. It is common in poorly drained soils to have water tables rise to the soil surface during the winter and spring months, during this time there is the potential for release of P into these drainage waters which can then be carried to nearby streams via subsurface flow. When soils are wet (during spring and late fall) or during time periods when irrigation exceeds ET, shallow soils can potentially leach P into the underlying basalt which can then be carried to surface waters (i.e. springs).

For the *P Site Index*, leaching potential shall be based on a USDA-NRCS categorization scheme based on the soil hydrologic group, predominant slope, saturated hydraulic conductivity, depth to high water table (HWT) and depth to bedrock Table 6. This information shall be determined through site inspection and the NRCS Web Soil Survey.

Table 6. Leaching potential.

Soil Leaching Potential	Hydrologic Group A	Hydrologic Group B	Hydrologic Group C	Hydrologic Group D
Low	NA	NA	NA	All **<u>except</u>**: • Apparent HWT • Depth to bedrock < 24”
Medium	• Slope > 6% • No apparent HWT and Depth to bedrock > 24”	• Slope > 6% or slope ≤ 6% with K_{sat} < 0.24 in/hr • No apparent HWT and Depth to bedrock > 24”	All **<u>except</u>**: • Apparent HWT • Depth to bedrock < 24”	NA
High	• Slope < 6% • Apparent HWT or Depth to bedrock < 24”	• Slope < 6% with K_{sat} > 0.24 in/hr • Apparent HWT or Depth to bedrock < 24”	• Apparent HWT • Depth to bedrock < 24”	• Apparent HWT • Depth to bedrock < 24”

High Water Table (HWT) is defined as a saturated layer < 24” from the surface anytime during the year.

Distance from Edge of Field to Surface Water

Another factor that affects the risk of P transport from soils to surface waters is the distance between the P source (i.e., the field) and the receiving waters. In some areas, the nearest water body may be a mile or more from the field being evaluated with no connectivity between the field and surface water; in these cases, even high levels of soil P may have low risk for nonpoint source pollution since the potential for transport to the water body is low. On the other hand, fields that are directly connected to surface water, such as surface irrigated fields with tailwater ditches, directly convey runoff water to surface water bodies through the return flow system. In these cases, even fields with low soil P can convey a large amount of both particulate and soluble P to surface waters.

The *P Site Index* shall take into account the distance from field edge to the nearest surface water body or other conveyance system connected to surface water (tailwater ditches, return flow ditches, laterals (Table 7).

Table 7. Distance from edge of field to surface water

Distance From Edge of Field to Surface Water	Value
> 2,640’ (0.5 mile)	0
200’ to 2,640’	2
< 200’	8

Best Management Practices for Reducing Transport Losses of P

There are several best management practices (BMPs) that can reduce the transport and loss of P from agricultural fields. In many situations, a combination of management practices is more effective than one BMP alone. To account for the effect of BMPs on the off-site transport of P from agricultural fields, a reduction in the overall transport factor is applied with varying BMPs that could be implemented on farm.

Contour farming, i.e. planting across the slope instead of up and down the hill can reduce soil erosion significantly. It is estimated that contour farming can reduce sediment loss by 20 to 50% depending on the slope of the field (Wischmeier and Smith, 1978). Keeping soil surfaces covered through cover or green manure crops can reduce losses of P by reducing erosion losses, however in some cases soluble P is either not affected or can increase. Sharpley and Smith (1991) reported reductions in total P losses of 54 to 66% with the use of cover crops while soluble P was reduced by 0 to 63%. The use of perennial crops such as alfalfa will also reduce the amount of sediment and therefore P leaving the field.

The installation of a dike or a berm that captures runoff from the field will prevent the loss of both soluble and total P. The effectiveness will depend on the holding capacity of the retention area. The use of drip irrigation vs. surface irrigation can significantly reduce the amount of runoff and therefore P that is transported off site. Mchugh et al. (2008) reported a 90% reduction in total P loss from fields with subsurface drip irrigation vs. furrow irrigation. Vegetative filter strips can trap sediment thereby reducing the offsite transport of P. Abu-Zreig et al. (2003) found that filter strips removed 31 to 89% of total P with filter length being the predominant factor affecting filter strip efficacy. The use of polyacrylamide (PAM) with irrigation has been shown to reduce losses of P from both furrow and sprinkler irrigated fields. Applying PAM with irrigation water or directly to furrow soil reduced soil erosion more than 90% on research plots (Lentz et al. 1992, Sojka and Lentz 1997, Trout et al. 1995). A conservative estimate for production fields is 50% to 80% reduction in soil loss. By reducing soil erosion, PAM treatment also reduced total P concentrations in runoff water (Lentz et al. 1998) but had little impact on dissolved P concentrations (Bjorneberg and Lentz, 2005). When used with sprinkler irrigation PAM has been shown to reduce P losses by 30%, but the effectiveness of PAM is minimal after three irrigations (Bjorneberg et al., 2000). Conservation tillage can also reduce soil erodibility and increase residue in furrows, both of which reduce soil loss to irrigation return flow (Carter and Berg 1991).

Sediment ponds remove suspended material from water by reducing flow velocity to allow particles to settle. Sediment ponds also remove nutrients associated with sediment particles. A large pond removed 65% to 75% of the sediment and 25% to 33% of the total P that entered the pond (Brown et al. 1981). A smaller percentage of total P was removed because only the P associated with sediment was removed and a large portion of the total P flowing into the pond was dissolved. Average total P concentrations significantly decreased by 13 to 42% in five ponds with 2 to 15 hour retention times, while dissolved P concentrations only decreased 7 to 16% in thee of the five ponds (Bjorneberg et al., 2015). Dissolved P concentration may actually be greater in pond outflow than pond inflow because P may continue to desorb from sediment as water flows through the pond. Implementing sediment control practices on an 800 ha (2,000 ac) irrigation tract in the Columbia Basin of Washington reduced P discharges by 50% (King et al. 1982). Tailwater recovery systems that capture runoff from furrow irrigated fields and pump it back for re-use as irrigation water should eliminate the loss of P from the system during the irrigation system, provided that no water leaves the field.

The reduction in transport factor due to the implementation of BMPs is listed in Table 8. For each BMP implemented, the transport factor shall be reduced by the amounts listed in the tables. Combinations of BMPs will reduce the transport factor sequentially, for example if you had a score of 36 and you implemented contour farming and a sediment basin your score would then be:

$$36 - (0.2 \times 36) = 28.8 - (0.6 \times 28.8) = \mathbf{11.5}$$

Table 8. Management practices to reduce the loss of P from fields.

Management Practice[1]	BMP Coefficient
Contour Farming	0.20
Cover & Green Manure Crop	0.30
Dike or Berm	0.40 or 0.80
Drip Irrigation	0.80
Filter Strip[3]	0.35
PAM - Furrow Irrigation	0.60
PAM – Sprinkler Irrigation	0.30
Residue Management/Conservation Tillage[4]	0.30
Sediment Basin	0.30
Tailwater Recovery & Pumpback Systems[2]	0.80
Established Perennial Crop[5]	0.50

[1]BMPs designed by NRCS can receive full credit; otherwise the BMPs must meet the requirements set out in the BMP definition section.

Phosphorus Site Index

Part A: Phosphorus Loss Potential Due to Site and Transport Characteristics

Sample Calculation

Part A: Phosphorus Loss Potential Due to Site and Transport Characteristics

Calculation of the Total Site and Transport Value for Part A of the P Site Index

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Once the values for soil erodibility, soil surface runoff, leaching potential and distance from edge of field to surface water have been obtained, these values shall be added together to obtain a total site and transport value (sum for Part A).

EXAMPLE:

A field located in the Magic Valley with a Portneuf silt loam soil, 1.5% slope, that is surface irrigated with water running off of the field >50% of the irrigation set time. Hydrologic soil group C, K_w factor for erosion is 0.43, K_{sat} 0.2 to 0.6 in/hr, depth to water table > 80". The surface irrigation runoff flows directly into the return flow system.

Soil Erodibility
Using Table 3, a K_w factor of 0.43 with a slope of < 2% puts this in the "Low" category, with a value of **1** (Table 1).

Soil Surface Runoff
This field is surface irrigated with runoff >50% of the set time, which is a value of **8** (Table 1).

Leaching Potential
This soil is in Hydrologic Group C without a high water table and is not a shallow soil, which is a medium risk (Table 6) with a value of **2** (Table 1).

Distance from edge of field to surface water
Since the runoff from this field flows directly into the return flow system the distance from edge of field to surface water is 0' which would be a value of **8** (Table 1).

All of the field values in Part A are then added together to obtain the Total Site Transport Value

1 + 8 + 2 + 8 = 19

**If this site had a tailwater recovery and pumpback system the transport value would be reduced by 80%*

19 – (19 x 0.8) = 3.8

Sum of Part A = 3.8

Phosphorus Site Index

Part B: Phosphorus Loss Potential Due to P Source and Management Practices

Soil Test Phosphorus

Phosphorus exists in many forms in the soil, both inorganic and organic. Major inorganic forms are soluble, adsorbed, precipitated and minerals containing Al, Ca, and Fe. Each "pool" of soil P has a characteristic reactivity and potential for movement in either soluble or particulate forms. Iron and aluminum oxides, prevalent in most soils, strongly adsorb P under acidic conditions; under alkaline conditions, adsorption and precipitation are fostered by the presence of free calcium ions and calcium carbonate (Leytem and Westermann, 2003). Microorganisms and plant uptake can immobilize inorganic P by incorporation into biomass. Conversely, as organic materials decompose, soluble P can be released and made available for transport. How much P exists in each of these pools is determined by soil type, mineralogy, microbial activity, cropping, and fertilization practices (with both inorganic and organic sources of P).

Past and present research has demonstrated that there is a positive relationship between soil test P and dissolved P in surface runoff; that is, as soil test P increases, dissolved P in runoff also increases (Westermann et al., 2001; Turner et al., 2004). However, this relationship varies with soil type, cropping system and nature of the runoff episode. In addition to impacting P levels in surface waters, soil test P has also been found to affect P loss in drainage waters (Heckrath et al., 1995; Sims et al, 1998). Thus, as soils are fertilized to levels exceeding the soil test P values considered optimum for plant growth, the potential for P to be released to soil solution and transported by surface runoff, leaching, subsurface movement and even groundwater increases. Therefore, it is important to include a measure of the current soil test P values in any risk assessment tool for P.

For the *P Site Index,* soil test P values are expressed in ppm of either Olsen or Bray P. Olsen P is the most common (and appropriate) soil test for Idaho's calcareous soils. However certain regions of the state with lower soil pH (<7.4) may also use the Bray method for determination of soil test P.

P Site Index Value For Table 1 = 0.05 x Olsen Soil Test P (ppm), or

P Site Index Value For Table 1 = 0.025 x Bray Soil Test P (ppm)

Phosphorus Application Rate

The addition of fertilizer P or organic P to a field will usually increase the amount of P available for transport to surface waters. The potential for P loss when fertilizers, manures, or other P sources are applied is influenced by the rate, timing, and method of application and by the form of the P source (e.g. organic vs. inorganic). These factors also interact with others, such as the timing and duration of subsequent irrigation, rainfall or snowmelt and the type of soil cover present (vegetation, crop residues, etc.; Sharpley et al., 1993). Past research has established a clear relationship between the rate of fertilizer P applied and the amount of P transported in runoff (Baker and Laflen, 1982; Romkens and Nelson, 1974). These studies showed a linear relationship between the amount of P added as superphosphate fertilizer and P loss in runoff. Using manure as the source of P, Westerman et al. (1983) also demonstrated a direct relationship between the quality of runoff water and the application of manure. Therefore, it is important that the amount of P added to a site is accounted for in any risk assessment for nonpoint source pollution by P.

The P application rate is the amount of P in pounds P_2O_5 per acre that is applied to the crop. The amount of P in manures shall be determined either by sample submission for testing by a certified laboratory or calculated using Table 10.

Table 9. Phosphorus application rate. Corresponding value to be included in the *P Site Index (Table 1).*

P Application Rate (lbs P_2O_5 applied per acre)	Value
No Application	0
< 60	1
60 - 150	2
151 - 300	4
> 300	8

Table 10. Phosphorus concentration of dairy manure

Dairy Manure Type	%P_2O_5 on a wet basis
Solid stacked	0.57
Composted	0.69
Lagoon liquid	0.03
Slurry	0.30

Phosphorus Application Method

Directly related to the amount of fertilizer and organic P sources applied to a field is the method and timing of the application. Baker and Laflen (1982) determined that the dissolved P concentrations of runoff from areas receiving broadcast fertilizer P average 100 times more than from areas where comparable rates were applied 5cm below the soil surface. Muller et al (1984) showed that incorporation of dairy manure reduced total P losses in runoff five-fold compared to areas with broadcast applications. Surface applications of fertilizers and manures decrease the potential interaction of P with the soil, and therefore increase the availability of P for runoff from the site. When fertilizers and manures are incorporated into the soil, the soil is better able to absorb the added P and thus decrease the likelihood of P loss. It is particularly important that fertilizers and manures are not surface applied during times when there is no plant growth, when the soil is frozen, during or shortly before periods of irrigation, intense storms or times of the year when fields are generally flooded due to snowmelt. The major portion of annual P loss in runoff generally results from one or two intense transport periods. If P applications are made during any of these high risk times, the percentage of applied P lost would be higher than if applications are made when runoff probabilities are lower (Edwards et al., 1992). Also, the time between application of P and the first runoff even is important. Westerman and Overcash (1980) applied manure to plots and simulated rainfall at intervals ranging from one to three days following manure application. Total P concentrations in the runoff were reduced by 90% by delaying the first runoff event for three days. In order to manage manure and fertilizers to decrease potential for P transport off-site, they must be either applied below the surface or incorporated into the soil within a short period of time and also be applied shortly before the growing season when available P can be utilized by the plant.

For the *P site Index*: To determine the field value for application methods of P sources, information about the time of year and method of application must be obtained from the nutrient user and assigned values using Table 11.

Table 11. Values of P application methods for inclusion in *P Site Index (Table 1)*.

P Application Method	Value
None applied	0
Incorporated within 2 day or injected/banded below surface at least 2”	1
Incorporated within 7 days of application	2
Incorporated >7 days or no incorporation when applied between February 16 and December 15	4
Application between December 16 and February 15	8

The Phosphorus Site Index
Part B: Phosphorus Loss Potential Due to P Source and Management Practices

Sample Calculation

Part B: Phosphorus Loss Potential Due to P Source and Management Practices

Calculation of the Total P Source and Management Value for Part B of the P Site Index

Once the values for soil test P, P application rate and P application method have been obtained, these values shall be added together to obtain a total P source and management practice value (sum for Part B).

EXAMPLE:
The field described for calculation of Part A has an Olsen soil test P value of 80 and solid manure is applied at 50 tons/acre in October and is not incorporated.

Soil Test P value
Olsen P of 80 x 0.05 = **4**

P Application Rate
50 tons/acre = (50 x 2,000 x (0.57/100)) = 570, this would be a value of **8**

P Application Method
Surface applied between Feb 16 and Dec 15 and not incorporated, this is a value of **4**

All of the field values in Part B are then added together to obtain the Total P Source and Management Value

4 + 8 + 4 = 16

Sum of Part B = 16

The Phosphorus Site Index

Calculation and Interpretation of the Overall P Loss Rating for a Site

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To find the overall *P Loss Rating* for a site (the final *P Site Index Value*), multiply the total site and transport value from Part A by the total management and source value from Part B as follows:

***P Site Index* = [Sum of Part A] x [Sum of Part B]**

Sum of Part A = 19

Sum of Part B = 16

***P Site Index* = 19 x 16 or 304**

A *P Site Index* value of **304** is classified as **Very High (See Tables 2 or 12)**

*If a tailwater recover with a pumpback system was used as a BMP then the P Site Index value would be

Sum of Part A = 3.8

Sum of Part B = 16

***P Site Index* = 3.8 x 16 or 61**

A *P Site Index* value of **61** is classified as **Low (See Tables 2 or 12)**

Interpretation of the *P Site Index* Value

Compare the *P Site Index* value calculated as show above with the ranges given in Table 12 for Low, Medium, High, or Very High risk of P loss. **It is important to remember that a P Site Index value is an indication of the degree of risk of P loss, not a quantitative prediction of the actual amount of P lost from a given field.** Fields in the "Low" category are expected to have a lower potential for P losses than fields in the "Medium P loss rating category, while fields in the "Medium P loss rating category are expected to have a relatively lower potential for P loss than fields in the "High" P loss rating category, and so on. The numeric values used in Table 12 to separate the various P loss categories are based on the best professional judgement of the individuals involved in the development of the *P Site Index* using data from fields and farms in Idaho where field evaluations were conducted in 2017.

Table 12. Interpretation of the *Phosphorus Site Index* Value

***P Site Index* Value**	**Generalized Interpretation of the *P Site Index* Value**
< 75	**LOW** potential for P movement from this site given current management practices and site characteristics. There is a low probability of an adverse impact to surface waters from P losses from this site. Nitrogen-based nutrient management planning is satisfactory for this site. Soil P levels and P loss potential may increase in the future due to N-based nutrient management planning.
75 - 150	**MEDIUM** potential for P movement from this site given current management practices and site characteristics. Phosphorus applications shall be limited to the amount expected to be removed from the field by crop harvest (crop uptake) or soil test-based P application recommendations. Testing of manure P prior to application is required.
151 – 225	**HIGH** potential for P movement from this site given the current management practices and site characteristics. Phosphorus applications shall be limited to 50% of crop P uptake. Testing of manure P prior to application is required.
> 225	**VERY HIGH** potential for P movement from this site given current management practices and site characteristics. No P shall be applied to this site.

Best Management Practice Definitions

Contour Farming. Farming sloping land in such a way that planting is done on the contour (perpendicular to the slope direction). This practice would apply to fields having a slope of 2% or greater. When converting from surface to sprinkler irrigation, this can be as simple as planting across the direction of the surface water flow. For other more complex settings, the maximum row grade shall not exceed half of the downslope grade up to a maximum of 4%. The minimum ridge height shall be 2 inches for row spacing greater than 10 inches and 1 inch for row spacing less than 10 inches.

Cover & Green Manure Crop. A cover and/or green manure crop is a close-growing crop primarily for seasonal protection and soil improvement. This practice reduces erosion by protecting the soil surface. Cover crops must be established (have vegetative cover over a minimum of 30% of the soil) by November 1 and must be maintained to within 30 days prior to planting the following crop. There shall be a minimum of 2 to 3 plants per square foot (about 100,000 plants/acre).

Dike or Berm. This practice applies to non-surface irrigated fields only and is comprised of an embankment to retain water on the field. The dike or berm must be engineered to retain runoff from a 25 year 24 hour storm event (0.8 BMP coefficient) or from 1 inch of runoff from the field (0.4 BMP coefficient).

Drip Irrigation. The credit for implementing this practice only applies when switching from surface irrigation to drip irrigation. A drip irrigation system shall be comprised of an irrigation system with orifices, emitters or perforated pipe that applies water directly to the root zone or soil surface. This practice efficiently applies water to the soil surface with low probability of runoff, as determined using the calculation in Table 5.

Filter Strip. A filter strip is a strip of permanent herbaceous dense vegetation in an area where runoff occurs. A filter strip can only be used on fields having < 10% slope. Ideally they are perpendicular to the flow of water and the runoff from the source area is such that flow through the strip is in the form of sheet runoff. Channeling of water through a filter strip will severely reduce its effectiveness. Filter strips must be a minimum of 20 feet in length. If the length of the field contributing runoff to the filter strip is greater than 1000 feet, then the minimum filter strip width shall be 50 feet. They must be irrigated and maintained so that there is a minimum of 75% vegetative cover. The seeding rate shall be sufficient to ensure that the plant spacing does not exceed 4 inches (about 16-18 plants per square foot).

Polyacrylamide (PAM). PAM is an organic polymer that stabilizes the soil surface when applied with irrigation water. This practice can increase infiltration and reduce soil erosion. The PAM must be a soluble anionic polyacrylamide. Standards for proper implementation of this BMP shall follow the NRCS Conservation Practice Standard “Anionic Polyacrylamide (PAM) Application” (450-CPS-1).

Residue Management/Conservation Tillage. is any method of soil cultivation that leaves the previous year crop residue cover on the soil surface (such as corn stock or wheat stubble).. Conservation tillage must result in crop residue remaining on at least 30% of the soil surface. This practice reduces soil erosion by protecting the soil surface.

Sediment Basin. A basin or pond constructed to collect and retain sediment. This practice slows the velocity of flowing water which allows sediment to settle in the basin. Sediment basin size must be at least 500 cubic feet per acre of drainage area (20,000 ft^3 for 40 acre field or 20 ft x 200 ft x 5 ft). The length-to-width ratio shall be 2 to 1 or greater with a minimum depth of 3 feet. Sediment basins must be cleaned on an annual basis or more frequently.

Tailwater Recovery & Pumpback Systems. This practice applies to surface irrigated fields only. Design standards and management must follow the ASABE Engineering Practice Standard 408.3 "Surface Irrigation Runoff Reuse Systems". Irrigation runoff reuse systems have four basic components: 1) runoff collection and conveyance channels (tailwater ditches, drains), 2) storage reservoir (tailwater pit, pond, sump), 3) pumping plant (reuse, return, pumpback pump), and 4) delivery pipe (return, pumpback pipe). Runoff from irrigated fields is intercepted by a system of open channels or pipelines and conveyed by gravity to a storage reservoir or pumping plant. Capacity of the channels and pipelines shall be sufficient to convey the maximum expected runoff rate from irrigation. Also, the collection system must be able to safely convey or bypass runoff from precipitation. Reuse systems designed to capture 50% of the application volume will usually capture a large percentage of the total irrigation runoff.

Established Perennial Crop. This is a crop that is grown for more than one year. Perennial crop is considered to be "established" the season after it was seeded.

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NITROGEN MANAGEMENT PLAN WORKSHEET

NAME ______________________________

Crop Year (Harvested) ______________________________

Field ID ______________________________

Acres ______________________________

Crop Nitrogen Management Planning	
1. Crop	
2. Production Unit	
3. Projected Yield (units/acre)	
4. N Recommended (lbs/acre)	
Post Production Actuals	
5. Actual Yield (units/acre)	
6. Total N Applied (lbs/acre)	
7. N Removed (lbs/acre)	
Notes:	
PSNT Test:	

N Applications/Credits	Recommended/ Planned N	Actual N
Manure/Organic Material N		
8. Available N in Manure/Compost (lbs/acre)		
Nitrogen Fertilizers		
9. Dry/Liquid N (lbs/acre)		
10. Foliar N (lbs/acre)		
11. Total Available N Applied (lbs/acre)		
Nitrogen Credits		
12. Available N in soil (lbs/acre)		
13. N in Irrigation Water (lbs/acre)		
14. Total N Credits (lbs/acre)		
15. Total N Applied & Available		

Certified By:	
Date:	

Instructions

1. This is the crop that is planted in the year for which the information is recorded.
2. This is the crop yield units ie. bushels, tons, cwt, etc.
3. Projected yield (units/acre). This is the yield that you are anticipating for this crop in this year.
4. N Recommended (lbs/acre). This is the amount of N recommended based on the projected yield.
5. Actual Yield (units/acre). The actual harvested yield on this field for this crop.
6. Total N Applied (lbs/acre). The actual amount of total N that was applied to this crop during this season from line 11.
7. N Removed (lbs/acre). The amount of N that was removed with the crop (calculated by summing all of the biomass removed multiplied by the tissue N concentration of the different biomass pools)
8. Available N in Manure/Compost (lbs/acre). This is the total amount of plant available N applied for the growing season including previous fall applications. Use Table 1 to determine the % PAN of total N in manure/compost/liquid/slurry etc.
9. Dry/Liquid N (lbs/acre). This is the total amount of N applied as fertilizer including starter fertilizer, broadcast applications, in season side-dress applications and any N applied with irrigation.
10. Foliar N (lbs/acre). This is the total amount of N applied as a foliar spray during the growing season.
11. Total Available N Applied (lbs/acre). This is the sum of blocks 8, 9 and 10.
12. Available N in soil (lbs/acre). This is determined from soil samples collected within 8 months of planting. It is preferential to collect a pre-plant soil sample within 3 weeks of planting for the most accurate accounting of N in soil. This must include soils from 0 to 12". The lbs/acre is calculated by multiplying the average ppm N ($NH_4 + NO_3$) in the 0 to 12" sample by 4. It is preferential to account for the N in the top 2' of soil. If you have soil samples from 0 to 12" and 12 to 24" you would multiply each sample by 4 and then add them together (0 to 12" ppm N x 4) + (12 to 24" ppm N x 4). Alternatively, if you only have a 0 to 12" soil sample you could multiply the ppm N x 8 to represent the first 2', however this is not as accurate.
13. N in irrigation water (lbs/acre). If irrigation water contains N, the N applied with irrigation water must be included.
14. Total N Credits (lbs/acre). This is the sum of blocks 12 and 13.
15. Total N Applied and Available. This is the sum of blocks 11 and 14.

Table 1. Plant available N in manure

Manure Source	N available (%)
Lagoon Liquid	80
Lagoon Slurry/Sludge	60
Solid Stacked Manure (corral)	30
Composted Manure	10

ADDRESSES: You may submit comments (identified by Docket No. IC20–19–000) by either of the following methods:

• *eFiling at Commission's Website: http://www.ferc.gov/docs-filing/efiling.asp.*

• *Mail/Express Services:* Persons unable to file electronically may mail similar pleadings to the Federal Energy Regulatory Commission, 888 First Street NE, Washington, DC 20426. Hand delivered submissions in docketed proceedings should be delivered to Health and Human Services, 12225 Wilkins Avenue, Rockville, Maryland 20852.

Instructions: All submissions must be formatted and filed in accordance with submission guidelines at: *http://www.ferc.gov/help/submission-guide.asp.* For user assistance, contact FERC Online Support by email at *ferconlinesupport@ferc.gov,* or by phone at: (866) 208–3676 (toll-free).

Docket: Users interested in receiving automatic notification of activity in this docket or in viewing/downloading comments and issuances in this docket may do so at *http://www.ferc.gov/docs-filing/docs-filing.asp.*

FOR FURTHER INFORMATION CONTACT: Ellen Brown may be reached by email at *DataClearance@FERC.gov* and telephone at (202) 502–8663.

SUPPLEMENTARY INFORMATION:

OMB Control No.: 1902–0099.

Abstract: The FERC Form 561 responds to the FPA requirements for annual reporting of similar types of positions which public utility officers and directors hold with financial institutions, insurance companies, utility equipment and fuel providers, and with any of an electric utility's 20 largest purchasers of electric energy (*i.e.,* the 20 entities with high expenditures of electricity). The FPA specifically defines most of the information elements in the Form 561 including the information that must be filed, the required filers, the directive to make the information available to the public, and the filing deadline.

The Commission uses the information required by 18 CFR 131.31 and collected by the Form 561 to implement the FPA requirement that those who are authorized to hold interlocked directorates annually disclose all the interlocked positions held within the prior year. The Form 561 data identifies persons holding interlocking positions between public utilities and other entities, allows the Commission to review these interlocking positions, and allows identification of possible conflicts of interest.

Type of Respondents: Public utility officers and directors holding financial positions, insurance companies, security underwriters, electrical equipment suppliers, fuel provider, and any entity which is controlled by these.

Estimate of Annual Burden: [1] The Commission estimates the total annual burden and cost [2] for this information collection as follows:

FERC FORM 561, (ANNUAL REPORT OF INTERLOCKING POSITIONS)

Number of respondents	Annual number of responses per respondent	Total number of responses	Average burden & cost per response	Total annual burden hours & total annual cost	Cost per respondent ($)
(1)	(2)	(1) * (2) = (3)	(4)	(3) * (4) = (5)	(5) ÷ (1)
2,700	1	2,700	0.25 hrs.; $20.00	675.00 hrs.; $54,000	$20.00

Comments: Comments are invited on: (1) Whether the collection of information is necessary for the proper performance of the functions of the Commission, including whether the information will have practical utility; (2) the accuracy of the agency's estimates of the burden and cost of the collection of information, including the validity of the methodology and assumptions used; (3) ways to enhance the quality, utility and clarity of the information collection; and (4) ways to minimize the burden of the collection of information on those who are to respond, including the use of automated collection techniques or other forms of information technology.

Dated: May 7, 2020.

Kimberly D. Bose,

Secretary.

[FR Doc. 2020–10252 Filed 5–12–20; 8:45 am]

BILLING CODE 6717–01–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–10009–53–Region 10]

Final Reissuance of NPDES General Permit for Concentrated Animal Feeding Operations in Idaho (IDG010000)

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final reissuance of NPDES general permit.

SUMMARY: The Director of the Water Division, Environmental Protection Agency (EPA), Region 10, is reissuing the National Pollutant Discharge Elimination System (NPDES) General Permit for Concentrated Animal Feeding Operations (CAFOs) located in Idaho, excluding facilities in Indian Country. The General Permit authorizes discharges of wastewater from CAFOs. The previous permit NPDES General Permit for CAFOs in Idaho expired on May 8, 2017. This permit will transfer to the State of Idaho in July 2020 as part of the phased implementation of Idaho's administration of the NPDES program. The EPA will remain the permitting authority for CAFO facilities located in Indian Country in Idaho.

DATES: The issuance date of the General Permit is May 13, 2020. The General Permit will be effective on June 15, 2020 and will expire on June 14, 2025.

ADDRESSES: Copies of the general permits, Fact Sheet and Response to Comments are available upon request. Written requests may be submitted to: Water Division; USEPA Region 10; 1200 Sixth Avenue, Suite 155, WD19–C04; Seattle, WA 98101–3188. These documents can be accessed online on the EPA Region 10 website at: *https://www.epa.gov/npdes-permits/npdes-general-permit-concentrated-animal-feeding-operations-cafos-idaho.*

[1] Burden is the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. For further explanation of what is included in the information collection burden, refer to Title 5 Code of Federal Regulations 1320.3.

[2] Commission staff estimates that the industry's skill set and cost (for wages and benefits) for FERC–561 are approximately the same as the Commission's average cost. The FERC 2019 average salary plus benefits for one FERC full-time equivalent (FTE) is $167,091/year (or $80.00/hour).

FOR FURTHER INFORMATION CONTACT: Requests may be made to Audrey Washington at (206) 553–0523 or to Nicholas Peak at (208) 378–5765. Requests may also be electronically mailed to: *washington.audrey@epa.gov,* or *peak.nicholas@epa.gov.*

SUPPLEMENTARY INFORMATION:

I. General Information

All animal feeding operations (AFOs) that meet the regulatory definition of a CAFO and are subject to 40 CFR part 412 are eligible for coverage under the permit, excluding facilities in Indian Country. Eligible CAFOs may apply for authorization under the terms and conditions of the permit by submitting a Notice of Intent (NOI) and nutrient management plan (NMP). Upon receipt, the EPA will review the NOI and NMP to ensure that all permit requirements are met. If the EPA makes a preliminary determination that the NOI is complete, the NOI, NMP, and draft terms of the NMP to be incorporated into the permit will be made available for a thirty (30) day public review and comment period.

If determined appropriate by the EPA, CAFOs will be granted coverage under the permit upon written notification by the EPA.

The EPA received 81 comments from six different organizations/entities during the public comment period which extended from October 23, 2019 through December 9, 2019. A Response to Comments document was prepared to respond to public comments received and explain any changes made to the draft general permit to produce the final general permit. The EPA received the final State CWA 401 certification on April 8, 2020.

The EPA has completed a Biological Evaluation for these Permit actions. Consultation under the Endangered Species Act between the EPA and the National Marine Fisheries Service and the U.S. Fish and Wildlife Service has been completed. The Services concurred on the EPA's determination that the Permit actions are not likely to adversely affect species listed under the Endangered Species Act or designated critical habitat.

II. Other Legal Requirements

This action was submitted to the Office of Management and Budget (OMB) for review under Executive Orders 12866, *Regulatory Planning and Review,* and 13563, *Improving Regulation and Regulatory Review,* and was determined to be not significant.

Dated: May 7, 2020.

Daniel D. Opalski,

Director, Water Division, Region 10.

[FR Doc. 2020–10227 Filed 5–12–20; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL ACCOUNTING STANDARDS ADVISORY BOARD

Notice of Issuance of Statement of Federal Financial Accounting Concepts 9, *Materiality: Amending Statement of Federal Financial Accounting Concepts (SFFAC) 1, Objectives of Federal Financial Reporting, and SFFAC 3, Management's Discussion and Analysis*

AGENCY: Federal Accounting Standards Advisory Board.

ACTION: Notice.

Pursuant to 31 U.S.C. 3511(d), the Federal Advisory Committee Act, as amended (5 U.S.C. App.), and the FASAB Rules Of Procedure, as amended in October 2010, notice is hereby given that the Federal Accounting Standards Advisory Board (FASAB) has issued Statement of Federal Financial Accounting Concepts (SFFAC) 9, *Materiality: Amending Statement of Federal Financial Accounting Concepts (SFFAC) 1, Objectives of Federal Financial Reporting, and SFFAC 3, Management's Discussion and Analysis.*

SFFAC 9 is available on the FASAB website at *https://fasab.gov/accounting-standards/.* Copies can be obtained by contacting FASAB at (202) 512–7350.

FOR FURTHER INFORMATION CONTACT: Ms. Monica R. Valentine, Executive Director, 441 G Street NW, Suite 1155, Washington, DC 20548, or call (202) 512–7350.

Authority: Federal Advisory Committee Act (5 U.S.C. App.).

Dated: May 4, 2020.

Monica R. Valentine,

Executive Director.

[FR Doc. 2020–10154 Filed 5–12–20; 8:45 am]

BILLING CODE 1610–02–P

FEDERAL COMMUNICATIONS COMMISSION

[OMB 3060–1210; FRS 16737]

Information Collection Being Reviewed by the Federal Communications Commission

AGENCY: Federal Communications Commission.

ACTION: Notice and request for comments.

SUMMARY: As part of its continuing effort to reduce paperwork burdens, and as required by the Paperwork Reduction Act of 1995 (PRA), the Federal Communications Commission (FCC or Commission) invites the general public and other Federal agencies to take this opportunity to comment on the following information collections. Comments are requested concerning: Whether the proposed collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; the accuracy of the Commission's burden estimate; ways to enhance the quality, utility, and clarity of the information collected; ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology; and ways to further reduce the information collection burden on small business concerns with fewer than 25 employees.

The FCC may not conduct or sponsor a collection of information unless it displays a currently valid Office of Management and Budget (OMB) control number. No person shall be subject to any penalty for failing to comply with a collection of information subject to the PRA that does not display a valid OMB control number.

DATES: Written PRA comments should be submitted on or before July 13, 2020. If you anticipate that you will be submitting comments, but find it difficult to do so within the period of time allowed by this notice, you should advise the contact listed below as soon as possible.

ADDRESSES: Direct all PRA comments to Nicole Ongele, FCC, via email *PRA@fcc.gov* and to *Nicole.ongele@fcc.gov.*

FOR FURTHER INFORMATION CONTACT: For additional information about the information collection, contact Nicole Ongele, (202) 418–2991.

SUPPLEMENTARY INFORMATION:

OMB Control Number: 3060–1210.

Title: Wireless E911 Location Accuracy Requirements (PS Docket No. 07–114).

Form Number: N/A.

Type of Review: Revision of a currently approved collection.

Respondents: Business or other for-profit, State, Local or Tribal Government, and Federal Government.

Number of Respondents and Responses: 4,394 respondents; 29,028 responses.

Response to Comments

Idaho Concentrated Animal Feeding Operation General Permit (IDG010000)

Introduction

On October 23, 2019, the U.S. Environmental Protection Agency Region 10 (EPA) issued a public notice for the proposed reissuance of the National Pollutant Discharge Elimination System (NPDES) General Permit for Concentrated Animal Feeding Operations in the State of Idaho excluding Tribal lands (IDG010000). The public comment period closed December 9, 2019.

During the public comment period, the EPA received comments from the following:

Commenter	Comments
Idaho Cattle Association	ICA #1 - #22
Idaho Dairymen's Association	IDA #1 - #16
Idaho Conservation League	ICL #1 - #4
J.R. Simplot Co.	JRS #1 - #20
Food & Water Watch	FWW #1 - #18
In Defense of Animals*	IDOA #1
* 5,758 individuals submitted this comment on the draft permit to the EPA.	

This document presents the comments received and provides corresponding responses to those comments. Where comments resulted in changes to permit language, those are so noted.

The Idaho Department of Environmental Quality (IDEQ) transmitted its final CWA §401 certification to the EPA on April 8, 2019. The certification is included in the Administrative Record for this permit.

Note: The EPA has reproduced comments as accurately as possible in this document. Formatting has been modified in order to fit a single response to comment document format, including removal of footnotes. In converting from pdf formats to incorporate comments into this document, minor errors may have occurred. The original comment letters are included in the Administrative Record for the Final Permit.

Response to Comments

Comment ICA #1 (Idaho Cattle Association)
I.B.4. The Beef Environmental Control Act in the state of Idaho designates Nutrient Management Plans as trade secrets and therefore should not be subject to public comment.

> **EPA Response:** Pursuant to 40 CFR §122.23(h) the permitting authority must make available for public review and comment the notice of intent (NOI) submitted by the CAFO, including the CAFO's nutrient management plan (or NMP), and the draft terms of the nutrient management plan to be incorporated into the permit. Any subsequent revisions to the nutrient management plan must also be available to the public. 40 CFR §122.42(e)(6)(ii)(A) and (B). Furthermore, 40 CFR §122.7 states that "[i]nformation required by NPDES application forms...may not be claimed confidential. This includes information submitted on the forms...and any attachments...." Therefore, nutrient management plans are required to be subject to public comment and cannot be claimed as confidential and/or trade secrets.
>
> Idaho's regulations are not inconsistent with the federal Clean Water Act. In seeking NPDES permitting authority, Idaho explained that nutrient management plans are not considered trade secrets for those CAFOs regulated under the Clean Water Act. Idaho Attorney General's Statement, IPDES Application at p. 3. Moreover, the Beef Environmental Control Act specifically states that "[t]he provisions of [the Act] do not alter the requirements, liabilities and authorities with respect to or established by an Idaho NPDES program." Thus, even when IDEQ obtains permitting authority, nutrient management plans for regulated CAFOs will not be considered trade secrets.

Comment ICA #2 (Idaho Cattle Association)
I.B. There is no requirement for the EPA to make a timely determination on completeness of an application. Even though an operation has applied for a NOI, it would be out of compliance until the NOI has been approved by the EPA. The Idaho Cattle Association recommends that the EPA have 30 days to determine if an NOI is complete.

> **EPA Response:** A NPDES permit sets forth requirements for permittees, not requirements for the NPDES permitting authority. However, it is the EPA's intent to conduct timely review of NOIs and NMPs to provide permit coverage to a CAFO as soon as possible.

Comment ICA #3 (Idaho Cattle Association)
I.B. Existing CAFO's have no control on whether a location has been designated as historical. Also, outside organizations could attempt to designate a CAFO as historical and use the language in this permit to cause additional burdens to the CAFO. This section has nothing to do with the CWA and should be stricken.

> **EPA Response:** Pursuant to 40 CFR §122.49(b), the EPA is required to consider the applicability of the National Historic Preservation Act of 1966 and consult with the relevant State/Tribal Historic Preservation Officer(s) when issuing permits. In order to ensure that the permitting action will not have an effect on historic properties, the permit contains a condition where a CAFO is not eligible for coverage under the general permit where there will be an effect on historic properties. In such cases, the CAFO owner/operator should consult with the State/Tribal Historic Preservation Officer regarding measures needed to mitigate effects on

historic properties. These measures can be included in an individual NPDES permit. See Part I.F.1.c of the Final Permit. Since the general permit does not allow CAFOs to obtain coverage when they effect historic property, the EPA has removed the provisions regarding consultation with the State/Tribal Historic Preservation Officer as such consultation will be done during the individual NPDES permitting process. The EPA notes that the designation of historic properties is outside the scope of this permitting action.

Comment ICA #4 (Idaho Cattle Association)
I.C. Only if a permittee chooses to be repermitted can the EPA compel a permittee to re-apply for permit coverage 180 days prior to the expiration of a current permit. If a CAFO owner/operator does not choose to be repermitted, the EPA may not require him to reapply.

EPA Response: 40 CFR §122.21(d), *Duty to reapply*, requires that permittees with currently effective permits shall submit a new application 180 days before the existing permit expires. The EPA agrees that the agency cannot require a permittee to reapply for permit coverage. However, it should be noted that if the permittee does not reapply for permit coverage, the prior general permit will expire, and the permittee will no longer have permit coverage.

Comment ICA #5 (Idaho Cattle Association)
II.A.1.b. Beef cattle operations are only required to have 120 days of storage. Therefore, this should be changed to read: "During the required storage period for the operation."

EPA Response: The EPA is modifying the permit to include the same language regarding the ELGs applicable to the production area that was contained in the expired 2012 permit. Therefore, EPA has removed "of 180 days" from II.A.1.b.

Comment ICA #6 (Idaho Cattle Association)
II.A.2.a.ii. Daily inspection is not reasonable especially since many of these lines are underground. Weekly inspection should be adequate.

EPA Response: 40 CFR §412.37(a)(1)(ii) requires daily inspection of water lines, including drinking water or cooling water lines. See also response to comment IDA #12.

Comment ICA #7 (Idaho Cattle Association)
II.B.8.b. It is recommended that alternative conservation practices that are designed in consultation with a Profession Engineer (P.E.) licensed in the State of Idaho also be approved as an alternative to a 100 ft wellhead setback or 35 ft vegetative buffer.

EPA Response: This alternative has been included in the Final Permit.

Comment ICA #8 (Idaho Cattle Association)
II.A. Proposed addition: Tightlining. Many CAFO facilities have a discharge from an animal watering system that is not contaminated by manure or litter. This form of watering system is called tightlining. Tightlining involves collecting the trough water overflow directly from the top of the tank into a sealed pipe thereby not allowing for contamination. ICA recommends making the following addition: There must be no discharge of manure, litter, or process wastewater pollutants into waters of the United States from the production except as provided below:

1. *Whenever precipitation causes an overflow of manure, litter, or process wastewater, pollutants in the overflow may be discharged into waters of the United States provided:*
   a. *The production area is properly designed, constructed, operated and maintained to contain all manure, litter, process wastewater, and runoff and direct precipitation from a 25-year, 24-hour storm event for the location of the CAFO.*

2. *Tightline water trough overflow that is managed as follows.*
   a. *Water trough overflow that is discharged in a closed pipe directly from the water trough past the process area so no manure or litter contamination can occur.*
   b. *Only occurs in the winter months to prevent freezing.*
   c. *Management of tightline overflow is included in the Nutrient Management Plan*

> **EPA Response:** Overflows from trough water systems include pollutants that may be discharged to waters of the U.S. As such, the permit needs to address these discharges. Discharges from the production area are allowed only when in compliance with Part II.A.1 of the Final Permit. No change has been made to the permit as a result of this comment.

Comment ICA #9 (Idaho Cattle Association)
III.A.2.a.i. The comments reference the IDAWM software. It is our understanding that this software is no longer in use and should be replaced with the appropriate software. In addition, an alternative provision should be added to allow a producer to demonstrate that the facility is designed with adequate storage capacity as determined by runoff and design calculations conducted by a Professional Engineer (P.E.) licensed in the state of Idaho, followed by an as built survey conducted by a Professional Engineer (P.E.) licensed in the state of Idaho.

> **EPA Response:** The EPA acknowledges that the IDAWM software is no longer in use; however, the IDAWM spreadsheet can still be used for purposes of making this specific calculation. In addition, the EPA agrees to include alternative provisions to allow the permittee to demonstrate adequate storage capacity through alternative documentation. The EPA has made this change to the Final Permit. See IDA comment #6.

Comment ICA #10 (Idaho Cattle Association)
III.A.2.a.ii. The comments reference the use of the Washington NRCS Engineering Technical Note #23 for use in ensuring the proper operation and maintenance of wastewater and manure storage structures. It is recommended other standards that are shown to be equally protective to the Washington NRCS Engineering Technical Note #23 also be allowed to be used to prove compliance of existing wastewater and manure storage structures. This request is made due to the fact that some existing storage structures may have been previously designed using equally protective standards from other states and these standards have already been documented. Allowing the use of current documentation, a producer has on file to prove equal protection standards could potential save the producer thousands of dollars in consulting fees while attaining the same level or environmental protection.

> **EPA Response:** As suggested by the commenter, an alternative demonstration, certified by a professional engineer, has been included in the Final Permit. See IDA comment #6.

Comment ICA #11 (Idaho Cattle Association)

III.A.2.b. The NPDES permit should not be dictating how mortalities are handled other than they need to be handled so as to not contaminate waters of the US.

> **EPA Response:** The mortality handling provisions of Part III.A.2.b are consistent with the regulatory requirements at 40 CFR §412.37(a)(4); NRCS Conservation Practice Standards 316 (Animal Mortality Facility) and 368 (Emergency Animal Mortality Management); and Idaho's regulations for Dead Animal Movement and Disposal (IDAPA 02.04.17). The requirements in the permit provide the producer significant latitude to determine schedules, on-site storage methods, final disposal methods, etc. The Permit only requires that these elements of mortality management be described in the NMP. No change has been made to the permit as a result of this comment.

Comment ICA #12 (Idaho Cattle Association)
III.A.2.f. Dairies may opt to use the P Index. We recommend changing this to read: "facilities may opt". As in the course of the next five years, other types of facilities may utilize the P Index.

> **EPA Response:** This change has been made in the Final Permit.

Comment ICA #13 (Idaho Cattle Association)
III.A.2.h. ICA recommends that actual crop removal data gathered through crop tissue testing at the time of harvest also be allowed to be used for calculating crop nutrient needs and land application rates. Actual crop removal data is the most specific and accurate data available.

> **EPA Response:** The Final Permit allows for the use of alternative methods for calculating crop nutrient needs and land application rates. In the absence of specific Land Grant University fertilizer or production guides, the NMP can identify and include the best available data, like actual crop removal data, used to determine specific land application rates for the crop, if all data and calculations are appropriately documented in the NMP.

Comment ICA #14 (Idaho Cattle Association)
III.A.2.h. ICA also recommends that land application rates of nutrients in the NMP only be calculated in terms of pounds per acre for a given crop and yield. Application volumes of manure, litter or process wastewater can later be calculated at the time of application based on the nutrient concentration of the manure, litter or process wastewater to be applied. This will better allow for adjustment of application volumes based on nutrient variability that may take place in the manure, litter or process wastewater throughout the year. Actual land application volumes applied can be recorded in the annual report along with the calculations showing that total nutrient applications did not exceed the crop nutrient requirements.

> **EPA Response:** The EPA emphasizes that the nutrient management plan submitted with the NOI *must* include application volume calculations so that the permitting authority can undertake a reasonable evaluation of the NMP. These volumes must also be included in all annual reports. However, the Final Permit now clarifies that application volumes of manure, litter and process wastewater may be calculated immediately prior to application.

Comment ICA #15 (Idaho Cattle Association)

III.A.5.b. Lists four items that EPA considers substantial changes but does not limit it to only these changes. ICA recommends defining all changes that are considered to be substantial in the permit and not leaving it open to arbitrary judgment.

> **EPA Response:** This requirement is taken directly from the regulations at 40 CFR §122.42(e)(6)(iii)(A)-(D). No change has been made as a result of this comment.

Comment ICA #16 (Idaho Cattle Association)
II.A.5.b. Again, NMP are deemed a trade secret in Idaho code and should not be available for public comment.

> **EPA Response:** See response to comment ICA #1.

Comment ICA #17 (Idaho Cattle Association)
III.B. The permit calls for any damage to the liner to be evaluated by an engineer and corrected within 30 days. ICA recommends that damage should be evaluated by an engineer and corrected by the appropriate season. 30 days does not allow adequate time to utilize a professional engineer in this process.

> **EPA Response:** Manure, litter and process wastewater storage structures are used in all seasons, so it is unclear what the commenter means by "*the appropriate season*". Since liner damage can result in significant environmental harm if it is not repaired, a timeline must be included in the Permit. However, the EPA acknowledges that there may be certain situations where a delay may be justified, and has modified this sentence in the Final Permit to read: *Any damage to the liner must be evaluated by a Professional Engineer and corrected within thirty (30) days of the damage, <u>unless the Permitting Authority approves an alternative schedule. The permittee must submit the request within thirty (30) days of the damage, and it must include the PE evaluation of the risks of pollutant releases if the liner is not repaired immediately</u>.*

Comment ICA #18 (Idaho Cattle Association)
III.C. This section of the permit should be omitted from the NPDES. If a facility has terminated coverage under the NPDES closure it should not be regulated by the permit.

> **EPA Response:** The Facility Closure provisions in Part III.C of the permit stipulate the protective measures that must be taken in order to close the facility prior to terminating permit coverage. The EPA notes that discharges from the facility following termination of permit coverage may constitute violations of the Clean Water Act. Thus, careful attention to closure procedures is in the best interest of the operator. No change has been made to the permit as a result of this comment.

Comment ICA #19 (Idaho Cattle Association)
IV.B. ICA recommends that the annual reports only be required to contain field and corresponding application information for fields listed in the facilities NMP that received manure, litter or process wastewater in that given year. Fields that did not receive manure, litter or process wastewater should be allowed to be excluded from the annual report until which time they receive manure, litter or process wastewater. This is the processing utilized by other states in their NMP/NPDES annual reporting processes.

EPA Response: Annual reports need only include information on fields that received manure, litter and process wastewater during a given reporting year. This requirement has been clarified in the Annual Report Template of the Final Permit.

Comment ICA #20 (Idaho Cattle Association)
IV.B. Many of the reporting requirements are considered confidential. ICA recommends not submitting information in an annual report, but maintaining this information on site, which EPA can review.

EPA Response: Per 40 CFR §122.42(e)(4) all of the reporting requirements in the permit are required elements of annual reports that must be submitted to the permitting authority. See response to comment ICA #1.

Comment ICA #21 (Idaho Cattle Association)
IV.C. ICA recognizes the former WOTUS rule has been vacated and the latest definition needs to be used in the permit.

EPA Response: See response to comment JRS #20.

Comment ICA #22 (Idaho Cattle Association)
IV.C. ICA's understanding is that any manure that spills from a truck on the way to a stockpile area or field is considered a discharge. It is also ICA's interpretation, leaving a feedlot and driving on to a roadway with manure on your tires you drive through a feed yard, it would be considered a discharge. This standard is unreasonable and would be impossible to manage.

EPA Response: A spill to a roadway is only a discharge if it reaches waters of the U.S. Thorough and timely clean-up should prevent an actual discharge. If the commenter is requesting release from responsibility for spills that result in a discharge of pollutants to waters of the U.S., the EPA cannot provide such assurance in an NPDES permit. With respect to expectations regarding spill response please see 40 CFR §122.41 *Duty to Mitigate* (Part V.B.4 of the Final Permit) and 40 CFR §122.41(l)(6)(i) *Noncompliance Reporting* (Part IV.C, Unauthorized Discharges and IV.E, Spills/Releases of the Final Permit).

Comment IDA #1 (Idaho Dairymen's Association)
With the transfer of permitting authority from EPA to the Idaho Department of Environmental Quality ("IDEQ") rapidly approaching (July 1, 2020); EPA's proposed reissuance of a NPDES General Permit for CAFOs in Idaho is ill-timed and inadequately informed by the needs, requirements and processes of dairy environmental management in Idaho. IDA recommends that issuance of a new General Permit for dairy operations and other CAFOs in Idaho be delayed until IDEQ takes over permitting authority and has an opportunity to work with the Idaho State Department of Agriculture ("ISDA''), IDA and other interested parties in Idaho to develop a permit that is tailored to the meet the challenges, needs and expectations of dairy environmental management in Idaho.

Among regulatory agencies, ISDA has the most direct, in-depth knowledge and experience with dairy environmental management and administration in Idaho. More than any other government agency, ISDA understands dairy nutrient management planning and containment structure construction and maintenance. IDA has participated in IDEQ's workgroup developing guidance for the anticipated IPDES CAFO permits to ensure that IDPES permit provisions and procedures are clear, consistent with the law and dairy environmental management in Idaho, and do not create conflicts between IPDES permitting and dairy environmental management administration and enforcement by ISDA. Unfortunately, ISDA has not been sufficiently involved in the development of EPA's Draft Permit. This is evident from several proposed permit provisions that reference, incorporate or apply guidance documents and standards that are not used or pertinent to dairy environmental management in Idaho. As proposed, EPA's draft permit contains numerous provisions that will create confusion and conflicting standards for regulatory agencies and permittees, as well as undue hardship for dairyoperators.

If EPA does not postpone reissuance of an NPDES Permit to allow IDEQ to develop and issue a permit that will work in Idaho, IDA recommends that a section be added to the beginning of the permit that explains the posture and timeline of this permit. At a minimum, it should explain that: (1) this permit will be enforced by EPA until Idaho gains primacy of its CAFO permits in 2020; (2) once Idaho gains primacy, this permit will be enforced by Idaho agencies; (3) the effective period of this permit and Idaho's intent to use this permit as the IPDES permit until it writes its own; and (4) precisely what Idaho agencies must be contacted for each requirement once Idaho gains primacy of the permit. There are numerous points in the permit that refer to reports being made to EPA, but they do not indicate to whom those reports must be made once Idaho takes primacy. Because this Draft Permit will become the Idaho Pollution Discharge Elimination System (IPDES) Program permit in 2020, we feel it is necessary to clearly delineate this information at the beginning of the document so that permittees can clearly understand the framework and reporting requirements of the final permit.

IDA also encourages EPA to recognize and implement the common sense and practical approach that IDA has taken in recommending the solutions contained herein. CAFOs, and especially dairies, are dynamic operations with complex operational challenges. As such, the requirements that permittees are held to should be realistic and reflect actual working conditions of a dairy, rather than idealistic requirements from text books that are not practically attainable on the ground during the normal course of operation. *As* a group that represents real-life, potential permittees, IDA hopes that this collaborative approach will provide insight to bridge the gap between agency expectations and what is realistically attainable by the permittees themselves.

> **EPA Response:** ISDA and IDEQ have a Memorandum of Understanding between the agencies that primarily deals with inspections once IDEQ obtains CAFO permitting authority; however, ISDA will not have any NPDES permitting or enforcement authority. Once general permitting authority is transferred on July 1, 2020, IDEQ is the sole IPDES permitting authority for CAFOs in the State. The EPA and IDEQ developed the phased schedule for transfer of the NPDES program with the specific understanding that the CAFO General Permit will be in place prior to the transfer of the general permitting program on June 1, 2020. For additional details on roles and responsibilities associated with the transfer of the Idaho NPDES program see: https://www.epa.gov/npdes-permits/idaho-npdes-program-authorization. As explained in the Fact Sheet, once the permit transfers to IDEQ, all documentation required by the permit would be sent to IDEQ rather than to the EPA and any decision under the permit stated to be made by the EPA or jointly between the EPA and IDEQ will be made solely by IDEQ. See Fact Sheet at p. 4. No further clarification is necessary with regard to the permit.

Comment IDA #2 (Idaho Dairymen’s Association)
I.F.2 IDA recommends changing this section to read as follows:

Pursuant to 40 C.F.R. §122.28(b)(3). EPA may ~~at any time~~ require any facility authorized by this permit to apply for, and obtain, an individual NPDES permit. EPA will notify the operator, in writing, *that an application for an individual permit is required and will set a time for submission of the application. Coverage of the facility under this general NPDES permit is automatically terminated when: (1) the operator fails to submit the required individual NPDES permit application within the defined time frame; or (2) the individual NPDES permit is issued by EPA.*

EPA Response: This change has been made to the Final Permit.

Comment IDA #3 (Idaho Dairymen's Association)
I.F.3. This section states that an owner/operator may request to be covered under an individual permit pursuant to 40 CFR § 122.28(3)(iii). However, there is an error with this CFR reference that may confuse permittees. The correct reference should be to 40 C.F.R. § 122.28(b)(3)(iii). IDA recommends correcting this section to read asfollows:

Any owner/operator who believes that the terms and conditions of this general permit are not appropriate for his/her CAFO facility, either prior to or after obtaining coverage under this permit, may request to be covered under an individual permit pursuant to 40 CFR § 122.28<u>(b)</u>(3)(iii). The owner/operator shall submit an application for an individual permit (Form 1 and Form 2B) with the reasons supporting the application to EPA If a final, individual NPDES permit isissued to an owner/operator otherwise subject to this general permit, the applicability of this NPDES CAFO general permit to the facility is automatically terminated on the effective date of the individual NPDES permit. Otherwise, the applicability of this general permit to the facility remains in full force and effect.

EPA Response: The EPA thanks the commenter for catching this error. It has been corrected in the Final Permit.

Comment IDA #4 (Idaho Dairymen's Association)
II.B.8. This section discusses compliance alternatives to the 100-feet land application set back. Although IDA understands the intent of this section, it believes that its vague language may be open to interpretation and that it may confuse permittees. IDA recommends making the following changes to this section to provide clarity for permittees:

<u>Land application setback requirements.</u> Unless the permittee exercises one of the compliance alternatives of this section <u>as</u> provided below <u>in (a) or (b)</u>, manure, litter, and process wastewater may not be applied closer than 100 feet to any down- gradient surface waters, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to service waters.

a. *Vegetated buffer compliance alternative. As a compliance alternative, the CAFO may substitute the 100-foot setback with a 35-foot wide vegetated buffer where applications of manure, litter, or process wastewater are prohibited.*

b. *Alternative practices compliance alternative. As a compliance alternative, the CAFO may demonstrate that a setback or buffer is not necessary because implementation of alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent or better than the reductions that would be achieved by the 100-foot setback. An adequate demonstration may include the use of site-specific data using a tool such as the Idaho NRCS Water Quality Technical Note #6, Idaho Nutrient Transport Risk Assessment (INTRA) (Appendix E) or the Idaho Phosphorus Site Index (Appendix I) , <u>and associated implementation of</u>*

alternative conservation practices recommended as a result of these tools.

EPA Response: These changes have been made to the Final Permit.

Comment IDA #5 (Idaho Dairymen's Association)
II.B.9. This section states that there "shall be no dry weather discharge ... to waters of the United States ... through subsurface flows." Upon first review, this reference is troublesome because it appears to imply that the Clean Water Act (CWA) has authority over groundwater with its reference to "subsurface flows," which is subject to debate as the law regarding this authority is currently unsettled. IDA recommends striking this sentence from this section, as its intended message is clear from the first sentence of this section without including unsettled law that is subject to debate:

No Dry Weather Discharge. There shall be no dry weather discharge of manure, litter, or process wastewater to a water of the United States from a CAFO as a result of the application of manure, litter or process wastewater to land areas under the control of the CAFO. ~~This prohibition includes discharges to waters of the United States through tile drains, ditches or other conveyances, irrigation related flow and subsurface flows.~~

EPA Response: The term *subsurface flows* does not refer to groundwater in this context. The intent of this provision was to prohibit discharges through tile drains, ditches and other man-made conveyances and activities whether above, at or below the ground surface. To prevent confusion, the EPA has removed the term from this provision. The last sentence of Part II.B.9 in Final Permit now reads: *This prohibition includes discharges to waters of the United States through tile drains, ditches or other conveyances and irrigation return flows.*

Comment IDA #6 (Idaho Dairymen's Association)
III.A.2.a.ii. This section requires permittees to complete Washington NRCS Engineering Technical Note #23 for each wastewater or manure storage structure and to include the results of the evaluation in the permittee's NMP. IDA believes it is inappropriate to incorporate another state's technical note into the Idaho Draft Permit when this technical note has not been adopted by Idaho state agencies. This technical note was created to address geographic conditions in the state of Washington, not Idaho. Furthermore, wastewater and manure storage structures in Idaho have been constructed to comply with NRCS Appendix 10D and IDAPA 02.04.14.030.01, which have different requirements than Technical Note #23. As such, IDA fears that use of this note will create confusion and conflicting standards for regulatory agencies and permittees, as well as undue hardship for dairy operators who have constructed their wastewater and manure storage structures to be compliant with Idaho standards, rather than Washington standards. IDA recommends providing flexibility by allowing producers to forego use of Technical Note #23 by showing compliance with NRCS Appendix 10D and IDAPA 02.04.14.030.01through the confirmation of a professional engineer. As such, this section should be amended to read as follows:

The CAFO covered by this permit must ensure the proper operation and maintenance of wastewater and manure storage structures by confirming compliance with NRCS Appendix 10D and IDAPA 02.04.14.030.01 through a professional engineer, or by completing the Washington NRCS Engineering Technical Note #23, January 2013 (Appendix D), for each wastewater or manure storage structure. If the evaluation of the CAFO's wastewater or manure storage structures identifies deficiencies in the operation or maintenance of the structures, the CAFO must identify *measures to address those deficiencies in its NMP. If the permittee chooses to confirm compliance through the use of an engineer, then the NMP must include the results of the engineer's evaluation. If the permittee chooses to use Technical Note #23, then ~~T~~the NMP must include the results of the evaluation using Washington NRCS Engineering Technical Note #23, January 2013 (Appendix D).*

> **EPA Response:** This alternative has been included in the Final Permit. See Response to Comment ICA #10

Comment IDA #7 (Idaho Dairymen's Association)
III.A.2.e. This section begins with the broad statement that a permittee must: "Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals or contaminants." There is no definition of "chemicals or contaminants" in this permit. IDA is concerned that the first sentence may be interpreted to prohibit the continued use of generally accepted industry agents that are required for animal husbandry and to clean milking parlors as mandated by the Pasteurized Milk Ordinance. The agents used for these practices inevitably enter wastewater storage structures. It is unrealistic to separate and divert cleaning and animal husbandry agents from storage structures, or require permittees to "specifically design" their structures to treat them. Preventing a hoof treatment from entering a storage structure, for example, is not realistic or achievable, when cows walk through the water and manure that enters storage structures. Accordingly, this section must be clarified so that it is not interpreted to prohibit the use of these generally accepted industry cleaning (and required by the Pasteurized Milk Ordinance) and animal husbandry agents. IDA recommends amending this section as provided below to provide this clarification for permittees:

*Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals or contaminants. For purposes of this permit, agents that have been used for cleaning to comply with the Pasteurized Milk Ordinance and for animal husbandry purposes, such as hoof baths, that are generally accepted by the industry, shall not be considered chemicals or contaminants that may not enter storage systems. All wastes from dipping vats, pest and parasite control units, and other facilities utilized for the management of potentially hazardous or toxic chemicals shall be handled and disposed of in a manner sufficient to prevent pollutants from entering the manure, litter, or process wastewater storage structure or waters of the United States. The NMP must include references to any applicable chemical storage and handling protocols and incorporate specific **BMPs** and actions that will be taken to prevent the improper disposal of chemicals and other contaminants into any manure, litter, process wastewater, or storm water storage or treatment system. The NMP should also consider chemical handling plans for the protection of wells, water supplies, and any drainage ways that are close to chemical storage and handling areas.*

> **EPA Response:** Pursuant to 40 CFR §122.42(e)(1)(v), chemicals and other contaminants handled on-site may not be disposed of in any manure, litter or process wastewater or stormwater storage or treatment system unless that system is specifically designed to treat those chemicals and contaminants. As a practical matter, the EPA concedes that residues of these chemicals or contaminants may end up in storage or treatment systems as a result of standard animal husbandry practices. A r*esidue*, in this context, consists of trace amounts of a material, or its

breakdown product(s), when that material has been employed or applied for its intended use using appropriate methods, amounts and/or rates. These would not constitute permit violations. However, these agents *are* considered chemicals and contaminants which should not be disposed of in manure, litter, process wastewater or stormwater storage and treatment systems. There is a distinction between residues in the discharge and disposing of these materials into the storage or treatment system for waste disposal, spill clean-up, container rinsing or other purposes. The latter set of actions are not authorized (i.e., the facility should not actively dispose of these chemicals in manure, litter, processes wastewater or stormwater storage and treatment systems). No change to the permit has been made as a result of this comment.

Comment IDA #8 (Idaho Dairymen's Association)

III.A.2.f. As written, this section can be interpreted to require all land application areas to achieve a low risk rating under the INTRA or the P Index by use of the phrase "[t]he NMP must identify all fields that have a Medium or greater risk assessment and identify appropriate site-specific conservation practices required to reduce the risk assessment for each specific field to a Low rating." This statement is unnecessarily restrictive and contradicts the function and use of these indices. The **P** Index and INTRA are designed to reduce risk, but **do not** require all fields to achieve a low risk rating. Instead, manure must be applied at varying levels that correspond to the field's risk rating, with higher risk fields having lower application rates than low risk fields. The **P** index and INTRA are designed to operate at all ratings and it would undermine the function and utility of the indices to require every field to operate at a low risk rating. This section essentially requires a facility to control all environmental variabilities in order to land apply under the indices, which is not realistic or consistent with the indices. IDA recommends that the section be amended to accurately reflect the operation of the indices as follows:

*Identify appropriate site-specific conservation practices to be implemented on the land application areas, including as appropriate buffers or equivalent practices as stipulated in Section 11.B.8, to control runoff of pollutants to waters of the United States. The NMP must include appropriate conservation practices identified by evaluating each land application area using the Idaho NRCS Water Quality Technical Note #6, Idaho Nutrient Transport Risk Assessment (INTRA) (Appendix E). Dairies may opt to utilize the Idaho Phosphorus Site Index (P Index) (Appendix I). The NMP must include the results of the INTRA or P Index evaluations. ~~The NMP must identify all fields that have a Medium or greater risk assessment and identify appropriate site specific conservation practices required to reduce the risk assessment for each specific field to a Low rating.~~ All operations must follow guidance provided by INTRA and the **P** Index. If the site-specific conservation practices are NRCS conservation practice standards, the NMP must include provisions to operate and maintain those site-specific conservation practices according to the specific NRCS conservation practices standard. If the owner/operator proposes alternative practice or performance standards, the NMP must describe and cite those standards so that EPA can perform an adequate review. In addition, the NMP must include a schedule for implementation of site-specific conservation practices and proper operation and maintenance procedures.*

EPA Response: The EPA agrees with the commenter's statement. This change has been made to the Final Permit.

Comment IDA #9 (Idaho Dairymen's Association)

III.A.2.g.iii. This section requires a NAPT certified laboratory to analyze all manure and soil samples. Although NAPT certified laboratories are appropriate for soil test analyses, this is not the correct certification for laboratories that analyze manure and compost samples. The proper certification authority for manure testing is the Minnesota Department of Agriculture, and once approved, laboratories are referred to as Manure Analysis Proficiency Laboratories. A list of these approved laboratories can be found at http://www2.mda.state.mn.us/webapp.lis/maplabs.jsp. IDA recommends amending this section to reflect that NAPT laboratories must analyze soil samples, while Manure Analysis Proficiency Laboratories must analyze manure samples, as follows:

~~Manure and~~ soil samples must be analyzed by a laboratory certified by the North American Proficiency Testing Program (NAPT). Manure samples must be analyzed by a certified Manure Analysis Proficiency Laboratory.

> **EPA Response:** The EPA agrees with the commenter's statement. This change has been made to the Final Permit.

Comment IDA #10 (Idaho Dairymen's Association)
III.C.1.c. This section requires facility closure if the permittee "ceases operation." This language is problematic, because it may be interpreted to require closure when a permittee ceases its dairy operation but plans to sell it to a new owner that will need the facility when it takes over and resumes operation. The proper standard for closure is stated in the highlighted portions of the attached Idaho NRCS Practice Standard Code 360 (referenced in subsection d. of this section). Standard 360 defines "Waste Facility Closure" as: "The decommissioning of a facility where agricultural waste has been treated or stored, and is no longer used for the intended purpose." Standard 360 applies "to an agricultural waste facility or livestock production site that is no longer needed as a part of a waste management system and is to be permanently closed or converted for another use." This section also describes the requirements for maintaining a facility that is not in use for 12 consecutive months. IDA understands that liners must not be allowed to dry out to prevent cracking. However, we feel that this provision deserves further discussion between EPA, ISDA, and IDA, as it could be interpreted to mean that a pond would need to be entirely or mostly refilled with clean water when not in use, including when heading into winter months. This is problematic for dairies who have emergency reserve lagoons that may go dry for more than twelve months, as it would mean that they would have to go into winter months with their emergency storage structure full of clean water, which would not be sensical and would also be contrary to ISDA's direction to operators to head into winter months with as much capacity as possible to ensure adequate storage for when land application is inappropriate. IDA is not aware of any legal or scientific authority that would support the broad language of this protocol, and would like to see the citing authority for this requirement. IDA requests that further discussion be had on how to make this a practical requirement that complies with ISDA's directions to operators and to prevent an interpretation where an operator is expected to keep reserve lagoons entirely full, thereby rendering those lagoons useless for emergency situations. We also suggest separating this requirement from the prior section for clarity. Furthermore, "financial viability" of a dairy operation is a an undefined, vague, and improper standard for facility closure. IDA recommends amending this section as follows:

c. *All lagoons and other earthen or synthetic lined basins that are no longer needed as a part of a waste management system and are to be permanently decommissioned or converted for another use must be properly closed ~~if the permittee ceases operation~~ consistent with the Idaho*

NRCS Practice Standard Code 360 contained in Natural Resources Conservation Service Field Office Technical Guide (Appendix B). Consistent with this standard the permittee shall remove all waste materials to the maximum extent practicable and dispose of them in accordance with the permittee's NMP, unless otherwise authorized by EPA.

d. *~~In addition,~~ For ~~A~~any lagoon or other earthen or synthetic lined basin that is not in use for a period of twelve (12) consecutive months ~~must be properly closed unless the facility if financially viable, intends to resume use of the structure at a later date, and~~ but will not be permanently decommissioned or converted to another use, the permittee shall ~~either~~:*

   i. *Maintain~~s~~ the structure as though it were actively in use in order to prevent compromise of structural integrity pursuant to ISDA direction and/or protocols; ~~or~~*
   ~~ii. Remove manure and wastewater to a depth of one foot or less and refills the structure with clean water to preserve the integrity of the synthetic or earthen liner.~~
   iii. *The permittee shall notify EPA, in writing, of the action taken, and shall conduct routine inspections, maintenance, and record keeping as though the structure were in use. Prior to restoration of use of the structure, the permittee shall notify EPA, in writing, and provide the opportunity for inspection. The permittee shall properly handle and dispose of the water used to preserve the integrity synthetic or earthen liner during periods of non-use in accordance with the NMP.*

~~d. All closure of lagoons and other earthen or synthetic lined basins must be consistent vii.th the Idaho NRCS Practice Standard Code 360 contained in Natural Resources Conservation Service Field Office Technical Guide (Appendix B). Consistent with this standard the permittee shall remove all waste materials to the maximum extent practicable and dispose of them in accordance with the permittee's NMP, unless otherwise authorized by EPA.~~

e. *Unless otherwise authorized by EPA, completion of closure for lagoons and other earthen or synthetic lined basins shall occur as promptly as practicable after ~~the permittee ceases to operate or, if the permittee has not ceased operation,~~ twelve (12) months from the date on which the use of the structure ceased, unless the lagoons or basins are being maintained for possible future use in accordance with the requirements above.*

2. *Closure Procedures for Other Manure, Litter, or Process Wastewater Storage and Handling Structure*

No other manure, litter, or process wastewater storage and handling structure shall be abandoned. Closure of all such structures shall occur as promptly as practicable ~~after the permittee has ceased to operate, or, if the permittee has not ceased to operate,~~ within twelve (12) months after the date on which the use of the structure ceased, unless the lagoons or basins are being maintained for possible future use in accordance with the requirements above. To close a manure, litter, or process wastewater storage and handling structure, the permittee shall remove all manure, litter, or process wastewater and dispose of it in accordance with the permittee's NMP, or document its transfer from the permitted facility in accordance with off-site transfer requirements specified in this permit Section III.D, unless otherwise authorized by EPA.

EPA Response: The EPA agrees with the commenter that some clarification on facility closure would be helpful. Some of the suggested edits have been included in the Final Permit in order to better clarify the distinction between permanent closure and temporary cessation of activities. The Final Permit includes the suggested changes to Part c. The Final Permit includes most of the suggested changes to Part d, except the reference to ISDA protocols in (i). The Final Permit does not include the deletion suggested by the commenter in Part e. The final permit does include the changes suggested in Part 2.

Comment IDA #11 (Idaho Dairymen's Association)
IV.A.1.b. This section requires permittees to record weekly depth of the manure and process wastewater in storage via a depth marker. However, permanent and accurate installation of depth markers is nearly impossible due to environmental conditions. Instead, IDA proposes a more practical method of recording structure levels by noting the feet of freeboard on the pond. This method is currently employed by inspectors and is a more accurate, reliable, and practical way of measuring storage levels. IDA recommends that the language be amended as follows:

b. *Weekly records of the depth of the manure and process wastewater in storage, containment and/or treatment structure(s), as applicable, as indicated by the depth marker under Section II.A.2.b, or by measuring the feet of freeboard of the structure ;*

EPA Response: Pursuant to 40 CFR §412.37(a)(2), depth markers are required for all open surface liquid impoundments at dairy and cattle (other than veal) operations. In addition, depth markers provide immediate clarity on the amount of freeboard, which is a much more effective management tool. The permittee has significant latitude to determine the design and installation of the depth marker as long as the intent – "at-a-glance" data on available freeboard – is met. No change has been made to the permit as a result of this comment.

Comment IDA #12 (Idaho Dairymen's Association)
IV.A.1.e. This section requires permittees to keep a record of all water line inspections, including drinking and cooling water lines. However, the permit does not explain howor when water lines must be inspected. Taking a practical and common-sense approach, IDA suggests that EPA expects that water lines be inspected when an operational abnormality or change is observed. For example, if water pressure is lower than normal, then it would be practical to inspect the water lines, while it would not be practical to dig up all buried water lines on a weekly basis when no operational abnormality is observed. IDA recommends that the language be amended as follows to reflect a more practical approach:

e. *~~Records documenting the inspections of all water line inspections, including drinking and cooling water lines and whether or not leaks were discovered.~~ Record water line leaks and/or abnormalities discovered during the normal course of operation through low water pressure or other signs indicating a possible leak or abnormality. Document any repairs and/or corrective actions taken to prevent further leaking or correct the abnormality;*

EPA Response: 40 CFR §412.37(a)(1)(ii) requires daily inspection of water lines, including drinking water or cooling water lines. The specific means of inspections are left to the discretion of the permittee and should be described in the NMP. Daily visual inspections for anomalies with the appropriate follow-up, as described by the commenter, is appropriate. No change has been made to the permit as a result of this comment.

Comment IDA #13 (Idaho Dairymen's Association)
V.A.8. This section discusses changes in the discharge of toxic pollutants. It is IDA's understanding that CAFOs are not allowed to discharge toxic pollutants to begin with. Therefore, this section does not seem applicable to a general CAFO permit. IDA recommends that this section (V.A.8) be entirely stricken.

EPA Response: All provisions in Part V of the permit are standard conditions, specified in 40 CFR §122.41, and must be included in all NPDES permits.

Comment IDA #14 (Idaho Dairymen's Association)
V.B.5. This section appears to have been copied and pasted from another type of general permit, such as a municipal permit, and does not seem to be applicable to a general CAFO permit. Proper operation and maintenance protocols have already been addressed by other provisions in the permit citing applicable NRCS and other CAFO- specific protocols. Therefore, it is inappropriate to include it in this permit. IDA recommends that this section (V.B.5), be entirely stricken.

EPA Response: All provisions in Part V of the permit are standard conditions, specified in 40 CFR §122.41, and must be included in all NPDES permits.

Comment IDA #15 (Idaho Dairymen's Association)
IDA appreciates the opportunity to comment on this Draft Permit.

EPA Response: The EPA thanks the Idaho Dairymen's Association for their comments on the Draft Permit.

Comment IDA #16 (Idaho Dairymen's Association)
IDA recommends that issuance of a new General Permit for dairy operations and other CAFOs in Idaho be delayed until IDEQ takes over permitting authority and has an opportunity to work with ISDA, IDA and other interested parties in Idaho to develop a permit that is tailored to the meet the challenges, needs and expectations of dairy environmental management in Idaho.

If EPA does not postpone reissuance of an NPDES Permit to allow IDEQ to develop and issue a permit that will work in Idaho, IDA respectfully requests that its concerns and solutions be addressed and implemented in the final permit. IDA also welcomes the opportunity to meet with EPA and discuss the changes detailed herein.

EPA Response: See response to comment IDA #1. The EPA welcomes ongoing discussions with IDA.

Comment ICL #1 (Idaho Conservation League)
Coverage under the CAFO general permit. Under the last iteration of this general permit, a grand total of **zero** CAFO facilities in Idaho (out of 365 total) applied for coverage. According to the EPA's *2018 NPDES CAFO Permitting Status Report*, many states have at least 50% permitting coverage of their CAFOs, with some states approaching full coverage. The list of close to fully permitted CAFOs includes states like Michigan, Pennsylvania, and Wisconsin – all of which have similar numbers of total facilities

to Idaho.

We are skeptical that not a single CAFO facility in Idaho merits coverage under this general permit. A cursory glance at satellite imagery for the Snake River Plain, where the majority of Idaho's large CAFOs are located, highlights the fact that a number of these facilities that are in close proximity to rivers, creeks, or irrigation canals that drain into waters of the United States. We do not include this comment to assert that any specific facility is currently out of compliance or discharging without a permit. Rather, we are emphasizing that there is a reasonable potential for some CAFOs to need NPDES permitting coverage. It is hard to believe that out of 365 CAFOs in Idaho, not a single one has the potential to have CWA- regulated discharges.

The mere existence of this permit does not protect Idaho's water quality if there is not a single CAFO facility regulated by it. Thus, while we very much appreciate the amount of work that EPA has done to revise and strengthen this permit, the true value of that work will only be realized once facilities are regulated. We urge EPA/IDEQ to conduct a detailed assessment of existing CAFO facilities to evaluate which ones do indeed require coverage and then take the appropriate next steps to ensure that those facilities apply for coverage, and adhere to the terms and conditions pursuant to this general permit. Short of proactive assessment, the EPA/IDEQ should make clear that there is an onus on the CAFOs themselves to evaluate whether they have the potential for unauthorized discharges, and if so, to take the steps to apply for coverage under this general permit.

> **EPA Response:** The EPA acknowledges the comment.

Comment ICL #2 (Idaho Conservation League)
Monitoring and compliance. Monitoring is an essential component of any NPDES discharge permit because it allows both the agencies and the public the ability to track facility compliance. Without proper monitoring requirements, not only is the public left in the dark, but the regulatory agencies do not have the necessary information to ensure compliance with their permits. As stated in 40 C.F.R. § 122.44, a permit with effluent limitations "*requires all effluent and ambient monitoring necessary to show that during the term of the permit the limit on the indicator parameter continues to attain and maintain applicable water quality standards*." Although regulatory agencies seem to view CAFO monitoring as more difficult than for other point sources, there are no exemptions to baseline compliance monitoring requirements.

The Draft Permit currently lacks the monitoring requirements necessary to allow EPA and IDEQ to provide true oversight of the permittees' compliance with the water quality-based provisions in the permit. It is absolutely necessary for EPA to include periodic, representative water sampling in this permit and require the same discharge monitoring reports that all other industry point sources have to submit. The existing monitoring requirements in the Draft Permit serve to help calculate agronomic rates of manure application, but do not enable EPA to determine whether the waste was actually applied properly in accordance with CAFO nutrient management plans. Thus, it will be very difficult, if not impossible, to monitor discharges appropriately.

> **EPA Response:** The CAFO regulations prohibit regular/ongoing discharges and establish monitoring requirements in CAFO permits that focus on maintaining that framework, e.g., daily and weekly inspections in the production area, manure and soil analyses and land application equipment inspections. These have been incorporated into the permit. No change has been made to the permit as a result of this comment.

Comment ICL #3 (Idaho Conservation League)
Water-quality based provisions. We appreciate the inclusion of the water-quality based provisions in this permit (Provisions 9 and 10). We agree with EPA that both of these provisions are necessary to protect Idaho's waterways from CAFO pollution and strongly recommend that they be retained in the final permit.

Provision 10 prohibits the application of any manure, litter or process wastewater when the land is frozen or snow-covered, or when the soil is saturated with water. EPA presents an impressive table of peer- reviewed literature to support their decision to include this provision in the permit. As stated by EPA in the Fact Sheet, "*the weight of scientific evidence clearly demonstrates high risks of runoff from winter manure application and relative ineffectiveness of BMPs in curtailing that risk*." We too have serious concerns regarding the ongoing winter application of manure on Idaho CAFOs and appreciate the clear prohibition of that practice in this permit.

EPA Response: The EPA acknowledges the comment.

Comment ICL #4 (Idaho Conservation League)
Coordination with the Idaho State Dept. of Agriculture. The Idaho State Department of Agriculture (ISDA) plays a significant role in the oversight and regulation of CAFOs in Idaho. In order to ensure the necessary level of protection is provided to Idaho's waters, it is critical that the EPA and the ISDA are coordinating on the implementation of this general permit. We request that the EPA discuss the level of coordination between ISDA and EPA on the development of this general permit and how they plan to collaboratively identify and engage facilities that require coverage under this general permit. Additionally, we request that EPA provide a copy of any binding agreements (legal or otherwise) between the two agencies related to compliance with the requirements of this general permit. If such an agreement does not exist, we request that EPA explain how it will ensure that ISDAs oversight and regulation of CAFOs in Idaho will comply with the requirements of this general permit.

EPA Response: As part of Phase III of the Idaho NPDES Program Authorization (IPDES), IDEQ will assume authority for general permits (including the CAFO general permit) on July 1, 2020. Multiple documents associated with this transfer of authority, including documentation of Idaho's plans and commitments for administering the program, are available at: https://www.epa.gov/npdes-permits/idaho-npdes-program-authorization. See also response to comment IDA#1.

Comment JRS #1 (J.R. Simplot Co.)
As indicated in the EPA draft 2019 NPDES General Permit for CAFOs in Idaho Fact Sheet, EPA has authorized Idaho Department of Environmental Quality (IDEQ) to implement a NPDES permit program and IDEQ will obtain permitting authority for general NPDES permits on July 1, 2020. Based on the rapidly approaching transition schedule of these permits from EPA to IDEQ authority, the proposed reissuance of the NPDES General Permit for CAFOs in Idaho should be delayed until after the transition is completed. In addition, the NPDES General Permit for CAFOs in Idaho should be drafted by IDEQ.

EPA Response: See response to comment IDA #1.

Comment JRS #2 (J.R. Simplot Co.)
In general, this draft 2019 permit has numerous requirements that are more detailed compared to the

2012 NPDES General Permit for CAFOs in Idaho. These more rigorous requirements are overly burdensome in they require a high level of technical knowledge to implement, have a high cost of compliance, and will be time-consuming to implement. These requirements are going to be difficult for a large operation to implement and likely not possible for small operations. We recommend that EPA consider the effect this permit will have on the economic viability of CAFO operations.

EPA Response: The CAFO permit is applicable to Large CAFOs, not small operations. Small operations would only be subject to the CAFO permit if those operations were designated as regulated CAFOs pursuant to 40 CFR §122.23(c). While compliance is certainly not without cost, provisions identical or similar to those in this permit are being implemented by operations nation-wide. The EPA completed thorough cost-benefit analyses for the CAFO regulations during the rulemaking process. The EPA is not required to complete economic analyses for each permit action.

Comment JRS #3 (J.R. Simplot Co.)
In the permit there are numerous requirements to comply with specific standards or specific guidance documents. If alternative methods are available that achieve compliance with the permit, these alternative methods should be allowed. The permit should not dictate the methods, but rather the required results.

EPA Response: The EPA evaluated the alternative methods and tools included in the permit for water quality outcomes and practical implementability. Where appropriate, the EPA has included the option of pursuing an alternative method. In general, NPDES CAFO permits specify the best management practices (i.e., methods) to be implemented rather than numeric effluent limits (i.e., outcomes), which are typical in NPDES permits for other sectors. If a permittee/CAFO operator believes that a facility warrants different types of permit conditions than what is in the CAFO permit, that permittee/CAFO operator may request to be covered under an individual permit. See CAFO Permit at Part I.F.3.

Comment JRS #4 (J.R. Simplot Co.)
Also, in Idaho, the State Department of Agriculture (ISDA) has historically had a role in regulating CAFOs. Simplot believes that it would be beneficial for the regulated community to understand which of these agencies will be designated as the lead agency and the roles each will have in permit implementation: ISDA, IDEQ, and EPA.

EPA Response: Prior to July 1, 2020, the EPA is the NPDES permitting authority over general permits. After July 1, 2020, IDEQ assumes NPDES permitting and enforcement authority over general permits in the State of Idaho, other than on Tribal Lands, where the EPA will continue to administer the NPDES program. ISDA has no NPDES regulatory authority, although the agency may play a technical assistance/support role and also implement state regulations outside the scope of the NPDES program. See response to comment IDA #1.

Comment JRS #5 (J.R. Simplot Co.)
I.B. With respect to Item 4, there is no requirement for EPA to make a timely determination on completeness of a Notice of Intent (NOI) and Nutrient Management Plan (NMP). Simplot recommends EPA have 30 days to determine if an NOI and NMP are complete.

EPA Response: See response to comment ICA #2.

Comment JRS #6 (J.R. Simplot Co.)
I.B. Item 5 states "In order to determine if an expansion is a new source, the applicant must submit to EPA information describing the expansion and a map showing the location of the expansion. If EPA determines the expansion meets the new source definition, the owner/operator must prepare and submit an EID or draft EA as described above." Simplot comments that the facility be responsible for making this determination. This would not eliminate the facility's responsibility to comply with NEPA requirements for expansions or eliminate EPA's authority to enforce against the facility if they made an improper determination. It would simply streamline the process. If these determinations are going to be made by EPA, it is likely to delay projects and affect the economic viability of the facility. If EPA is going to make the determination, then Simplot recommends that there needs to be a requirement for EPA to make the determination within 30 days. A delay beyond 30 days would likely be very costly to the facility and require coordination for the long term raising of cattle at an alternative CAFO location, which may be of considerable distance from the facility.

EPA Response: Pursuant to 40 CFR §6.200, the EPA is the permitting authority who must make a determination on whether a facility expansion constitutes a "new source." The regulations do not stipulate a specific timeline for making the determination. The EPA expects that it would need to work with the operator to make a determination regarding "new source" status.

The EPA notes that new source determinations may apply after July 1, 2020 with respect to applicability of certain provisions in the CAFO ELGs. However, NEPA only applies to federal actions (EPA permit issuance, in this case). As such, after July 1, 2020, a NEPA analysis would not be required for new sources subject to this permit because IDEQ will be the permitting authority.

Comment JRS #7 (J.R. Simplot Co.)
II.A. Sections 1.a. and 1.b. appear to be the same requirement but just stated in different terms. Simplot recommends eliminating 1.b.i. - vii and keeping Section 1.a. as is, with the exception of specifying a 120 day storage period for manure, litter, and process wastewater, as is currently required for wastewater storage in Idaho, rather than the 180 day storage period listed in the draft 2019 NPDES General Permit for CAFOs in Idaho, so this section becomes:

A. Effluent Limitations and Standards Applicable to the Production Area

Except as provided I Section II.A.3., there must be no discharge of manure, litter, or process wastewater into wasters of the United States from the production area except as provided below.

1. *Whenever precipitation causes an overflow of manure, litter, or process wastewater, pollutants in the overflow may be discharged into waters of the United States provided:*

    a. *The production area is designed, constructed, operated, and maintained to contain all manure, litter, process wastewater, and the runoff and direct precipitation from the 25-year, 24-hour storm event for the location of the CAFO for a storage period of 120 days.*

EPA Response: These are not redundant requirements. (a) stipulates the precipitation duration and frequency for the design and b. stipulates many of the design criteria and objectives. See also response to comment ICA #5.

Comment JRS #8 (J.R. Simplot Co.)
II.A. Section 2.a.ii. requires daily visual inspections of all water lines, including drinking water and cooling water lines. Simplot recommends EPA clarify if daily visual inspections apply to aboveground water lines or underground water lines, or both. With regards to frequency of visual water line inspections, Simplot recommends it be revised to weekly rather than daily inspections, as weekly inspections should be sufficient.

EPA Response: See responses to comments ICA#6 and IDA#12.

Comment JRS #9 (J.R. Simplot Co.)
II.B. Section 2. uses the phrase "to achieve realistic production goals" with respect to the application of nutrients in the NMP. This is a vague term that adds no value to the statement. Simplot recommends changing it to the following: "The NMP must address the form, source, amount, timing, and method of application of nutrients on each field, while minimizing nitrogen and phosphorus movement to surface waters."

EPA Response: 40 CFR §412.4(c)(1) states that the NMP must incorporate certain requirements "based on a field-specific assessment.... that addresses the form, source, amount, timing and method of application of nutrients on each field to *achieve realistic production goals*...." 40 CFR § 412.4(c)(1). This is the language that has been incorporated into the permit. No change has been made to the permit as a result of this comment.

Comment JRS #10 (J.R. Simplot Co.)
III.A. There is no timeline requirement for the EPA to review and determine completeness of the NMP in Permit Condition 1. We recommend adding a requirement for EPA to make the determination within 30 days of receipt of the NMP.

EPA Response: See response to comment ICA #2.

Comment JRS #11 (J.R. Simplot Co.)
III.A. The Idaho Animal Waste Management (IDAWM) Software mentioned in Permit Condition 2.a.i. and the Washington NRCS Engineering Technical Note #23 listed in Permit Condition 2.a.ii. appear to be developed for wastewater storage and wet manure. Dry or composted manure are common to all CAFOs. Simplot recommends EPA clarify if dry or composted manure are required to be evaluated using IDAWM Software and Washington NRCS Engineering Technical Note #23. In addition, Simplot recommends EPA clarify if these calculation methods may be utilized for dry or composted manure.

EPA Response: Technical Note #23 and IDAWM apply to manure storage lagoons, not dry or composted manure. See also response to comment ICA #10.

Comment JRS #12 (J.R. Simplot Co.)
III.A. With regards to Permit Condition 2.b., the handling of mortalities does not affect nutrient management and therefore should not be in the NMP. The 2019 NPDES General Permit for CAFOs

in Idaho should not prescribe how mortalities are handled other than they need to be handled so as to not contaminate surface water. If this requirement remains for the NMP, Simplot recommends changing Permit Condition 2.b. to the following: "Mortalities shall be handled in such a way as to prevent the discharge of pollutants to waters of the United States."

EPA Response: See response to comment ICA #11.

Comment JRS #13 (J.R. Simplot Co.)
III.A. Permit Condition 2.c. requires clean water be diverted from the production area or requires the facility provide adequate wastewater or manure storage capacity at the facility to contain clean water. It is difficult and costly to divert run on water from adjacent properties.

As an example, at the Simplot operation near Grand View, Idaho, the topography north and east of the facility consists of steep rising terrain to a desert plain above the Snake River. The land bordering the Simplot operation is owned by the federal government and is managed by the U.S. Bureau of Land Management (BLM). This plain reaches elevations above 2,900 feet and drains to the Snake River valley below through a series of "draws". Building diversion structures to totally divert this water is not appropriate or feasible. In fact, to do so would require a number of such structures to be built on federal lands. If such structures were allowed by rules, such a project would go through a number of regulatory processes such as the National Environmental Policy Act (NEPA). Thus, this would be a very cumbersome process with an uncertain outcome.

It is also not feasible to contain run on water at Simplot's Grand View property due to the enormous volume of run on water from thousands of acres of BLM land up-gradient of the facility. Therefore, Simplot recommends Permit Condition 2.c. be removed from the draft 2019 NPDES General Permit for CAFOs in Idaho.

EPA Response: Clean water diversion measures may or may not be costly, and are generally less expensive than collecting, managing and treating clean water that becomes contaminated. Clean water diversion is a standard and effective management practice with regard to CAFOs. Part III.A.2.c requires clean water be diverted "*as appropriate*". At operations where clean water diversions are not feasible, permittees may document the alternative conservation measures that the permittee has used in the NMP. Therefore, the commenter may opt to treat clean water that becomes contaminated rather than divert clean water away from the production area at the Grand View operation if this is identified as the most feasible alternative. The original language is retained in the Final Permit.

Comment JRS #14 (J.R. Simplot Co.)
III.A. Permit Condition 2.f. requires CAFOs to perform a risk assessment and rate every land application area field for the NMP. The requirement to perform assessments for every field would be overly burdensome in that they would be very expensive and labor intensive. Simplot recommends this Permit Condition 2.f. be removed from the draft 2019 NPDES General Permit for CAFOs in Idaho.

EPA Response: Pursuant to 40 CFR §122.42(e)(5), nutrient management plans must provide field-specific assessments for all fields to which manure is applied. The EPA has opted to utilize the narrative rate approach in this permit in order to simplify nutrient management planning for operators, but as required by the regulation, this does not eliminate the need for field-specific assessments. No change has been made to the permit as a result of this comment.

Comment JRS #15 (J.R. Simplot Co.)
III.A. For Permit Condition 2.h., it requires "annual nutrient budgets must be generated to determine land application rates for each field where manure, litter, or process wastewater is applied". Most facilities have the data to calculate nutrient budgets, just not a good system to compile all of the data into one report. It would be costly and time consuming to gather the data for annual nutrient budgets. Simplot recommends the requirement for annual nutrient budgets in Permit Condition 2.h. be removed from the draft 2019 NPDES General Permit for CAFOs in Idaho.

EPA Response: The permit, pursuant to 40 CFR § 122.42(e)(5), requires the generation of nutrient budgets. Appropriate application rates cannot be calculated without this information. Neither the regulations nor the permit stipulates a specific format or system in which the information must be compiled, as long as it becomes part of the NMP documentation. No change has been made to the permit as a result of this comment.

Comment JRS #16 (J.R. Simplot Co.)
III.A. Section 5.b. lists four items that EPA considers substantial changes, but does not limit it to only these changes. Simplot recommends defining all changes that are considered to be substantial in the permit rather than leaving it vague, so that compliance can be determined from the face of the permit.

Farmers are continually changing crop rotations, adding new ground, trying different rates and methods of application. A facility's NMP could be under constant EPA review or the facility could easily be out of compliance for adding a new crop or adding new land application ground to his operation prior to obtaining Agency approval. Simplot recommends adding flexibility to the criteria defining a substantial NMP change or allow for expedited Agency review in Section 5.b., to account for these types of changes.

EPA Response: See response to comment ICA #15.

Comment JRS #17 (J.R. Simplot Co.)
IV.A. These permit conditions list recordkeeping requirements for the production area and land application area in paragraph format. Since the recordkeeping requirements are complex with many types of parameters recorded at various frequencies, Simplot recommends the recordkeeping requirements be re-formatted into a table to make them easier to track and maintain compliance (see attached table format as an example from section IV.A. of the 2012 NPDES General Permit for CAFOs in Idaho).

EPA Response: The EPA agrees that there are a number of record-keeping requirements. Rather than presenting them in tabular form instead of list form, the EPA is developing simple electronic reporting forms that CAFO operators may opt to utilize for ease of record-keeping. Those forms are currently under development and should be available early in the permit term.

Comment JRS #19 (J.R. Simplot Co.)
IV.B. Many of the reporting requirements for the Annual Report is currently protected in Idaho and considered confidential business information. Simplot recommends not submitting information to Agencies in an Annual Report, but maintaining the confidential information on site, which Agencies

can review on site.

EPA Response: See response to comment ICA #1.

Comment JRS #20 (J.R. Simplot Co.)
VI. On October 22, 2019, the EPA and Department of the Army published a final rule to repeal the 2015 Clean Water Rule and re-codify it to a pre-existing definition of "waters of the United States". This rule will be effective December 23, 2019. In addition, the EPA and Department of the Army proposed a revised definition of "waters of the United States" on December 11, 2018. Since the definition of "waters of the United States" is in transition, Simplot recommends removing the definition in total and replacing it with a definition to simply reference 40 CFR Part 122.2 (Waters of the United States means waters as defined in 40 CFR Part 122.2).

EPA Response: This change has been made in the Final Permit.

Comment FWW #1 (Food & Water Watch)
The CWA expressly defines CAFOs as "point sources." Congress' decision to include CAFOs in the definition of point source demonstrates an unambiguous intent to control and continuously reduce discharges of pollutants from the CAFO industry through the NPDES program and progressively more demanding TBELs. Yet EPA's regulatory scheme for the industry has allowed most CAFOs nationally – and all CAFOs in Idaho – to evade regulation.

EPA has adopted an overly broad application of the agricultural stormwater exemption found in the Act's definition of "point source." Under this interpretation, EPA considers many discharges of CAFO pollutants from agricultural fields caused by precipitation outside the NPDES permitting regime. The exception has swallowed the rule that CAFO pollution is point source pollution. The result is that the vast majority of water pollution caused by CAFOs is essentially ignored so long as they comply with minimal land application parameters like "agronomic rate" requirements designed not to protect water quality but to maximize crop production. This virtually guarantees there will be unregulated runoff of CAFO pollution to waterways—the very concern that prompted Congress to regulate CAFOs as point sources in the first place. EPA also assumes that CAFO production areas are essentially non-discharging.

Moreover, even where CAFOs are permitted, EPA has not required CAFO permits to contain water quality monitoring requirements as it has done with almost every other industrial category regulated under the CWA. As a result, there is a dearth of data on the actual pollution impacts from CAFOs' routine operations, and even facilities that previously operated under NPDES permits now assert that they do not discharge and are not required to apply for permits. Combined, this framework results in CAFOs being treated as "zero discharge" facilities—a legal fiction even in EPA's estimation. Because of this and EPA's failure to promulgate regulations requiring CAFOs to apply for NPDES permits, none of Idaho's hundreds of CAFOs are currently operating under any CWA permit whatsoever. Slight improvements to permit requirements absent provisions that will lead to permitting in the first place are thus plainly insufficient.

EPA Response: This comment concerns the regulation of CAFOs in general and, as such, are outside the scope of this permit action. This permit implements the CAFO regulations found in 40 CFR § 122.23 and 40 CFR Part 412. No change has been made to the permit as a result of this comment.

Comment FWW #2 (Food & Water Watch)
Idaho is home to a growing CAFO industry. Idaho is now the third largest dairy producing state with approximately 614,000 dairy cows as of January 1, 2019. The State also hosts other types of CAFOs, including one of the largest beef cattle CAFOs in the nation, housing over 150,000 cattle at a time. Many of these livestock are concentrated in approximately 365 large CAFOs. These CAFOs are primarily located in the Magic and Treasure Valleys of southern Idaho, through which many jurisdictional waters flow, including the Snake River. But there are also CAFOs in other regions throughout the State. The excessive concentration of livestock in these regions is having dire impacts on the State's water resources, including surface water quality.

Widespread impairment of Idaho's waterways is well established and is getting worse. Idaho's most recent 303(d) list includes 1,989 miles of streams and 471 acres of lakes contaminated with *E. coli*, 239 miles of streams and 55,509 acres of lakes burdened with excessive nutrients that can lead to conditions fatal for fish and other aquatic species, and 920 miles of streams with unsafe levels of fecal coliform that threaten human health and wildlife. 34,404 miles of rivers and streams and 258,383 acres of lakes are currently not supporting the beneficial uses these waterways would safely support absent pollution. Several Idaho waterways in areas dominated by CAFOs show *E. coli* levels far in excess of the Water Quality Criterion of 126 cfu/100mL geometric mean. Many Idaho waterways passing through CAFO dominated areas also suffer from fecal coliform contamination, nutrient overloads, and oxygen deficiency—likely caused or exacerbated by the discharge of waste from CAFOs.

These impairments to jurisdictional waters are increasing. For example, Idaho waters no longer meeting one or more beneficial use due to *E. coli* contamination have been on the rise since at least 2012. Harmful algal blooms caused at least in part from nutrient loads are also an increasing water quality concern for Idaho. CAFO-generated waste is suspected (and likely) to be a primary culprit behind these increasing impairments, but without permitting and meaningful monitoring there is no way for the public or regulators to know the full extent of the harm.

Yet despite these increasing water quality impairments, EPA's failure to require CAFOs to seek permit coverage – no matter how massive their operation and no matter how extensive their disposal of CAFO waste to Idaho's lands and waters – has resulted in CAFOs operating without any form of NPDES permit. In 2011, over 100 CAFOs in Idaho were operating under an NPDES permit. Today that number is zero. Thus, Idaho's decline in water quality correlates with the complete deregulation of its CAFOs.
CAFOs introduce enormous quantities of waste containing all of these pollutants into Idaho's environment through industry-standard waste management practices. The primary means by which Idaho CAFOs manage and dispose of their animal manure and other waste is by storing it in manure lagoons at production sites and then applying it to nearby agricultural fields (or selling or giving the waste to third parties to apply to their lands at their discretion). Both the storage and disposal of CAFO waste results in discharges of harmful pollutants to waters of the United States, either directly or via groundwater with direct hydrological connection to jurisdictional waters—in fact, the Snake River is a quintessential example of a river fed by groundwater. Manure lagoons are actually designed to leak. And applying CAFO waste to agricultural fields has the potential to discharge pollutants to waterways in several ways: through over-application, runoff in dry weather conditions, tile drainage systems that underlie target fields and channel liquid waste into nearby waters, and drift and runoff from spray irrigation systems used to apply liquid waste, among other pollutant pathways.

Leaching from storage facilities, excessive land application of CAFO waste, and other discharges from production and land application areas is almost certainly causing and contributing to widespread water quality impairments in Idaho. The State's waterways are under siege from excessive numbers of animals housed on CAFOs and the necessity of disposing of their waste one way or another, year after year. As explained above, hundreds of state- collected water quality samples have discovered impairments from nutrient overloads, fecal coliform, dissolved oxygen, and *E. coli* many times the 126 cfu/100ml water quality criterion. Nutrient pollution is widespread and dozens of streams, as well as large portions of the Snake River, have been under phosphorus total maximum daily loads ("TMDLs") for years now. These water quality problems threaten the environment, wildlife, and human health throughout Idaho.

> **EPA Response:** The EPA acknowledges the statements made by the commenter. Regarding the duty of discharging CAFOs to apply for permit coverage, see response to comment FWW #4.

Comment FWW #3 (Food & Water Watch)
When Congress specifically included CAFOs in the CWA's definition of "point source," it demonstrated an unambiguous intent to control and continuously reduce discharges of pollution from the CAFO industry through the NPDES permitting program. EPA's approach to date has failed, and though the Draft Permit is an improvement to the status quo, it does not comply with the CWA and will not adequately reduce CAFO pollution of Idaho's waterways.

CAFOs are and will continue to operate without the necessary oversight required by the CWA absent strong EPA action to ensure that discharging CAFOs must obtain NPDES permits in the first instance, in addition to more protective permit conditions. Unfortunately, EPA's fundamentally flawed framework for regulating CAFOs has left them profoundly underregulated, with serious and ongoing consequences to water quality across Idaho. With an expanding CAFO industry and increasingly impaired waters, Idaho needs far more protection that the Draft Permit provides. Idaho's CAFOs are not "zero discharge" facilities, and the Draft Permit does not go far enough.

> **EPA Response:** The EPA acknowledges the comment. Much of this comment concerns the regulation of CAFOs in general and, as such, are outside the scope of this permit action. To the extent that this comment mentions the draft permit, the commenter does not point to a specific provision that is at issue or inconsistent with the CWA and/or its implementing regulations.

Comment FWW #4 (Food & Water Watch)
EPA Should Establish a Presumption of Discharge for CAFOs. To regulate all CAFO dischargers and establish an effective duty to apply standard, EPA must make the requisite factual findings to support the inclusion of provisions in its General Permit that create a presumption of discharge for certain CAFOs. Following *National Pork Producers Council*, which eliminated the duty to apply for CAFOs that propose to discharge based on design or operation characteristics, the number of NPDES-permitted CAFOs in Idaho has dropped from over one hundred to *zero*. Yet EPA has estimated that as many as 75% of CAFOs in fact discharge. Idaho CAFOs are no exception, and EPA cannot allow the status quo of nonregulation of jurisdictional discharges and associated water quality impairments to continue across the State.

EPA has already done much of the work to establish the needed presumptions. While some aspects are no longer applicable since *Pork Producers* and EPA's subsequent rule revision, EPA's 2010 CAFOs that Discharge or are Proposing to Discharge guidance ("2010 Guidance") provides a strong starting point to conduct objective assessments of which categories of Idaho CAFOs discharge based on the conditions and practices at the state's CAFOs that can lead to illegal and unpermitted discharges in the state. The 2010 Guidance explains that some conditions that lead to CAFO discharges – including proximity to waters of the U.S., whether the CAFO is upslope from waters of the U.S., climatic conditions, and drainage of the production area – are "beyond the operator's control," such that EPA can support a factual determination that all Idaho CAFOs with these conditions are dischargers with a duty to apply for the General Permit.

The 2010 Guidance also addresses ventilated livestock confinement buildings as sources of production area discharges of contaminated process wastewater, as these systems can directly discharge pollutants such as manure dust, litter, ammonia, and feathers into nearby waters of the U.S. or conduits to jurisdictional waters, such as production area ditches or channels. While the Guidance limited this discussion to poultry houses, other livestock sectors, including dairies, also emit ammonia and other pollutants via the confinement buildings, whether open air, partially enclosed, or fully enclosed. As discussed below at section III.K, the majority of ventilated or otherwise emitted ammonia will deposit nearby, including in conduits to waters of the U.S. and in waters of the U.S. themselves, where it contributes to nitrogen pollution. Because these systems cause ongoing discharges at many facilities, CAFOs ventilating pollutants from their confinement houses have a duty to apply for an NPDES permit if an objective assessment indicates that this method of operation leads to a discharge of pollutants.

It appears that EPA has not conducted the requisite objective assessments for Idaho CAFOs in the past several years, because the number of permitted operations in the state has dwindled to zero under the agency's watch. Nonetheless, absent appropriate findings that certain CAFOs discharge and a corresponding duty to apply for all discharging CAFOs, the Draft Permit is unlawful. The presumptions of discharge from the production area and duty to apply should likely at a minimum apply to CAFOs located directly upslope from, land applying upslope from, or otherwise located or land applying in close proximity to a water of the U.S. or conduit to water of the U.S.; CAFOs located in a floodplain; and CAFOs discharging via water-polluting emissions and ventilation systems.

> **EPA Response:** Pursuant to the decision cited by the commenter (*National Pork Producers Council, et al v United States Environmental Protection Agency*, United States Court of Appeals for the Fifth Circuit, March 29, 2011), the EPA does not have the authority to establish a presumption of a discharge in the permit. However, also pursuant to that decision, if a CAFO is discharging, they have a duty to apply under the CWA. Consistent with the CWA, its implementing regulations and case law, this permit requires all discharging CAFOs to apply for permit coverage. Pursuant to 40 CFR §122.23(f), a CAFO must be covered by a permit at the time that it discharges.

Comment FWW #5 (Food & Water Watch)
The Final Permit Should Require Individual NPDES Permits for Very Large CAFOs and CAFOs Located in Already Impaired Watersheds. As a threshold matter, EPA should consider two additional criteria requiring an individual NPDES permit in addition to those outlined at Section I.F of the Draft Permit. First, EPA should consider a numerical animal unit cap for coverage under this General Permit. Very large facilities should not be assumed to have the same water pollution potential as all other, smaller facilities, and EPA should not assume that the same TBELs will adequately protect water quality from large CAFOs of every scale. EPA has itself recognized that general permit conditions may be too generalized to address the unique potential for discharges at extremely large CAFOs, and the Final Permit should reflect that fact.

> **EPA Response:** The CAFO regulations already take the size of a CAFO into consideration, thus, the general permit does not need to include a cap on eligibility. If the commenters believe that a

facility is more appropriately covered under an individual permit, then the commenter can petition the EPA to do so [*see* 40 CFR §122.28(b)(3)].

Comment FWW #6 (Food & Water Watch)
Second, given Idaho's existing significant water impairments in regions dominated by CAFOs and irrigated agriculture used to dispose of CAFO waste, CAFOs located in or land applying waste in already impaired watersheds should be required to obtain individual NPDES permits. This would allow EPA and state regulators to more effectively analyze the CAFO's likely impact on the impaired waterway and determine the WQBELs and wasteload allocations necessary to attain WQS and implement TMDLs. Assuming that compliance with a general permit—which is by nature generalized and not capable of ensuring those protections uniquely necessary for certain impaired waterways—will stop ongoing impairment, and even improve water quality, is incorrect and not supported by a history of water quality problems in Idaho. Individual NPDES permit coverage would be far more effective at meeting the goal of the CWA and bringing CAFO pollution under control.

For example, significant portions of the Snake River watershed are under TMDLs for pathogens and phosphorus, and recent data show levels of nitrate contamination in the hydrologically connected groundwater in the same area are likely to keep rising for 40-50 years even if nitrogen inputs are held constant. This same area is heavily populated by CAFOs.

EPA Response: During the permit development process, the EPA reviewed all nutrient and bacteria TMDLs for the State of Idaho. There are no TMDL wasteload allocations (WLAs) assigned to any CAFO in the State of Idaho. Pursuant to 40 CFR §122.44(d)(1)(vii)(B), permit conditions must be consistent with the assumptions and requirements of any available WLA. Relevant Idaho TMDL documents that have identified agricultural sources of pollutants have not assigned WLAs to CAFO operations, but rather have identified the implementation of BMPs via technical assistance approaches. It is the best professional judgement of the permit writer that the implementation of these same BMPs via the conditions specified in a general permit are appropriate and adequate to control pollutants in impaired watersheds when a general class of operations, i.e., agriculture, has been identified as a source, but no specific operation nor classes of operations have been assigned WLAs. The EPA also notes that Idaho's draft Water Quality 401 Certification (August 30, 2019) certifies that the conditions of the general permit "comply with Idaho's Water Quality Standards, including any applicable water quality management plans (e.g., total maximum daily loads)."

Comment FWW #7 (Food & Water Watch)
The Final Permit Must Require Effluent Monitoring. The CWA requires that NPDES permits contain conditions, including data collection and reporting, to "assure compliance" with the Act. Furthermore, Section 308 of the Act states that "[w]henever [it is] required to carry out the objective" of the CWA, "(A) the [EPA's] Administrator shall require the owner or operator of any point source to … (iii) install, use, and maintain such monitoring equipment or methods … and (v) provide such other information as he may reasonably require."

EPA's accompanying CWA regulations require all NPDES permits to include certain monitoring and reporting requirements designed to "assure compliance with permit limitations." These regulations include, among other provisions, "requirements to monitor: (i) The mass (or other measurement specified in the permit) for each pollutant limited in the permit; (ii) The volume of effluent discharged from each outfall; [and] (iii) Other measurements as appropriate…." Permit monitoring provisions must further specify the "type, intervals, and frequency [of sampling] sufficient to yield data which are representative of the monitored activity, including, when appropriate, continuous monitoring." Permittees must report monitoring results "with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year." Given these statutory and regulatory requirements, "[g]enerally, 'an NPDES permit is unlawful if a permittee is not required to effectively monitor its permit compliance.'"

EPA must include monitoring requirements that allow for meaningful oversight of Idaho CAFOs' compliance with the Draft Permit's conditions and effluent limitations. This requires representative water quality monitoring at CAFO production sites as well as land application sites adequate to provide oversight of permit compliance. While the Draft Permit prohibits discharges from CAFO production areas except under limited circumstances and requires CAFOs to develop and implement Nutrient Management Plans ("NMP") for the handling, storing, and land application of their waste, the Draft Permit does not include monitoring requirements that would enable EPA, Idaho officials, or the public to ensure their operations are in compliance with these no discharge parameters and effluent limitations. As explained by the Second Circuit, "NPDES permits must contain conditions that require both *monitoring* and *reporting of monitoring results* of TBELs and WQBELs to ensure compliance." The Draft Permit's failure to require such monitoring plainly violates the CWA and leaves regulators and the public to guess whether and how CAFOs are violating the law.

The sampling and monitoring requirements the Draft Permit does contain are insufficient to satisfy the CWA or EPA regulations. The soil and manure sampling requirements included in the Draft Permit look at the nitrogen and phosphorus content of CAFO waste and target fields, helping calculate agronomic rates of application, but have nothing to do with whether discharges are occurring that impact jurisdictional waters. Nothing about this sampling tells whether waste was actually applied appropriately and in accordance with a CAFO's NMP. And the requirement to monitor manure spills and other obvious, discrete discharges from wastewater or manure storage structures also does not suffice because it takes place after a known violation, rather than being representative and serving to assure compliance.

EPA must determine what monitoring is representative for a particular CAFO applicant. It will likely include monitoring surface water and/or groundwater where a direct hydrological connection exists between groundwater and jurisdictional waters, monitoring discharge points from production areas, such as ditches that may carry contaminated wastewater off-site and into waterways. Representative monitoring must also include monitoring requirements for tile drain outfalls at fields where CAFO waste is land applied, where such systems are in place. Tile drain systems are conduits underlying agricultural fields designed to shed excess moisture, and where liquid manure is applied can directly discharge pollutants to surface waters or conduits to surface waters. This is necessary to monitor compliance with the Draft Permit's "no dry weather discharge" provision.

Until EPA requires representative effluent monitoring where appropriate to document discharges from CAFO production and land application areas, many of the terms and conditions of the Draft Permit will remain mere words on paper. EPA may not excuse CAFOs from the monitoring required of all NPDES permittees simply because it has created a legal fiction that these operations do not discharge. But even if that were the case, zero is an effluent limit, and the CWA requires CAFOs to demonstrate their compliance with it.

EPA Response: See response to comment ICL #2.

Comment FWW #8 (Food & Water Watch)

The Final Permit Must Require BPJ Limits for CAFO Pollutants with No ELG. EPA essentially treats CAFO waste as only containing nutrients that are beneficial to crop production if applied at agronomic rates. Under this approach, any other pollutants of concern that may be found in CAFO waste, but that are not beneficial to or utilized by crops, are not considered or regulated under the NPDES program. Yet CAFO waste contains a variety of other pollutants including solids (feed, hair, feathers, etc.); salts; trace elements such as arsenic, copper, selenium, zinc, cadmium, molybdenum, nickel, lead, iron, manganese, aluminum, and pesticide ingredients; pathogens (bacteria, viruses, protozoa, fungi, prions, and helminths); antimicrobials (antibiotics and vaccines); hormones (both natural and synthetic); pesticides; soaps; and disinfectants.

Regarding pollutants for which no ELG has been established, EPA regulations require case-by-case effluent limitations based on Best Professional Judgment ("BPJ"). BPJ effluent limitations can take the form of numerical limitations or BMPs. Recent EPA guidance further clarifies that permitting agencies must establish BPJ limits for pollutant discharges not covered by the applicable ELGs:

> Where EPA has not promulgated technology-based effluent guidelines for a particular class or category of industrial discharger, *or where the technology- based effluent guidelines do not address all waste streams or pollutants discharged by the industrial discharger*, EPA must establish technology-based effluent limitations on a case-by-case basis in individual NPDES permits, based on its best professional judgment or "BPJ."
> . . .
>
> *[A]n authorized state must include technology-based effluent limitations in its permits for pollutants not addressed by the effluent guidelines for that industry*. 33 USC § 1314(b); 40 CFR § 122.44(a)(1), 123.25, 125.3. In the absence of an effluent guideline for those pollutants, the CWA requires permitting authorities to conduct the "BPJ" analysis discussed above on a case-by-case basis for those pollutants in each permit.

CAFOs are capable of discharging a variety of pollutants with no established ELGs, as explained further in sections E and K. This includes CAFO waste handled at production areas and land applied to fields, as well as discharges of pollutants from CAFO ventilation systems. Many pollutants found in CAFO waste applied to agricultural fields are not subject to agronomic rate considerations because they are not nutrients available for use by crops. Instead, they must be treated as what they are: pollutants that CAFOs produce, handle, and dispose of in ways that potentially result in discharges to jurisdictional waters. These pollutants and those discharged by ventilation systems do not have ELGs and thus require EPA to develop BPJ limitations sufficient to protect against unpermitted discharges to jurisdictional waters.

> **EPA Response:** The Final Permit includes provisions designed to address additional pollutants, e.g., mortality management (Part III.A.2.b), chemical and other contaminant management (Part III.A.2.e) as well as all sources in the production area (see response to comment FWW #16). These requirements are designed to minimize additional pollutants in any waste stream or discharge. The pollutant management approach for CAFOs uses nutrients as the measurable metric. However, it does not ignore other possible pollutants, such as those mentioned by the commenter. Pollutants at CAFOs are comingled in waste streams, storage structures, mortality management systems, etc. Therefore, by managing those collective systems and waste streams,

all pollutants are managed.

Comment FWW #9 (Food & Water Watch)
The Draft Permit Requires Inadequate Sampling of Soils and CAFO Waste. FWW supports EPA's requirement of annual soil tests for land application sites in the Draft Permit, which is more protective than its ELG requirement of a phosphorus soil test only every five years. However, a timeframe for when sampling must occur and clear requirements for representative sampling would be an appropriate additional safeguard. It is critical that current and actual soil conditions are understood before CAFO waste is applied to agricultural fields. As the University of Idaho Bulletin # 704 regarding soil sampling states, "soil sampling is also one of the most important steps in a sound crop fertilization program." CAFOs "should take soil samples as close as possible[,]" ideally "2 to 4 weeks before . . . fertilizing the crop." Because the University of Idaho Bulletin # 704 does not mandate this common sense practice, FWW asks that EPA establish a clear period of time prior to waste application in which CAFOs must conduct this sampling to avoid early sampling that does not capture actual and current soil conditions. For example, if soil samples are taken early in the year, potentially many months before land applications will occur, actual soil conditions may no longer be understood and CAFO waste may be overapplied. A variety of factors could make dated soil samples inappropriate tools for ensuring agronomic rate applications including other nutrient applications, drift from nutrient applications to nearby fields, or re-deposition of nitrogen lost to the atmosphere from CAFO waste from volatilization during storage and handling.

The Draft Permit should also make clear that soil samples must be representative of actual conditions on the target field. As University of Idaho Bulletin # 704 notes, "[a]n absolute minimum of 10 subsamples from each sampling unit" should be taken, especially for irregular fields, as this is "necessary to obtain an acceptable [overall] sample." Since the Bulletin is merely suggestive, EPA should include a clear and mandatory permit condition along these lines.

Similarly, FWW supports at least annual manure sampling as outlined in the Draft Permit, but EPA should establish more stringent requirements. First, EPA should make clear in the Final Permit that such manure samples must be representative of the material that will be applied by the CAFO. University of Idaho Manure and Wastewater Sampling CIS 1139 notes that "proper sampling is the key to reliable manure analysis," but only suggests the need for multiple and representative samples. Requiring "compliance" with such open-ended and non- mandatory technical standards is inadequate; EPA must go farther and require multiple, representative samples in such a way as to ensure accurate understanding of what the CAFO is spreading onto fields.

And as with soil sampling, EPA should mandate that manure sampling be conducted shortly before land application. The Draft Permit gives passing reference to University of Idaho Manure and Wastewater Sampling CIS 1139, but does not mandate anything from the guidance and fails to mention anything regarding when samples must be taken. CIS 1139 suggests that CAFOs conduct manure sampling "as close to the date of application as practical…or within 30 days" at the earliest. EPA should clearly incorporate and mandate this standard. If manure is land applied at different times throughout the year, the Draft Permit should require sampling shortly prior to each and every period of application.

EPA Response: While customizing sampling can sometimes improve data quality, monitoring requirements in permits must also consider data interpretability for the intended purpose. As the commenter notes, annual soil testing provides notable improvements in interpretability for the purposes of estimating appropriate nutrient application rates. While the EPA supports the recommendation of soil sampling within 2-4 weeks of land application whenever possible, the logistical issues (lab capacity and turn-around times, for example) may make this infeasible. For purposes of land application of manure, annual sampling is necessary and appropriate, and the current requirements optimize data quality and implementability. No change has been made to the permit as a result of this comment.

Comment FWW #10 (Food & Water Watch)
Additionally, EPA should expand the pollutants for which CAFOs must conduct sampling. The Draft Permit requires that manure only be sampled for nitrogen and phosphorous. But, as explained above, CAFO waste is known to contain an array of other pollutants of concern. EPA should require CAFO waste that will be applied to fields be analyzed for all of the constituent pollutants that EPA has already found it likely to contain, and these sampling requirements should correspond to the pollutants for which EPA determines it must establish BPJ effluent limits. If laboratory analysis determines that other pollutants of concern are present in the samples, appropriate restrictions on land application practices must be in place to ensure harmful constituents are not disposed of on agricultural fields in such a way that will likely lead to a discharge to surface waters.

EPA Response: See response to comment FWW #8. In the absence of evidence of actual human health or environmental concerns associated with additional pollutants, e.g., CWA 303(d) verified impairments, broader manure sampling and analysis requirements that would apply to all facilities with coverage under a general permit is not currently warranted.

Comment FWW #11 (Food & Water Watch)
The Final Permit Should Contain Stronger Waste Storage Requirements. Appropriate waste storage structures are an integral part of ensuring CAFOs do not discharge pollutants in violation of permit conditions. EPA should include two additional permit conditions and revise one provision pertaining to waste storage structures.

First, EPA should include phase-out requirements for old manure lagoons and other storage facilities that no longer meet the most current EPA and NRCS standards. Antiquated storage facilities pose an unacceptable threat, and should not be allowed to simply continue operating until they fail. As noted above, the regions of Idaho most populated with CAFOs overlie highly fractured basalt geology that allows nutrients to infiltrate groundwater, which is well-documented to have direct hydrological connection to jurisdictional waters.

Second, EPA should develop its own standards for the technical specifications of waste storage facilities. The Draft Permit relies on NRCS standards, which have proven insufficient after years of water quality impairments across the United States. In fact, NRCS standards expressly allow for leaks of pollutants, which can result in discharges of pollutants to jurisdictional waters. Specifically, EPA should require that all waste impoundment structures that are not virtually impermeable (such as concrete manure storage facilities) phase in synthetic liners with leak monitoring systems as soon as practicable. Synthetic liners with leak detection systems are in use at some CAFOs already, and are the appropriate BAT standard that Idaho CAFOs should be held to.

Finally, EPA should revise the Draft Permit Section III.A.2.a.i to eliminate the ability of a CAFO to seek coverage under this permit without having in place sufficient waste storage capacity. As written, the Draft Permit appears to enable a CAFO to begin or continue housing animals even if its waste storage capacity evaluation determines the facility has "less than the minimum capacity requirements specified in Section II.A.1." This does not make sense and could easily lead to CAFOs operating without needed capacity when the time comes—instead, every CAFO must have adequate waste storage capacity *before* its Notice of Intent is approved.

> **EPA Response:** The waste storage standards and specifications apply to all existing and planned manure, litter and wastewater storage structures. The permit includes a specific requirement that the storage capacity of all storage structures must be evaluated and that operators of any structures found to be deficient must provide corrective and interim measures, as well as schedules for correcting any deficiencies. See Part III.A.2.a.i of the Final Permit. While the EPA is not requiring the use of synthetic liners with leak monitoring systems in the permit, the EPA is requiring permittees to have a liner that is constructed and maintained in accordance with Idaho NRCS standards. NRCS practice standards do include considerations for categories where synthetic liners should be used in conjunction with clay liners. If the commenter believes that different regulations are warranted, the commenter can petition the EPA for rulemaking for to develop its own standards and technical specifications for manure, litter, and wastewater storage structures. No change has been made to the permit as a result of this comment.

Comment FWW #12 (Food & Water Watch)

EPA Should Establish Additional Requirements for Transfers of CAFO Waste to Third Parties. As written, the Draft Permit's safeguards for avoiding discharges of pollutants to jurisdictional waterways via land application only apply to "land under the control of the CAFO owner/operator," and the requirements for when a CAFO instead transfers its waste are extremely sparse. EPA must include additional safeguards for when CAFO owners/operators transfer CAFO waste by sale or gift to third parties. This is a necessary and appropriate addition because as NPDES-permitted industrial facilities, CAFO waste management practices of all kinds are central to attaining the goal of the CWA. Absent greater protections, CAFOs have an incentive to transfer their waste to third parties without conducting any due diligence as to the likely impacts on water quality; third party land application brings all the same risks of water quality impairments attendant to a CAFO's own land application. When a CAFO generates waste, which has a high potential to pollute jurisdictional waters, it should be required to responsibly deal with that waste, even when doing so means transferring it to a third party.

In addition to the conditions outlined at III.D of the Draft Permit, CAFO owners/operators should be required to do the following before being permitted to transfer waste to a third party: communicate to any recipient all land application guidelines and best management practices that would apply were the CAFO land applying the waste to lands under its control, inquire as to whether the third party intends to responsibly handle and utilize the waste and receive an affirmative response, inquire where and in what quantities the recipient intends to land apply any of the transferred waste, and record and report the preceding items to EPA and Idaho officials. CAFO owners/operators should retain some degree of responsibility for how and to whom they transfer their waste, lest this loophole become a go-to avenue for disposing of a CAFO's waste irresponsibly. These measures are necessary to safeguard against CAFOs transferring waste to another person who is incapable of responsibly handling such wastes and from CAFO owners/operators using third parties to do what they themselves are prohibited from doing under the terms of their NMP and this General Permit.

> **EPA Response:** The proposed permit is consistent with 40 CFR §§122.42(e)(3) and 122.42 (e)(4). 40 CFR §122.42(e)(3) states that prior to transferring manure, litter or process wastewater to a third party, CAFOs must provide the recipient with the most current nutrient analysis. In addition, the permitted CAFO must retain such records for five years. 40 CFR

§122.42(e)(4) requires the annual report to include an estimate of the amount of total manure, litter or process wastewater transferred to other persons in the past 12 months. If a third party meets the regulatory definition of a CAFO and discharges manure, litter, or process wastewater to waters of the United States, the owner/operator or third party in control of that CAFO must apply for the permit. In addition, Section 301(a) of the CWA prohibits the discharge of pollutants to waters of the U.S. except in accordance with an NPDES permit. If that third party meets the definition of a point source as defined in 40 CFR §122.2 and discharges pollutants to waters of the U.S. without an NPDES permit, that third party may be subject to enforcement for an unauthorized discharge.

Comment FWW #13 (Food & Water Watch)
Land Application of Waste from Anerobic Digesters. An increasing number of CAFOs in Idaho are using or are considering using anaerobic digesters to capture methane from animal waste generated at CAFOs. EPA may not ignore the use of digestate—the leftover solid and liquid waste after methane capture—as a fertilizer for land applications. Digestate poses heightened risks to water quality, and merely spreading this digestate on fields as though it were no different than undigested CAFO waste is not BAT, in violation of the CWA and EPA's regulations. NRCS warns that nitrogen, phosphorus, and other elements in digestate are more water soluble than in undigested CAFO waste, making it more prone to leaching and runoff and posing a unique risk to surface water. Until EPA conducts a thorough assessment of the water pollution implications of land applying digestate, and how this affects agronomic rates, the Draft Permit should prohibit the use of liquid or solid digestate in land application practices.

EPA Response: The application of nutrients in any form, including digestate, must be accounted for in the nutrient management plan. See Part II.B.2 of the Final Permit. No change has been made to the permit as a result of this comment.

Comment FWW #14 (Food & Water Watch)
The Final Permit Must Prohibit Spray Irrigation. The Draft Permit should expressly prohibit spray irrigation of manure given the unique risks associate with this practice. Using spray irrigation threatens surface waters because this practice can result in excessive application that causes waste ponding, leaching, and potential dry weather runoff. Spray irrigation also has the potential to cause drift to surface waters nearby target fields. These irrigation systems are also reliant on pipes and hoses to connect lagoons with sprayfields, which can leak or break, resulting in unpermitted discharges.

Spray irrigation also results in higher rates of evaporation and volatilization of a range of CAFO pollutants. Several studies have found that when manure is not incorporated into soil after application, more than half of the manure ammonia is lost, likely due to volatilization. This directly impacts surface waters because volatilized ammonia will re-deposit into waterways.

EPA Response: Please see the Idaho Nutrient Transport Risk Assessment (INTRA) method (Appendix E of the Final Permit), which directly incorporates an irrigation index into the risk assessment. This ensures that if spray irrigation is used, it is adequately accounted for. No change has been made to the permit as a result of this comment.

Comment FWW #15 (Food & Water Watch)
EPA Must Prohibit Land Applications When Current or Impending Rainfall Is Capable of Producing Unauthorized Discharge. The Draft Permit does not appear to include a condition requiring, or even

suggesting, CAFOs delay land applications of waste if current or impending precipitation capable of producing an unauthorized discharge is forecasted. This is a typical requirement in other CAFO NPDES permits, and one EPA strongly encourages delegated states to implement; EPA should clearly require it in this permit as well. Even the currently operative CAFO general permit from 2012 contains this consideration by incorporating NRCS Conservation Practice 590. As a result, if the Final Permit does not include this prohibition and lacks a considered justification and finding of necessity, it would violate the CWA's express anti-backsliding prohibition.

When the National Weather Service forecasts rainfall exceeding one-half inch, or less if a lesser rainfall event is capable of producing unauthorized discharge, during the planned time of application or within 24 hours after the planned time of application, CAFOs must delay land application because rainfall onto freshly applied waste is likely to result in discharges. Such a requirement follows logically from the restrictions already deemed essential in the Draft Permit, namely the prohibition on applying to saturated ground. There is no reason to only prohibit applying waste when rain has already saturated ground, but not when rainfall is actively or imminently going to produce similar conditions that make unauthorized discharges likely.

> **EPA Response:** The EPA concurs with the comment. Avoiding land application during precipitation or snowmelt events or when conditions that could generate discharges are expected, is an inherent aspect of application timing. However, none of the appended technical tools specifically articulates this element. Therefore, Part II.B.10.b of the Final Permit has been modified as follows to provide clarity on the prohibition on land application of manure, litter and process wastewater: *When the top two inches of soil are saturated from rainfall, snow melt, irrigation, <u>or when current or predicted weather is capable of producing such conditions</u>.*

Comment FWW #16 (Food & Water Watch)
Discharges from Ventilation Systems. The Final Permit should also make clear that discharges from CAFO ventilation systems are point source discharges covered by the CWA, and establish permit conditions necessary to protect waterways from this pollution. The term "pollutant" is defined very broadly in the CWA, and EPA's position is that CAFO ventilation fans are capable of discharges covered by the CWA. These ventilation systems are used by various types of facilities, and can directly discharge pollutants such as manure, dust, litter, ammonia, and animal debris (feathers, hair, etc.) into nearby jurisdictional waters or conduits to jurisdictional waters, such as production area ditches or channels.

EPA must include BPJ conditions in the Permit regarding the use of ventilation systems. As EPA has stated, "there are other circumstances where a permit writer must use BPJ or special permit conditions to address specific discharges at CAFOs that are not included in the ELG. For example, the CAFO ELG does not address … pollutants (such as manure, feathers, and feed) that have fallen to the ground immediately downward from confinement building exhaust ducts and ventilation fans …."

> **EPA Response:** The permit is clear that <u>any</u> discharge of manure, litter or process wastewater from the production area is prohibited except for the circumstances of discharges occurring when specific 25-year 24-hour storm design standards have been implemented and maintained (Part II.A.1). There are no exceptions to this discharge prohibition. The permittee is required to develop a nutrient management plan that addresses all site-specific conditions to comply with this requirement (Part III.A.2). This necessarily includes all sources and transport mechanisms of manure, litter and process wastewater, even though the permit does not provide an exhaustive list.

Comment FWW #17 (Food & Water Watch)

Reassess 25-year, 24-hour Storm Event Standards. EPA should require Idaho CAFOs to plan for the extreme precipitation events made increasingly more common by climate change. Extreme precipitation events are likely to cause overflows of stored waste at CAFO production areas designed to specifications based on outdated historical precipitation patterns. The consequences of storage lagoon overflows are dire, as shown by recent events elsewhere in the nation. The Draft Permit does not specifically define this standard, but a CAFO operator could reasonably look to EPA's regulatory definition for guidance to determine the nature of a "25-year, 24-hour storm event" for their operation. Unfortunately, EPA anchors its regulatory definition to nearly 60-year-old NRCS data. Given that dated and no longer applicable set of metrics, EPA should establish a more protective and accurate standard based on the most current data that ensures CAFOs' waste impoundments are capable of accommodating today's more extreme 25-year, 24-hour storms. EPA has asked other state authorities to do just this. If EPA does not require Idaho CAFOs to prepare for current conditions, facilities will be able to avail themselves of a permit shield for overflows and other discharges resulting from storms that are no longer 25-year, 24-hour events, but rather are the new normal.

> **EPA Response:** Changing either the regulatory threshold, i.e., the 25-year, 24-hour storm, as stipulated in 40 CFR Part 412 or NOAA's published rainfall precipitation frequency and duration estimates are outside the scope of this permitting action. No change has been made to the permit as a result of this comment.

Comment FWW #18 (Food & Water Watch)

CAFOs in Idaho are having serious impacts on the State's jurisdictional waters, and EPA needs to bring these facilities' pollution under control to protect and improve water quality as required by the CWA. Commenters appreciate the steps forward EPA has included in the Draft Permit, but respectfully request that it strengthen the Permit with the above conditions and requirements that are necessary to protect water quality in Idaho from an out-of-control CAFO industry. And to give the Permit effect and make these improvements lead to actual improvements in water quality, EPA must establish a presumption of discharge for certain CAFOs that requires them to obtain NPDES permit coverage. Please contact us with any questions you may have regarding any of the above comments and why the proposed revisions are necessary in Idaho. Thank you for your attention and consideration.

> **EPA Response:** The EPA acknowledges the comment and has addressed the specifics summarized in this paragraph in prior responses.

Comment IDOA #1 (In Defense of Animals)

As one of 250,000 supporters of the California-based international animal protection nonprofit organization In Defense of Animals, I respectfully urge the EPA's Region 10 Office to NOT reissue the National Pollutant Discharge Elimination System General Permit for Idaho's Concentrated Animal Feeding Operations (CAFOs). CAFOs perpetrate severe animal cruelty, are inherently unsustainable, and cause significant environmental damage. The EPA is charged with safeguarding human health and the environment, and therefore should not give corporations permission to invade rural communities and damage their residents' health.

CAFOs produce large quantities of waste and manure, which is dumped in lagoons or large fields. During downpours, the waste can overflow causing runoff to end up in rural communities' water supplies. Waste also seeps into underground aquifers containing groundwater.

Additionally, CAFOs are a significant source of air pollution.

According to the National Association of Local Boards of Health, CAFOs create a stench which forces neighbors to stay indoors and emit toxic fumes which cause neurological and respiratory disorders. The fumes produced in CAFOs are deliberately blown outside with fans since they are toxic to the workers and animals inside them.

These disastrous problems are inherent to CAFOs. Although some steps can be taken to lessen the environmental destruction they cause, CAFOs, by nature, will always lead to significant harm and suffering. The EPA should use its authority to protect the health of rural communities, animals bred for slaughter, and wild animals who are adversely affected by CAFOs, instead of the profits of powerful corporations.

I am sincerely hoping that logic and compassion will replace greed and denial on this most critical of issues.

> **EPA Response:** Many of the water quality impacts from CAFOs are the reason why the CWA regulates these facilities under the NPDES permit program. The permit places enforceable requirements on permittees to implement pollution controls. No change has been made to the permit as a result of this comment.

CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the Ninth Circuit by using the appellate CM/ECF system on September 22, 2020. I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the appellate CM/ECF system.

Date: September 22, 2020

s/ Tyler Lobdell
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Case No. 20-71554

In the United States Court of Appeals
for the Ninth Circuit

FOOD & WATER WATCH, INC.; SNAKE RIVER WATERKEEPER, INC.,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

On Petition for Review of Final Action of the United States Environmental Protection Agency

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Petitioners Food & Water Watch, Inc.; Snake River Waterkeeper, Inc.
Excerpts of Record
Volume 2

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TABLE OF CONTENTS

BIOLOGICAL EVALUATION OF THE CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOs) NPDES GENERAL PERMIT FOR THE STATE OF IDAHO

PREPARED FOR:

U.S. FISH AND WILDLIFE SERVICE

And

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

PREPARED BY:
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TABLE OF CONTENTS

Page

LIST OF ACRONYMS

ACOE	U.S. Army Corps of Engineers
AFOs	Animal Feeding Operations
AgriMet	Pacific Northwest Cooperative Agricultural Weather Network
BE	Biological Evaluation
BLM	Bureau of Land Management
BMPs	Best Management Practices
BOD5	Five-day Biochemical Oxygen Demand
BPA	Bonneville Power Administration
CAFOs	Concentrated Animal Feeding Operations
CBFWA	Columbia Basin Fish and Wildlife Authority
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
EID	Environmental Information Document
EIS	Environmental Impact Assessment
ELG	Effluent Limit Guideline
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU/	Evolutionarily Significant Units/Distinct Population Segments
FONSI	Finding of No Significant Impacts
FPC	Fish Passage Center
FR	Federal Register
IDCDC	Idaho Conservation Data Center
IHNV	Infectious Hematoporietic Necrosis Virus
ISDA	Idaho State Department of Agriculture
LAA	Likely to Adversely Affect
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NE	No Effect
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
NMP	Nutrient Management Plan
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries
NOI	Notice of Intent
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRM	Northern Rocky Mountain
NSPS	New Source Performance Standards
ORW	Outstanding Resource Waters
PCE	Primary Constituent Element

Permit	General CAFO Permit
Rkm	River kilometer
RM	River Mile
SR	Snake River
TMDLs	Total Maximum Daily Loads
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

Background

The U.S. Environmental Protection Agency plans to reissue a General National Pollutant Discharge Elimination System (NPDES) Permit for concentrated animal feeding operations (CAFOs) in the State of Idaho, excluding CAFOs located on Tribal lands (the Permit). The Permit will replace the previous general permit for CAFOs in Idaho, NPDES Permit No. IDG010000, which expired on May 8, 2017. To protect water quality and human health, the Permit contains requirements from the CAFO regulations at 40 Code of Federal Regulations (CFR) Parts 122 and 412.

Federal Action

The proposed Federal action that is the subject of this consultation under Section 7 of the Endangered Species Act (ESA) between EPA and the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) (collectively referred to as the Services) is the reissuance of the Permit. The Permit will be issued by EPA pursuant to the Clean Water Act (CWA) and implementing regulations. The Permit will establish effluent limitations, prohibitions, best management practices (BMPs), and other conditions governing the discharge of pollutants to waters of the United States (waters of the U.S.) from CAFOs covered by the Permit. The Permit has a term of five years from the effective date. The fact sheet developed in support of the Permit describes the proposed permit requirements as well as the scope of the Permit. A copy of the draft Permit and fact sheet are included in Appendices A and B, respectively.

Federal Definition of a CAFO

The definitions for both animal feeding operation (AFO) and CAFO are included below. An AFO means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of forty-five (45) days or more in any twelve (12) month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. A CAFO is an AFO which is defined as a Large CAFO or Medium CAFO by 40 CFR 122.23 (4) and (6), or that is designated as a CAFO.

A large CAFO means an AFO that stables or confines as many as or more than the numbers of animals specified in any of the following categories:

- 700 mature dairy cattle, whether milked or dry;
- 1,000 veal calves;
- 1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs;
- 2,500 swine each weighing 55 pounds or more;

- 10,000 swine each weighing less than 55 pounds;
- 500 horses;
- 10,000 sheep or lambs;
- 55,000 turkeys;
- 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system;
- 125,000 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system;
- 82,000 laying hens, if the AFO uses other than a liquid manure handling system;
- 30,000 ducks (if the AFO uses other than a liquid manure handling system); or
- 5,000 ducks (if the AFO uses a liquid manure handling system).

A medium CAFO means any AFO that stables or confines as many or more than the numbers of animals specified in any of the following categories:

- 200 to 699 mature dairy cattle, whether milked or dry cows;
- 300 to 999 veal calves;
- 300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs;
- 750 to 2,499 swine each weighing 55 pounds or more;
- 3,000 to 9,999 swine each weighing less than 55 pounds;
- 150 to 499 horses, (vii) 3,000 to 9,999 sheep or lambs,
- 16,500 to 54,999 turkeys,
- 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system;
- 37,500 to 124,999 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system;
- 25,000 to 81,999 laying hens, if the AFO uses other than a liquid manure handling system;
- 10,000 to 29,999 ducks (if the AFO uses other than a liquid manure handling system); or
- 1,500 to 4,999 ducks (if the AFO uses a liquid manure handling system)

In addition, a medium CAFO must meet either one of the following conditions:

- pollutants are discharged into waters of the U.S. through a man-made ditch, flushing system, or other similar man-made device; or
- pollutants are discharged directly into waters of the U.S. which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

CAFOs which discharge pollutants to waters of the U.S. are considered point sources subject to the NPDES permitting program and must obtain a permit (see 40 CFR 122.21(a) and 122.23(d)(1)).

The Permit includes requirements in accordance with the effluent limitation guidelines (ELGs) for the production facility and land application areas contained in the NPDES and Effluent Limitation Guidelines and Standards for CAFOs Final Rule (2008 CAFO Rule). The 2008 CAFO Rule and the Permit prohibit the discharge of manure, litter, or process wastewater from the production area unless in accordance with the ELGs, and the Permit prohibits the discharge of manure, litter, or process wastewater from land application area except where that discharge is an agricultural storm water discharge as provided in 40 CFR 122.23(3).

A CAFO is a "new source" if it was constructed or became defined as a CAFO after April 14, 2003 (the date the 2003 NPDES and Effluent Limitation Guidelines and Standards for CAFOs became effective (2003 CAFO Rule)). In addition to adherence with the ELGs that are incorporated as conditions of the Permit, a new source must adhere to the New Source Performance Standards (NSPS) found at 40 CFR 412.46. CAFOs that existed prior to April 14, 2003 do not have to meet the NSPS requirements because they are not "new sources," however, these CAFOs must still adhere to the ELGs for the production and land application areas contained in the Permit.

EPA has obtained the most recent estimate of the numbers and sizes of AFOs and CAFOs from the Idaho State Department of Agriculture (ISDA). The numbers of existing AFOs and CAFOs, as defined by ISDA are as follows:

Size (Number of Animals)	Number of Facilities
< 300	948
300 – 999	398
1,000 – 4,999	97
5,000 – 9,999	27
> 10,000	27

The approximate locations of the facilities are shown below in Figure 1. As can be seen, most facilities are in the southern portion of Idaho.

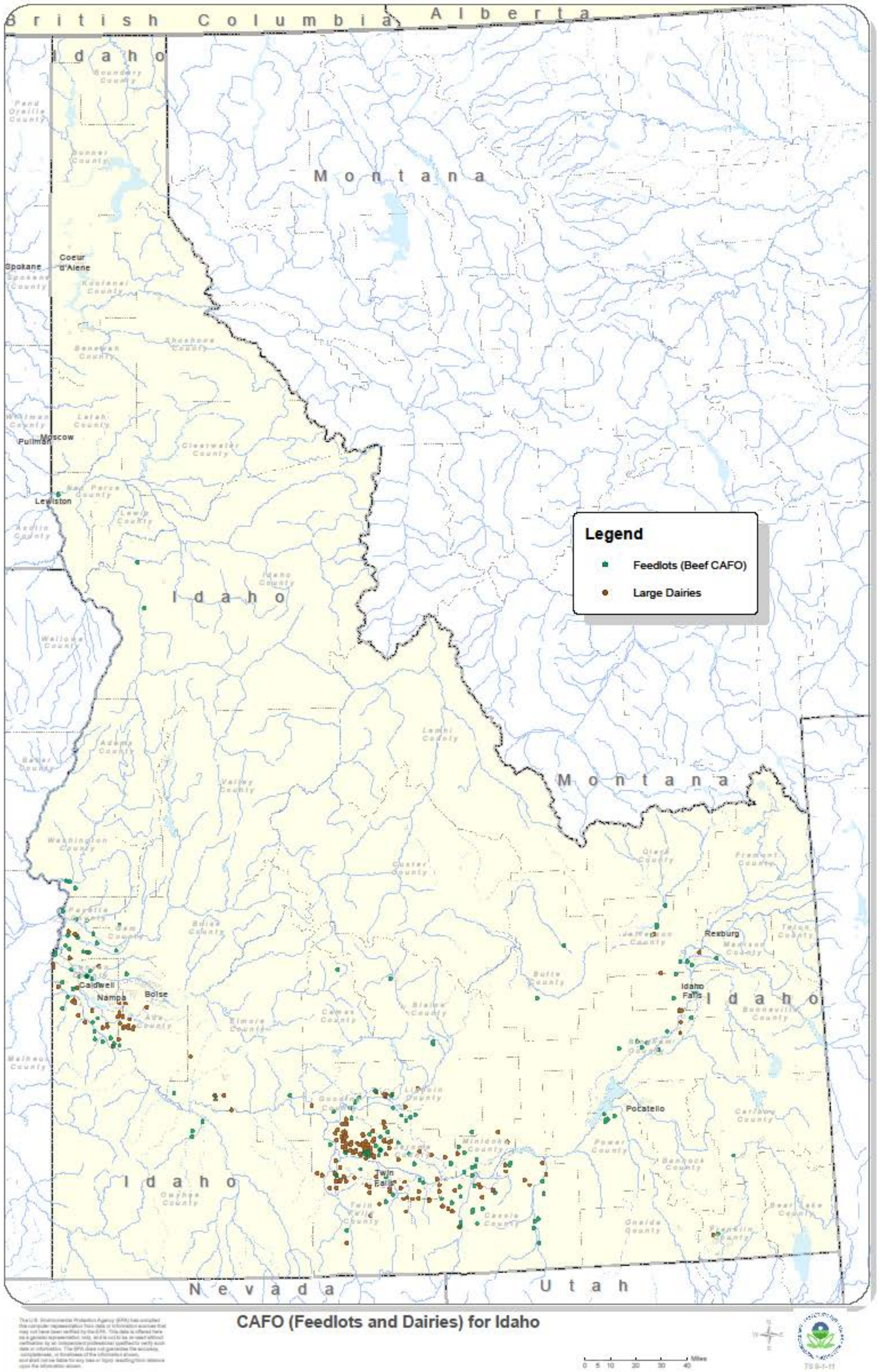

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Figure 1. Map of Large AFOs and CAFOs in Idaho.

Application for Coverage

In accordance with 40 CFR §§ 122.21(i)(1)(x), 122.28(b)(2), and 122.23(d)(3), a CAFO operator seeking coverage under the Permit must submit a signed Notice of Intent (NOI) (see CAFO General Permit Appendix A) and a Nutrient Management Plan (NMP) to EPA. EPA Form 2B serves as the NOI for this permit. Copies of the NOI must also be submitted to the Idaho Department of Environmental Quality and the Idaho Department of Agriculture.

Pursuant to 40 CFR § 122.23(h), EPA will review the NOI and NMP to ensure that all permit requirements are fulfilled. EPA may request additional information from the CAFO owner or operator if additional information is necessary to complete the NOI and NMP or to clarify, modify, or supplement previously submitted material. If EPA makes a preliminary determination that the NOI is complete, the NOI, NMP, and draft terms of the NMP to be incorporated into the permit will be made available at EPA Region 10's website at: https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program for a thirty (30) day public review and comment period. EPA will respond to comments received during this period and, if necessary, require the CAFO owner or operator to revise the NMP. If determined appropriate by EPA, CAFOs will be granted coverage under the permit upon written notification by EPA. If EPA determines that the facility is ineligible for coverage under the permit, EPA will inform the facility an individual permit is required. Until the CAFO owner/operator receives written notification from EPA that the CAFO is authorized to discharge under the permit, any discharges from the CAFO are not covered by a NPDES permit.

CAFOs classified as "new sources" must conduct an environmental review under the National Environmental Policy Act (NEPA) [40 CFR § 6]. A CAFO is a "new source" if construction commenced after April 14, 2013, and it meets the criteria set forth in 40 CFR § 122.29. *See* 40 CFR § 122.2 and 68 Fed. Reg. 7176, 7200 (February 12, 2003). New Source CAFOs in Idaho must submit a Finding of No Significant Impact ("FONSI") or an Environmental Impact Statement ("EIS") issued by EPA Region 10 along with the NOI and NMP in order to obtain coverage under the general permit.

With regard to an owner/operator of an existing CAFO that proposes to expand the facility, the facility would not become a new source unless the modifications totally replace the process or production equipment that causes the discharge of pollutants, or the new/modified facility's production and waste handling processes are substantially independent of the preexisting source. *See* 68 Fed. Reg. at 7200. For an existing CAFO, the draft permit adds a procedure to be used for permit coverage of a significant expansion that is constructed after the effective date of the permit. If EPA determines the expansion renders a facility a *new source*, then the permittee must include a FONSI or an EIS issued by Region 10 along with the NOI to have the expansion covered by the Permit.

Permit Expiration

In accordance with 40 CFR § 122.46(a), NPDES permits shall be effective for a fixed term not to exceed five (5) years. If the permit is not reissued prior to the expiration date, it shall be eligible for an administrative extension of coverage in accordance with the Administrative Procedures Act (APA) and will remain in full force. The EPA cannot provide coverage under the Permit to any Permittee who submits their NOI requesting permit coverage after the permit expiration date.

Consultation History

The prior CAFO general permit underwent Section 7 consultation with the Services.

1.1 SCOPE OF CAFO PERMIT

Regulations implementing the NPDES program at 40 CFR § 122.28 allow EPA to issue general permits to regulate numerous facilities in one permit when the facilities:

- Are located within the same geographic area;
- Involve the same or substantially similar types of operations;
- Discharge the same types of wastes;
- Require the same effluent limits or operating conditions;
- *Require the same or similar monitoring requirements; and*
- In the opinion of EPA, are more appropriately controlled under a general permit rather than an individual permit.

As with the 2012 CAFO permit, the reissued Permit will be a general permit. All CAFO's within the State of Idaho that are not excluded (see below) or located within Tribal lands will be eligible to apply for coverage under the Permit.

The table below shows an estimate of the number and size of AFOs and CAFOs within Idaho.

Size (Number of Animals)	Number of Facilities
< 300	948
300 – 999	398
1,000 – 4,999	97
5,000 – 9,999	27
> 10,000	27

Source: Idaho State Department of Agriculture, Spring 2018

It is uncertain how many CAFOs will apply for coverage under the Permit as none applied for or received coverage under the previous permit. CAFOs that do not discharge are not required to obtain coverage under an NPDES permit. A map outlining the location of known AFOs and CAFOs is provided in Figure 1.

Excluded Facilities

In accordance with 40 CFR § 122.28(a)(4)(ii), EPA may exclude specific sources or areas from coverage under the Permit. The following CAFOs are not eligible for coverage under the Permit, and must apply for an individual permit:

- CAFOs that have been notified by EPA that they are ineligible for coverage under this general permit due to a past history of non-compliance. [40 CFR § 122.28(b)(3)(A)]
- CAFOs that are seeking coverage that will adversely affect species that are federally-listed as endangered or threatened ("listed") under the Endangered Species Act (ESA) or adversely modify critical habitat of those species. This provision is included in accordance with the outcome of consultation pursuant to Section 7 of the Endangered Species Act.
- CAFOs that are seeking coverage that will have the potential to affect historic properties. CAFO owners/operators must determine whether their permit-related activities have the potential to affect a property that is listed or eligible for listing on the National Register of Historic Places, pursuant the National Historic Preservation Act. If the CAFO seeking coverage will have an effect on historic properties, the CAFO's owners/operators must consult with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other tribal representatives regarding measures to mitigate or prevent any adverse effects on historic properties.
- CAFOs with discharges to a designated Outstanding Resource Water. As of the effective date of this permit there are no Outstanding Resource Waters approved by the Idaho Legislature. This provision is included in accordance with the State of Idaho's certification of this permit pursuant to CWA § 401(a)(1), 33 U.S.C. § 1341(a)(1) and 40 CFR § 124.53.
- CAFOs located in Indian Country. Administration of this permit will be assumed by Idaho DEQ mid-permit term (2020), but authorization to administer permits in some portions of Indian Country will be retained by EPA

1.2 ACTION AREA

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402). Observable or measurable effects of the action would not be expected beyond the boundaries of the action area.

The action area for the Permit includes all waters within Idaho that could be impacted by the CAFO discharges authorized by the Permit.

2 DISCHARGE LIMITATIONS AND OPERATING REQUIREMENTS

Section 301(a) of the Clean Water Act (CWA), 33 U.S.C. § 1311(a), prohibits the discharge of pollutants to waters of the U.S. except in accordance with a National Pollutant Discharge Elimination System (NPDES) permit. CWA Section 402, 33 U.S.C. § 1342, authorizes EPA to issue NPDES permits authorizing such discharges subject to requirements that implement CWA Sections 301, 304, and 401, 33 U.S.C. §§ 1311, 1314, and 1341.

These requirements must include effluent limitations that implement technology-based limits as well as any more stringent limits necessary to protect state water quality standards. Violation of a condition contained in an NPDES permit, whether an individual or general permit, is a violation of the CWA and subjects the operator of the permitted facility to the penalties specified in Section 309 of the CWA, 33 U.S.C. § 1319.

The Permit authorizes discharge from the production area and land application fields in accordance with the ELGs specified in Part II.A. and Part II.B of the Permit. All CAFOs that obtain coverage under the Permit will be subject to the same effluent limits, operating conditions, and monitoring requirements, other than where specific water quality-based limits are implemented to be consistent with wasteload allocations articulated in an approved Total Maximum Daily Load.

The following Section describes the discharge limitations and operating requirements contained in the Permit.

2.1 Effluent Limitations and Standards Applicable to the Production Area

The production area at a CAFO includes the animal confinement areas and other parts of the facility, including manure storage areas, raw materials storage areas, and waste containment areas. (40 CFR § 122.23(b)(8).)

2.1.1 ALL CAFOS

Manure, litter, and process wastewater discharges resulting from CAFOs are subject to the requirements found at 40 CFR §§ 122.23 and 122.42(e). Many CAFOs are also subject to the effluent limitation guidelines (ELGs) found at 40 CFR § 412. Pursuant to CWA § 402(a)(2), 33 U.S.C. § 1342(a)(2), and 40 CFR § 122.44(k)(3), best management practices (BMPs) are being proposed in the Permit.

For all CAFO's other than swine, poultry and veal "new sources," discharge from the production area is prohibited unless precipitation causes an overflow of pollutants into waters of the U.S. and the production area has been designed, constructed, operated, and maintained to contain all manure, litter, process wastewater, and the runoff and direct precipitation from the 25-year, 24-hour storm event for the location of the CAFO. If the discharge does not meet these criteria, the discharge is not authorized under the Permit and the CAFO is in violation of the CWA. An overflow is defined as the "discharge of manure or process wastewater resulting from the filling of wastewater or manure storage structures beyond the point at which no more manure, process wastewater, or storm water can be contained by the structure."

Parts II.A.1.b.i-vii of the Permit list each of the components needed in the design storage volume and can be seen in Figure 2-2, below (taken from EPA's Managing Manure Nutrients at Concentrated Animal Feeding Operations, August 2004). Of note, the volume to contain the direct precipitation and runoff for a 25-year, 24-hour storm event is just one component of the total design volume. A properly designed storage lagoon must include each of the other factors shown in Figure 2-2 and will contain more than a 25-year, 24-hour storm event. All owners/operators of a CAFO must have properly designed, constructed, operated, and maintained impoundments in accordance with the permit. No discharges will be allowed for CAFOs that do not meet the design criteria listed in Part II.A.1 and follow the additional requirements found in Part II.A.3. In addition, Part II.A.2.a.-e. of the Permit contains additional requirements CAFO owners or operators must follow in order to discharge from their production areas.

Chapter 2: Requirements for the Production Area

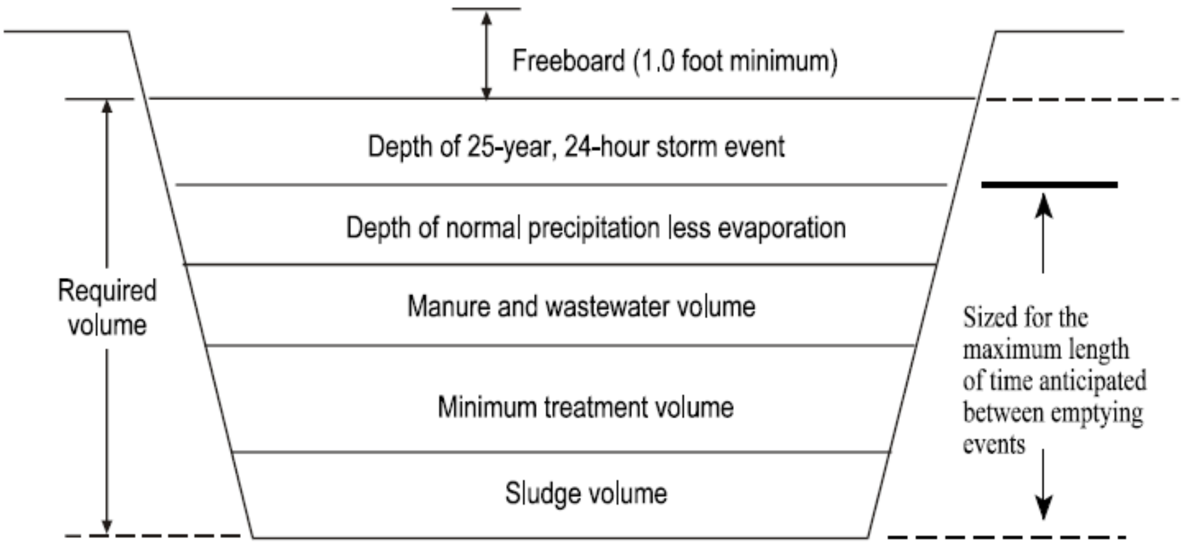

Figure 2-2. Cross Section of Properly Designed Lagoon

If a discharge from the production area occurs, a CAFO must show that the discharge was due to an overflow event. As shown in Figure 2-2 and Part II.A.1.b.i-vii of the Permit, a properly designed storage lagoon must contain allowances for the following:

- The normal precipitation less evaporation during the storage period;
- The normal runoff during the storage period;
- The direct precipitation from a 25-year, 24-hour storm event;
- The runoff from the 25-year, 24-hour storm event from the production area;
- The residual solids after liquid has been removed;
- One-foot freeboard to maintain structural integrity; and
- In the case of treatment lagoons, the necessary minimum treatment volume.

The addition of the volume required to contain the runoff and direct precipitation from a 25-year, 24-hour rainfall event, plus the required freeboard, ensures that if a CAFO designs, constructs, operates, and maintains their production area in accordance with the provisions specified in Parts II.A., the CAFO will be able to contain precipitation events up to the 100-year, 24-hour storm, and should only discharge in rare circumstances due to extreme or unplanned events. In addition to the design criteria, the CAFO must show that it has met Part II.A.1.-2. for that discharge to be authorized the CAFO's production area

2.1.2 ADDITIONAL REQUIREMENTS FOR ALL FACILITIES

- Visual Inspections
    - Weekly inspections of all storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to the wastewater and manure storage and containment structures. [40 CFR § 412.37(a)(1)(i)]
    - Daily inspections of all water lines, including drinking water and cooling water lines. [40 CFR § 412.37(a)(1)(ii)]
    - Weekly inspections of the manure, litter, and process wastewater impoundments noting the level as indicated by the depth marker installed in accordance with 40 CFR § 412.37(a)(2). [40 CFR § 412.37(a)(1)(iii)]

- Installation of a depth marker in all open surface liquid impoundments which clearly indicates the minimum capacity necessary to contain the runoff and direct precipitation of the 25-year, 24-hour rainfall event. The depth marker need not be a gauge or any formal type of structure; it need only provide immediate visual verification that adequate freeboard remains. [40 CFR § 412.37(a)(2)]

- Correction of any deficiencies that are identified as a result of visual inspections as soon as possible. [40 CFR § 412.37(a)(3)]

- No disposal of animal mortalities in any liquid manure or process wastewater systems and handling of animal mortalities in such a way as to prevent discharge of pollutants to surface water. [40 CFR §§ 122.42(e)(1)(ii) and 412.37(a)(4)]

- Maintenance of complete records for the production area. Records must be maintained on-site at the permitted CAFO for five years from the date they are created. [40 CFR §§ 122.42(e)(2) and 412.37(b)]

2.1.3 NEW SOURCE SWINE, POULTRY, AND VEAL LARGE CAFOS

"New source" CAFOs, are facilities where construction began after April 14, 2003. This applies to CAFOs that meet or exceed the following: 2,500 swine each weighing 55 pounds or more; 10,000 swine each weighing less than 55 pounds; 30,000 laying hens or broilers if the facility uses a liquid manure handling system; 82,000 laying hens if the facility uses other than a liquid manure handling system; 125,000 chickens other than laying hens if the facility uses other than a liquid manure handling system; 55,000 turkeys; and 1,000 veal calves (40 CFR § 412.40). The new source performance standards for production areas of swine, poultry and veal calf operations (40 CFR § 412.46) require that there be no discharge of manure, litter, or process wastewater pollutants into waters of the U.S. from the production area.

2.2 Effluent Limitations and Standards Applicable to the Land Application Area

Discharges of pollutants to waters of the U.S. from land application fields are authorized only if the discharge is agricultural storm water, as provided in 40 CFR 122.23(3). Permit provisions for land application of manure, litter or process wastewater under the control of the CAFO owner/operator include both technology-based and water quality-based limits. The first eight provisions are technology-based requirements based on best management practices specified in the CAFO regulations, including the ELG. [40 CFR §§ 122.42(e)(5) and 412.4(c)(1)]

- Develop and implement a NMP that is based on a field-specific assessment of the potential for nitrogen and phosphorus transport from the field. [40 CFR § 412.4(c)(1)]

- Address the form, source, amount, timing, and method of application of nutrients on each field to achieve realistic production goals, while minimizing nitrogen and phosphorus movement to surface waters. [40 CFR § 412.4(c)(1)]

- Determine application rates for manure, litter, and process wastewater that minimize phosphorus and nitrogen transport from the field to surface waters in accordance with the University of Idaho Fertilizer Guides or related University of Idaho Crop Production Guide . If a University of Idaho Fertilizer Guide or related Crop Production Guide is unavailable, a fertilizer or production guide from a Pacific Northwest Land Grant University may be used. If a land grant university fertilizer or crop production guide is unavailable, the NMP must identify and include the best available data used to determine specific land application rates for the crop. [40 CFR § 412.4(c)(2)]

- Identify appropriate site-specific conservation practices to be implemented, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the U.S. [40 CFR § 122.42(e)(1)(vi)]

- Establishment of protocols to land apply manure, litter, and process wastewater in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater. [40 CFR § 122.42(e)(1)(viii)]

- Analyze manure and soil a minimum of once annually for nitrogen and phosphorus content. [40 CFR § 412.4(c)(3)]

- Periodically inspect for leaks from equipment used for land application of manure, litter, or process wastewater. [40 CFR § 412.4(c)(4)]

- Do not apply manure, litter, or process wastewater closer than 100 feet to any down-gradient surface waters, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to surface waters. The permittee may opt to use a 35-foot vegetated buffer instead of the 100-foot setback. As a compliance alternative to the 100-foot non-vegetated and 35-foot vegetated setback, the permittee may demonstrate to the permitting authority that the use of an alternative practice will result in equivalent or better pollutant reductions than would be achieved by the use of the 100- or 35foot setback. An adequate demonstration must include the use of site-specific data using a credible tool such as INTRA or the Idaho Phosphorus Site Index. [40 CFR §§ 412.4(c)(5) and 412.4(c)(5)(i)]

The next two provisions are water quality-based provisions. The rationale for those provisions are explained in the Fact Sheet.

- Prevent dry weather discharges of manure, litter and process wastewater, including discharges to waters of the U.S. through tile drains, ditches or other conveyances, discharges associated with irrigation, as well as discharges via subsurface flows. Where manure, litter, or process wastewater has been applied in accordance with the CAFO's NMP, a precipitation related discharge of manure, litter, or process wastewater from land areas under the control of the CAFO is considered to be an agricultural storm water discharge. All other discharges from the land application area that are not agricultural storm water discharges are dry weather discharges and are prohibited.

- Do not apply manure, litter or process wastewater when the land is frozen or snow-covered, or when the top two inches of soil are saturated from rainfall, snow melt or irrigation.

2.3 Special Conditions

2.3.1 NUTRIENT MANAGEMENT PLAN

The CAFO operator/owner must develop, submit and implement a NMP [40 CFR §§ 122.42(e)(5) and 412.4(c)(1)]. The NMP shall identify and describe practices that will be implemented to ensure compliance with the effluent limitations and other provisions the Permit. CAFOs seeking permit coverage under the permit must submit the completed NMP to the EPA with the NOI. The permittee shall implement its NMP upon authorization under the Permit [40 CFR § 122.23(h)].

2.3.2 NMP CONTENT

The Permit specifies that each NMP must include site-specific practices and procedures necessary to implement the applicable effluent limitations and standards. In addition, each NMP must meet nine minimum measures required under 40 CFR § 122.42(e)(1)(i-ix), and specified in the Permit. These requirements include the following:

- Ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the storage facilities. Each wastewater or manure storage structure must be designed, constructed, operated and maintained in accordance with the requirements specified in Section II.A.1 of the permit.

  Each wastewater or manure storage structure must be evaluated using the Idaho Animal Waste Management (IDAWM) Software, Version 4, December 2000. If the evaluation determines that the existing wastewater or manure storage structures have a storage capacity less than the minimum capacity specified in Section II.A.1, the NMP must include measures that the CAFO will take to ensure that the storage capacity is increased and that interim measures are implemented to prevent negative consequences of having inadequate, or inadequately designed storage. The results of the evaluation must be included with the NMP.

The CAFO covered by the Permit must ensure the proper operation and maintenance of wastewater and manure storage structures by completing the Washington NRCS Engineering Technical Note #23, NRCS Assessment Procedure for Existing Waste Storage Ponds (Appendix D of Permit), for each wastewater or manure storage structure. If the evaluation of the CAFO's wastewater or manure storage structures identifies deficiencies in the operation or maintenance of the structures, the CAFO must identify measures to address those deficiencies in its NMP. The NMP must include the results of the evaluation [40 CFR § 122.42(e)(1)(i)].

- Ensure proper management of mortalities (i.e., dead animals) to ensure that they are not disposed of in a liquid manure, storm water, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities. Mortality handling activities must comply with all applicable Federal, State and local regulatory requirements. Both typical and catastrophic mortality handling procedures should be detailed in the NMP, as stipulated in the permit [40 CFR § 122.42(e)(1)(ii)].

- Ensure that clean water is diverted, as appropriate, from the production area. The NMP must identify the necessary structures and controls to exclude clean water from the production area, and the necessary operation and maintenance requirements for those controls. All water that comes into contact with any polluting materials must be directed to storage or treatment structures and accounted for in the sizing and management of those structures [40 CFR § 122.42(e)(1)(iii)].

- Prevent the direct contact of animals confined or stabled at the facility with waters of the U.S. [40 CFR § 122.42€(1)(iv)].

- Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals or contaminants. The NMP must include the appropriate storage, handling and disposal practices for these materials [40 CFR § 122.42(e)(1)(v)].

- Identify appropriate site-specific conservation practices to be implemented, including as appropriate buffers or equivalent practices as stipulated in Section III.A.2.f to control runoff of pollutants to waters of the U.S. Each land application area must be evaluated using the Idaho NRCS Water Quality Technical Note #6, Idaho Nutrient Transport Risk Assessment (INTRA), and include the results of the evaluation in the NMP. Dairies may opt to utilize the Idaho Phosphorus Site Index in lieu of INTRA. The NMP must identify all land application areas with a Medium or High risk assessment rating and identify the appropriate conservation practices required to reduce the risk assessment of each land application area to a Low risk assessment rating. The NMP must include a schedule of implementation for the site-specific conservation practices and provisions on the proper operation and maintenance if those site-specific conservation practices have been implemented in accordance with NRCS conservation practice standards, or other standards as identified in this permit or in the NMP with adequate information and citations for EPA to adequately review [40 CFR § 122.42(e)(1)(vi)].

- The Permit identifies protocols for the appropriate testing of manure, litter, process wastewater and soil on an annual basis. Manure, litter, or process wastewater must be analyzed in accordance with the University of Idaho Manure and Wastewater Sampling, CIS 1139. Soil samples, from each field that will be used to land apply, must be analyzed in accordance with the University of Idaho Bulletin 704, Soil Sampling. Manure, litter, or process wastewater must be analyzed for nitrogen and phosphorus content and at a minimum, soil must be analyzed for pH, soil organic matter, Nitrate-Nitrogen (NO3-N), Ammonium-Nitrate (NH4-N), and phosphorus (P). All analyses must be conducted by a laboratory certified by the North American Proficiency Testing Program. All analyses must be used in determining application rates for manure, litter and process wastewater [40 CFR § 122.42(e)(1)(vii)].

- Establish protocols to land apply manure, litter, or process wastewater in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater. Each permittee must develop land application rates for each land application area where manure, litter, or process wastewater is applied. The land application rates must be developed in accordance with the University of Idaho Fertilizer Guides or related University of Idaho Crop Production Guide. If a University of Idaho Fertilizer Guide or Crop Production Guide is unavailable, a fertilizer or crop production guide from a Pacific Northwest Land Grant University may be used instead (i.e., Oregon State University, Washington State University). If no fertilizer guides or crop production guides are available, the NMP must identify and use the best data available to determine land application rates for each land application area. The NMP must express land application rates in pounds per acre, and volume of manure, litter, or process wastewater in tons, gallons, or cubic feet [40 CFR § 122.42(e)(1)(viii)].

- Identify and maintain site specific records to document the implementation and management of the minimum elements described in Sections III.A.2.a-h and in compliance with the Permit [40 CFR § 122.42(e)(1)(ix)]

2.3.3 NMP CHANGES

When a CAFO owner or operator covered by the Permit makes changes to their NMP previously submitted to EPA, the owner or operator must provide EPA with the most current version of the CAFO's NMP and identify changes from the previous version. EPA will review the revised NMP. If EPA determines that the changes to the NMP require revision of the terms of the NMP incorporated into the permit, EPA must then determine whether such changes are substantial. Substantial changes to the terms of a NMP incorporated as terms and conditions of a permit include, but are not limited to:

- Addition of new land application areas not previously included in the CAFO’s NMP, except that if the added land application area is covered by the terms of a NMP incorporated into an existing NPDES permit and the permittee complies with such terms when applying manure, litter, and process wastewater to the added land [40 CFR § 122.42(e)(6)(iii)(A)];

- Changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop [40 CFR § 122.42(e)(6)(iii)(B)];
- Addition of any crop or other uses not included in the terms of the CAFO's NMP and corresponding field-specific rates of application; and [40 CFR § 122.42(e)(6)(iii)(C)]
- Changes to site specific components of the CAFO's NMP, where such changes are likely to increase the risk of nitrogen and phosphorus transport to waters of the U.S [40 CFR §122.42(e)(6)(iii)(D)].

If the changes to the terms of the NMP are not substantial, EPA will include the revised NMP in the Permit record, revise the terms of the Permit based on the site specific NMP, and notify the permittee and the public of any changes to the terms of the Permit based on revisions to the NMP If EPA determines that the changes to the terms of the NMP are substantial, EPA will notify the public, make the proposed changes and make the information submitted by the CAFO owner or operator available for public review and comment, and respond to all significant comments received during the comment period. The process for public comments, hearing requests and the hearing process if a hearing is held will follow the procedures set forth in 40 CFR 124.11 through 124.13. EPA may require the permittee to further revise the NMP, if necessary. Once EPA incorporates the revised terms of the NMP into the permit, EPA will notify the permittee of the revised terms and conditions of the permit.

2.3.4 PROPER OPERATION AND MAINTENANCE

The permittee must at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of the Permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2.3.5 INSPECTION AND ENTRY

Part V.B.2.c.7 of the Permit addresses facility access. The permittee must allow the Director of the Office of Compliance and Enforcement, EPA Region 10; or an authorized representative (including an authorized contractor acting as a representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

In addition, a permitted CAFO must submit an annual report to EPA in accordance with Part IV.E of the permit.

2.3.6 MAINTAINING COMPLIANCE IF SYSTEM FAILS

The permittee, in order to maintain compliance with the permit, must control all applications and discharges upon reduction, loss or failure of the waste storage or utilization facilities until the facilities are restored or an alternative method of storage or utilization is provided.

2.4 Additional Permit Terms

In addition to the operating requirements and discharge limitations discussed above, the Permit also requirements for monitoring, inspection, record keeping, and reporting.

2.4.1 INSPECTION, MONITORING, AND RECORDKEEPING

The Permit requires the permittee to maintain records to demonstrate compliance and implementation of Parts II.A, II.B, and III.A of the Permit. This includes:

1. Record keeping requirements for the production area

The permittee must maintain on-site for a period of five (5) years from the date they are created a complete copy NOI, the NMP, records to document the implementation and management of Section III.A.2.a-h, and Section IV.A.1.a-f below. The permittee must make these records available to EPA upon request.

a. Records documenting the inspections required under Section II.A.2.a;
b. Weekly records of the depth of the manure and process wastewater in the liquid impoundment as indicated by the depth marker under Section II.A.2.b;
c. Records documenting any actions taken to correct deficiencies required under Section II.A.2.c. Deficiencies not corrected with thirty (30) days must be accompanied by an explanation of the factors preventing immediate correction;
d. Records of mortalities management and practices used by the permittee to meet the requirements of Section II.A.2.d.;
e. Records documenting the current design of any wastewater or manure storage structure to meet the requirements of Section II.A.1.6. including volume for solids

accumulation, design treatment volume, total design volume, and approximate number of days of storage capacity; and

f. Records of the date, time, and estimated volume of any overflow and additional requirements of Section IV.D.

2. Recordkeeping requirements for the land application area

The permittee must maintain on-site a copy of its site-specific NMP. Each permittee must maintain on-site for a period of five (5) years from the date they are created a complete copy of the information required by Section II.B and Section III.A.2.a-h, and the records specified in Section IV.A.2.a-j below IV.B.2

a. Expected crop yields;
b. The date(s) manure, litter, or process waste water is applied to each field;
c. Weather conditions at the time of application and for 24 hours prior to and following application;
d. Soil surface condition at the time of application and if incorporated the method used.
e. Test methods used to sample and analyzed manure, litter, process waste water, and soil required under Section III.A.2.g;
f. Results from manure, litter, process waste water, and soil sampling required under Section III.A.2.g;
g. Explanation of the basis for determining manure application rates as required in Section III.A.2.h;
h. Calculations showing the per acre application rate and the total nitrogen and phosphorus to be applied to each field, including sources other than manure, litter, or process wastewater as required by Section III.A.2.h;
i. The per acre application rate and the total amount of nitrogen and phosphorus actually applied to each field, including documentation of calculations for the total amount applied as required by Section III.A.2.h.

2.4.2 NOTIFICATION OF DISCHARGES RESULTING FROM MANURE, LITTER, AND PROCESS WASTEWATER STORAGE, HANDLING, ON-SITE TRANSPORT AND APPLICATION

The Permit Part IV.E provides that in the event of an unauthorized discharge of pollutants to a water of the U.S., the permittee is required to make immediate oral notification within 24-hours to the EPA Region 10, NPDES Compliance Unit, Office of Compliance and Enforcement, Seattle, WA at 206-553-1846 and notify EPA and the Idaho State Department of Agriculture (ISDA), and the appropriate DEQ regional office in writing within five (5) working days of the discharge from the facility. In addition, the permittee must keep a copy of the notification submitted to EPA and ISDA together with the other records required by the permit. The discharge notification must include: 1) A description of the discharge and its cause, including a description of the flow path to the receiving water body and an estimate of the flow and volume discharged; and 2) The period of non-compliance, including exact dates and times, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate and prevent recurrence of the discharge. This reporting requirement is a standard permit condition under 40 CFR 122.41(l)(6). Note that runoff that meets the definition of agricultural stormwater does not constitute a point source discharge

2.4.3 Monitoring Requirements for All Discharges from Retention Structures

The Permit Part IV.A. provides that in the event of any overflow or other discharge of pollutants from a manure and/or wastewater storage or retention structure, whether or not authorized by the permit, the discharge must be sampled and analyzed, and an estimate of the volume of the release and the date and time must be recorded. [40 CFR 122.41(j)]

Samples must, at a minimum, be analyzed for the following parameters: total nitrogen, nitrate nitrogen, ammonia nitrogen, total phosphorus, *E. coli*, five-day biochemical oxygen demand (BOD5), total suspended solids, pH, and temperature. The discharge must be analyzed in accordance with approved EPA methods for water analysis listed in 40 CFR Part 136. [40 CFR 122.41]

If conditions are not safe for sampling, the permittee must provide documentation of why samples could not be collected and analyzed. For example, the permittee may be unable to collect samples during dangerous weather conditions (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.). However, once the dangerous condition has passed, the permittee shall collect a sample from the retention structure (pond or lagoon) from which the discharge occurred. [40 CFR 122.41]

2.4.4 SPILLS/RELEASES IN EXCESS OF REPORTABLE QUANTITIES

The Permit Part IV.E. provides that the permittee notify the National Response Center and DEQ in the event of a release of a hazardous substance or oil in an amount equal or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a 24-hour period.

2.4.5 COMPLIANCE AND ENFORCEMENT

Although not part of EPA's proposed Federal action to reissue the Permit, EPA has a robust compliance and enforcement program for Idaho CAFOs. Part V.B. describes EPA's compliance and enforcement program and provides additional context and background related to the action.

EPA Region 10's Office of Compliance and Enforcement selects CAFOs for inspection in priority areas or watersheds based on size and type of operations, proximity to waters of the U.S., citizen complaints, 303(d) water quality data, environmental justice data, and facility compliance history. In previous years, EPA Region 10 has used aerial overflights and photography to target facilities that were discharging illegally. In addition, EPA uses compliance data and CWA Section 308 information requests to assess compliance at unpermitted and permitted CAFOs.

EPA has a standard procedure for enforcement follow up if EPA inspects a CAFO and observes an unauthorized discharge or noncompliance with a CAFO's NPDES permit. EPA has a range of enforcement options available including, but not limited to, letters of warning, Notices of Violation (NOV), administrative compliance orders, administrative penalty orders, civil judicial orders, and criminal enforcement. EPA will use enforcement discretion for choosing what the appropriate enforcement follow-up when instances of noncompliance are found during an inspection at a CAFO, whether permitted or unpermitted.

3 ENVIRONMENTAL SETTING

The environmental setting for the action includes the entire State of Idaho. While most AFOs/CAFOs are concentrated in the southern part of Idaho, the Permit allows permittees from any part of the State to seek coverage, with the exception of those located on Tribal lands.

3.1 Species and Critical Habitat in the Project Area

The following table lists ESA-listed species and designated critical habitat that have been identified as potentially occuring in the project area (i.e., the State of Idaho).

Species	Population/Counties/DPS /ESU	Present Status	Federal Register Notice		Critical Habitat Status
Mammals					
Canada Lynx (*Lynx canadensis*)	Adams, Bear Lake, Blaine, Boise, Bonner, Bonneville, Boundary, Butte, Camas, Caribou, Cassia, Clark, Clearwater, Custer, Elmore, Franklin, Fremont, Gem, Idaho, Kootenai, Lemhi, Madison, Oneida, Power, Shoshone, Teton, Twin Falls, Valley, Washington	Threatened	65 FR 16052	03/24/00	Designated
Grizzly Bear (*Ursus arctos horribilis)*	Bonner, Boundary	Threatened	40 FR 31736	07/28/75	Designated
North American Wolverine (*Gulo gulo luscus*)	Adams, Bannock, Bear Lake, Benewah, Bingham, Blaine, Boise, Bonner, Bonneville, Boundary, Butte, Camas, Caribou, Clark, Clearwater, Custer, Elmore, Franklin, Fremont, Gem, Idaho, Jefferson, Latah, Lenhi, Madison, Shoshone, Teton, Valley	Proposed Threatened (USFWS Montana 2018)	78 FR 7863	02/04/2013	Not Designated
Northern Idaho Ground Squirrel (*Urocitellus brunneus*)	Valley, Washington counties	Threatened	65 FR 17779	04/05/00	Not Designated
Woodland Caribou (*Rangifer tarandus caribou*)	Selkirk Mountains, Bonner, Boundary County	Endangered	49 FR7394	02/29/84	Designated
Birds					

Yellow-billed Cuckoo (*Coccyzus americanus*)	Yellow-billed Cuckoo Western DPS	Threatened	79 FR 59991	10/03/2014	Proposed
Fish					
Bull Trout (*Salvelinus confluentus*)	Columbia & Klamath River Jarbridge River Coastal-Puget Sound and St. Mary-Belly Rivers	Threatened Threatened Threatened	63 FR 31647 64 FR 17110 63 FR 58910	07/10/98 04/08/99 11/01/99	Designated
Chinook Salmon (*Oncorhynchus tshawytscha*)	Snake River Fall Run Spring/Summer Run	Threatened Threatened	70 FR 37160 70 FR 37160	06/28/05 06/28/05	Designated
Sockeye Salmon (*O. nerka*)	Snake River	Endangered	70 FR 37160	06/28/05	Designated
Steelhead (*O. mykiss*)	Snake River Basin	Threatened	71 FR 834	01/05/06	Designated
White Sturgeon (*Acipenser transmontanus*)	Boundary county	Endangered	59 FR 46002	09/06/94	Designated
Invertebrates					
Banbury Springs limpet (*Lanx* sp.)	Gooding county	Endangered	57 FR 59257	12/14/92	Not Designated
Bliss Rapids Snail (*Taylorconcha serpenticola*)	Elmore, Gooding, Jerome, Twin Falls counties	Threatened	57 FR 59244	12/14/92	Not Designated
Bruneau Hot Springsnail (*Pyrgulopsis bruneauensis*)	Owyhee county	Endangered	63FR 32981	06/17/98	Not Designated
Snake River Physa Snail (*Physa natricina*)	Cassia, Elmore, Gooding, Jerome, Minidoka, Twin Falls	Endangered	57 FR 59257	12/14/92	Not Designated
Flowering Plants					
MacFarlane's Four-o'clock (*Mirabilis macfarlanei*)	Idaho county	Threatened	60 FR 10697	03/15/96	Not Designated
Spalding's catchfly (*Silene spaldingii*)	Benewah, Idaho, Kootenai, Latah, Lewis, Nez Perce, Shoshone counties	Threatened	66 FR 51598	10/10/01	Not Designated
Ute Ladies' Tresses (*Spiranthes diluvialis*)	Bingham, Bonneville, Fremont, Jefferson, Madison counties	Threatened	57 FR 2053	01/17/92	Not Designated
Water Howellia (*Howellia aquatilis*)	Benewah, Kootenai, Latah, Shoshone counties	Threatened	59 FR 35864	07/14/94	Not Designated
Slickspot Peppergrass *(Lepidium papilliferum)*	Ada, Elmore, Canyon, Gem, Owyhee and Payette counties	Threatened	74 FR 52013	10/8/09	Designated

The biological requirements of the life history stages of ESA-listed species evaluated in this BE are met through access to essential features of critical habitat. Essential features include adequate substrate (especially spawning gravel), water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and migration conditions.

EPA has determined that many of the species and critical habitats found in the project area (i.e., State of Idaho) are either not present or highly unlikely to be present in the action area of the Permit (i.e., waters within Idaho that could be impacted by facilities covered by the Permit). None of the ESA-listed mammal species (Canada lynx, grizzly bear, wolverine, northern Idaho ground squirrel, or woodland caribou) or their designated critical habitats are expected to be present in the action area, and only two of the plant species are considered aquatic. Therefore, EPA has determined the Permit will have ***no effect*** on any ESA-listed mammals and their designated critical habitat, or the MacFarlane's four-o'clock, Spalding's catchfly, water howellia, and Slickspot peppergrass or its designated critical habitat, and they are not considered further in this BE.

The following Section provides a description of the ESA-listed species and designated critical habitats that may be present in the action area of the Permit.

3.1.1 BIRDS

Yellow-billed Cuckoo

The following information was summarized from USFWS (2001).

Description

The yellow-billed cuckoo is a secretive, robin-sized songbird that lives in the western United States in willow and cottonwood forests along rivers and streams. The birds are generally absent from heavily forested areas and large urban areas. Only about 12- inches long, this bird's most notable features are a long, boldly-patterned black and white tail, and an elongated and down-curved bill, which is yellow on the bottom. Its plumage is grayish-brown along the topside of the bird with a white undercarriage. Adults have narrow yellow eye rings. The bird has distinctive feet—two toes pointing forward and two back (zygodactyl foot), whereas most birds have three toes in front and one in back. Yellow-billed cuckoos primarily eat large insects such as caterpillars and cicadas, as well as an occasional small frog or lizard. Cuckoos usually lay two or three eggs, and the young develop very rapidly.

History

The yellow-billed cuckoo once ranged throughout most of the United States, southern Canada, and Mexico, but has experienced severe population declines in the twentieth century, particularly west of the Rocky Mountains. By the 1920s, the yellow-billed cuckoo had disappeared from its former range in British Columbia, and by the 1950s the species no longer bred in the northwestern United States, including northern California, Washington, and possibly Nevada. Today, only small remnant populations persist in the West (CLO 2001).

Distribution

Yellow-billed cuckoos breed from southern Canada south to the Greater Antilles and Mexico. While the yellow-billed cuckoo is common east of the Continental Divide, biologists estimate that more than 90 percent of the bird's riparian habitat in the West has been lost or degraded as a result of conversion to agriculture, dams and river flow management, bank protection, overgrazing, pesticide use, and competition from exotic plants such as tamarisk.

While considered extremely rare in Idaho, the yellow-billed cuckoo is believed or known to occur throughout many counties, such as Ada, Bannock, Bingham, Camas, Jefferson, Lincoln, and Power counties. The occurrence of this species overlaps CAFO locations in Ada, Bingham, Blaine, Bonneville, Camas, Jefferson, Lincoln, Madison, and Power counties. Yellow-billed cuckoo prefer relatively large tracts of riparian habitat along meandering and free-flowing rivers and streams.

Threats to Species

Because the birds are primarily found in riparian areas, potential threats include conversion of this habitat to agriculture, dams and riverflow management, bank protection, livestock overgrazing, agricultural water use, pesticide use, and competition from exotic plants.

Recovery Plans

No information was found on proposed recovery plans for this species.

Critical Habitat

Critical habitat was proposed for this species on August 15, 2014 (79 FR 48547 48652) but has not been designated. There are four proposed critical habitat units in Idaho: Snake River 1 located in Bannock and Bingham Counties; Snake River 2 located in Bonneville, Madison, and Jefferson Counties; Big Wood River in Blaine County, and; Henry's Fork and Teton Rivers in Madison County. All units include the following physical or biological features essential to the conservation of the western yellow-billed cuckoo: (1) Rivers and streams of low gradient with a broad floodplain; (2) flowing rivers and streams, elevated subsurface groundwater tables, and high humidity; (3) rivers and streams that allow functioning ecological processes and support riparian habitat regeneration (such as deposited fine sediments for riparian seed germination); (4) areas of riparian woodlands with mixed willow-cottonwood at least 200 ac (80 ha) in extent and 325 ft (100 m) in width with one or more densely foliaged nesting groves; and (5) an abundant large insect fauna during the nesting season.

The stressors generated by the proposed action include reduced water quality resulting from the discharge of effluent containing pollutants associated with CAFOs. Therefore, the only physical or biological critical habitat feature with any potential to be impacted by the Permit is #3, rivers and streams that allow functioning ecological processes. EPA does not consider the physical siting or location of CAFO's to be interrelated or interdependent to the Permit action since: 1) the Permit does not regulate or otherwise influence the location of the facilities, and; 2) CAFO's do not technically require an NPDES permit to operate as they could design, constructn and operate their facilities in a way that would completely eliminate the potential for discharge and need for a permit. No facilities received coverage under the last Permit and it remains unclear the number, if any, that will apply for coverage when the Permit is reissued.

3.1.2 FISH

3.1.2.1 Bull Trout

Description

Small bull trout eat terrestrial and aquatic insects but shift to preying on other fish as they grow larger. Large bull trout are primarily fish predators. Bull trout evolved with whitefish, sculpins, and other trout and use all of them as food sources. Adult bull trout are usually small, but can grow to 36 inches in length and up to 32 pounds. Bull trout reach sexual maturity at between 4 and 7 years of age and are known to live as long as 12 years. They spawn in the fall after temperatures drop below 9℃, in streams with abundant cold, unpolluted water, clean gravel and cobble substrate, and gentle stream slopes. Many spawning areas are associated with cold water springs or areas where stream flow is influenced by ground water. Bull trout eggs require a long incubation period compared with other salmon and trout, hatching in late winter or early spring. Fry may remain in the stream gravels for up to 3 weeks before emerging (USFWS 2002a).

Four life-history forms of char are recognized, each exhibiting a specific behavioral or life history pattern (Brown 1994). Resident fish live their whole lives near areas where they were spawned. Migratory fish are usually spawned in small headwater streams and then migrate to larger streams or rivers (fluvial), lakes or reservoirs (adfluvial), or salt water (anadromous) where they grow to maturity. Smaller resident fish remain near the areas where they were spawned in smaller, high elevation streams and seldom reach size of over 30 cm (Brown 1994; USFWS 2002). Larger, migratory fish will move considerable distances to spawn when habitat conditions allow. For instance, bull trout in Montana's Flathead Lake have been known to migrate up to 250 km to spawn (USFWS 2002a).

Because bull trout life history patterns include migratory and resident forms, both adults and juveniles are present in the streams throughout the year. Bull trout adults may begin to migrate from feeding to spawning grounds in the spring and migrate slowly throughout the summer (Pratt 1992). Bull trout spawn in the fall after water temperatures drop below 8.9℃, in streams with cold, unpolluted water, clean gravel and cobble substrate, and gentle stream slopes. Many spawning areas are associated with cold water springs or areas where stream flow is influenced by groundwater. Bull trout eggs require a long incubation period compared to other salmon and trout (4 to 5 months), hatching in late winter or early spring. Fry remain in the stream bed for up to 3 weeks before emerging. Juvenile fish retain their fondness for the stream bottom and are often found at or near there (USFWS 2002a).

Bull trout are seldom found in waters where temperatures are warmer than 15℃ to 18℃. Besides very cold water, bull trout require stable stream channels, clean spawning gravel, complex and diverse cover, and unblocked migration routes (USFWS 2002a).

History

Historically bull trout occurred throughout the Columbia River Basin; east to western Montana; south to the Jarbridge River in northern Nevada, the Klamath Basin in Oregon, and the McCloud River in California; and north to Alberta, British Columbia, and possibly southeastern Alaska. Today bull trout are found primarily in upper tributary streams and several lake and reservoir systems; they have been eliminated from or their numbers reduced in the main stems of most large rivers. The main populations remaining in the lower 48 states are in Montana, Idaho, Oregon, and Washington with a small population in northern Nevada. Bull trout no longer occur in northern California (USFWS 2002a).

Distribution

The Columbia River population segment is from the northwestern United States and British Columbia, Canada. This population segment comprises 386 bull trout populations in Idaho, Montana, Oregon, and Washington, with additional populations in British Columbia. The Columbia River population segment includes the entire Columbia River Basin and all its tributaries, excluding the isolated bull trout populations found in the Jarbridge River in Nevada. Bull trout populations within the Columbia River population segment have declined from historic levels and are generally considered to be isolated and remnant.

Threats to Species

Bull trout are vulnerable to many of the same threats that have reduced salmon populations. Because of their need for very cold waters and long incubation time, bull trout are more sensitive to increased water temperatures, poor water quality, and degraded stream habitat than many other salmonids. Further threats to bull trout include hybridization and competition with nonnative brook trout, brown trout, and lake trout; overfishing; poaching; small population size; climate change; and man-made structures that block migration (USFWS 2002a, USFWS 2015).

In many areas, continued survival of the species is threatened by a combination of factors rather than one major factor. For example, past and continuing land management activities have degraded stream habitat, especially along larger river systems and streams located in valley bottoms. Degraded conditions have severely reduced or eliminated migratory bull trout as water temperature, stream flow, and other water quality parameters fall below the range of conditions that these fish can tolerate. In many watersheds, remaining bull trout are smaller, resident fish isolated in headwater streams. Brook trout, introduced throughout much of the range of bull trout, easily hybridize with them, producing sterile offspring. Brook trout also reproduce earlier and at a higher rate than bull trout, so bull trout populations are often supplanted by these non-natives. Dams and other in-stream structures also affect bull trout by blocking migration routes, altering water temperatures, and killing fish as they pass through and over dams or are trapped in irrigation and other diversion structures (USFWS 2002a).

Recovery Plans

Coeur d'Alene Lake Basin Recovery Unit - This recovery unit encompasses the Spokane River and its tributaries upstream of Post Falls Dam as well as Coeur d'Alene Lake and its tributaries. Estimates based on 10 years of redd surveys (eggs laid in streams) show the average annual spawning population is roughly 180 adult bull trout. Local populations within the core area are primarily migratory and may use the Coeur d'Alene Lake and St. Joe and Coeur d'Alene rivers during some portion of their life stage. At the time of listing the status of bull trout in this area was considered depressed and population trends declining. Sixty years ago bull trout were documented in more than 30 streams and river reaches throughout the Coeur d'Alene Basin. Now, spawning and rearing appears to be concentrated in relatively few tributaries in the St. Joe River sub-basin area, especially during lower stream flows (USFWS 2002c).

The goal of the bull trout recovery plan is to ensure the long-term persistence of self-sustaining, complex interacting groups of bull trout distributed across the species' range so that the species can be delisted. To recover bull trout in the Coeur d'Alene Lake Basin Recovery Unit, the following objectives have been identified:

- Maintain current distribution of bull trout and restore distribution in previously occupied or depressed areas within the recovery unit;

- Maintain stable or increasing trends in bull trout abundance;

- Restore and maintain suitable habitat conditions for all bull trout life stages; and

- Conserve genetic diversity and provide opportunity for genetic exchange (USFWS 2002c).

Clearwater River Recovery Unit - Bull trout are distributed throughout most large rivers and associated tributaries within the Clearwater River Recovery Unit, and they exhibit fluvial, adfluvial, and resident life history patterns. Limited data exist for the unit. This recovery unit lies in north central Idaho and extends from the Idaho/Montana border near Missoula, Montana to the Idaho/Washington border at Lewiston, Idaho. Major tributaries in the recovery unit include the Clearwater, North Fork Clearwater, Middle Fork Clearwater, South Fork Clearwater, Lochsa, and Selway Rivers. About 1,904 miles of streams and 16,611 acres of lakes are proposed for critical habitat. Approximately 16 percent of the streams within the entire recovery unit are proposed for critical habitat (USFWS 2002d).

The recovery objectives for this unit are identical to those listed for the Coeur d'Alene Lake Basin Recovery Unit (USFWS 2002d).

Salmon River Recovery Unit - The Salmon River Recovery Unit encompasses the entire Salmon River basin and lies in central Idaho. The area extends from the Idaho/Montana border on the east to the Snake River on the Idaho/Washington border on the west. The Salmon River flows north and west through central Idaho to join the Snake River in lower Hells Canyon. Major tributaries to the Salmon River include: Yankee Fork Salmon River, East Fork Salmon River, Lemhi River, Pahsimeroi River, North Fork Salmon River, Panther Creek, Middle Fork Salmon River, South Fork Salmon River and Little Salmon. About 4,777 miles of streams are proposed for critical habitat in the Salmon River Recovery Unit. This is approximately 25 percent of the waters in the entire recovery unit (USFWS 2002e).

The status of bull trout in the Salmon River Unit is unknown. Comprehensive data do not exist on bull trout abundance through time in most of the recovery unit. In the past, emphasis on data collection within the unit has been on anadromous fish. However, bull trout are well distributed throughout most of the unit. There are 125 identified local populations located within 10 core areas. Distribution data for bull trout in the Salmon River Recovery Unit come primarily from presence/absence surveys and basin-wide surveys (USFWS 2002e).

The recovery objectives for this unit are identical to those listed for the Coeur d'Alene Lake Basin Recovery Unit (USFWS 2002e).

Southwest Idaho River Recovery Unit - The Southwest Idaho River Basins Recovery Unit includes the Boise, Payette, and Weiser River basins. Although there were likely no historic barriers to bull trout moving among the three basins via the Snake River, today bull trout occupy areas in the basins upstream of unsuitable habitat and dams. About 1,735 miles of streams are proposed for critical habitat in the Boise, Payette, and Weiser River basins in southwestern Idaho. This is approximately 16 percent of the waters in the entire recovery unit (USFWS 2002f).

In the Boise River subunit bull trout are distributed in three core areas, all upstream of Lucky Peak Dam. Migratory and resident bull trout occur in this subunit, with 31 existing local populations (USFWS 2002f).

In the Payette River subunit bull trout are distributed in five core areas within the Payette River watershed. Bull trout are mainly resident fish, with low numbers of migratory fish in some areas. There are 18 existing local populations in this subunit (USFWS 2002f).

In the Weiser River subunit consists of a single core area, which includes watersheds upstream of and including the Little Weiser River. Bull trout in this area are believed to be resident fish only. There are 5 existing local populations in this subunit (USFWS 2002f).

Based on the depressed, likely declining population trend and loss of range within the recovery unit, or the lack of adequate population trend data, bull trout in all core areas within the Southwest Idaho River Basins Recovery Unit are currently at increased risk (USFWS 2002f).

The recovery objectives for this unit are identical to those listed for the Coeur d'Alene Lake Basin Recovery Unit (USFWS 2002f).

Little Lost River Recovery Unit - The Little Lost River Recovery Unit includes the Little Lost River in central Idaho and its tributaries where bull trout have been observed. The recovery unit includes one core area and 10 local populations. About 115.4 miles of streams are proposed for critical habitat in the Little Lost River basin. This is approximately 9 percent of the stream miles in the entire recovery unit (USFWS 2002g).

Bull trout are widely distributed throughout the Little Lost Recovery Unit, with individuals occurring from the headwaters in the upper Little Lost River to below the flood control structure near Howe, Idaho. Both resident and migratory bull trout occur in the recovery unit. There are approximately 6,250 adult bull trout in 10 local populations. These are not considered at risk from genetic drift (USFWS 2002g).

The recovery objectives for this unit are identical to those listed for the Coeur d'Alene Lake Basin Recovery Unit (USFWS 2002g).

Critical Habitat

On September 30, 2010, the U.S. Fish and Wildlife Service designated critical habitat for bull trout throughout their U.S. range (75 FR 63898). 8,772 stream miles and 170,218 acres of lakes or reservoirs were designated as critical habitat in Idaho. Critical habitat units in Idaho include the Clark Fork River Basin, Kootenai River Basin, Coeur d'Alene River Basin, Little Lost River, Salmon River, Southwest Idaho Basins, Jarbridge River, Mainstem Snake River, Clearwater River, Hells Canyon Complex, and Sheep/Granite Creeks.

Currently, there are only two CAFOs located within bull trout critical habitat. Issuance of the Permit for the CAFO facilities is not anticipated to adversely affect critical habitat for the bull trout because (1) we do not anticipate the removal or modification of habitat (i.e. in-stream or riparian) associated with the proposed action that would affect migration or any other essential behavior or life history stage of bull trout, (2) CAFOs are not anticipated be present high in a watershed or in the vicinity of headwater streams, where bull trout are known to spawn, and (3) there are no aspects of the action that will modify the flow or the natural hydrograph, nor is there an activity that will introduce, or enhance conditions for nonnative predatory fish. Lastly, the potential for a discharge to occur is considered unlikely due to the requirements contained in the Permit, including BMPs and NMPs.

3.1.2.2 Chinook Salmon

(The following summary is taken from 63 FR 11481, March 9, 1998).

Chinook salmon are easily distinguished from other *Oncorhynchus* species by their large size. Adults weighing over 120 pounds have been caught in North American waters. Chinook salmon are very similar to coho salmon in appearance while at sea (blue-green back with silver flanks), except for their large size, small black spots on both lobes of the tail, and black pigment along the base of the teeth. Chinook salmon are anadromous and semelparous. This means that as adults, they migrate from a marine environment into the freshwater streams and rivers of their birth (anadromous) where they spawn and die (semelparous). Adult female Chinook will prepare a spawning bed, called a redd, in a stream area with suitable gravel composition, water depth, and velocity. Redds will vary widely in size and in location within the stream or river. The adult female Chinook may deposit eggs in four to five "nesting pockets" within a single redd. After laying eggs in a redd, adult Chinook will guard the redd from 4 to 25 days before dying. Chinook salmon eggs will hatch, depending upon water temperatures, between 90 to 150 days after deposition. Stream flow, gravel quality, and silt load all significantly influence the survival of developing Chinook salmon eggs. Juvenile Chinook may spend from 3 months to 2 years in freshwater after emergence and before migrating to estuarine areas as smolts, and then into the ocean to feed and mature.

Among Chinook salmon two distinct races have evolved. One race, described as a "stream-type" Chinook, is found most commonly in headwater streams. Steam-type Chinook salmon have a longer freshwater residency, and perform extensive offshore migrations before returning to their natal streams in the spring or summer months. The second race is called the "ocean-type" Chinook, which is commonly found in coastal streams in North America. Ocean-type Chinook typically migrate to sea within the first 3 months of emergence, but they may spend up to a year in freshwater before emigrating. They also spend their ocean life in coastal waters. Ocean-type Chinook salmon return to their natal streams or rivers in spring, winter, fall, summer, and late-fall runs, but summer and fall runs predominate. The difference between these life history types is also physical, with both genetic and morphological foundations.

Juvenile steam- and ocean-type Chinook salmon have adapted to different ecological niches. Ocean-type Chinook salmon tend to use estuaries and coastal areas more extensively for juvenile rearing. The brackish water areas in estuaries also moderate physiological stress during parr-smolt transition. The development of the ocean-type life history strategy may have been a response to the limited carrying capacity of smaller stream systems and glacially scoured, unproductive watersheds, or a means of avoiding the impact of seasonal floods in the lower portion of many watersheds.

Stream-type juveniles are much more dependent on freshwater stream ecosystems because of their extended residence in these areas. A stream-type life history may be adapted to those watersheds, or parts of watersheds, which are more consistently productive and less susceptible to dramatic changes in water flow, or which have environmental conditions that would severely limit the success of subyearling smolts. At the time of saltwater entry, stream-type (yearling) smolts are much larger, averaging 73-134 mm depending on the river system, than their ocean-type (subyearling) counterparts and are, therefore, able to move offshore relatively quickly.

Coast-wide, Chinook salmon remain at sea for 1 to 6 years (more commonly, 2 to 4 years), with the exception of a small proportion of yearling males, called jack salmon, which mature in freshwater or return after 2 or 3 months in salt water. Ocean- and stream-type Chinook salmon are recovered differentially in coastal and mid-ocean fisheries, indicating divergent migratory routes. Ocean-type Chinook salmon tend to migrate along the coast, while stream-type Chinook salmon are found far from the coast in the central North Pacific. Differences in the ocean distribution of specific stocks may be indicative of resource partitioning and may be important to the success of the species as a whole.

There is a significant genetic influence on the freshwater component of the returning adult migratory process. A number of studies show that Chinook salmon return to their natal streams with a high degree of fidelity. Salmon may have evolved this trait as a method of ensuring an adequate incubation and rearing habitat. It also provides a mechanism for reproductive isolation and local adaptation. Conversely, returning to a stream other than that of one's origin is important in colonizing new areas and responding to unfavorable or perturbed conditions at the natal stream.

Chinook salmon stocks exhibit considerable variability in size and age of maturation, and at least some portion of this variation is genetically determined. The relationship between size and length of migration may also reflect the earlier timing of river entry and the cessation of feeding for Chinook salmon stocks that migrate to the upper reaches of river systems. Body size, which is correlated with age, may be an important factor in migration and redd construction success. Under high-density conditions on the spawning ground, natural selection may produce stocks with exceptionally large returning adults.

Early researchers recorded the existence of different temporal "runs" or modes in the migration of Chinook salmon from the ocean to freshwater. Freshwater entry and spawning timing are believed to be related to local temperature and water flow regimes. Seasonal "runs" (i.e., spring, summer, fall, or winter) have been identified on the basis of when adult Chinook salmon enter freshwater to begin their spawning migration. However, distinct runs also differ in the degree of maturation at the time of river entry, the thermal regime and flow characteristics of their spawning site, and their actual time of spawning. Egg deposition must occur at a time that will ensure that fry emerge during the following spring when the river or estuary productivity is sufficient for juvenile survival and growth.

Pathogen resistance is another locally adapted trait. Chinook salmon from the Columbia River drainage were found to be less susceptible to *Ceratomyxa shasta*, an endemic pathogen, than stocks from coastal rivers where the disease is not known to occur. Alaskan and Columbia River stocks of Chinook salmon exhibit different levels of susceptibility to the infectious hematopoietic necrosis virus (IHNV).

The preferred temperature range for Chinook salmon has been variously described as 12.2-13.9 degrees Celsius (℃) (Brett 1952), 10-15.6℃ (Burrows 1963, as cited in McCullough 1999), or 13-18℃ (Theurer et al. 1985, as cited in McCullough 1999). Temperatures for optimal egg incubation are 5.0-14.4℃. (Bell 1986, as cited in McCullough 1999). The upper lethal temperature limit is 25℃ (Brett 1952), but may be lower depending on other water quality factors (Ebel et al. 1971). Variability in temperature tolerance between populations is likely due to selection for local conditions; however, there is little information on the genetic basis of this trait.

Dissolved oxygen concentrations of 5.0 mg/L or greater are needed for successful egg development in redds for water temperatures between 4 and 14°C (Reiser and Bjornn 1979, as cited in NMFS 1996). Freshwater juveniles avoid water with dissolved oxygen concentrations below 4.5 mg/L at 20°C (Whitmore et al. 1960). Migrating adults will pass through water with dissolved oxygen levels as low as 3.5-4.0 mg/L (Alabaster 1988, 1989).

3.1.2.2.1 Snake River Fall Chinook Salmon

This ESU was listed as threatened on June 28, 2005. The 11/2/94 Emergency Rule (59 FR 54840), reclassifying Snake River Chinook from threatened to endangered, expired on May 26, 1995.

Description

Fall-run Chinook salmon in this ESU are ocean-type. Ocean-type Chinook typically migrate to sea within 3 months of emergence, but may spend up to a year in freshwater prior to emigration. Adults return to the Snake River at ages 2 through 5, with age 4 most common at spawning (Chapman et al. 1991). Spawning, which takes place in late fall, occurs in the mainstream and in the lower parts of major tributaries (NWPPC 1989, Bugert et al. 1990, as cited in EPA 1998). Juvenile fall-run Chinook salmon move seaward slowly as sub-yearlings, typically within several weeks of emergence (Chapman et al. 1991). Based on modeling by the Chinook Technical Committee, the Pacific Salmon Commission estimates that a significant proportion of the Snake River fall-run Chinook (about 36 percent) are taken in Alaska and Canada, indicating a far-ranging ocean distribution. In recent years, only 19 percent were caught off Washington, Oregon, and California, with the balance (45 percent) taken in the Columbia River (Simmons 2000, as cited in EPA 1998).

Distribution

The Snake River Basin drains an area of approximately 280,000 km^2 and incorporates a range of vegetative life zones, climatic regions, and geological formations. The Snake River ESU includes the mainstream river and all tributaries, from their confluence with the Columbia River to the Hells Canyon Dam complex. Because genetic analyses indicate that fall-run Chinook salmon in the Snake River are distinct from the spring-summer-run in the Snake River Basin (Waples et al. 1991), Snake River fall-run Chinook salmon are considered separately from the other two forms. They are also considered separately from those assigned to the Upper Columbia River summer- and fall-run ESU because of considerable differences in habitat characteristics and adult ocean distribution, and less definitive, but still significant, genetic differences. There is, however, some concern that recent introgression from Columbia River hatchery strays is causing the Snake River population to lose the qualities that made it distinct for ESA purposes.

History

Snake River fall-run Chinook salmon remained stable at high levels of abundance through the first part of the 20th century, but then declined substantially. Although the historical abundance of fall-run Chinook salmon in the Snake River is difficult to estimate, adult returns appear to have declined by three orders of magnitude since the 1940s, and perhaps by another order of magnitude from pristine levels. Irving and Bjornn (1981, as cited in EPA 1998) estimated that the mean number of fall-run Chinook salmon returning to the Snake River declined from 72,000 during the period 1938 to 1949, to 29,000 during the 1950s. Further declines occurred upon completion of the Hells Canyon Dam complex, which blocked access to primary production areas in the late 1950s. Estimated returns of naturally produced adults from 1985 through 1993 range from 114 to 742 fish (USEPA 1998).

Habitat and Hydrology

With hydrosystem development, the most productive areas of the Snake River Basin are now inaccessible or inundated. The upper reaches of the mainstream Snake River were the primary areas used by fall-run Chinook salmon, with only limited spawning activity reported downstream from river kilometer (Rkm) 439. The construction of Brownlee Dam (1958; Rkm 459), Oxbow Dam (1961; Rkm 439), and Hells Canyon Dam (1967; Rkm 397) eliminated the primary production areas of Snake River fall-run Chinook salmon. There are now 12 dams on the mainstream Snake River, and they have substantially reduced the distribution and abundance of fall-run Chinook salmon (Irving and Bjornn 1981, as cited in EPA 1998).

Hatchery Influence

The Snake River has contained hatchery-reared fall-run Chinook salmon since 1981 (Busack 1991, as cited in Waples et al. 1991). The hatchery contribution to Snake River escapement has been estimated at greater than 47 percent (Myers et al. 1998). Artificial propagation is recent, so cumulative genetic changes associated with it may be limited. Wild fish are incorporated into the brood stock each year, which should reduce divergence from the wild population. Release of subyearling fish may also help minimize the differences in mortality patterns between hatchery and wild populations that can lead to genetic change (Waples 1999). (See NMFS 1999a for further discussion of the Snake River fall-run Chinook salmon supplementation program.)

Threats to Species

Almost all historical Snake River fall-run Chinook salmon spawning habitat in the Snake River Basin was blocked by the Hells Canyon Dam complex; other habitat blockages have also occurred in Columbia River tributaries. The ESU's range has also been affected by agricultural water withdrawals, grazing, and vegetation management. The continued straying by nonnative hatchery fish into natural production areas is an additional source of risk. Assessing extinction risk to the newly configured ESU is difficult because of the geographic discontinuity and the disparity in the status of the two remaining populations. The relatively recent extirpation of fall-run Chinook in the John Day, Umatilla, and Walla Walla Rivers is also a factor in assessing the risk to the overall ESU. Long-term trends in abundance for specific tributary systems are mixed. For the Snake River fall-run Chinook salmon ESU, NOAA Fisheries estimates that the median population growth rate (lambda) over a base period from 1980 through 1998 ranges from 0.94 to 0.86, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with that of fish of wild origin (McClure et al. 2000). The Snake River component of the fall Chinook run has been increasing during the past few years as a result of hatchery and supplementation efforts in the Snake and Clearwater River Basins. In 2002, more than 15,200 fall Chinook were counted past the two lower dams on the Snake River, with about 12,400 counted above Lower Granite Dam. These adult returns are about triple the 10-year average at these Snake River projects (FPC 2003).

Recovery Plans

Efforts are underway to conserve and enhance natural Chinook salmon populations by improving seaward migration survival, restoring habitat, reducing harvest and modifying hatchery operations to reduce negative effects on wild fish.

Critical Habitat

The critical habitat for the Snake River fall Chinook salmon was listed on December 28, 1993 (58 FR 68543) and modified on March 9, 1998 (63 FR 11515) to include the Deschutes River. A 1995 status review found that the Deschutes River fall-run Chinook salmon population should be considered part of the Snake River fall-run ESU. Populations from Deschutes River and the Marion Drain (tributary of the Yakima River) show a greater genetic affinity to Snake River ESU fall Chinook than to the Upper Columbia River summer-fall-run Chinook (March 9, 1998, 63 FR 11490). The designated critical habitat (63 FR 11515, March 9, 1998) includes all river reaches accessible to Chinook salmon in the Columbia River from The Dalles Dam upstream to the confluence with the Snake River in Washington (inclusive). Critical habitat in the Snake River includes its tributaries in Idaho, Oregon, and Washington (exclusive of the upper Grande Ronde River and the Wallowa River in Oregon, the Clearwater River above its confluence with Lolo Creek in Idaho, and the Salmon River upstream of its confluence with French Creek in Idaho). Also included are river reaches and estuarine areas in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) upstream to The Dalles Dam. Excluded are areas above specific dams (see March 9, 1998, 63 FR 11519) or above longstanding, naturally impassable barriers (e.g., natural waterfalls in existence for at least several hundred years).

Figure 5-4 outlines the habitat of the fall Chinook salmon habitat and the potential large CAFO facilities in Idaho. There is one facility located near to but not in the habitat of the spring/summer or fall Chinook salmon; however, due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, effluent discharges from the CAFO facilities covered under this Permit should be insignificant and discountable with regards to impacts to this species.

3.3.2.2.2 Snake River Spring and Summer Chinook Salmon

This ESU was listed as threatened on June 28, 2005. The species was originally listed on April 22, 1992, and was "downgraded" to a proposed endangered status on December 28, 1994. The November 2, 1994 Emergency Rule (59 FR 54840), reclassifying Snake River Chinook from threatened to endangered, expired on May 26, 1995.

Description

In the Snake River, spring and summer Chinook are both stream-type fish, with juveniles that migrate to sea as yearling smolts. Depending primarily on location within the basin (and not on run type), adults tend to return after either 2 or 3 years in the ocean. Most Snake River spring/summer Chinook salmon enter individual subbasins from May through September. Juvenile Snake River spring/summer Chinook salmon emerge from spawning gravels from February through June (Bjornn and Peery 1992). Typically, after rearing in their nursery streams for about 1 year, smolts begin migrating seaward in the period from April through May (Bugert et al. 1990, as cited in Matthews and Waples 1991; Cannamela 1992, as cited in NMFS 1999b). After reaching the mouth of the Columbia River, spring/summer Chinook salmon probably inhabit near-shore areas before beginning their northeast Pacific Ocean migration. For detailed information on the life history and stock status of Snake River spring/summer Chinook salmon, see Matthews and Waples (1991), NMFS (1991a), and 56 FR 29542 (June 27, 1991).

Distribution

Snake River spring-run and/or summer-run Chinook salmon are found in several subbasins of the Snake River (CBFWA 1990). Of these, the Grande Ronde and Salmon Rivers are large, complex systems composed of several smaller tributaries that are further composed of many small streams. In contrast, the Tucannon and Imnaha Rivers are small systems with most salmon production in the main river. In addition to these major subbasins, three small streams, Asotin, Granite, and Sheep Creeks, which enter the Snake River between Lower Granite and Hells Canyon Dams, provide small spawning and rearing areas (CBFWA 1990). Although there are some indications that multiple ESUs may exist within the Snake River Basin, the available data do not clearly demonstrate their existence or define their boundaries.

History

Historically, Snake River spring- and/or summer-run chinook salmon spawned in virtually all accessible and suitable habitat in the Snake River system (Evermann 1895, as cited in Matthews and Waples, 1991; Fulton 1968, as cited in Matthews and Waples, 1991)). During the late 1800s, the Snake River produced a substantial fraction of all Columbia Basin spring and summer Chinook salmon, with total production probably exceeding 1.5 million in some years. By the mid-1900s, the abundance of adult spring and summer Chinook salmon had greatly declined. Fulton (1968),as cited in Matthews and Waples (1991) estimated that an average of 125,000 adults per year entered the Snake River tributaries from 1950 through 1960. As evidenced by adult counts at dams, however, spring and summer Chinook salmon have declined considerably since the 1960s.

Habitat and Hydrology - In general, the habitats used for spawning and early juvenile rearing are different among the three Chinook salmon forms (spring, summer, and fall) (Chapman et al. 1991). In both the Columbia and Snake Rivers, spring Chinook salmon tend to use small, higher elevation streams (headwaters), and fall Chinook salmon tend to use large, lower elevation streams or mainstream areas. Summer Chinook are more variable in their spawning habitats; in the Snake River, they inhabit small, high elevation tributaries typical of spring Chinook salmon habitat, whereas in the upper Columbia River they spawn in the larger lower elevation streams characteristic of fall Chinook salmon habitat. Differences are also evident in juvenile out-migration behavior. In both rivers, spring Chinook salmon migrate swiftly to sea as yearling smolts, and fall Chinook salmon move seaward slowly as subyearlings. Summer Chinook salmon in the Snake River resemble spring-run fish in migrating as yearlings, but migrate as subyearlings in the upper Columbia River. Early researchers categorized the two behavioral types as "ocean-type" Chinook for seaward migrating subyearlings and as "stream-type" Chinook for the yearling migrants.

Hatchery Influence - There is a long history of human efforts to enhance production of Chinook salmon in the Snake River Basin through supplementation and stock transfers. The evidence is mixed as to whether these efforts have altered the genetic makeup of indigenous populations. Straying rates appear to be low.

Threats to Species

Recent trends in redd counts in major tributaries of the Snake River indicate that many subpopulations could be at critically low levels. Subpopulations in the Grande Ronde River, Middle Fork Salmon River, and Upper Salmon River Basins are at particularly high risk. Both demographic and genetic risks would be of concern for such subpopulations, and in some cases, habitat may be so sparsely populated that adults have difficulty finding mates. NOAA Fisheries estimates that the median population growth rate (lambda) over a base period from 1980 through 1998 ranges from 0.96 to 0.80, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with the effectiveness of fish of wild origin (Tables B-2a and B-2b in McClure et al. 2000). In 2002, the fish count at Lower Granite Dam was 75,025, more than double the 10-year average. Estimated hatchery Chinook at Lower Granite Dam accounted for a minimum of 69.7 percent of the run. The spring Chinook count in the Snake River was at the all-time low of about 1,500 as recently as 1995, but in 2001 and 2002 both hatchery and wild/natural returns to the Snake River increased (FPC 2003).

Recovery Plans

Efforts are underway to conserve and enhance natural Chinook salmon populations by improving seaward migration survival, restoring habitat, reducing harvest and modifying hatchery operations to reduce negative effects on wild fish.

Critical Habitat

The critical habitat for the Snake River spring/summer Chinook salmon was listed on December 28, 1993 (58 FR 68543). The designated habitat consists of river reaches of the Columbia, Snake, and Salmon Rivers, and all tributaries of the Snake and Salmon Rivers (except the Clearwater River) presently or historically accessible to Snake River spring/summer Chinook salmon (except reaches above impassable natural falls and Hells Canyon Dam).

Figure 5-4 outlines the habitat of the spring/summer Chinook salmon habitat and the potential large CAFO facilities in Idaho. There is one facility located near to but not in the habitat of the spring/summer or fall Chinook salmon; however, due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, effluent discharges from the CAFO facilities covered under this Permit should be insignificant and discountable with regards to impacts to this species.

3.1.2.3 Snake River Sockeye Salmon

Description

Snake River (SR) sockeye salmon enter the Columbia River primarily during June and July. Arrival at Redfish Lake, which now supports the only remaining run of SR sockeye salmon, peaks in August and spawning occurs primarily in October (Bjornn et al. 1968). Eggs hatch in the spring between 80 and 140 days after spawning. Fry remain in the gravel for 3 to 5 weeks, emerge in April through May, and move immediately into the lake where juveniles feed on plankton for 1 to 3 years before migrating to the ocean. Migrants leave Redfish Lake from late April through May (Bjornn et al. 1968), and smolts migrate almost 900 miles to the Pacific Ocean. Out-migrating juveniles pass Lower Granite Dam (the first dam on the Snake River downstream from the Salmon River) from late April to July, with peak passage from May to late June. Once in the ocean, the smolts remain inshore or within the Columbia River influence during the early summer months. Later, they migrate through the northeast Pacific Ocean (Hart 1973, Hart and Dell 1986, as cited in NMFS 1999b). SR sockeye salmon usually spend 2 to 3 years in the Pacific Ocean and return in their fourth or fifth year of life. For detailed information on the SR sockeye salmon, see Waples et al. (1991b) and 56 FR 58619, November 20, 1991.

Distribution

The only remaining anadromous sockeye in the Snake River system are found in Redfish Lake, on the Salmon River. The non-anadromous form (kokanee), found in Redfish Lake and elsewhere in the Snake River Basin, is included in the ESU. SR sockeye were historically abundant in several lake systems of Idaho and Oregon. However, all populations have been extirpated in the past century, except fish returning to Redfish Lake.

History

In 1910, impassable Sunbeam Dam was constructed 20 miles downstream of Redfish Lake. Although several fish ladders and a diversion tunnel were installed during subsequent decades, it is unclear whether enough fish passed above the dam to sustain the run. The dam was partly removed in 1934, after which Redfish Lake runs partially rebounded. Evidence is mixed as to whether the restored runs constitute anadromous forms that managed to persist during the dam years, nonanadromous forms that became migratory, or fish that strayed in from outside the ESU.

Historically, the largest numbers of SR sockeye salmon returned to headwaters of the Payette River, where 75,000 were taken one year by a single fishing operation in Big Payette Lake. During the early 1880s, returns of SR sockeye salmon to the headwaters of the Grande Ronde River in Oregon (Walleye Lake) were estimated between 24,000 and 30,000 at a minimum (Cramer 1990, as cited in NMFS 2000). During the 1950s and 1960s, adult returns to Redfish Lake numbered more than 4,000 fish.

Threats to Species

SR sockeye salmon returns to Redfish Lake since at least 1985, when the Idaho Department of Fish and Game began operating a temporary weir below the lake, have been extremely small (1 to 29 adults counted per year). SR sockeye salmon have a very limited distribution relative to critical spawning and rearing habitat. Redfish Lake represents only one of the five Stanley Basin lakes historically occupied by SR sockeye salmon and is designated as critical habitat for the species. NOAA Fisheries proposed an interim recovery level of 2,000 adult SR sockeye salmon in Redfish Lake and two other lakes in the Snake River Basin (NMFS 1995). Because only 16 wild and 264 hatchery-produced adult sockeye returned to the Stanley River Basin between 1990 and 2000, NOAA Fisheries considers the risk of extinction of this ESU to be very high. In 2002, 52 adult sockeye were counted at Lower Granite Dam (FPC 2003). As of September 23, 2003, 12 sockeye salmon have been counted at Lower Granite Dam on the Snake River (ACOE 2003).

Recovery Plans

Restoration of sockeye populations will depend on a combination of efforts, including flushing water over dams during seaward migration periods, improving habitat, increasing survival of juveniles migrating to the ocean and restricting harvest. Idaho's sockeye recovery plan also calls for restoring natural river flows to speed up downstream migration.

Critical Habitat

The critical habitat for the SR sockeye salmon was designated on December 28, 1993 (58 FR 68543). The designated habitat consists of river reaches of the Columbia, Snake, and Salmon Rivers, Alturas Lake Creek, Valley Creek, and Stanley, Redfish, Yellow Belly, Pettit, and Alturas Lakes (including their inlet and outlet creeks).

Figure 5-5 outlines the distribution of the Snake River sockeye and the potential large CAFO facilities in Idaho.There are only two facilities located near the habitat of the Snake River sockeye salmon; however, due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, effluent discharges from the CAFO facilities covered under this Permit should be insignificant and discountable with regards to impacts to this species.

3.1.2.4 Snake River Steelhead

Steelhead exhibit one of the most complex life histories of any salmonid species. Steelhead may be anadromous or freshwater resident. Resident forms are usually referred to as “rainbow” or “redband” trout, while anadromous life forms are termed “steelhead.”

Steelhead typically migrate to marine waters after spending 2 years in freshwater. They then reside in marine waters for 2 to 3 years prior to returning to their natal stream to spawn as 4- or 5-year-olds. Depending on water temperature, steelhead eggs may incubate in redds for 1.5 to 4 months before hatching as alevins (larval stage dependent on yolk sac as food). Following yolk sac absorption, alevins emerge from the gravel as young juveniles (fry) and begin actively feeding. Juveniles rear in freshwater from 1 to 4 years, then migrate to the ocean as smolts.

Biologically, steelhead can be divided into two reproductive ecotypes, based on their state of sexual maturity at the time of river entry and the duration of their spawning migration. These two ecotypes are termed “stream maturing” and “ocean maturing.” Stream maturing steelhead return to freshwater in a sexually immature condition and require several months to mature and spawn. Ocean maturing steelhead enter freshwater with well-developed gonads and spawn shortly after river entry. These two reproductive ecotypes are more commonly referred to by their season of freshwater entry (e.g., summer and winter steelhead).

Two major genetic groups or “subspecies” of steelhead occur on the west coast of the United States: a coastal group and an inland group, separated on the Fraser and Columbia River Basins by the Cascade crest. Historically, steelhead likely inhabited most coastal streams in Washington, Oregon, and California, as well as many inland streams in these states and Idaho. However, during the 20th century, over 23 indigenous, naturally reproducing stocks of steelhead are believed to have been extirpated, and many more are thought to be in decline in numerous coastal and inland streams.

Fish in this ESU are summer steelhead. They enter freshwater from June to October and spawn during the following March to May. Two groups are identified, based on migration timing, ocean-age, and adult size. A-run steelhead, thought to be predominately age-1-ocean, enter freshwater during June through August. B-run steelhead, thought to be age-2-ocean, enter freshwater during August through October. B-run steelhead typically are 75 to 100 mm longer at the same age. Both groups usually smolt as 2- or 3-year-olds (BPA 1992; Whitt 1954 and

Hassemer 1992, as cited in NMFS 2000). All steelhead are iteroparous, capable of spawning more than once before death.

Distribution

This inland steelhead ESU occupies the Snake River Basin of southeast Washington, northeast Oregon, and Idaho. The Snake River flows through terrain that is warmer and drier on an annual basis than the upper Columbia Basin or other drainages to the north. Geologically, the land forms are older and much more eroded than most other steelhead habitat. Collectively, the environmental factors of the Snake River Basin result in a river that is warmer and more turbid, with higher pH and alkalinity, than is found elsewhere in the range of inland steelhead. In many Snake River tributaries, spawning occurs at a higher elevation (up to 2,000 m) than for steelhead in any other geographic region.

History

The longest consistent indicator of steelhead abundance in the Snake River Basin is derived from counts of natural-origin steelhead at the uppermost dam on the lower Snake River. According to these estimates, the abundance of summer steelhead has declined from a 4-year average of 58,300 in 1964 to a 4-year average of 8,300 ending in 1998 (NMFS 2000). In general, steelhead abundance declined sharply in the early 1970s, rebounded moderately from the mid-1970s through the 1980s, and declined again during the 1990s.

Habitat and Hydrology - Hydrosystem projects create substantial habitat blockages in this ESU; the major ones are the Hells Canyon Dam complex (mainstream Snake River) and Dworshak Dam (North Fork Clearwater River). Minor blockages are common throughout the region. Steelhead spawning areas have been degraded by overgrazing, as well as by historical gold dredging and sedimentation due to poor land management. Habitat in the Snake River Basin is warmer and drier and often more eroded than elsewhere in the Columbia River Basin or in coastal areas.

Hatchery Influence - Hatchery fish are widespread and stray to spawn naturally throughout the region. In the 1990s, an average of 86 percent of adult steelhead passing Lower Granite Dam were of hatchery origin. Hatchery contribution to naturally spawning populations varies, however, across the region. Hatchery fish dominate some stocks, but do not contribute to others.

Threats to Species

For the SR steelhead ESU as a whole, NMFS (2000) estimates that the median population growth rate
(lambda) over a base period from 1990 through 1998 ranges from 0.91 to 0.70, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared with that of fish of wild origin (Tables B-2a and B-2b in McClure et al. 2000b). The main contributor of steelhead in the Columbia River Basin is the Snake River. In 2002, the turnoff into the Snake River was about

210,000, 71 percent of the total counted at McNary Dam (286,805). The 2002 Snake River steelhead count was about twice the 10-year average. The numbers of wild steelhead (non-clipped adipose fin) increased to about 55,000 average in the Snake River in 2002 (FPC 2003).

Recovery Plans

Efforts are underway to conserve and enhance natural steelhead populations by improving seaward migration survival, restoring habitat, reducing harvest and modifying hatchery operations to reduce negative effects on wild fish.

Critical Habitat

Critical Habitat was designated for the Snake River steelhead ESU on February 16, 2000 (59 FR 7764) and revised on September 2, 2005 (70 FR 52630). This designation encompasses historically accessible reaches of all rivers and tributaries with this ESU's range (excludes areas above Hells Canyon Dam, Dworshak Dam, and Napias Falls on Napias Creek). Critical habitat has been designated in Adams, Blaine, Clearwater, Custer, Idaho, Latah, Lemhi, Lewis, Nez Perce and Valley counties in Idaho. Critical habitat also includes the following Idaho subbasins: Hells Canyon, Lower Snake, Upper Salmon, Pahsimeroi, Middle Salmon - Panther, Lemhi, Upper Middle Fork Salmon, Lower Middle Fork Salmon, Middle Salmon – Chamberlain, South Fork Salmon, Lower Salmon, Little Salmon, Upper Selway, Lower Selway, Lochsa, Middle Fork Clearwater, South Fork Clearwater and Clearwater.

Figure 5-6 outlines the distribution of the Snake River steelhead critical habitat and distribution and the potential large CAFO facilities in Idaho. There are only two facilities located near the habitat of the Snake River steelhead; however, due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, effluent discharges from the CAFO facilities covered under this Permit should be insignificant and discountable with regards to impacts to this species.

3.1.2.5 White Sturgeon

The following information is summarized from USFWS (1999).

Description

The white sturgeon is light grey in color, and can grow quite large. These sturgeon have a characteristic elongated body, with a large, broad head, small eyes and flattened snout. This fish has a ventral mouth with four barbels in a transverse row on the ventral surface of the snout. In the Kootenai River Basin, adult sturgeon move upstream into the Kootenai River to spawn during the spring to early summer, in swift current. Water temperatures are usually between 8.9° C and 13° C. Males first begin spawning between 11 and 22 years of age, and females usually several years later. Female sturgeon may spawn several times during their lifetime at two- to 11-year intervals.

History

Considered genetically distinct from other Columbia River white sturgeon, the Kootenai River population upstream of Bonnington Falls in British Columbia has been isolated for over 10,000 years. Sturgeon are anadromous in most of the large rivers in which they occur, but are landlocked in the middle and upper Columbia river system.

Distribution

For the species as a whole, white sturgeon are found only in the Pacific drainages of North America from the Aleutian Islands of Alaska to Monterey, California. White sturgeon in the Kootenai River Basin (Kootenai River and Kootenay Lake) are found in Idaho, Montana and British Columbia, Canada. In 1997 the white sturgeon population was estimated at 1,468 adults and only 100 wild juveniles. Most adult fish are older than 25 years in age.

The Kootenai River population of the white sturgeon (*Acipenser transmontanus*) is restricted to approximately 270 km (168 river miles (RM)) in the Kootenai River. This reach extends from Kootenai Falls, Montana to Cora Linn Dam at the outflow from Kootenay Lake in British Columbia, Canada (USFWS, 1994a). A revised final designation of critical habitat was published on July 9, 2008 (73 FR 39506) for 18.3 RM of the Kootenai River. The area is entirely within Boundary County, Idaho and begins 31 miles (50 km) downstream from Libby Dam at Bonner's Ferry, extending downstream to river mile 141.4, below Shorty's Island. There are currently no large CAFO facilities within the habitat of the Kootenai River white sturgeon (Figure 5-7). EPA is not aware of any "small" or "medium" CAFO's located within white sturgeon habitat. However, the permit doesn't preclude the development of a facility within the species habitat in the future.

Threats to Species

The free-flowing river habitat for the white sturgeon has been modified and negatively impacted by development in the Kootenai River basin. The natural Kootenai River flows were altered by the construction of the Libby Dam for hydro power in 1974, which also negatively affects successful reproduction and removes some nutrients necessary for biological productivity.

Recovery Plans

The Recovery Plan for the white sturgeon calls for implementing various conservation measures to prevent extinction and allow successful natural reproduction of the species to begin. Actions include increasing Libby Dam water releases during the spring that would enhance Kootenai River flows to encourage natural reproduction. A conservation aquiculture program, operated by the Kootenai Tribe of Idaho, has been developed to rear juvenile white sturgeon yearly over the next ten years for release into the Kootenai River. To date, about 3,000 young sturgeon have been released from eggs hatched in 1992, 1994 and 1995.

Critical Habitat

A revised final designation of critical habitat was published on July 9, 2008 (73 FR 39506) for 18.3 river miles (RM) of the Kootenai River. The area is entirely within Boundary County and begins 31 miles (50 km) downstream from Libby Dam at Bonner's Ferry, extending downstream to river mile 141.4, below Shorty's Island. EPA is not aware of any CAFO facilities located within designated critical habitat for the white sturgeon.

3.1.3 INVERTEBRATES

3.1.3.1 Banbury Springs Limpet

The following information was summarized from USFWS (2006).

Description

The Banbury Springs limpet is a snail that is native to western North America. Its conical, pyramid-shaped shell is red-cinnamon in color, 0.09 to 0.28 inches in length, and only 0.03 to 0.17 inches tall. It is found only in cold, clear, well-oxygenated waters with swift currents. Limpet are found on smooth basalt, boulders or cobble-sized grounds ranging from two to 20 inches deep, but avoid areas with green algae. This species only lives about one year. Older adults die following reproduction in late winter to early spring.

History

The limpet was first discovered in 1988 at Banbury Springs. A second population was found one year later at Box Canyon Springs, joined by another in the Thousand Springs area near Hagerman, Idaho. A fourth population was recently discovered at Briggs Springs in the Hagerman Valley.

Distribution

Today, the Banbury Springs limpet only occurs in the largest and least disturbed spring complexes at Banbury Springs, Box Canyon Springs, Thousand Springs and Briggs Springs. The only county in Idaho where this species occurs—Gooding county—overlaps with several CAFOs. However, it is unlikely that CAFO facilities would be located in Banbury Springs limpet habitat in Gooding county due to the facts that: 1) most of Thousand Springs is now a hydroelectric facility, 2) the rugged terrain surrounding Banbury Springs, and 3) the small size of other springs are small and their proximity to aquaculture facilities.

Threats to Species

Because the limpet is found only at three sites within the Snake River drainage in Idaho, it is extremely vulnerable to habitat changes. The free-flowing, cold water environments required by this species have been threatened by hydroelectric development and operation, water withdrawal and diversions of springs, and water pollution in the aquifer.

Recovery Plans

Monitoring and habitat protection will be necessary to protect this species. A Management Plan for the Banbury Springs limpet complex is currently underway by Idaho Power Company.

Critical Habitat

Critical habitat has not yet been designated for the Banbury springs limpet.

3.1.3.2 Bliss Rapids Snail

The following information was summarized from USFWS (1995).

Description

The Bliss Rapids snail has a 2.0 to 4.0 millimeter-long (0.8 to .16 inch) shell. The shell ranges from pale tan, which is almost colorless, to an amber color. The pale form of this snail is slightly smaller. Most of these mollusks are found on stable rocks in the free-flowing waters of the Middle Snake River, as well as in several cold-water springs in the Hagerman Valley, Idaho. This species is primarily found on cobble boulder substrate, and in water temperatures between 59 and 61 degrees F. During the daytime, the snail resides on the sides and undersides of the rocks. It migrates to graze on small algae and diatoms on the tops of rocks at night.

Distribution

The Bliss Rapids snail occurs in cold water springs and spring-fed tributaries to the Snake River, and in some reaches of the Snake River. They are believed or known to occur in Elmore, Gooding, Jerome, and Twin Falls counties in south central Idaho. Recent surveys indicate the species is distributed discontinuously over 22 miles, from River Mile (RM) 547-560, RM 566-572, and at RM 580 on the Snake River. The species is also known to occur in 14 springs or tributaries to the Snake River including: Bancroft Springs; Thousand Springs and Minnie Miller Springs (Thousand Springs Preserve); Banbury Springs; Niagara Springs; Crystal Springs; Briggs Springs; Blue Heart Springs; Box Canyon Creek; Riley Creek; Sand Springs Creek; Elison Springs; the Malad River; Cove Creek (a tributary to the Malad River); and the headwater springs to Billingsley Creek (73 FR 46867).

According to the map of current CAFO facilities, there are a few CAFO facilities located on the Snake River between RM 547 and RM580 (Figure 1-1), and more than a dozen located in the counties where this snail occurs.

History

This species is one of the few that survived prehistoric Lake Idaho, which existed in southwestern Idaho about 3.5 million years ago. The Bliss Rapids snail was first collected live in 1959. It was formally described in 1994 by Hershler.

Threats to Species

The final rule that determined threatened status for the Bliss Rapids snail indicated that the free-flowing, cool water environments required by the species were impacted by and are vulnerable to continued adverse habitat modifications and deteriorating water quality from one or more of the following: hydroelectric development, peak-loading effects from existing hydroelectric project operations, water pollution, and inadequate regulatory mechanisms.

Recovery Plans

Water quality and habitat conditions in the mainstream Snake River must be improved to begin to recover the Bliss Rapids snail. Natural reproduction may increase if conservation measures are implemented such as protection of remaining free-flowing habitats from hydro development, prevention of further Snake River diversions, improved water quality and natural flow conditions.

Critical Habitat

Critical habitat has not yet been designated for the Bliss Rapids snail.

3.1.3.3 Bruneau Hot Springsnail

The following information was summarized from USFWS (1995).

Description

Adult Bruneau hot springsnails have a small shell that is only .22 inches long. Fresh shells are thin and transparent. Because the shells are clear to white, the pigmentation underneath makes the snail appear black.

Distribution

This freshwater snail occurs in a 5-mile reach of the Bruneau River and the lower one-third of its tributary, Hot Creek, in Owyhee County, Idaho. The snail is native to geothermal springs and seeps with temperatures ranging from 15.7 to 36.9°C. It is found in these habitats on the exposed surfaces of various substrates including rocks, sand, gravel, mud, and algal films.

The Bruneau River Canyon in this area is highly geologically confined with steep, basalt cliffs extending hundreds of feet directly adjacent to the river channel. Therefore, this area receives very little human influence other than recreation. Downstream of Hot Creek and in all geothermal spring habitats along the Bruneau River upstream of Hot Creek, cattle are presently excluded by BLM-constructed fences because livestock grazing was considered to be a threat in the 1990's to some geothermal spring habitats where the Bruneau Hot Springsnail was found. Thus, it is unlikely there would be CAFO facilities in the Bruneau Hot springsnail habitat, due to the rugged terrain of the location and the fact that fencing has been used to keep livestock away from this area.

History

This snail was first discovered in 1952 in upper Hot Creek, a tributary to the Bruneau River in southwest Idaho. It belongs to the family Hydrobiidae and was formally described in 1990 as *Pyrgulopsis bruneauensis,* or more commonly, Bruneau hot springsnail.

Threats to Species

The principal threat to the springsnail is the reduction and/or elimination of their geothermal spring habitat as a result of agricultural groundwater withdrawals.

Recovery Plans

Recovery of endangered or threatened animals and plants is a primary goal of the Service. A species is considered recovered when the species' ecosystem is restored and/or threats to the species are removed so that self-sustaining populations of the species can be supported as persistent members of native biotic communities.

The Endangered Species Act requires the development of recovery plans for listed species unless such a plan would not promote the conservation of a particular species. Section 4(f) of the Act requires that during plan development, we provide an opportunity for public review and comment. Information presented during the public comment period is considered in the preparation of final recovery plan, and is summarized in recovery plan appendices.

The objective of recovery plans is to provide a framework for the recovery of the species so that protection by the Act is no longer necessary. Recovery plans describe actions considered necessary for the conservation of the species, and estimate the time and costs associated with implementing the measures needed for recovery.

Critical Habitat

Critical habitat has not yet been designated for this species.

3.1.3.4 Snake River Physa Snail

The following information was summarized from USFWS (1995).

Description

Adult Snake River physa snails are 0.2 to 0.5 inches high and are usually amber to brown in color. Most Physidae are found in standing or slow-moving water, but the Snake River physa snail is a large-river species. This is exceptional because in the entire western United States there are only a few freshwater mollusks that can survive in that type of habitat. These snails live in the undersides of gravel and boulders in the deep, swift rapids of the mainstream Snake River.

Distribution

Snake River physa remains only at a few locations in the Snake River, mostly in the Hagerman and King Hill reaches in Idaho. Snake River physa are currently found only at a few locations in the Snake River, mostly in the Hagerman and King Hill reaches, with a distinct population near Minidoka Dam (RM 675). This species has been found on boulders in the deepest accessible parts of the Snake near the margins of rapids, but it is believed that fewer than 50 live Snake River physa have ever been collected in the middle Snake River (Frest et al. 1991), and only three have been seen in the last five years. According to the map of current CAFO facilities, there are a few CAFO facilities located on the Snake River between King Hill (RM 530) and Hagerman (RM573) and near Minidoka Dam.

History

Fossil records show that the Snake River physa snail occurred in Pleistocene-era lakes and streams in northern Utah and southwestern Idaho. At one time, this mollusk also occurred in the Snake River above Grandview, Owyhee County, but has become extinct in this downstream portion of the river.

Threats to Species

Free-flowing, turbulent, and cold water environments required by this species have been altered by reservoir development, river diversions and habitat modification. Also, water quality has deteriorated due to altered natural flow and pollution.

Recovery Plans

Because this species has become so rare, little has been done for it. Specimens that have been inadvertently collected are returned immediately to the wild. Water quality and habitat conditions in the mainstream Snake River must be improved to begin to recover the Snake River physa snail. Natural reproduction may begin to recur if conservation measures are implemented such as protection of remaining free-flowing habitats from hydro development, prevention of further Snake River diversions, improved water quality and greater emphasis on natural flow conditions.

Critical Habitat

Critical habitat has not yet been designated for the Snake River physa snail.

3.1.4 FLOWERING PLANTS

3.1.4.1 Ute Ladies'-Tresses

The following information was summarized from Fertig et al. (2005).

Description

Ute ladies'-tresses is a perennial, terrestrial orchid with 8 to 20-inch stems. The flowers consist of small white or ivory flowers clustered into a spike arrangement at the top of the stem. The plant generally blooms from late July through August. However, depending upon location and climatic conditions, Ute Ladies'-tresses may bloom in early July or May still be in flower as late as early October. The orchid is easiest to positively identify when it is blooming.

Distribution

Ute ladies'-tresses is found in moist soils near springs, lakes or perennial streams at elevations of 1,800 to 7,000 feet. It may also occur in meadows, wetlands, or near riparian woodlands. The orchid was discovered in Idaho in 1996 along the South Fork of the Snake River, downstream of Palisades Dam. Currently, over 20 small populations have been identified in this area. In Idaho, many of the plants are on federal lands administered by the U.S. Forest Service and Bureau of Land Management. Other populations occur in Utah, Colorado, Wyoming, Washington, Montana, Nevada, and Nebraska.

In Idaho, Ute ladies'-tresses are known or believed to occur in Bannock, Bingham, Bonneville, Fremont, Jefferson, Madison, and Teton counties. There are several CAFOs throughout these counties that may discharge to receiving waters (Figure 5-11), potentially impacting the riparian habitats in which the Ute ladies-Tresses occurs.

History

Ute ladies'-tresses was first described as a distinct species in 1984. While studying numerous species of ladies'-tresses, botanists found that plants from Utah and Colorado were distinct from related species in the east and northwest.

Threats to Species

Orchid species generally are never common. Natural stream processes that contribute to the orchid's flood-plain habitat have been dramatically modified since settlement of the west. A major threat to the orchid has been result of habitat alteration due to increased demands of water by agriculture and municipal uses, which resulted in dams, reservoirs, and water diversions. Other threats include increased recreational use of riparian areas, changes in grazing patterns and invasion of exotic plant species.

Recovery Plan

Service biologists are working in partnership with other federal agencies, such as the U.S. Forest Service and Bureau of Land Management, to remove threats and conserve habitat for this species on federal land in Idaho. In some areas, plants are being protected while allowing for the development of nearby transportation and recreation projects such as roads, boat ramps, campgrounds and trails.

Critical Habitat

Critical habitat has not yet been designated for this species.

3.2 Environmental Baseline

The following section describes the environmental baseline condition. The environmental baseline is defined as the existing condition of the habitat for each listed species. The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation of this proposed action (50 CFR§402.02).

Any proposed action must be evaluated in the context of the existing environmental baseline to determine whether the proposed action, when added to the "present and future human and natural contexts," will jeopardize listed species (National Wildlife Federation [NWF] v. NMFS) 524 F.3d 917 at 930 (Ninth Circuit Court 2007). Where baseline conditions imperil a species, a new action can be taken as long as it does not "cause some new jeopardy" or "deepen the jeopardy by causing additional harm," or cause "some deterioration in the species' pre-action condition" NWF v NMFS, 524 F.3 at 930.

EPA's action is the reissuance of the Permit, and so would maintain the existing environmental baseline, which is summarized below.

3.2.1 CURRENT STATUS OF THE AQUATIC ENVIRONMENT

The CWA requires states to conduct a bi-annual comprehensive analysis of state waters to determine if water bodies meet state water quality standards and thus support beneficial uses, or if additional pollution controls are needed. The Idaho Department of Environmental Quality (DEQ) meets this requirement by preparing Idaho's Integrated Report. The report provides an overview of environmental conditions of Idaho's surface waters and discusses environmental data collected throughout the state. The Integrated Report presents background information about the waters of Idaho, DEQ's water pollution control program, and special concerns affecting water quality. It also presents surface water monitoring and assessment summaries, including a discussion about public health issues. The report also provides an overview of Idaho's ground water monitoring and assessment and a summary of public participation in developing the Integrated Report.

The report's appendices include schedules for TMDL development that reflect the priority ranking of waters needing a TMDL, maps showing the status of all Idaho waters, DEQ's response to public comments, and any other relevant supporting information for the Integrated Report. The appendices also contain lists showing the classification of all state waters into at least one of five different categories, and a list of assessment unit-cause combinations that EPA approved to be delisted (removed) from Categories 4 or 5.

To assess the current conditions of the aquatic environment in Idaho EPA reviewed the State of Idaho's 2014 Integrated Report.

The 2014 Integrated Report presents information about the status of Idaho's waters based on IDEQ data and other readily available data or information from the past five years (2010–2014). The report presents background information about the waters of Idaho, DEQ's water pollution control program, and special concerns affecting water quality. Also presented are surface water monitoring and assessment summaries, including a discussion about public health issues. The report also provides an overview of Idaho's ground water monitoring and assessment efforts and a summary of public participation in developing the Integrated Report.

Like much of the nation, many waters in Idaho are not supporting their uses and are listed as impaired.

Highlights of the 2014 Integrated Report

- Based on existing and readily available water quality data and information assessed for the 2014 Integrated Report, 33% of stream/river miles and 6% of lake acres are fully supporting state water quality standards, 36% of streams and 55% of lakes are not fully supporting water quality standards, and 31% of streams and 39% of lakes have not been assessed (see summary table below).
- Compared to the 2012 Integrated Report, the percent of stream/river miles fully supporting beneficial uses has increased from 30% to 33%, and the percent of lake acreage fully supporting beneficial uses has remained the same at 6%.
- DEQ delisted 307 AU-cause combinations from Categories 4 and 5 during the 2014 Integrated Report cycle.
- During the 2014 Integrated Report cycle, DEQ assessed support of beneficial uses within waters using procedures outlined in Water Body Assessment Guidance (WBAG), 2nd Edition (Grafe et al. 2002). In October 2016 DEQ finalized WBAG 3rd edition, which will be used to assess beneficial use support status of waters during the 2016 Integrated Report cycle.
- Appendix A of the report highlights several nonpoint source program success stories. In Bear Valley Creek in west-central Idaho, restoration efforts and modification of land management that have resulted in sediment reductions and water quality improvements. In addition, three water bodies are highlighted as making progress in achieving water quality standards: the lower South Fork Payette River, located in west-central Idaho, Rapid Creek in southeastern Idaho, and Shoshone Creek in southern Idaho.
- The report includes a description of Idaho's antidegradation implementation procedures (IDAPA 58.01.02.051). First adopted by Idaho and approved by EPA in 2011, final changes regarding insignificant degradation became effective in 2014.
- Idaho's policy on tribal waters has been clarified, including a description of how the policy is planned to be implemented during the 2018 Integrated Report, once EPA's ATTAINS database is finalized.
- The report describes how DEQ prioritizes development of Total Maximum Daily Loads (TMDL) for impaired waters.
- The report includes an updated discussion of nutrients, including harmful algal blooms.

- The report describes how DEQ consults with Basin Advisory Groups (BAGs) and Watershed Advisory Groups (WAGs) pursuant to Idaho House Bill 271, which was signed into law on April 11, 2013, and clarifies DEQ decisions that are subject to BAG and WAG consultation.

The Table below presents a summary of the 2014 water quality support status in Idaho.

Summary of Water Quality Support Status in the 2014 Integrated Report

	Stream/River		**Lake**	
	Number of Assessment Units	**Miles of Stream/River**	**Number of Assessment Units**	**Lake Acres**
Fully Supporting				
Category 1	373	4,776	209	5,646
Category 2	1,397	26,807	39	21,824
Not Assessed				
Category 3	1,441	29,888	318	182,964
Not Supporting				
Category 4a	2,466[a]	25,685	69[a]	206,884
Category 4b	4[a]	51	0[a]	0
Category 4c	558[a]	7,376	12[a]	85,785
Category 5	792[a]	10,799	34[a]	205

A description of the listing categories is provided below:

Category 1: *Waters of the State Wholly within Designated Wilderness or Inventoried Roadless Area Where Standards are Presumed to be Attained*

Category 1 waters are those wholly within a designated wilderness or inventoried roadless area where water quality standards are presumed to be attained for all beneficial uses.

Category 2: *Waters of the State Attaining Some Standards*

Category 2 waters fully support those beneficial uses that have been assessed. Some beneficial uses have not been assessed due to insufficient data (or no data) and information.

Category 3: *Waters of the State with Insufficient Data and Information to Determine if Any Standards are Attained*

Category 3 waters have insufficient data or information to determine if water quality standards are attained and if beneficial uses are supported. Category 3 is meant to be temporary until sufficient data and information are obtained to support a designated use attainment determination. However, in Idaho a water may remain in Category 3 under any of the following circumstances: (1) the stream has no flow when visited by DEQ (i.e., is intermittent); (2) access to the monitoring site was denied; or (3) the monitoring site is inaccessible. When DEQ encounters any of these circumstances, every attempt will be made in subsequent years to collect sufficient data and information to support a designated use attainment determination for these waters.

Category 4: *Waters of the State Impaired for One or More Beneficial Uses but Not Requiring the Development of a Total Maximum Daily Load*

Category 4 water bodies are grouped into one of three subcategories:

- Category 4a: TMDL completed and approved by EPA.
- Category 4b: Waters that have pollution control requirements in place, other than a TMDL, and are expected to meet standards within a reasonable period of time.
- Category 4c: Water bodies impaired by pollution (e.g., flow alteration and habitat alteration) but not pollutants. According to EPA, water bodies impaired by pollution do not require development of a TMDL.

Category 5: *Waters of the State for Which a TMDL is Needed*

Impaired water bodies that do not meet applicable water quality standards for one or more beneficial uses by one or more pollutants are placed in Category 5. Category 5 is a streamlined §303(d) list that excludes waters that have an EPA-approved TMDL (Category 4a), waters addressed by other pollution control measures (Category 4b), and waters impaired by pollution (Category 4c), such as flow alteration or habitat modification. Waters can only be removed from Category 5 by having either an EPA-approved TMDL or EPA approval to remove based on good cause.

In some cases, a water body may be classified in more than one category. If the water is impaired or if water quality standards are not being met, an assessment unit may show up in both Category 4 and 5 of the Integrated Report. Most occurrences of such multiple listings are for water bodies that are impaired for multiple pollutants or pollution (e.g., flow or habitat alteration). For example, if a water body is impaired by a pollutant (e.g., temperature) and pollution (e.g., flow alteration), then the water body would be listed in Category 5 for temperature and Category 4c for flow alteration.

4 EXPOSURE ASSESSMENT

To assist with the effects analysis EPA conducted an exposure assessment for ESA-listed species and critical habitats that may be present in the action area of the Permit. The exposure assessment consisted of overlaying the current NPDES large CAFO permitted facility locations in Idaho with critical habitat or known habitat for the listed threatened and endangered species in Idaho. The results are provided in the following figures.

EPA considers the likelihood that any individual ESA-listed species or critical habitat would be exposed to a permitted discharge to be extremely unlikely, making effects of the action discountable. The permit only allows a discharge under extraordinary circumstances (i.e., a 25-year, 24-hour precipitation event) when the storage facilities and land application areas overflow. As explained in Section 2, the volume to contain the direct precipitation and runoff from a 25-year, 24-hour storm event is just one component of the total design volume (Figure 2-2). A properly designed impoundment must include each of the other factors shown in Figure 2-2 and will contain more than a 25-year, 24-hour storm event. Assuming a facility is properly operated and maintained in accordance with the permit, EPA believes the storage volume should be adequate to contain a 100-year, 24-hour storm event.

To estimate the number of times Idaho CAFO's may have experienced a permitted discharge over the last 30 years EPA performed a simple case-study using data from NOAA (Atlas 2, Volume 5, *Precipitation Frequency Atlas of the Western United States*,1973) and the Pacific Northwest Cooperative Agricultural Weather Network (AgriMet) for the Rupert weather station in southcentral Idaho near Burley. The Agrimet data shows that since March 23, 1988, there has only two (2) days of precipitation which exceeded the 25-year, 24-hour storm event for the Burley area: on November 6, 2008 and May 11, 2010. Assuming the owner/operator(s) are operating and maintaining their facilities in accordance with the permit, there should have been only two instances over the last 31 years where CAFO's in the Burley area could have potentially had a permitted discharge (assuming an overflow occurs during a 25-year, 24-hour storm event). This makes the likelihood of a permitted discharge occuring under the proposed action extremely unlikely. The probability that a permitted discharge would coincide with the presence of any ESA-listed species in the action area is discountable. Therefore, for the purposes of effects to ESA-listed species and their respective critical habitats, EPA considers any effects from permitted discharges to be discountable.

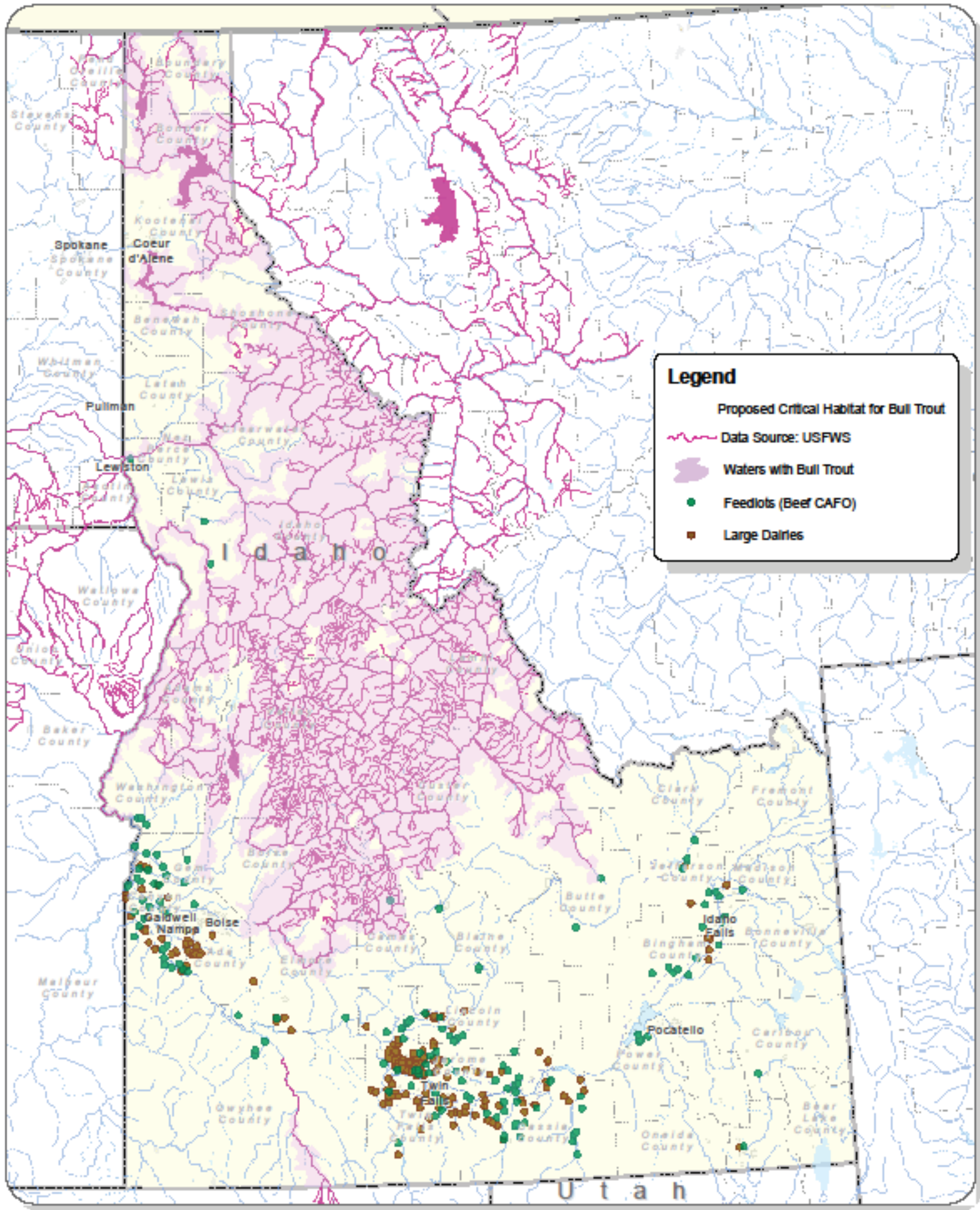

Figure 4-1: Bull trout distribution and bull trout critical habitats shown with large Idaho CAFO facilities (feedlot and dairies).

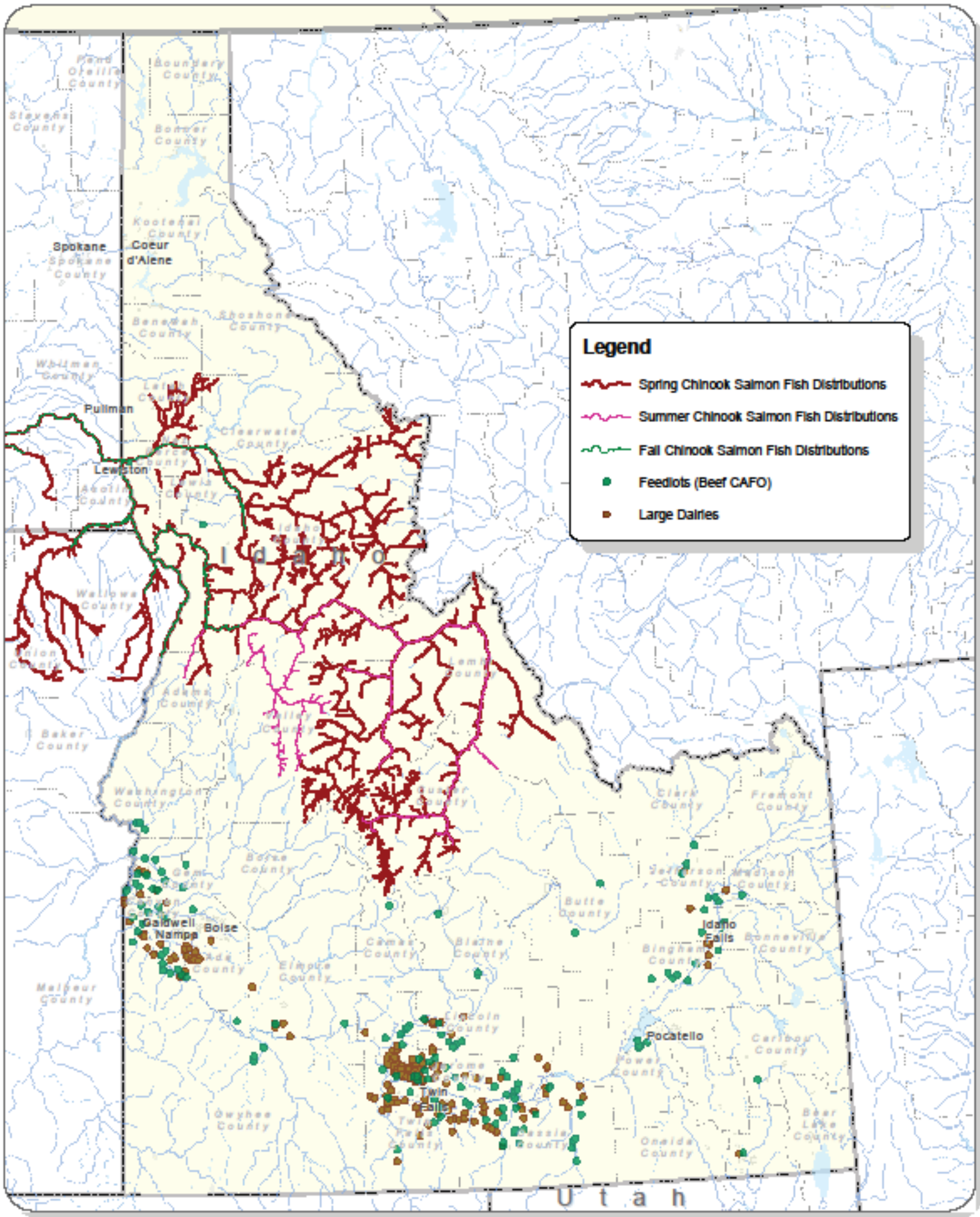

Figure 4-2: Spring/Summer and fall Chinook salmon distribution shown with large Idaho CAFO facilities (feedlots and dairies).

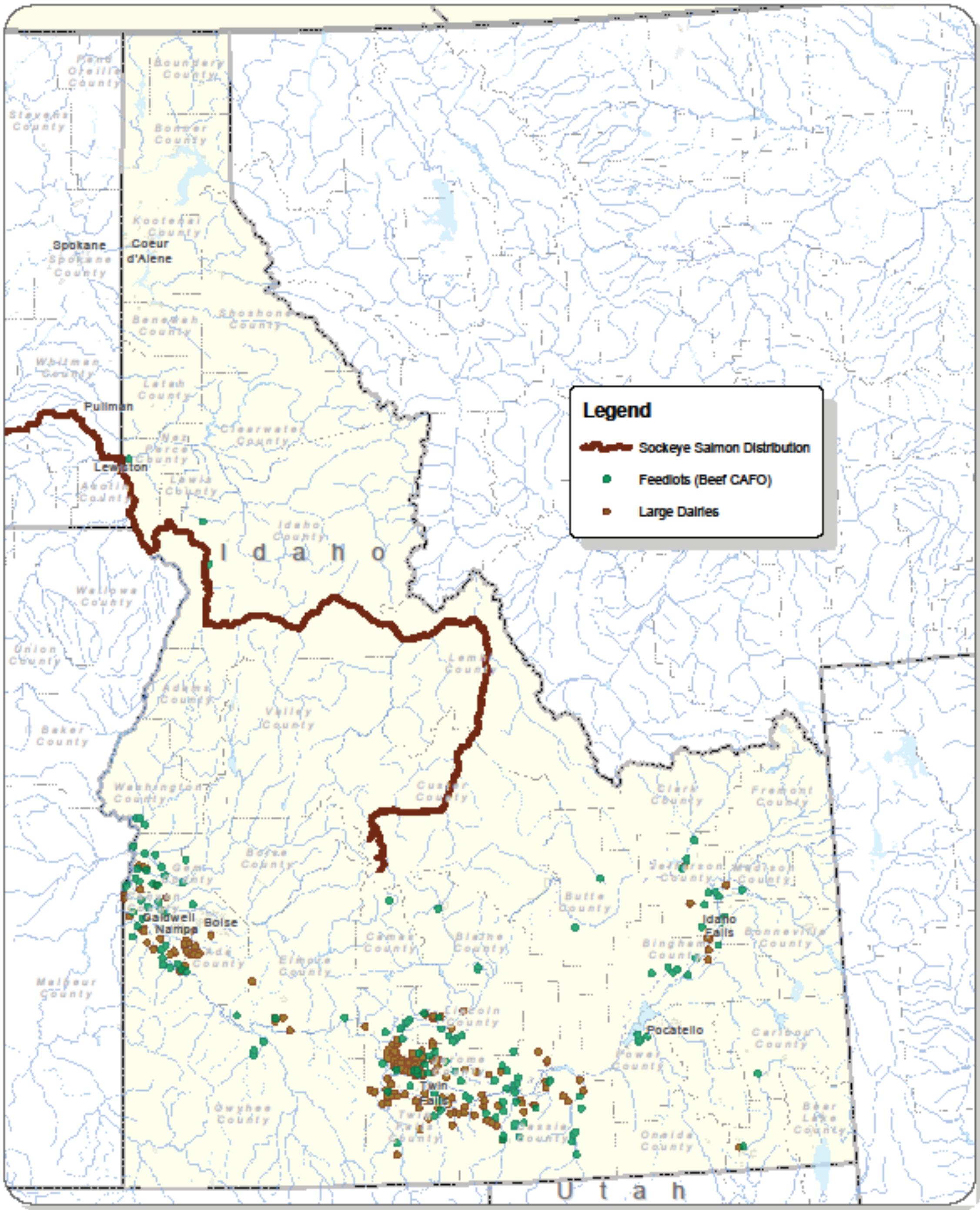

Figure 4-3: Sockeye salmon distribution shown with large Idaho CAFO facilities (feedlots and dairies)

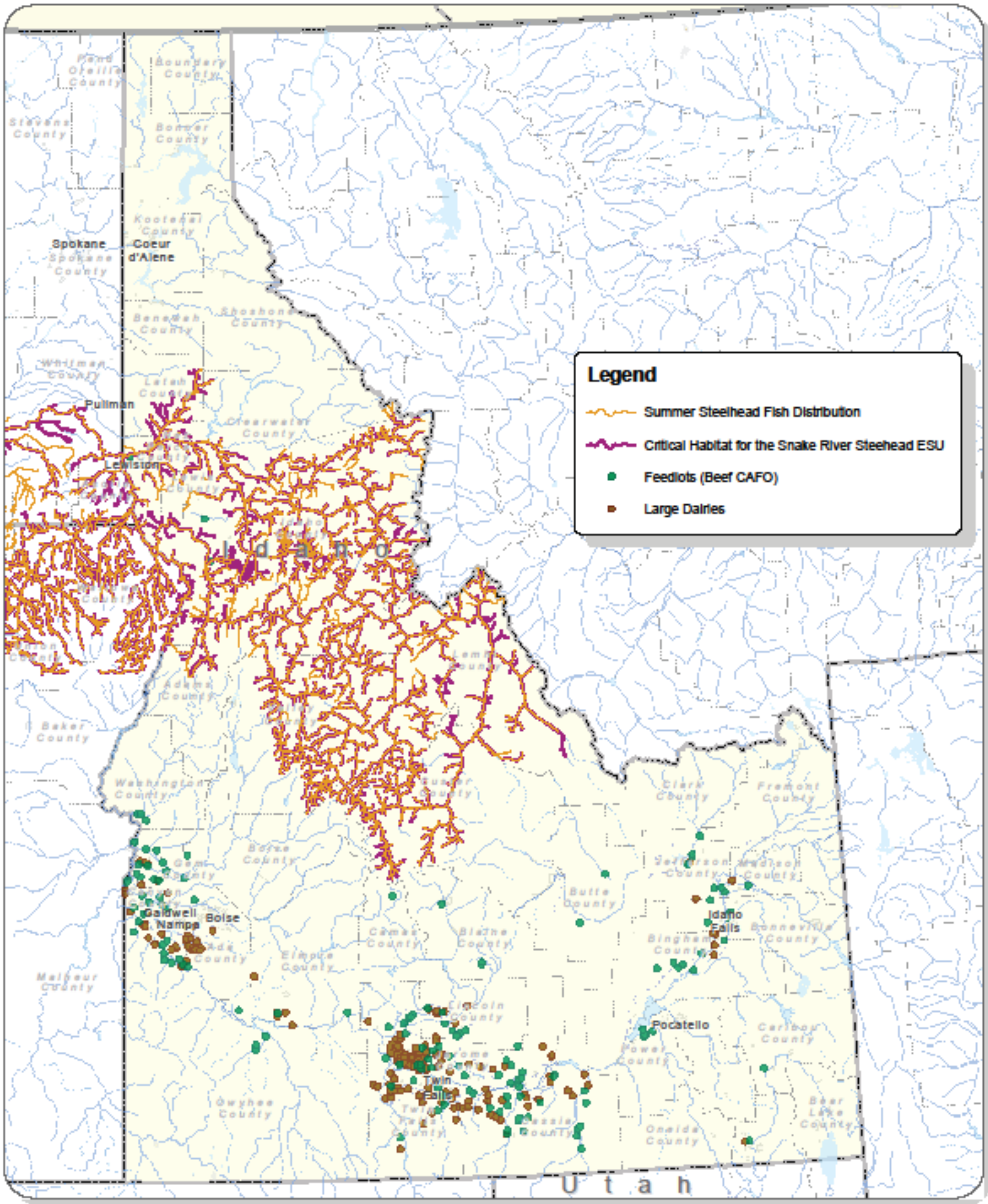

Figure 4-4: Snake River steelhead distribution and critical habitat shown with large Idaho CAFO facilities (feedlots and dairies).

StreamNet Generalized Fish Distribution -Summer Steelhead, (updated February, 2009)

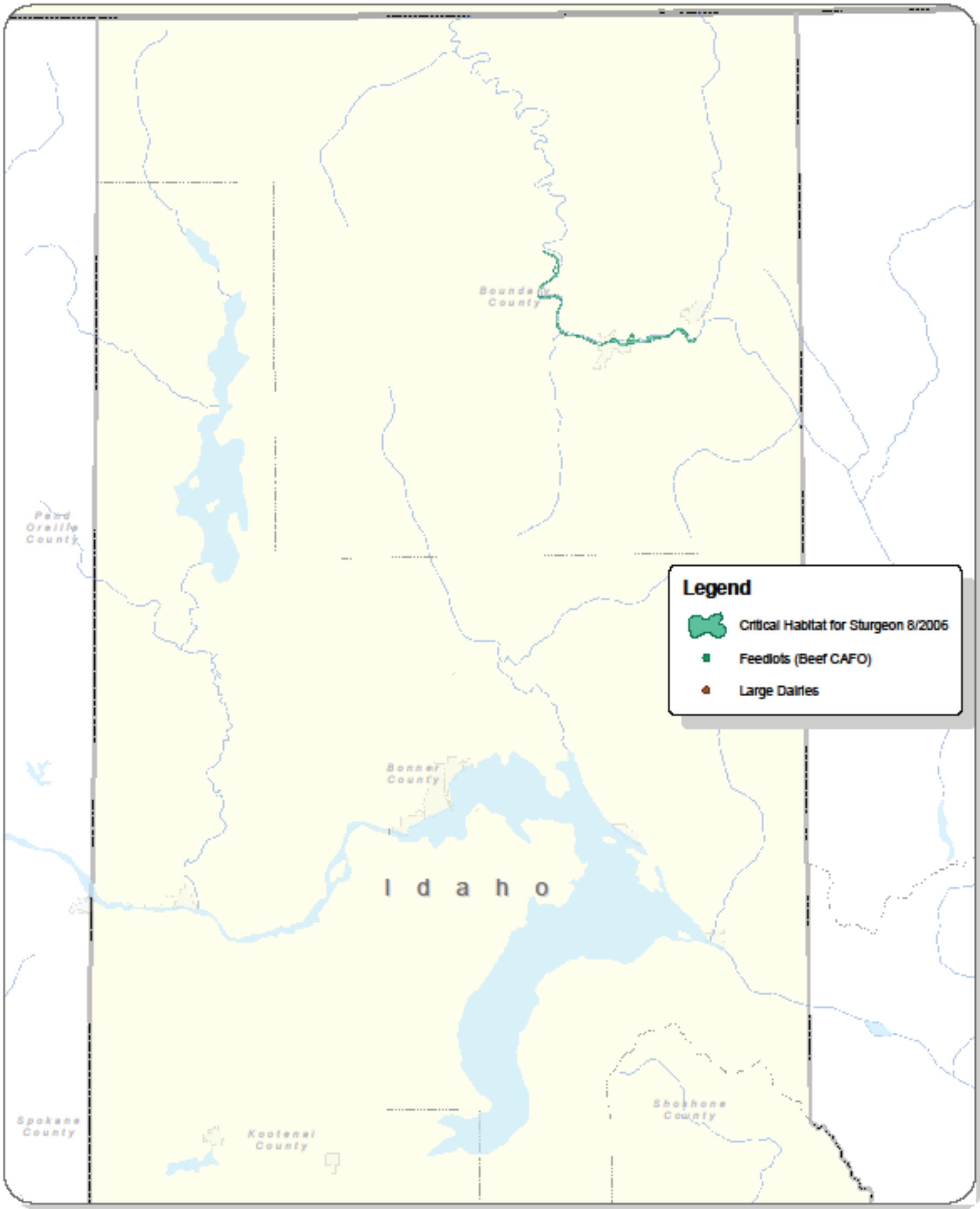

Figure 4-5: Kootenai River white sturgeon critical habitat shown with large Idaho CAFO facilities (feedlots and dairies)

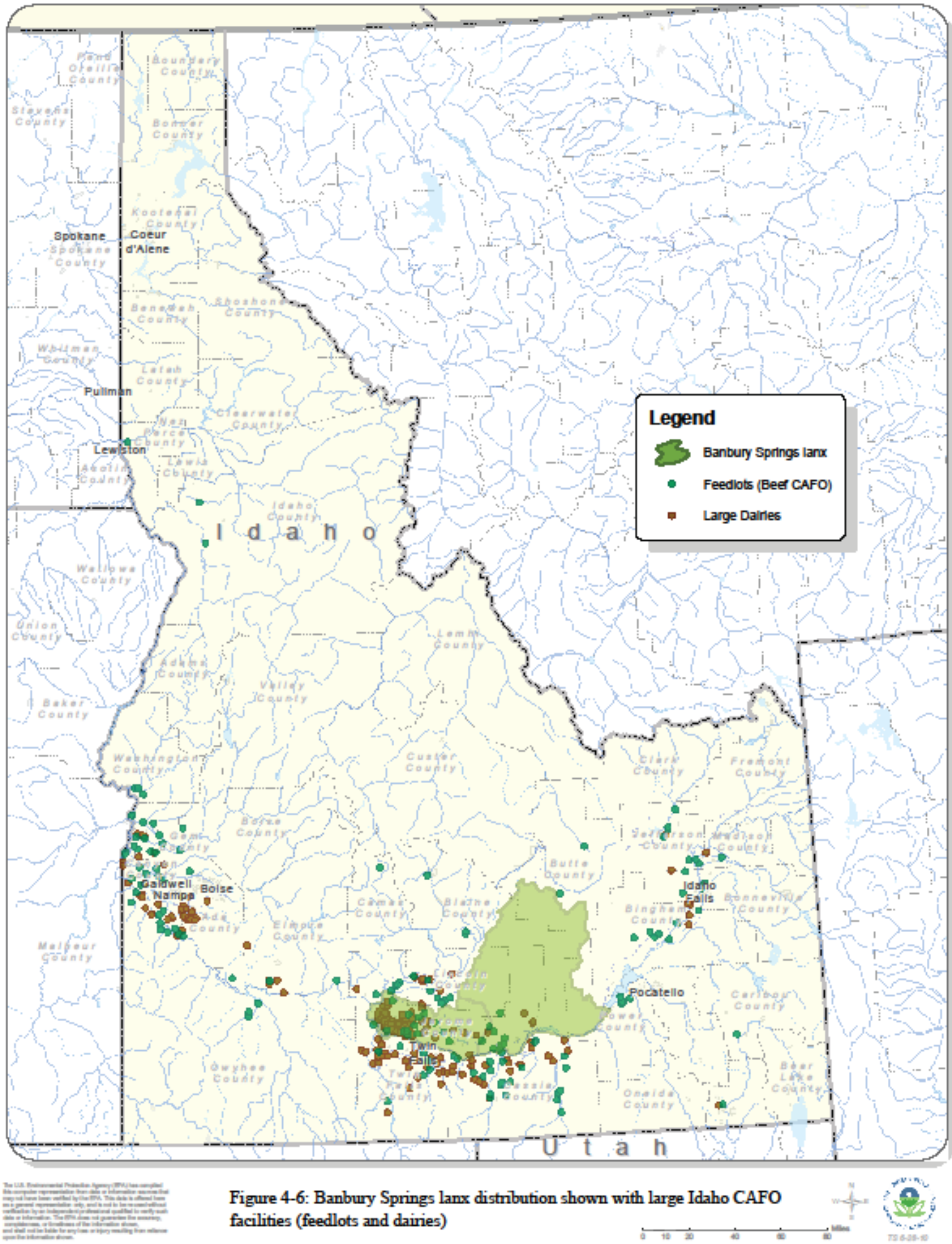

Figure 4-6: Banbury Springs lanx distribution shown with large Idaho CAFO facilities (feedlots and dairies)

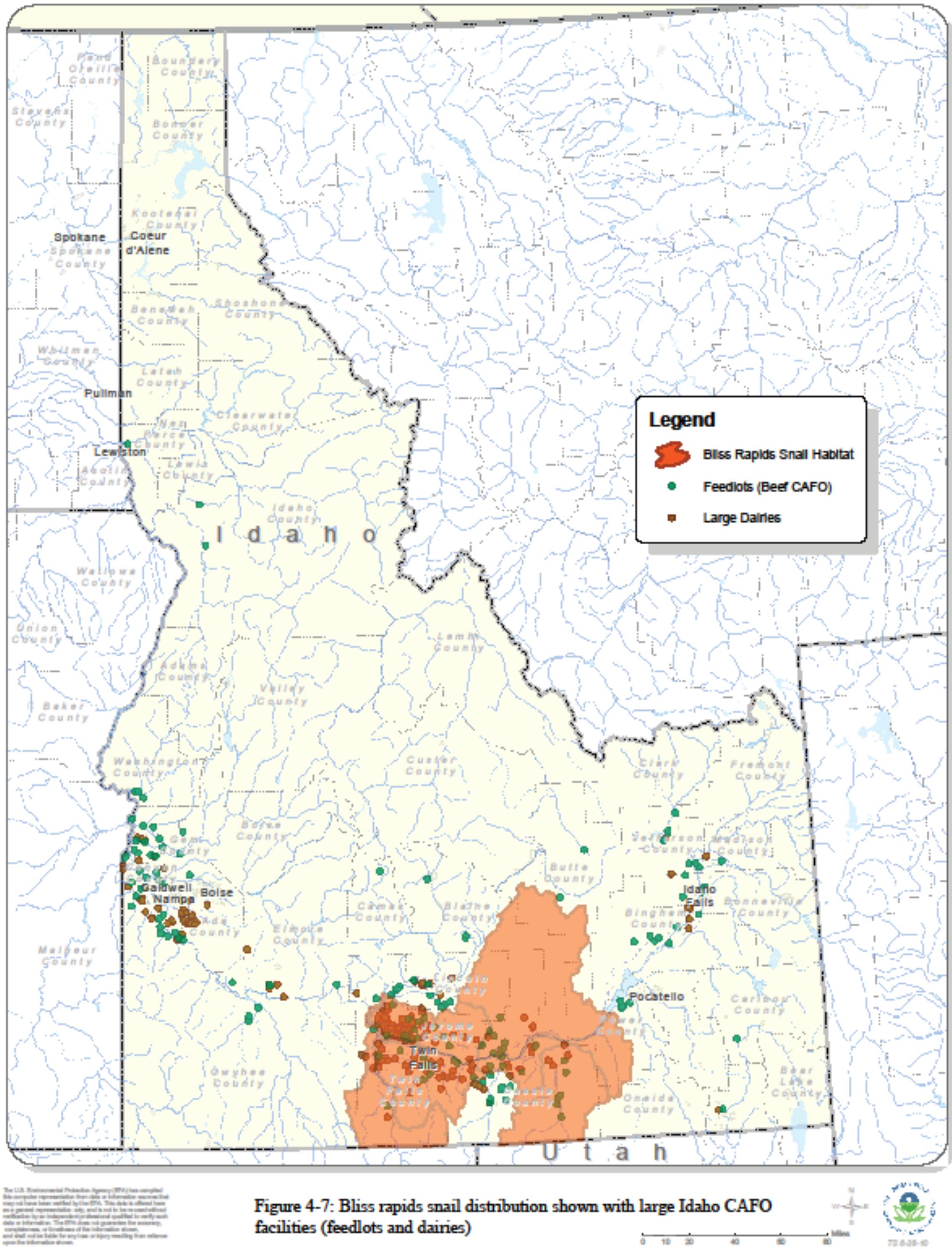

Figure 4-7: Bliss rapids snail distribution shown with large Idaho CAFO facilities (feedlots and dairies)

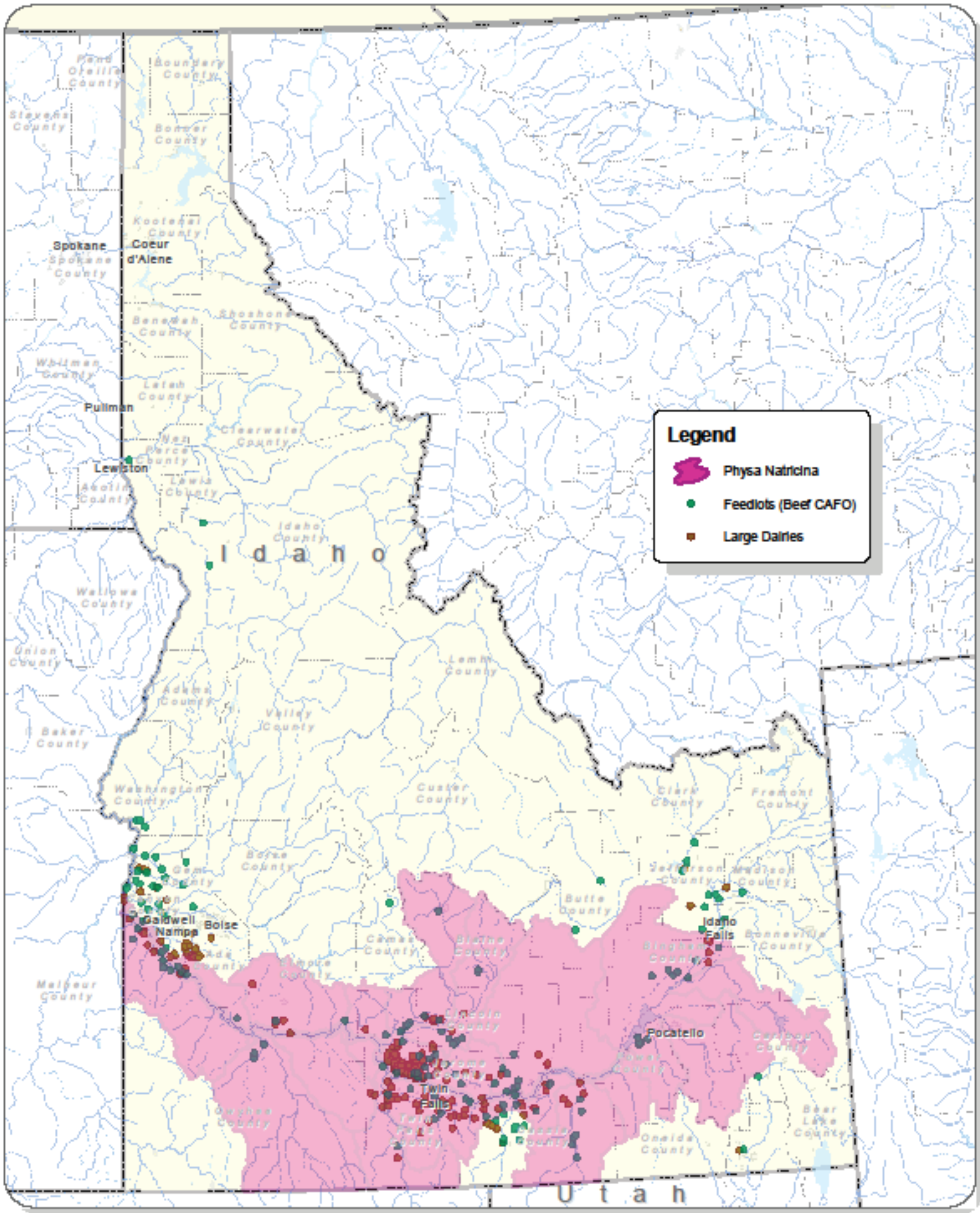

Figure 4-8: Snake River physa distribution shown with large Idaho CAFO facilities (feedlots and dairies).

Locations of Physa natricina plus 1-mile buffer and watersheds may influence surface waters that empty to the Snake River where Physa natricina occur.

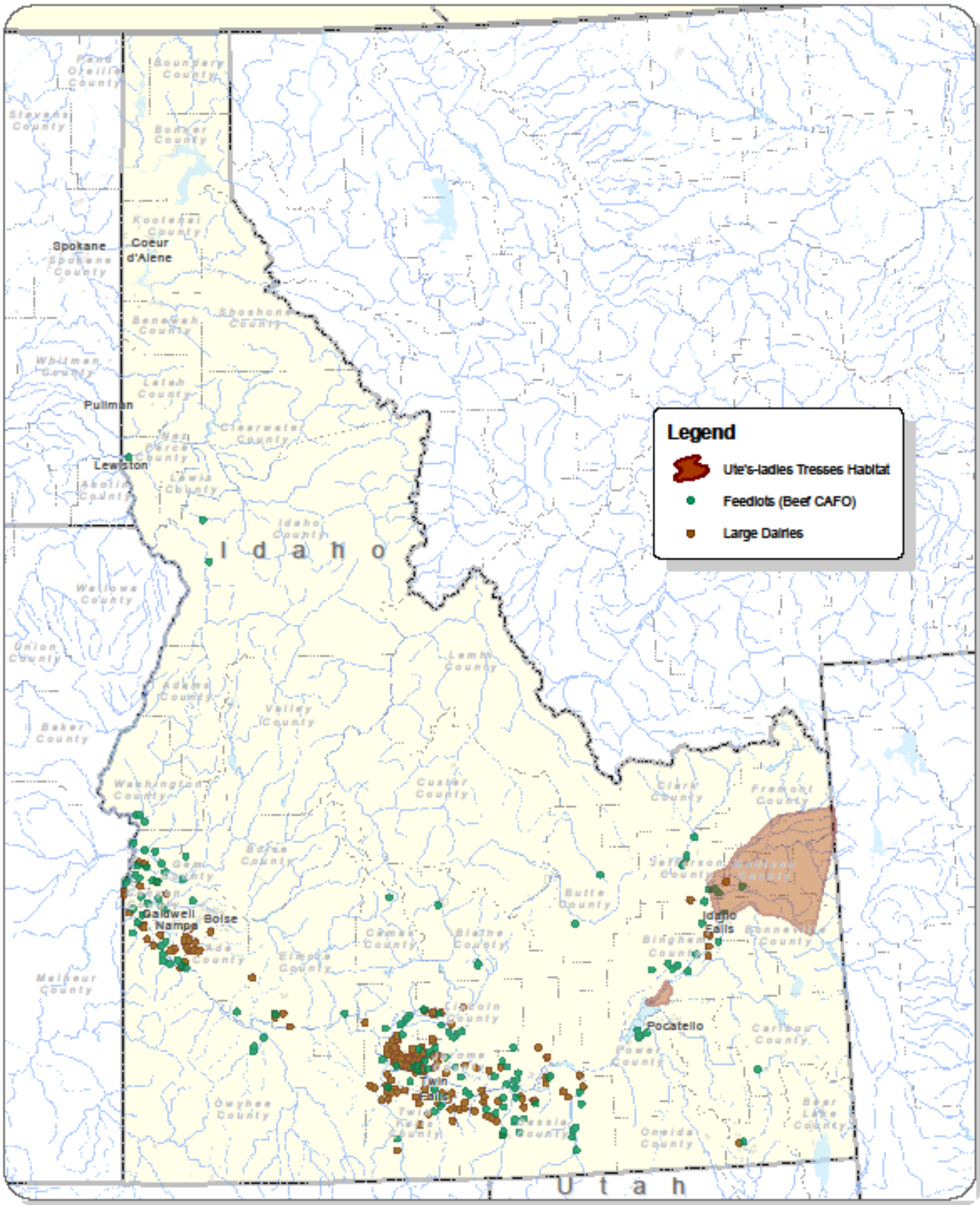

Figure 4-9: Ute's ladies'-tresses distribution shown with large Idaho CAFO facilities (feedlots and dairies)

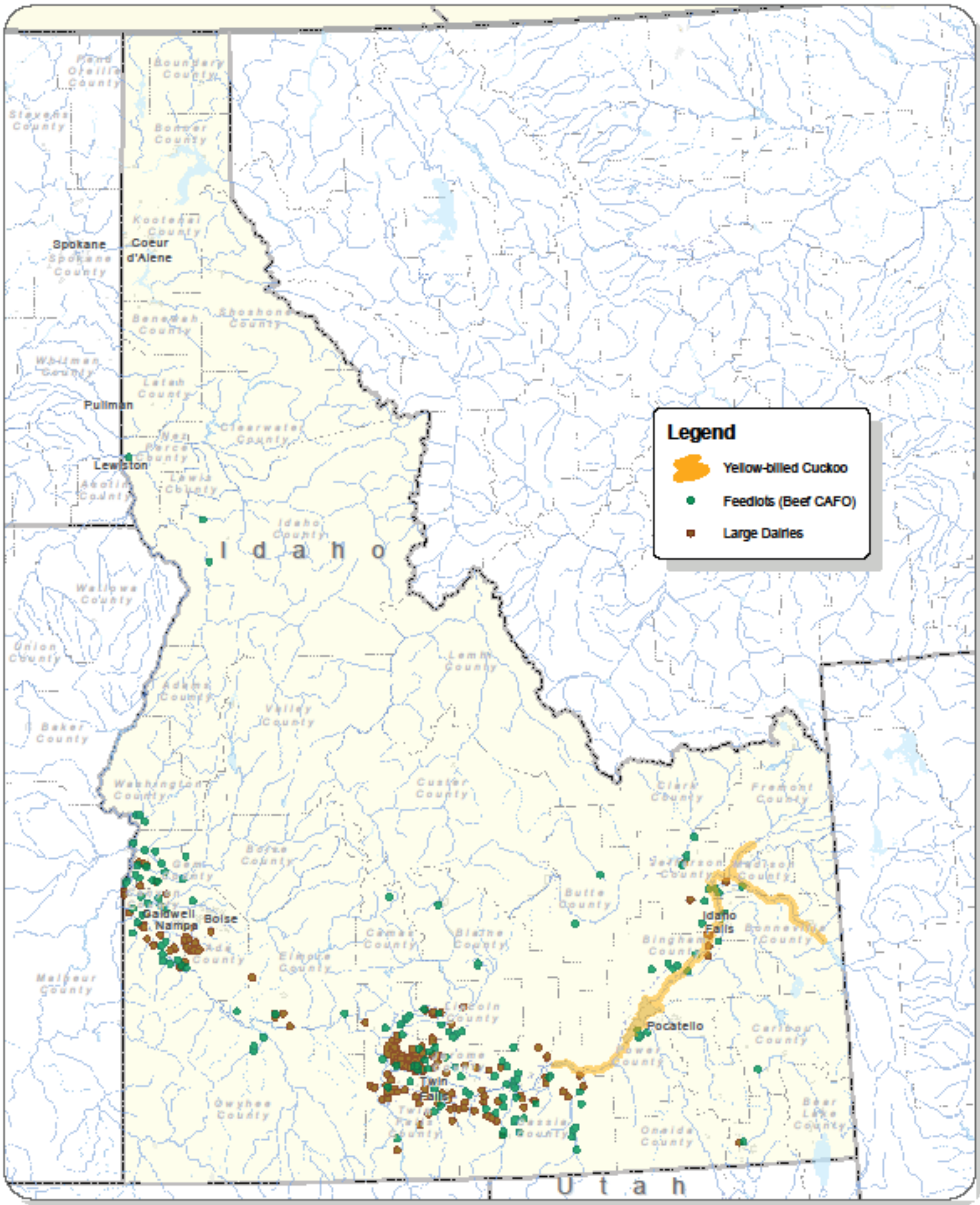

Figure 4-10: Yellow-billed cuckoo distribution shown with large Idaho CAFO facilities (feedlots and dairies)

5 ANALYSIS OF EFFECTS

The ESA Section 7 implementing regulations (50 CFR 402.02) define "effects of the action" as:

> The direct and indirect effects of an action on the species or critical habitat together with the effects of other activities which are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02).

EPA's action, issuance of the Permit, will not result in direct effects to proposed or listed species. Issuance of the Permit, in and of itself, will not change the environmental baseline or directly affect listed or proposed species. There are potential indirect effects of issuing the Permit because the approval allows implementation of the Permit and the authorization to legally discharge. There will be no interrelated or interdependent effects from the Permit. CAFO's in Idaho do not technically require an NPDES permit to operate as they could modify their operations and facilities to effectively eliminate discharges to surface waters. No CAFO's applied for or received coverage under the last Permit and it remains unclear the number, if any, that will obtain coverage under the reissued permit.

EPA has determined that reissuance of the Permit is an environmentally beneficial action since it regulates the discharge of pollutants to waters of the US. This BE concentrates on the protective measures afforded by the Permit. EPA's Enforcement and Compliance Assurance Division is responsible for ensuring strict adherence to the permit requirements. As such, the analysis of effects in the BE assumes compliance with the Permit and that the species of interest are not exposed to pollutant concentrations exceeding water quality standards, and examines what the potential effects on the species under that scenario.

There are three possible determinations of effects under the ESA (USFWS and NMFS 1998). The determinations and their definitions are:

- **No Effect (NE)** - the appropriate conclusion when the action agency determines its proposed action will not affect listed species or critical habitat.

- **May affect, is not likely to adversely affect (NLAA)** - the appropriate conclusion when effects on listed species are expected to be discountable, or insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

- **May affect, likely to adversely affect (LAA)** - the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial (see definition of "is not likely to adversely affect"). In the event the overall effect of the proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires formal section 7 consultation.

Pursuant to Section 7 of the ESA, any action that is reasonably certain to result in "take" is likely to adversely affect a proposed or listed species. The ESA (Section 3) defines "take" as "to harass, harm, pursue, hunt, shoot, wound, trap, kill, capture, collect or attempt to engage in any such conduct." Further, the term "harass" is defined as "an intentional or negligent act that creates the likelihood of injuring wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, or sheltering" (50 CFR 17.3). NMFS has interpreted "harm" as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, feeding, or sheltering" (64 FR 60727). The USFWS (1994) further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering."

5.1 POLLUTANTS OF CONCERN AND POTENTIAL IMPACTS

According to EPA's 1996 *National Water Quality Inventory*, agricultural operations, including animal feeding operations (AFOs), are a significant source of water pollution in the U.S. States estimate that agriculture contributes to the impairment of at least 173,629 river miles, 3,183,159 lake acres, and 2,971 estuary square miles. Twenty-two states reported on the impacts of specific types of agriculture on rivers and streams, attributing 20 percent of the agricultural impairment to intensive animal operations. In addition, NOAA reports that feedlots were a contributing factor in 110 of the 3,404 impaired shellfish areas in 1995. These findings, as well as incidents of waste spills, excessive runoff, leaking storage lagoons, and odor problems, have heightened public awareness of environmental impacts from AFOs.

In surface water, impacts are associated with waste spills, as well as surface runoff and subsurface flow. The waste's oxygen demand and ammonia content can result in fish kills and reduced biodiversity. Solids can increase turbidity and smother benthic organisms. Nitrogen and phosphorus can contribute to eutrophication and associated algae blooms. Turbidity from the blooms can reduce penetration of sunlight in the water column and thereby limit growth of seagrass beds and other submerged aquatic vegetation, which serve as critical habitat for fish, crabs, and other aquatic organisms. Decay of the algae (as well as night-time algal respiration) can lead to depressed oxygen levels, which can result in fish kills and reduced biodiversity. Trace elements in manure may also present ecological risks. Salts can contribute to salinization and disruption of the ecosystem. Antibiotics, pesticides, and hormones may have low-level, long-term ecosystem effects.

This section summarizes the potential pollutants of concern associated with CAFO facilities. Section 2.0 above states that the Permit authorizes a discharge from the production area only in accordance with the ELGs specified for the production area. If a CAFO discharges pollutants to waters of the U.S. from the production area, the discharge is authorized only when precipitation causes an overflow of pollutants into waters of the U.S. and if the production area is designed, constructed, operated, and maintained to contain all manure, litter, process wastewater, and the runoff and direct precipitation from the 25-year, 24-hour storm event. If the discharge does not meet these criteria, the discharge is not authorized under the Permit and the CAFO is in violation of the CWA.

5.1.1 NUTRIENTS

Nitrogen

Nitrogen (N) is an essential nutrient required by all living organisms. It is ubiquitous in the environment, accounting for 78 percent of the atmosphere as elemental nitrogen (N_2). This form of nitrogen is inert and does not impact environmental quality. It is also not bioavailable to most organisms and therefore has no fertilizer value. Nitrogen also forms other compounds which are bioavailable, mobile, and potentially harmful to the environment.

Manure nitrogen is primarily in the form of organic nitrogen and ammonia nitrogen compounds. In organic form, nitrogen is unavailable to plants. However, via microbial processes, the organic nitrogen is transformed into ammonium (NH_4^+) and nitrate (NO_3^-) forms, which are bioavailable and therefore have fertilizer value. These forms can also produce negative environmental impacts when they are transported in the environment, as described in the following subsections.

Ammonia

"Ammonia-nitrogen" includes the ionized form (ammonium, NH_4^+) and the un-ionized form (ammonia, NH_3). Ammonium is produced when microorganisms break down organic nitrogen products such as urea and proteins in manure. This decomposition can occur in either aerobic or anaerobic environments. Higher pH levels (lower H+ concentrations) favor the formation of ammonia, while lower pH levels (higher H+ concentrations) favor the formation of ammonium. Both forms are toxic to aquatic life, although the un-ionized form (ammonia) is much more toxic. Fish kills due to ammonia toxicity are a potential consequence of the direct discharge of animal wastes to surface waters.

Ammonia is also of environmental concern because it exerts a direct biochemical oxygen demand (BOD) on the receiving water. As ammonia is oxidized, dissolved oxygen is consumed.

Moderate depressions of dissolved oxygen are associated with reduced species diversity, while more severe depressions can produce fish kills.

Additionally, ammonia can lead to eutrophication, or nutrient over-enrichment, of surface waters. Ammonia itself is a nutrient, and it is also easily transformed to nitrate (another nutrient form of nitrogen) in the presence of oxygen. While nutrients are necessary for a healthy ecosystem, the overabundance of nutrients (particularly nitrogen and phosphorus) can lead to nuisance algae blooms. Algal blooms reduce the penetration of light through the water column (and thereby limit the growth of desirable aquatic plants), and reduce night-time levels of dissolved oxygen via respiration. Decay of dead algae also results in dissolved oxygen depressions. These depressions may reduce biodiversity, or may be severe enough to produce fish kills.

Ammonia can reach surface waters in a number of ways, including direct discharge, leaching, dissolution in surface runoff, erosion, and atmospheric deposition. Leaching and runoff are generally not significant transport mechanisms for ammonia compounds, because ammonium can be sorbed to soils (particularly those with high cation exchange capacity, or CEC), incorporated (fixed) into clay or other soil complexes, or transformed into organic form by soil microbes (Follett, 1995). However, in these forms, nitrogen can be transported to surface waters by erosion.

Nitrate

In the biochemical process of nitrification, aerobic bacteria oxidize ammonium to nitrite (NO_2^-) and then to nitrate (NO_3^-). Nitrite is toxic to most fish and other aquatic species, but it typically does not accumulate in the environment because it is rapidly transformed to nitrate in an aerobic environment. Alternatively, nitrite (and nitrate) can undergo bacterial denitrification in an anoxic environment. In denitrification, nitrate is converted to nitrite, and then further converted to gaseous forms of nitrogen - elemental nitrogen (N_2), nitrous oxide (N_2O), nitric oxide (NO), and/or other nitrogen oxide (NOx) compounds. Nitrification occurs readily in the typically aerobic conditions of receiving streams and dry soils; denitrification can be significant in anoxic bottom waters and saturated soils.

Nitrate is a useful form of nitrogen because it is biologically available to plants and is therefore a valuable fertilizer. However, excessive levels of nitrate in surface water can produce negative health impacts on animals including eutrophication of surface waters. Eutrophication can lead to negative aesthetic impacts, fish kills, reduced biodiversity, and growth of toxic organisms.

Nitrate can reach surface waters via direct discharge of animal wastes. Lagoon leachate and land-applied manure can also be significant contributors of nitrate to both surface and groundwaters. Nitrate is water soluble and moves freely through most soils. Overland runoff can carry dissolved nitrate to surface waters. To reduce the risk of nitrate contamination from biosolids, EPA's Part 503 Rule requires that land application be limited to agronomic rates for nitrogen (i.e., the nitrogen applied may not exceed the cover crop's nitrogen requirements).

Phosphorus

Animal wastes contain both organic and inorganic forms of phosphorus (P). As with nitrogen, the organic form must mineralize to inorganic form to become available to plants. This occurs as the manure ages and the organic P hydrolyzes to inorganic phosphate-containing compounds.

Phosphorus is of concern in surface waters because it is a nutrient which can lead to eutrophication. Eutrophication can lead to negative aesthetic impacts, fish kills, reduced biodiversity, and growth of toxic organisms.

Phosphorus is of particular concern in freshwaters, where plant growth is typically limited by phosphorus levels. Under high pollutant loads, however, freshwaters may become nitrogen limited (Bartenhagen et al., 1994). Thus, both nitrogen and phosphorus loads may contribute to eutrophication.

5.1.2 DISSOLVED OXYGEN

When discharged to surface water, the material is decomposed by aquatic bacteria and other microorganisms. During this decay process, dissolved oxygen is consumed, reducing the amount available for aquatic animals. Severe depressions in dissolved oxygen levels can result in fish kills. More moderate depressions in dissolved oxygen levels are associated with reduced biodiversity (i.e., reduction in desirable species). In a study of three Indiana stream systems, researcher James R. Gammon (1995) found that waters downstream from animal feedlots (mainly hog and dairy operations) contained fewer fish and a limited number of species of fish in comparison with reference sites. Gammon also found excessive algal growth, altered oxygen content, and increased levels of ammonia, turbidity, pH, and total dissolved solids.

5.1.3 TOTAL SUSPENDED SOLIDS

AFOs can be a source of manure solids and soil solids in surface waters. Suspended solids can clog fish gills and increase turbidity. Increased turbidity reduces penetration of light through the water column, thereby limiting the growth of desirable aquatic plants which serve as critical habitat for fish, crabs, and other aquatic organisms. Solids that settle out as bottom deposits can alter or destroy habitat for fish and benthic organisms. Additionally, solids provide a medium for the accumulation, transport, and storage of other pollutants, including nutrients, pathogens, and trace elements. Sediment-bound pollutants often have a long history of interaction with the water column through cycles of deposition, resuspension, and redeposition.

5.1.4 PATHOGENS

Both manure and animal carcasses can contain pathogens (disease-causing organisms) which can impact other livestock, aquatic life, and wildlife when introduced into the environment. Fecal coliform counts are often used as a surrogate measurement for gastroenteric pathogens, since the presence of fecal coliform bacteria is an indication of contamination by human and/or animal wastes. To help protect human health, EPA has recommended an ambient water quality standard of 200 CFU/ml for fecal coliforms in contact-recreational waters. Fecal coliform pollution from various sources is often cited in beach closures and shellfish restrictions. Fecal coliform counts of 3,000 CFU/100 ml and fecal streptococci counts over 30,000 CFU/100 ml have been reported downstream from a hog waste lagoon site (Paul, pers. comm., 1997). Bacteria discharged to the water column can subsequently adsorb to sediments, presenting a long-term health hazard. When the bottom stream is disturbed, the sediment releases bacteria back into the water column (Sherer et al., 1988, 1992).

Sources of pathogen contamination from livestock operations include direct discharges and leaching lagoons. Surface runoff from land application fields can also be a source of pathogen contamination, particularly if a rainfall event occurs soon after application. The natural filtering and adsorption action of soils typically causes a majority of the microorganisms in land-applied manure to be stranded at the soil surface (Crane et al., 1980). This helps protect underlying groundwater, but increases the likelihood of runoff losses to surface waters. Depending on weather, site, and operating conditions, subsurface flows may also be a significant mechanism for pathogen transport.

The survivability and transport of land-applied manure pathogens are not well-characterized. Several researchers (Dazzo et al., 1973; Ellis and McCalla, 1976; Morrison and Martin, 1977; Van Donsel et al., 1967) have found that soil type, manure application rate, and soil pH are dominating factors in bacteria survival. Experiments on land-applied poultry manure (Crane et al., 1980) have indicated that the population of fecal organisms decreases rapidly as the manure is heated, dried, and exposed to sunlight on the soil surface.

5.1.5 SALTS AND TRACE ELEMENTS

The salinity of animal manure is due to the presence of dissolved mineral salts. The major cations contributing to salinity are sodium, calcium, magnesium, and potassium; the major anions are chloride, sulfate, bicarbonate, carbonate, and nitrate (National Research Council, 1993). In land-applied wastes, salinity is a concern because salts can accumulate in the soil and become toxic to plants, and can deteriorate soil quality by reducing permeability and contributing to poor tilth. Direct discharges and salt runoff to fresh surface waters contribute to salinization and can disrupt the balance of the ecosystem. Leaching salts can deteriorate groundwater quality, making it unsuitable for human consumption.

Trace elements such as arsenic, copper, selenium, and zinc are often added to animal feed as growth stimulants or biocides (Sims, 1995). When land-applied, these elements can accumulate in soils and become toxic to plants. These elements are also of concern because they can impact human and ecological health. Arsenic and selenium, for example, are toxicants. Copper and zinc can cause gastrointestinal irritation.

The trace elements listed herein (as well as cadmium, mercury, molybdenum, nickel, and lead) are regulated in municipal sewage sludge by EPA's Part 503 Rule. Total concentrations of trace elements in animal manures have been reported as comparable to those in some municipal sludges, with typical values well below the maximum concentrations allowed by Part 503 for land-applied sewage sludge (Sims, 1995). Metals in agronomically-applied manures should pose little risk to the environment.

5.1.6 ANTIBIOTICS, PESTICIDES AND HORMONES

Antibiotics, pesticides, and hormones are organic compounds which are used in animal feeding operations and can be expected to appear in animal wastes. These compounds may pose risks to the environment. For example, chronic toxicity may result from low-level discharges of antibiotics and pesticides. Estrogen hormones have been implicated in reproductive disorders in a variety of wildlife (Colburn et al., 1993). Other environmental sources of antibiotics and hormones include municipal wastewaters, septic tank leachate, and runoff from land-applied sewage sludge. Other sources of pesticides include crop runoff and urban runoff.

Little information is available regarding the concentrations of these compounds in animal wastes, or on their fate/transport behavior and bioavailability in waste-amended soils. These compounds may reach surface waters via direct discharges and runoff from land-application sites. Groundwaters (and subsequently surface waters) may be impacted by leachate from waste lagoons and land application sites.

5.2 EFFECT SUMMARY FOR EACH SPECIES

EPA has determined that reissuance of the Permit is an environmentally beneficial action since it regulates the discharge of pollutants to waters of the US.

5.2.1 BIRDS

Yellow-billed cuckoo

This species is primarily found in riparian areas that are at least 250 acres in extent and 325 feet wide [79 FR 48558]. In Idaho the yellow-billed cuckoo is considered a rare visitor to the Snake River Valley in the southeast portion of the State where a relatively minimal number of CAFO's are known to operate. The most recent statewide assessment estimated the cuckoo breeding population in Idaho is likely limited to no more than 10 to 20 breeding pairs in the Snake River Basin (Reynolds and Hinckley 2005). The proposed action does not preclude the existence or placement of CAFO's in riparian habitats which may support yellow-billed cuckoo. There is the potential that the location of a CAFO near suitable habitat could result in avoidance behavior due to the presence of the facility and resulting noise and disturbance associated with operations. However, EPA does not consider the physical siting or location of CAFO's to be interrelated or interdependent actions to the Permit as: 1) the Permit does not regulate or influence the physical location or siting of the facilities, and; 2) CAFO's do not technically require an NPDES permit to operate as they could design, construct, and operate their facilities in a way that would completely eliminate the potential for discharge and need for a permit. No facilities received coverage under the last Permit and it remains unclear the number, if any, that will obtain coverage under the reissued Permit.

During permitted discharge events the proposed action could modify water quality in waterways adjacent to yellow-billed cuckoo habitat resulting in impacts to macroinvertebrates. However, other than frogs the yellow-billed cuckoo does not have an aquatic diet. As for direct effects, the probability of a permitted discharge coinciding with the presence of individual yellow-billed cuckoo within the action area is extremely unlikely. As such, effects to individual yellow-billed cuckoo are anticipated to be discountable.

While the proposed action could modify water quality, a discharge event is only permitted during extreme flood events when water levels and available dilution are already high, resulting in high dilution and dispersion of discharged constituents. As such, effects to water quality and flow in waterbodies adjacent to riparian habitat supportive of yellow-billed as a result of the proposed action are anticipated to be insignificant to yellow-billed cuckoo proposed critical habitat.

EPA has determined that the Permit **may affect, but is not likely to adversely affect** the yellow-billed cuckoo and is **not likely to destroy or adversely modify** yellow-billed cuckoo proposed critical habitat.

5.2.2 FISH

Reduced water quality is one of the factors contributing to the decline of the fish species under consideration in this BE. The Permit is expected to have a beneficial effect on water quality and thereby should also have a beneficial effect on ESA-listed fish species. While water quality directly affects fish health and survival, for the species under consideration, habitat loss, hydro power projects (dams), and over harvesting are also major contributors to species decline. For some species, predation, competition, and interbreeding with exotic species are also major contributors to species decline.

Bull Trout

The Columbia River population segment includes the entire Columbia River Basin and all its tributaries, excluding the isolated bull trout populations found in the Jarbridge River in Nevada. 8,772 stream miles and 170,218 acres of lakes or reservoirs were designated as critical habitat in Idaho. Critical habitat units in Idaho include the Clark Fork River Basin, Kootenai River Basin, Coeur d'Alene River Basin, Little Lost River, Salmon River, Southwest Idaho Basins, Jarbridge River, Mainstem Snake River, Clearwater River, Hells Canyon Complex, and Sheep/Granite Creeks.

Bull Trout Critical Habitat

The final rule designating bull trout critical habitat (70 FR 63898 [October 18, 2010]) identifies nine Primary Constituent Elements (PCEs) essential for the conservation of the species:

- *PCE #1*: *Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.*

- *PCE#2*: *Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers*.

- PCE #3: *An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertbrates, and forage fish.*

- PCE #4: *Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environmental, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities and structure.*

- PCE #5*: Water temperatures ranging from 2 to 15⁰ C (36 to 59⁰ F), with adequate thermal refugia available for temperatures that exceed the upper end of this range.*

- *PCE #6: In spawning and rearing areas substrate of sufficient amount, size and composition to ensure success of egg and embryo over-winter survival.*

- *PCE #7: A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.*

- *PCE #8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.*

- *PCE #9: Sufficiently low levels of occurrence of nonnative predatory (e.g. lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g. brook trout), or competing (e.g. brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.*

Currently, there are only two CAFOs located within bull trout critical habitat. Reissuance of the Permit is not anticipated to adversely affect any PCEs of bull trout critical habitat. We do not anticipate the removal or modification of habitat (i.e. in-stream or riparian) associated with the proposed action that would affect migration or any other essential behavior or life history stage of bull trout. CAFOs are not anticipated to be present high in a watershed or near headwater streams where bull trout are known to spawn. There are no aspects of the action that will modify the flow or the natural hydrograph, nor is there an activity that will introduce or enhance conditions for nonnative predatory fish.

As presented in the BE, the potential for a discharge to occur is considered highly unlikely due to the requirements contained in the Permit, including BMPs and NMPs. In addition, it is unclear how many facilities will seek coverage under the reissued Permit; no facilities received coverage under the prior permit. For any facilities that do apply for and received coverage, the requirements of the Permit will provide effective control of the discharges of manure, litter, and process wastewaters from the production area. Additionally, for land application activities, the Permit requires a setback or buffer and the development and implementation of a site-specific NMP, which will control soil erosion and offsite transport of nutrients and sediment.

Design of the storage lagoon must incorporate the capacity to store material for the maximum length of time anticipated between emptying events. This storage volume should also accommodate all wastes, precipitation, and runoff for this period of time. Therefore, properly designed systems should already account for the "rainy season" or the non-growing season typical of the CAFO's location. Storage capacity of the lagoons has been designed to accommodate precipitation in excess of a 25-year 24-hour storm event, and can store up to a 100-year, 24-hour storm event. Buffers, setbacks and vegetative filter strips that remove significant amounts of organic material are required to ensure that waste material does not reach surface water. Additionally, timing restrictions are in place to ensure maximum infiltration of land applied material.

Due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effects of the CAFO facilities covered under the proposed action should be discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** bull trout or their designated critical habitat.

Snake River Chinook salmon

The designated critical habitat for Snake River fall Chinook salmon consists of river reaches of the Columbia, Snake and Salmon Rivers, and all tributaries of the Snake and Salmon Rivers presently or historically accessible to Snake River fall Chinook salmon (except reaches above impassable natural falls and the Dworshak and Hells Canyon Dams).

Figure 4-2 outlines the habitat of the spring/summer and fall Chinook salmon habitat and the potential large CAFO facilities in Idaho. There is one facility located near to but not in the habitat of the spring/summer or fall Chinook salmon.

Due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effluent discharges from the CAFO facilities covered under this Permit should be insignificant and discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** spring/summer or fall Snake River Chinook salmon or their critical habitat.

Snake River sockeye salmon

Snake River (SR) sockeye salmon enter the Columbia River during June and July to migrate to Redfish Lake, which now supports the only remaining run of SR sockeye salmon. Migrating smolts returning to the ocean from Redfish Lake migrate in April thru late June. The designated critical habitat consists of Columbia River reaches upstream to the confluence of the Columbia and Snake Rivers, all Snake River reaches from the confluence of the Columbia River upstream to the confluence of the Salmon River; all Salmon River reaches from the confluence of the Snake River upstream to Alturas Lake Creek, Valley Creek, and Stanley, Redfish, Yellow Belly, Pettit, and Alturas Lakes (including their inlet and outlet creeks).

Figure 4-3 outlines the distribution of the Snake River sockeye and the potential large CAFO facilities in Idaho. There are only two facilities located near the habitat of the Snake River sockeye salmon.

Due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effluent discharges from the CAFO facilities covered under this Permit should be insignificant and discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** Snake River sockeye salmon or their critical habitat.

Snake River steelhead

Designated critical habitat for the Snake River steelhead includes the following subbasins in Idaho: Hells Canyon, Lower Snake, Upper Salmon, Pahsimeroi, Middle Salmon - Panther, Lemhi, Upper Middle Fork Salmon, Lower Middle Fork Salmon, Middle Salmon – Chamberlain, South Fork Salmon, Lower Salmon, Little Salmon, Upper Selway, Lower Selway, Lochsa, Middle Fork Clearwater, South Fork Clearwater and Clearwater.

Figure 4-4 outlines the distribution of the Snake River steelhead critical habitat and distribution and the potential large CAFO facilities in Idaho. There are only two facilities located near the habitat of the Snake River steelhead.

Due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effluent discharges from the CAFO facilities covered under this permit should be insignificant and discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** Snake River steelhead or their critical habitat.

White sturgeon

The Kootenai River population of the white sturgeon (*Acipenser transmontanus*) is restricted to approximately 270 km (168 river miles (RM)) in the Kootenai River. This reach extends from Kootenai Falls, Montana to Cora Linn Dam at the outflow from Kootenay Lake in British Columbia, Canada (USFWS, 1994a). A revised final designation of critical habitat was published on July 9, 2008 (73 FR 39506) for 18.3 RM of the Kootenai River. The area is entirely within Boundary County and begins 31 miles (50 km) downstream from Libby Dam at Bonner's Ferry, extending downstream to river mile 141.4, below Shorty's Island. As outlined in Figure 4-5, there are currently no large CAFO facilities within the habitat of the Kootenai River white sturgeon. A rudimentary satellite view analysis of the area using Google Earth also did not identify any small or medium CAFO's within designated critical habitat. While the permit doesn't preclude the development of a facility within the species habitat in the future, EPA would not consider this to be an interdependent or interrelated action as the facility would not technically need an NPDES permit to legally operate if they designed, constructed and operated their facility to be no discharge.

As presented in the BE, the potential for a discharge to occur is considered highly unlikely and discountable due to the requirements contained in the Permit, including BMPs and NMPs. In addition, it is unclear how many facilities will seek coverage under the reissued Permit; no facilities received coverage under the prior permit. For any facilities that do apply for and received coverage, the requirements of the Permit will provide effective control of the discharges of manure, litter, and process wastewaters from the production area. Additionally, for land application activities, the Permit requires a setback or buffer and the development and implementation of a site-specific NMP, which will control soil erosion and offsite transport of nutrients and sediment.

Design of the storage lagoon must incorporate the capacity to store material for the maximum length of time anticipated between emptying events. This storage volume should also accommodate all wastes, precipitation, and runoff for this period of time. Therefore, properly designed systems should already account for the "rainy season" or the non-growing season typical of the CAFO's location. Storage capacity of the lagoons has been designed to accommodate precipitation in excess of a 25-year 24-hour storm event, and can store up to a 100-year, 24-hour storm event. Buffers, setbacks and vegetative filter strips that remove significant amounts of organic material are required to ensure that waste material does not reach surface water. Additionally, timing restrictions are in place to ensure maximum infiltration of land applied material.

Due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effects of the CAFO facilities covered under the proposed action should be discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** Kootenai River white sturgeon or its critical habitat.

5.2.3 INVERTEBRATES

Banbury Springs limpet

Banbury Springs limpet are found on smooth basalt, boulders, or cobble-sized grounds ranging from 2 to 20 inches deep, but they avoid areas with green algae. The Banbury Springs limpet is currently known to only exist in four coldwater spring complexes along 10 river kilometers (rkm*)* 6 river miles (rm) of the middle Snake River: Thousand Springs, Box Canyon Springs, Banbury Springs, and Briggs Springs. Figure 4-6 shows the overlap of the large CAFO facilities with the full range of Banbury Springs limpet habitat, however, in reality Banbury Springs limpets are only located at the four spring locations. The actual springs of Banbury Springs originate from basalt cliffs and talus slopes about 50 m (164 feet (ft)) above the Snake River. The entire flow of these springs is captured in Morgan Lake, a man-made lake with a levee separating the lake from the Snake River. At Thousand Springs, much of the spring water that originally cascaded down the basalt cliffs is now diverted for delivery into the Thousand Springs hydroelectric project (Stephenson et al 2004). Box Canyon Creek is fed by Box Canyon Spring. It is approximately 1.75 km (1.1 mi) in length and joins the Snake River just upstream of the Thousand Springs complex at rkm 939.7. The majority of the water originating from Box Canyon Creek is diverted upstream of the existing Banbury Springs limpet colony into a flume for delivery to a commercial aquaculture facility (Taylor 1985). Briggs Springs Creek supplies water used for commercial fish production at Clear Springs Fish Hatchery. The Banbury Springs limpet was discovered at Briggs Springs in 1994 in the headwaters of the main channel of the Creek upstream of the upper-most diversion approximately 1.1 km (0.7 mi) from the Snake River. The limpet is also found just downstream of this diversion and in a diversion canal about 50 m (164 ft) from this location (Hopper in litt. 2006).

It is unlikely there would be CAFO facilities in the Banbury Springs limpet habitat due to the rugged terrain around Banbury Springs, the majority of Thousand Springs is now a hydroelectric facility, and the fact that the other springs are small and located near operating aquaculture facilities. In addition, due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effects of any CAFO facilities that may be present in the area and covered under the proposed action should be discountable. The permit requires facilities to have liners in their storage ponds and so any effects resulting from groundwater infiltration and contamination are also discountable. If a permitted facility experience a leak in their liner or otherwise infiltrated groundwater the effects to the limpet would be discountable as the impacts to water quality would be unmeasurable by the time the groundwater daylighted at one of the spring habitat complexes. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** the Banbury Springs limpet.

Bliss Rapids snail

The Bliss Rapids snail occurs in cold water springs and spring-fed tributaries to the Snake River, and in some reaches of the Snake River. The Bliss Rapids snail is primarily found on cobble boulder substrate, and in water temperatures between 59 and 61 degrees F. Recent surveys indicate the species is distributed discontinuously over 22 miles, from River Mile (RM) 547-560, RM 566-572, and at RM 580 on the Snake River. The species is also known to occur in 14 springs or tributaries to the Snake River including: Bancroft Springs; Thousand Springs and Minnie Miller Springs (Thousand Springs Preserve); Banbury Springs; Niagara Springs; Crystal Springs; Briggs Springs; Blue Heart Springs; Box Canyon Creek; Riley Creek; Sand Springs Creek; Elison Springs; the Malad River; Cove Creek (a tributary to the Malad River); and the headwater springs to Billingsley Creek (73 FR 46867).

According to the map of current CAFO facilities, there are a few CAFO facilities located on the Snake River between RM 547 and RM580. This species occurs in water bodies that could potentially receive discharges from CAFO facilities during extreme flood events, and one of the major threats to this species is deteriorating water quality from altered natural flow conditions and water pollution; however, due to Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effects from the CAFO facilities covered under the proposed action would be discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** the Bliss Rapids snail.

Bruneau Hot Springsnail

The Bruneau Hot springsnail resides in portions of the Bruneau River and its tributary Hot Creek. A decline in the population of the species is attributed to low flows from the geothermal aquifer emanating from springs at Hot Creek. The majority of land upstream of Hot Creek is Federal land administered by the BLM. The Bruneau River Canyon in this area is highly geologically confined with steep, basalt cliffs extending hundreds of feet directly adjacent to the river channel. Therefore, this area receives very little human influence other than recreation. The area downstream of Hot Creek is characterized by diversions and canals, hay fields, and areas with livestock that have access to the geothermal springs that contain *P. bruneauensis*. Prior to 1998, livestock grazing was considered a threat factor that impacted some geothermal spring habitats where *Pyrgulopsis bruneauensis* occurred near Hot Creek. In the 1990s, the BLM constructed fences to exclude livestock grazing in this area, and presently, cattle are excluded from Hot Creek and all geothermal spring habitats along the Bruneau River upstream of Hot Creek.

It is unlikely there would be CAFO facilities in the Bruneau Hot springsnail habitat due to the rugged terrain of the location and the fact that fencing has been used to keep livestock away from this area. In addition, due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effects of any CAFO facilities that may be present in the area and covered under the proposed action would be discountable. The permit requires facilities to have liners in their storage ponds and so any effects resulting from groundwater infiltration and contamination are also extremely unlikely and discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** the Bruneau Hot springnail.

Snake River physa snail

Figure 4-8 outlines the historical distribution and recovery area for the Snake River Physa snail. In 1995, USFWS reported the known modern range of the species to be from Grandview, Idaho (RM 487) to the Hagerman Reach of the Snake River (RM 573). While the species' current range is estimated to be over 300 river miles, the snail has been recorded in only 5% of over 1,000 samples collected within this area, and it has never been found in high densities. Snake River physa are currently found only at a few locations in the Snake River, mostly in the Hagerman and King Hill reaches, with a distinct population near Minidoka Dam (RM 675). Living specimens of the snail have been found on boulders in the deepest accessible parts of the Snake near the margins of rapids, but it is believed that fewer than 50 live Snake River physa have ever been collected in the middle Snake River (Frest et al. 1991).

According to the map of current CAFO facilities, there are a few CAFO facilities located on the Snake River between King Hill (RM 530) and Hagerman (RM573) and near Minidoka Dam. This species occurs in water bodies that might receive discharges from CAFO facilities in the event of a permitted discharge and one of the major threats to this species' persistence deteriorating water quality from altered natural flow conditions and water pollution; however, due to Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effects from the CAFO facilities covered under the proposed action would be discountable. Further, the permit requires facilities to have liners in their storage ponds and so any effects resulting from groundwater infiltration and contamination are also extremely unlikely and discountable. Therefore, EPA has determined that the Permit **may affect, but is not likely to adversely affect** the Bliss Rapids snail.

5.2.4 FLOWERING PLANTS

The listed and candidate plant species addressed in this BE typically require very specific habitats with generally very small ranges. Common threats to the listed and candidate plant species include livestock grazing, trampling, loss or changes in habitat resulting from land use (i.e. agriculture and urban development), hydrological alterations, herbicide spraying, and recreational activities (e.g., off-road vehicles and trampling), in addition to natural and man-made disturbances (e.g., landslides, floods, highway construction). For the species associated with wetland areas, water quality was not listed as a major reason for the species' decline.

Ute ladies'-tresses

Ute ladies' tresses is a perennial, terrestrial orchid endemic to mesic or wet meadows and riparian/wetland habitats near springs, seeps, lakes, or perennial streams. Soils may be inundated early in the growing season, normally becoming drier but retaining subsurface moisture through the season. Grazing and recreational use appear to be the most likely activities affecting the plant. Adequate data are not available; however, to determine what, if any, activities are affecting this species along the main stem of the Snake River. It is generally believed that any activity that degrades floodplain riparian or wetland habitats will also affect Ute ladies' tresses (57 FR 2053). The proposed action does not regulate the setting or location of CAFO facilities in Idaho. Figure 4-9 outlines the overlap of habitat for Ute ladies'-tresses with previously permitted facilities. While some CAFO's may be present or constructed within Ute ladies'-tresses habitat EPA does not consider the siting or location of CAFO's to be interrelated or interdependent actions as: 1) the Permit does not regulate the location of the facilities, and; 2) CAFO's do not technically require an NPDES permit to operate as they could design, construct and operate their facilities in a way that would completely eliminate the potential for discharge and need for a permit. No facilities received coverage under the last Permit.

Due to the Permit requirements and restrictions, and the extremely low probability of an overflow from a storm event, the effects of the CAFO's covered under the proposed action would be discountable. Therefore, EPA has determined the Permit **may affect, but is not likely to adversely affect** Ute ladies'-tresses.

5.3 CUMULATIVE EFFECTS AND INTERDEPENDENT/ INTERRELATED ACTIONS

5.3.1 CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions on endangered or threatened species or critical habitat that are reasonably certain to occur in the action area considered in this BE. Future federal actions or actions on federal lands that are not related to the proposed action are not considered in this section.

Future anticipated non-Federal actions that may occur in or near surface waters of Idaho include timber harvest, grazing, mining, agriculture, urban development, municipal and industrial wastewater discharges, road building, sand and gravel operations, aquaculture, off-road vehicle use, fishing, hiking, and camping. These non-Federal actions are likely to continue having adverse effects on the endangered and threatened species, and their habitat.

There are also non-Federal actions likely to occur in or near surface waters of Idaho that are likely to have beneficial effects on the endangered and threatened species. These include implementation of riparian improvement measures, best management practices associated with timber harvest, grazing, agricultural activities, urban development, road building and abandonment, recreational activities, and other nonpoint source pollution controls.

5.3.2 INTERDEPENDENT/INTERRELATED ACTIONS

Interdependent actions are defined as actions with no independent use apart from the proposed action. Interrelated actions include those that are part of a larger action and depend on the larger action for justification. No interdependent/interrelated actions are expected to result from the Permit as the permit only regulates the discharge of pollutants under extreme circumstances. Further, CAFO's do not technically or inherently require an NPDES permit to operate as they could be designed, constructed, and operated in a manner that eliminates the potential for discharge. No CAFO's obtained coverage under the last Permit and it remains unclear the number, if any, that will obtain coverage under the reissued Permit.

5.4 SUMMARY OF EFFECTS DETERMINATIONS

Effects determinations for the listed and candidate species discussed in this BE are summarized in the table below.

Summary of Effects Determinations

Species	Species			Critical Habitat		
Mammals	**NE**	**NLAA**	**LAA**	**NE**	**NLAA**	**LAA**
Canada Lynx	X			X		
Grizzly Bear	X			X		
North American Wolverine	X			NA	NA	NA
Northern Idaho Ground Squirrel	X			X		
Woodland Caribou	X			X		
Birds						
Yellow-billed Cuckoo		X			X[1]	
Fish						
Bull Trout		X			X	
Snake River Chinook Salmon		X			X	
Snake River Sockeye Salmon		X			X	
Snake River Steelhead		X			X	
White Sturgeon		X			X	
Invertebrates						
Banbury Springs Limpet		X		NA	NA	NA
Bliss Rapids Snail		X		NA	NA	NA
Bruneau Hot Springsnail		X		NA	NA	NA
Snake River Physa Snail		X		NA	NA	NA
Flowering Plants						
MacFarlane's Four-o'clock	X			NA	NA	NA
Spalding's catchfly	X			NA	NA	NA
Ute Ladies' Tresses		X		NA	NA	NA
Water Howellia	X			NA	NA	NA
Slickspot Peppergrass	X			X		

[1] Critical habitat has been proposed but not designated for yellow-billed cuckoo. EPA has determined the Permit is not likely to destroy or adversely modify yellow-billed cuckoo proposed critical habitat
NA: Not applicable since no critical habitat designated.

6.0 ESSENTIAL FISH HABITAT ANALYSIS

Essential Fish Habitat Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires Federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity and covers a species' full life cycle (50 CFR 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

The objective of this EFH assessment is to determine whether or not the proposed action(s) "may adversely affect" designated EFH for relevant commercially, federally-managed fisheries species within the proposed action area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed action.

Description of the Action/Action Area

See Section 1 for a description of the action and the action area.

Potential Adverse Effects on Salmon EFH

Analyses of the potential adverse effects of the Permit are discussed in Section 5.0. The Permit for CAFO facilities in Idaho is essentially a no discharge permit as discharges are only authorized during rare and infrequent overflow events. Facilities are required to follow effluent limitation guidelines to ensure discharges to waters of the U.S. do not occur on a regular basis. Additionally, very few facilities (2-3) occur within the habitat or critical habitat of salmon species. The Permit is found to have insignificant and discountable effects to Snake River Chinook salmon and their critical habitat. Therefore, the Permit is not expected to have adverse effects on essential fish habitat for Chinook salmon. Since coho salmon are closely related, the Permit would also have insignificant and discountable effects to coho salmon and thereby have no adverse effect on essential fish habitat for coho salmon.

EFH Conservation Measures

Conservation measures in the permit include, but are not limited to:

- Adequate storage of manure, litter and process wastewater in retention facilities that can contain the runoff and direct precipitation of the 25-year, 24-hour rainfall event.
- Weekly inspections of retention facilities ensure that these retention facilities do not overflow or discharge as well as ensure the manure or wastewater is properly utilized in land application procedures.
- Proper management of deceased animals to ensure they are not disposed of in liquid manure, storm water, or process wastewater storage or treatment systems not specifically designed to treat animal mortalities.
- Prevent direct contact of animals confined or stabled at the facility with waters of the U.S.
- Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system.
- Establishes protocols to land apply manure, litter or process wastewater in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure, litter or process wastewater.
- Does not allow application of manure, litter or process wastewater closer than 100 feet to any down gradient surface waters, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to surface water

Conclusions

Based on the data available and analysis based on that data for CAFO discharges, the Permit will not adversely affect designated EFH for relevant commercially, Federally-managed fisheries species within Idaho.

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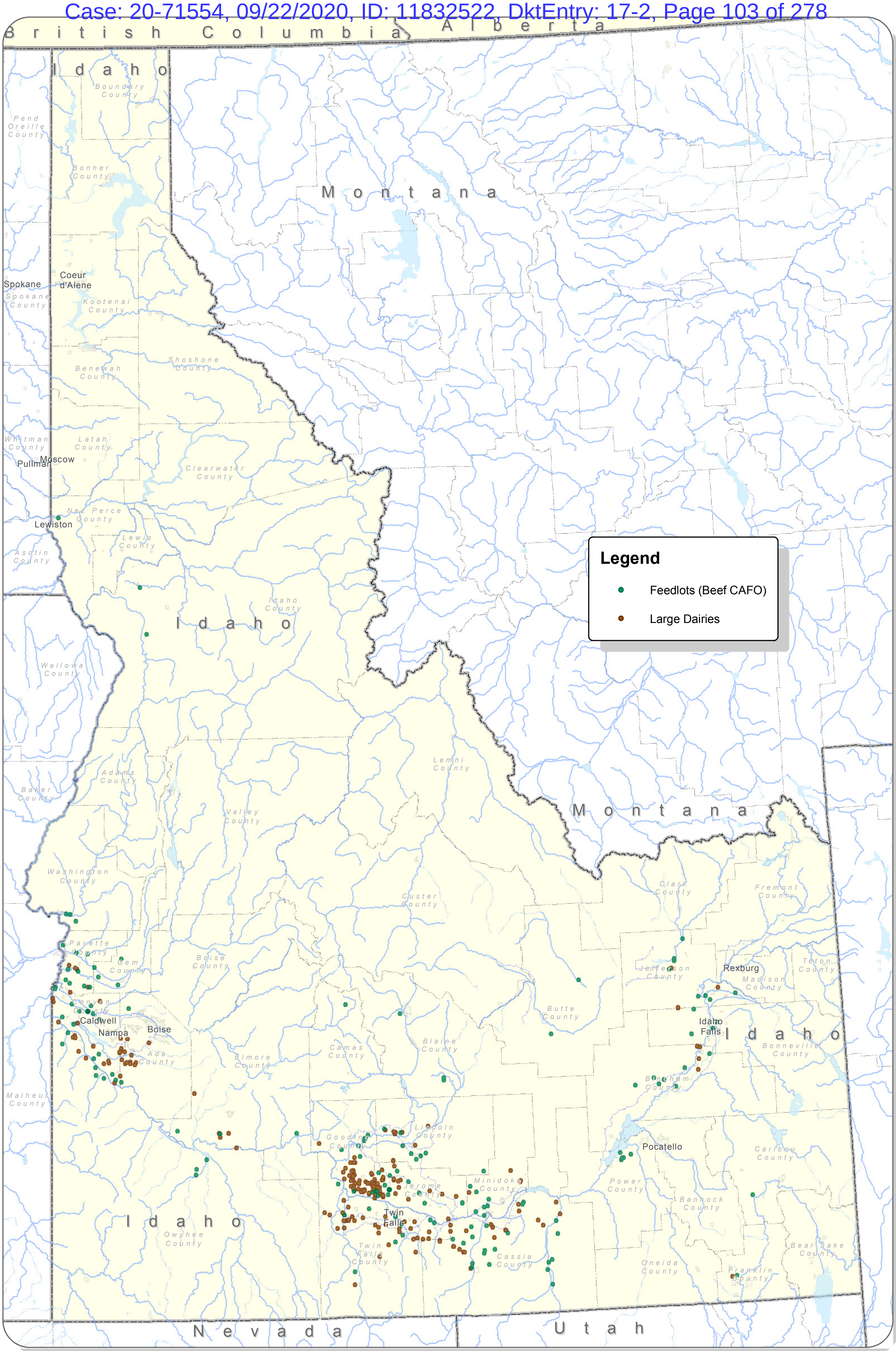
APPENDIX A

PRELIMINARY DRAFT CAFO PERMIT

APPENDIX B

PRELIMINARY DRAFT CAFO FACT SHEET



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CAFO (Feedlots and Dairies) for Idaho

0 5 10 20 30 40 Miles

ER-340

TS 9-1-11

EPA is currently working to reissue the Idaho NPDES CAFO general permit. The previous permit expired in May of 2017 and zero CAFOs had applied for coverage under the previous permit. Based on feedback from CAFOs and other stakeholders, EPA has made changes to the nutrient management requirements of the new draft Idaho NPDES CAFO general permit.

The previous Final Section 401 Water Quality Certification from DEQ required EPA to seek input from the appropriate DEQ regional office for discharges to impaired waters, high quality waters, and outstanding resource waters. EPA (We are) working to rewrite several section in the draft Idaho NPDES CAFO general permit to address these concerns but also would like to get input from DEQ on how to best address these sections given the changes in the draft permit.

A few questions to get discussion started:

- Are there CAFOs that have WLAs in TMDLs?
- If so, what are IDEQ expectations for implementing those WLAs in the CAFO permit?
- The CAFO permit allows discharge in some circumstances (production area and land app area). How would permit be implemented if :
    - The WLA = 0?
    - There is not a WLA for a CAFO in a TMDL?
    - The CAFO is located on an Outstanding Natural Resource Water (ONRW)?

Peak, Nicholas

From:	Loren.Moore@deq.idaho.gov
Sent:	Tuesday, January 23, 2018 3:55 PM
To:	Peak, Nicholas; Woodruff, Leigh
Cc:	Don.Essig@deq.idaho.gov; Mark.Cecchini-Beaver@deq.idaho.gov; rick.grisel@deq.idaho.gov; mary.anne.nelson@deq.idaho.gov; Barry.Burnell@deq.idaho.gov; Graham.Freeman@deq.idaho.gov
Subject:	RE: Draft CAFO General Permit discussion
Categories:	ID CAFO Permit Administrative Record

Nick/Leigh,

Thank you for the opportunity to meet and discuss the CAFO GP! Here are our thoughts on some of the items discussed in the meeting.

Currently there are no Outstanding Resource Waters designated in Idaho and thus there are no CAFOs with potential to discharge to an Outstanding Resource Water. We do not expect that a new facility would begin operation on an Outstanding Resource Water.

A CAFO facility is not always zero discharge, but if they comply with the permit effectively we expect them to operate as a zero discharge facility. Discharges from production areas should be rare events and these are allowed for by the permit, thus we do not think a WLA is needed.

With regards to land application of manure, non-point source runoff is covered by the agricultural runoff exemption, so long as such application is in accordance with a site-specific NMP ensuring appropriate agricultural utilization. The load allocations in TMDLs would be the approach to identify nonpoint source allocations. That being said, tighter requirements for land application on fields proximate to streams with a TMDL could be beneficial by following the ISDA Rules Governing Dairy Byproducts and their newly adopted Phosphorus Site Index. Please see IDAPA 02.04.14.

Any instance of surface water impacts from ground water contamination from land application would require strong evidence of a direct hydrologic connection. This would also be best acknowledged as a TMDL non-point source load allocation. Regardless, non-point source issues would not be addressed by our certification.

Although we can encourage CAFOs to apply for permit coverage, we do not believe we can create an obligation for dairymen to apply for a permit via a TMDL.

Thank you for your time.

Loren Moore
Water Quality-Based Permitting Coordinator
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Peak, Nicholas

From:	Loren.Moore@deq.idaho.gov
Sent:	Friday, June 14, 2019 9:44 AM
To:	Peak, Nicholas
Cc:	Stoddard, Jamey
Subject:	CAFO GP
Follow Up Flag:	Follow up
Flag Status:	Completed
Categories:	ID CAFO Permit Administrative Record

Nic,
I was hoping we could talk about a few things in the CAFO factsheet.

FACTSHEET

II.A.1 - I'm not familiar with all of the areas of the operation that are included in the "Permit Area" – could you help me define this? Maybe we can walk through all the areas outlined in the CAFO Final Rule? You mention the production area specifically on p.9. – I think this information would be helpful earlier in the permit discussion to define what the "permit area" is really. Is the term "production area" inclusive of all permit areas that could produce a discharge? Would really benefit from your expertise to understand this better. Thanks!

- might require some more description here about NOI transfer after July 1, 2020 – similar to wording on p.31

Pg. 6 – 2nd paragraph, "For an existing CAFO, the draft permit adds a procedure to be used for permit coverage… (would be good to reference the exact permit section here)

I was hoping if you could give me a little background on the "applying manure to frozen land" issue. It seems this is a pretty big deal, since the factsheet dedicates 5 pages to it (beginning p.13). Would really appreciate the history on this issue. Thanks!

Pg.19 – why isn't sediment discussed alongside nutrients and bacteria?

Why doesn't the permit list out the Pollutants of Concern like other general permits? I would like your help to develop a comprehensive list as we will need to cover these in the 401 certification. Currently, I have borrowed from the Aquaculture GP and would appreciate your feedback:

five-day biochemical oxygen demand (BOD_5), biological wastes, floating and submerged matter, total suspended solids (TSS), settleable solids, nutrients (phosphorus and nitrogen), ammonia, temperature, *Escherichia coli* and therapeutic drugs and chemicals (this was included in aquaculture – I'm sure that something similar would be considered but wanted your input here).

Thanks for your time!

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United States
Environmental Protection
Agency

Risk Assessment Evaluation for Concentrated Animal Feeding Operations

EPA/600/R-04/042
May 2004

Risk Management Evaluation For Concentrated Animal Feeding Operations

U.S. Environmental Protection Agency
Office of Research and Development
National Risk Management Research Laboratory
Cincinnati, Ohio

1 OVERVIEW OF RISK MANAGEMENT DOCUMENT

This document is intended to help the reader gain an understanding of potential environmental problems associated with Concentrated Animal Feeding Operations (CAFOs). Although a variety of animals are raised in CAFOs, this document will focus on beef, dairy, swine and poultry. The quantities and characteristics of manure produced by the different animals are presented. The watershed stressors resulting from CAFO pollution are discussed, as are the transport mechanisms that disperse them through the environment. Common manure management practices are also presented.

Because large numbers of animals are confined in relatively small areas at CAFOs, a very large volume of manure is produced and must be kept in a correspondingly small area until disposed of. The age-old practice of land application is used, but the volumes of manure that must be disposed in this way frequently exceed the assimilative capacity of land within economic transport distances. This may result in the release of excess manure to watershed environments during the catastrophic breach of holding facilities or more commonly, during the intermittent runoff of excess manure applied to already saturated land. Figure 1.1 shows the phosphorus assimilative capacity of farmland in the United States. Figure 1.2 shows the excess phosphorus available on farms with no export. Clearly, an imbalance exists between available phosphorus and the capacity of the land to absorb phosphorus. The same general relationship holds for nitrogen. If land in entire counties were available for application of animal waste, the overburden of nutrients is somewhat relieved, but excess quantities of nutrients still exist in some locales. Neither of the maps shown takes into account fertilizer applied to fields.

This would be a problem even if manure contained only beneficial nutrients. In excess amounts, these nutrients damage, not improve, soil fertility and may pollute nearby water. More importantly, however, manure from CAFOs contains components other than nutrients. The dominant element in manure is carbon. Many of the carbon compounds in manure may contribute to oxygen depletion in water. The nutrient elements N and P in manures may also contribute to eutrophication of water if their entry into water is not controlled. Modern agriculture with its emphasis on intensive housing and speeding the growth of livestock to market weight has employed a variety of substances that have not been used before in animal husbandry. These include antibiotics to combat the spread of disease among animals housed in close quarters, natural and synthetic hormones to speed growth, and metals (As, Cu, Zn) to do the same and preserve the freshness of feed. When present in the large amounts of manure generated at CAFOs and stored on-site, these other substances pose a threat to the environment. The effects of antibiotics on native soil bacteria are largely unknown. The effects of biogenic and synthetic hormones on other animals and humans are largely unknown.

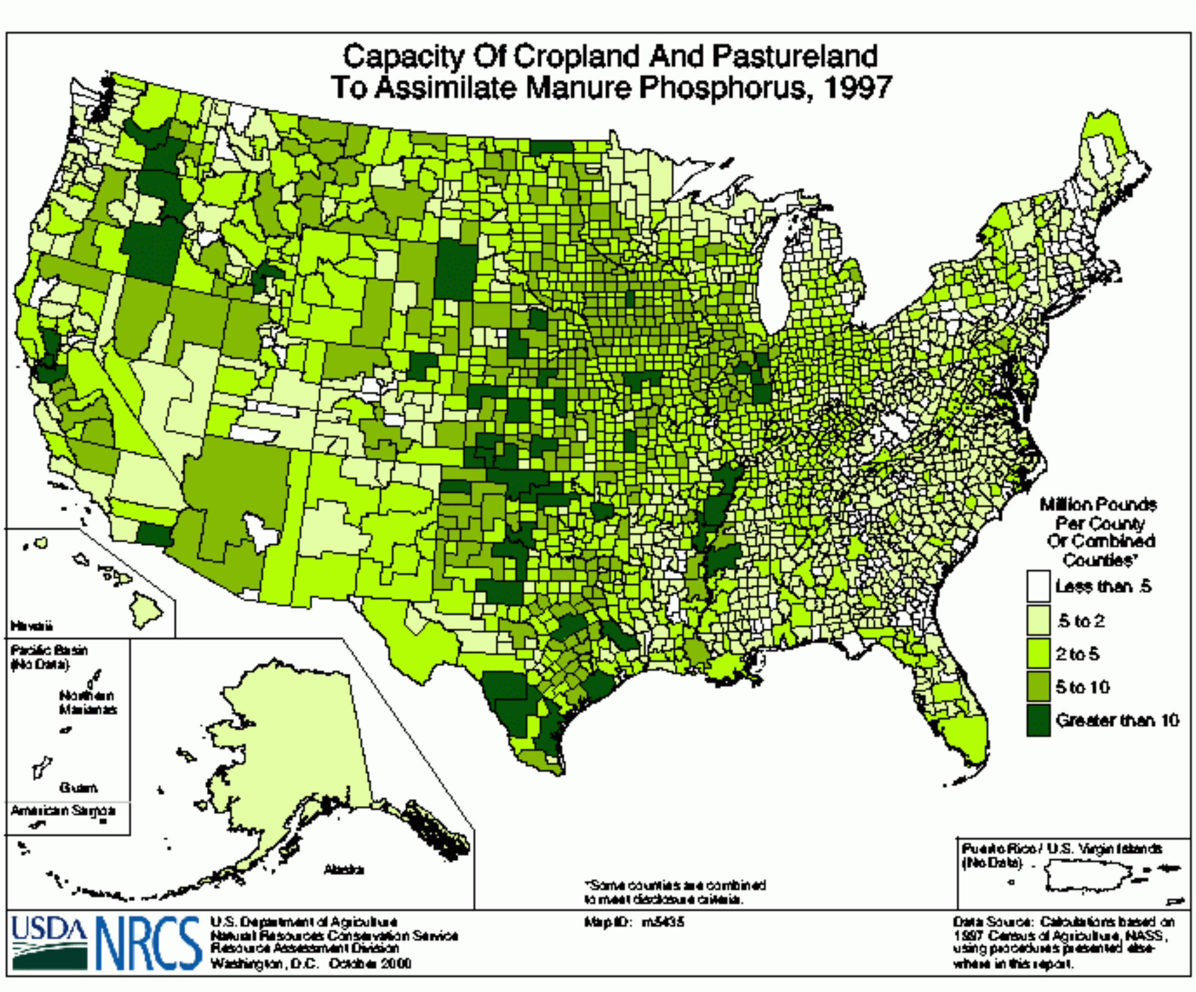


Figure 1.1. Phosphorus assimilative capacity for farms.

This Risk Management Evaluation (RME) is intended to document the salient environmental risks associated with hog, poultry, dairy and beef CAFOs and actions that could be taken to reduce those risks now. Areas in which further research is needed are identified and discussed in Section 8 of this document.

In reviewing the existing body of knowledge on intensive livestock agriculture, the following points became clear.

- Underlying all of the environmental problems associated with CAFOs is the fact that too much manure accumulates in restricted areas. Traditional means of using manure are not adequate to contend with the large volumes present at CAFOs.

- The nutrient load from CAFOs is large, with about 2.5 billion pounds of N and 1.4 billion pounds of P recoverable in manure. Total manure N is about 12.9 billion pounds and total manure P is about 3.8 billion pounds.

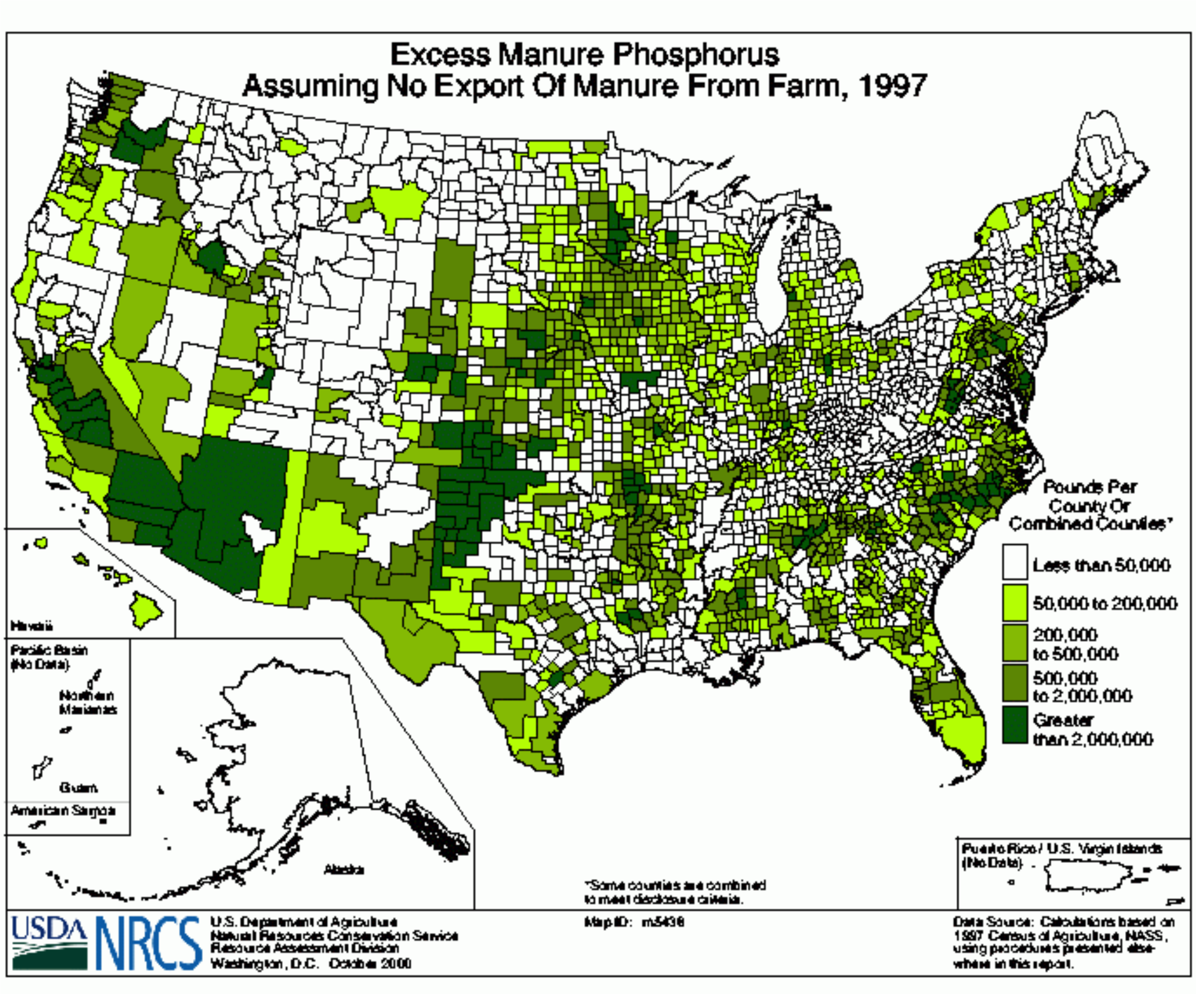


Figure 1.2. Excess phosphorus on farms with no export.

- CAFO manure contains potentially pathogenic microorganisms. The combination of large herds and closely confined housing makes it likely that at least some animals are asymptomatic carriers of pathogenic organisms. Once introduced, these pathogens may readily spread among the closely confined herd. Shed into the manure, these pathogens find favorable breeding grounds in the barns, manure storage and handling systems and are released into the watershed environment routinely during the land application of waste.

- The antibiotics administered to CAFO livestock may contribute to the development of antibiotic resistant strains of pathogens – especially those harbored within the livestock raised at these facilities. The sub-therapeutic use of antibiotics at CAFOs aggravates the problem.

- Naturally occurring and synthetic hormones administered to livestock to speed growth to market weight pollute the environment when released along with manure during land application or during an accidental release. The environmental effects of these compounds are largely unknown.

4 WATERSHED STRESSORS IN CAFO WASTE

The pollutants potentially leaving the CAFOs may affect watersheds directly or indirectly. The most often cited stressors affecting watersheds include nutrients, pathogens, sediments, EDCs, antibiotics, and metals. Direct effects occur when wastes flow directly into a receiving water as a result of poor storm water management or catastrophic failure of containment facilities. Indirect effects occur when wastes have been applied to a field and are subsequently moved into waterbodies by runoff after rainfall, percolation into groundwater with subsequent entry into streams or tile drain lines, wind driven movement, or volatilization and redeposition as in the case of ammonia.

The nutrient content of the manure generated on the CAFO is one of the most significant problems. Nitrogen in the waste may be transferred in the environment two ways. Ammonia may be volatilized from the waste directly into the air and generate odor and downwind deposition problems. Nitrate generated in the soil applied waste may enter surface or groundwater and may exceed the national drinking water limit of 10 mg/L to cause health problems in young children.

Phosphorus in waste may easily exceed crop requirements for a given year on a localized basis. If continual applications are made year after year, the soil becomes saturated with P and the potential for runoff losses and groundwater losses greatly increase.

The soil, if eroded will contribute to stream degradation by eutrophication. Erosion of soil onto which manure has been applied, may contribute to other environmental problems in waterbodies. Organic matter exerts an oxygen demand leading to a depression of dissolved oxygen. Solids, as either manure particles or eroded soil particles, increase the sediment load in streams and may unduly shade some parts of the stream. Other habitat effects will be associated with increased sediment load.

Microorganisms associated with manure may present a significant risk to health. The population of several known pathogens may be quite high in manure. Runoff from land application sites may carry large numbers of organisms into streams. Recreational use of the streams may then bring people into direct exposure to large numbers of potentially pathogenic microorganisms. Several disease outbreaks have been associated with manure contamination of water or food that has been contacted by manure.

There are also concerns associated with the potential metal content of poultry or swine waste. Trace levels of arsenic are added to poultry feed to promote growth. Similarly, copper is added to swine feed for growth promotion. Antibiotics, hormone compounds, and pesticides are found in animal wastes, and the environmental effects of these compounds are largely unknown. The following sections are meant to summarize the most pertinent literature concerning nutrients and other stressors from CAFO manure. The literature in the area of nutrients and nutrients as pollutants is overwhelming. This is an attempt to limit the literature review to the citations that have the most impact on EPA's mission.

4.1 Nutrients

"Livestock wastes, which for present purposes are defined as liquid and solid excreta with the associated remains of bedding and feed and sometimes with water added, have long been ranked among the farmer's most valuable resources. For traditionally, the fertility of his land has depended in very large measure on the supply of such waste, sometimes dropped in his field by grazing animals or sometimes stabilized in the steading into farmyard manure by the addition of straw. In the days of the agricultural revolution the efficiency of the yards as a '*manure factory*' was one of the primary criteria of farmstead design. More recently and more drastically, a variety of agricultural changes have combined to convert, under certain circumstances, this potential asset (manure) into an increasing liability. The agricultural changes result from growing economic pressures to increase the animal outputs by an increase in the number of livestock carried per unit of land." (ARC 1976)

4.1.1 Nitrogen

Animal waste contains nitrogen in organic and inorganic forms. The inorganic form is ammonia, and organic forms include urea and an array of organic compounds. Nitrogen compounds may move in a watershed in air, surface runoff, or through percolating groundwater. Any form of nitrogen may have an impact on a watershed because it is a major plant nutrient. Ammonia is immediately available to plants as ammonium ion. Ammonia may move as an air pollutant after volatilization from animal waste. In the soil, ammonia enters solution as ammonium ion that may be held on soil colloid exchange sites. Ammonium is formed when organic-N such as urea is metabolized either aerobically or anaerobically to NH_3 that ionizes in water to ammonium. Ammonia may lead to eutrophication, excessive oxygen demand in surface waters and fish kills, reduced biodiversity, objectionable tastes and odors, and growth of toxic organisms. Both forms of ammonia, NH_3 and NH_4^+, are toxic to aquatic life, although NH_3 is more toxic to fish. Ammonia may be converted by nitrification to nitrite and nitrate. Nitrite is toxic to fish and most aquatic species. Nitrite does not accumulate in the environment because it is rapidly oxidized to nitrate naturally by aerobic bacteria. Nitrate is highly mobile and may easily leach downward through the soil profile to an aquifer. Nitrate is the most widespread agricultural contaminant in drinking water wells (U.S.EPA, 1998). A drinking water maximum contamination level (MCL) of 10 mg/L has been set for nitrate-N based upon its role in the "blue baby syndrome" or methemoglobinemia. Nitrate may be converted to nitrite by nitrate reducing bacteria found in the low acidity infant stomach. Nitrite may then attaches to fetal hemoglobin in human infants forming methemoglobin, which is ineffective as an oxygen carrier. This toxicity, if not treated, may be fatal (Goldstein et al., 1974). Figure 4.1 depicts processes primarily responsible for transformation of nitrogen compounds in sediments at the bottom of lagoons (collection ponds) or in a topsoil layer treated with animal manure.

Soil profile characteristics and management practices may significantly affect leaching of nitrate and ammonium in feedlots and crop fields (Saint-Fort et al., 1995). Whereas runoff is the primary mechanism for the transport of sediment bound and solution phase ammonium, groundwater flow is the primary contributor of nitrate to surface water from agriculture. (Follet, 1995). Spatial variability of nitrate in ground water and temporal fluctuation are related to seasonal recharge and hydrologic variations in the region (Halberg, 1986). High concentrations of nitrate in groundwater are associated with high permeability soil and aquifer material, such as permeable sand and gravel, karst limestone, or fractured rock (Hitt et al., 1999). In these landscapes, manure applied as fertilizer is susceptible to relatively rapid infiltration, thus contaminating ground water with nitrogen and/or phosphorus.

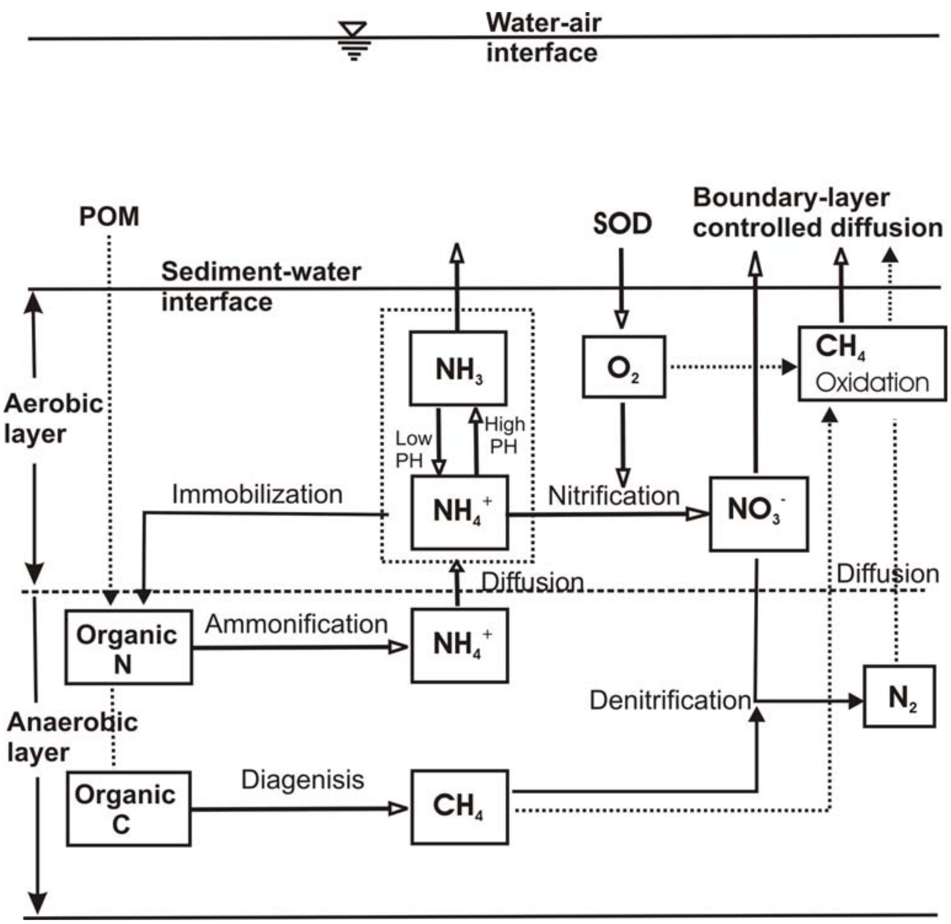


Figure 4.1. Depiction of carbon and nitrogen cycles in soils or sediments.

Leaky lagoons and below grade storage facilities are potential sources of nitrogen compounds that may enter groundwater. As structures age, the integrity of the walls and bottoms of the lagoon may be penetrated by burrowing animals, or the lagoon walls and bottoms may develop cracks from wetting and drying cycles as the water level in the lagoon changes (U.S. EPA, 2001). Rupture of lagoon seals may be attributed to drying of exposed embankments when lagoon levels drop or gas release from microbial activity in soil beneath the seal (Ciravolo et al., 1979: Parker et al., 1999). Short-circuits to natural filtering, such as uncapped or improperly capped wells and infiltration in vegetated filter strips adjacent to lagoons are potential sources of groundwater contamination (U.S. EPA, 2001). Groundwaters in areas of sandy soil, karst formations, or sinkholes are particularly vulnerable to nitrogen infiltration. Leaching of ammonia compounds is generally not a significant transport mechanism, because ammonium may be sorbed to soils, fixed by clay minerals and organic matter, or transformed into organic forms by soil microorganisms through the process of immobilization (Follet,1995). Mineralization is a process whereby organically bound nitrogen is converted to inorganic mineral forms, (NH_4^+ and NO_3^-). Legume crops may fix atmospheric nitrogen by transforming (N_2) to ammonia. Ammonium adsorbed onto soil below liners in abandoned dry lagoons, through nitrification, may produce nitrate (Ham, 1999) that is potentially available for leaching into the deep subsoil and ground water. Two modes may dominate transport of pollutants in soils: 1) rapid advection through macropores; and 2) slow percolation through the soil matrix. The first transport mode, which is promoted by gravitational forces through macro-channels, is also referred to as preferential flow (Figure 4.2). The second mode is much slower and is governed by gravity drainage and capillary forces at

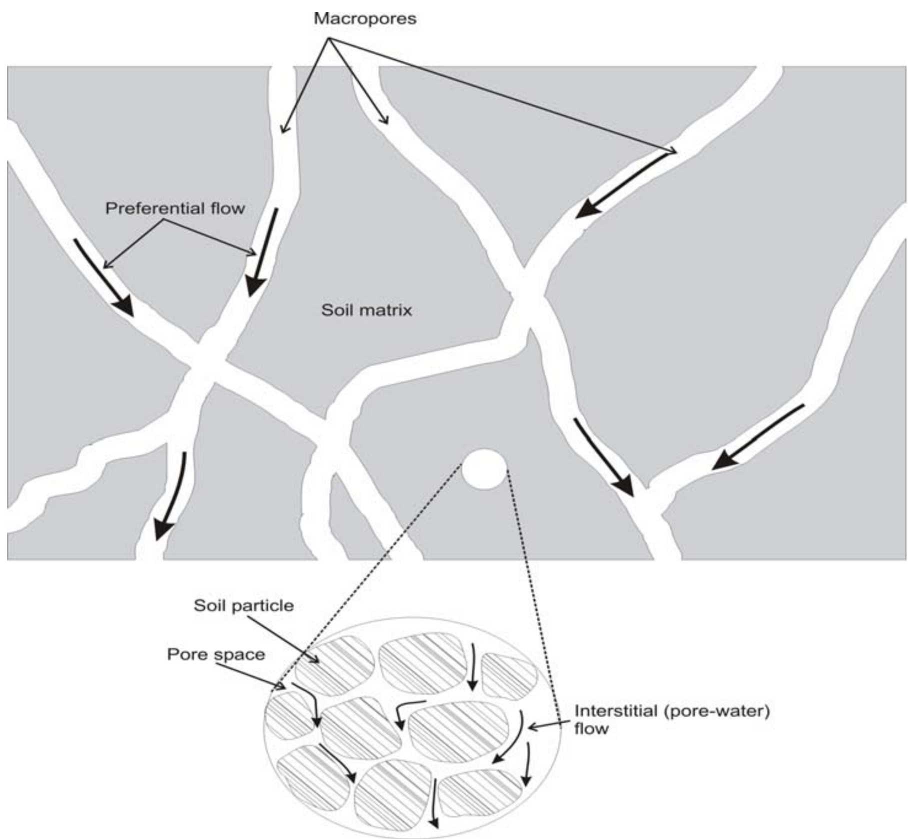


Figure 4.2. Diagrammatic illustration of preferential flow through macropores and interstitial (pore-water) flow in the soil matrix.

work through interstitial pore space. Preferential flow through macropores in soils beneath a waste lagoon may transport NH_4^+ or nitrate to ground water. Subsurface runoff and tile drainage are other transport pathways for nitrogen to surface waters.

Percolating water and leachate below lagoons may transport nitrate to ground water. Preferential flow through macropores and karst formations are also transport pathways to ground water. In heavily tile-drained watersheds most of the N added to surface water originates from tile drainage (Kovacic et al., 2000). In some areas nearly half of the applied fertilizer nitrogen may be discharged with tile-drainage water (Kanwar et al., 1983).

Nitrogen retention in the soil by adsorption of NH_4^+ onto soil colloids may constitute a source of NO_3^- to ground water (Ham, 1999). Urea and organic forms of N are also susceptible to leaching to ground water. Under anaerobic conditions, nitrate may be reduced to N_2 by denitrification, a primary process in reducing nitrate in ground water (Crandall, 1999). Denitrification occurs in the absence of dissolved oxygen and in the presence of chemically reduced compounds such as organic carbon or some divalent metals.

4.1.2 Phosphorus

Phosphorus exists as both organic and inorganic forms in animal waste. Inorganic phosphate in manure is easily adsorbed to soil particles, and thus has limited leaching potential. Organic P compounds are generally water soluble and subject to leaching (Sweeten, 1991).

Organic phosphate may easily be metabolized to inorganic phosphate that is the form that is useful as a nutrient. Inorganic phosphate in surface water is a major contributor to eutrophication. Because most surface water plant and algal growth is rate limited by phosphate level, pollutant phosphate is of particular concern. In concentrations over 1.0 mg/L phosphate may inhibit floc formation in drinking water treatment plants (Bartenhagen et al., 1994).

Phosphorus is much less susceptible to leaching because of its adsorption onto soil particles and therefore, poses less of a threat to groundwater than nitrate. Adsorption-desorption reactions in the soil regulate the rate at which P may be released (Siddique et al., 2000). Phosphorus accumulation in topsoil from animal waste and fertilizers constitutes a sediment problem more than a groundwater problem because P binds to the most erodible soil components (clay, organic matter, and oxides of Fe and Al)(Sims et al., 1998). However, if continual applications are made year after year, the soil becomes saturated with P and the potential for runoff losses and groundwater losses increases greatly. Phosphorus leaching may occur in sand soils where over-fertilization and/or excessive use of organic waste have increased soil P levels in excess of crop requirements (Sims et al., 1998). Preferential flow through macropores (e.g. soil cracks, root channels, earthworm borrowings) may transport a significant part of the phosphorus by suspended soil material to tile drains (Øygarden et al., 1977). Leaking from lagoons is also a likely source for groundwater contamination by phosphorus.

Environmentally significant export of anthropogenic P from agricultural soils by subsurface runoff begins with downward movement of P, either by slow leaching through the soil profile or preferential flow through macropores (e.g., soil cracks, root channels, earthworm borings). Dissolved inorganic P concentrations in subsurface runoff in artificial drainage systems may be higher than values associated with eutrophication of surface waters (Ryden et al., 1973, and Sims et al., 1998). P leaching may occur in deep sand soils, in high organic matter soils, and soils where over-fertilization and/or excessive use of organic waste have increased soil P values well above those required by crops. Leaching potential of P increases in soils with low concentrations of soil constituents that are primarily responsible for P retention, such as clays, oxides of Fe and Al, and carbonates (Sims et al., 1998). Mineralization of organic P and preferential flow through macropores and cracks caused by conservation tillage systems increase P concentration in drainage waters, including sediment-bound P.

4.1.3 Mineral Salts

Mineral salts of major concern in animal waste include the cations sodium, calcium, magnesium, and potassium and the anions: chloride, sulfate, bicarbonate, carbonate, and nitrate. These mineral salts, when applied repeatedly, may accumulate and increase soil ionic strength to levels that are toxic to plants and animals. Runoff may contribute to surface water salinization and leaching salts may affect ground water quality. Trace elements such as arsenic, copper, selenium, and zinc are often added to animal feed as growth stimulants and biocides. These when land applied may accumulate and adversely effect both human and ecologic health.

4.2 Pathogens

Animal manure is a potential source of pathogens. The organisms of concern in animal waste may be bacteria, fungi, protozoa, viruses, or worms. When released into the environment, these organisms may adversely effect human and animal populations. Although CAFOs are not the only source of these microorganisms, they are a major source of pathogenic contamination in most watersheds (Pell, 1997). Indeed, of the water bodies evaluated by the states, as required by the Clean Water Act, 36% of rivers were unfit for swimming and/or fishing as the result of pathogenic contamination largely attributed to CAFO operations (USEPA, 2001). In addition, the source waters from which drinking water is obtained for up to 43% of the United States comes from waters that are impaired by pathogenic contamination from CAFO operations (USEPA, 2001). About 15% of the population of the United States obtains drinking water from individual wells. When wells are located in areas hydrologically connected to CAFO operations, individuals using these wells may be exposed to pathogenic organisms present in the groundwater. Without purification, this may result in illness. CAFOs are likely to release pathogens into the environment for several reasons. First, because of the large number of animals kept in CAFO operations, the likelihood that one or more of the animals is infected with one or more pathogens is very high (Clinton, et al. 1979, Pell, 1997, Wesley et al. 2000). Second, because of the large volume of waste produced, manure may not be disposed of on-site in such a way that the pathogens will be killed or inactivated. Without treatment to reduce pathogen loads, storage and disposal practices will only serve to disseminate the microorganisms more widely in the environment.

Conventional water treatment is adequate to prevent the entry of bacterial contaminants into public drinking water supplies. Protozoan contaminants are usually in the form of cysts that are very resistant to chlorination. Drinking water treatment needs to be designed and operated properly to remove *Cryptosporidium* oocysts (Patania et al., 1995). Filtration through sand filters is usually necessary to remove protozoan cysts.

For the purpose of this RME only selected pathogenic organisms known to have a significant impact on human health or the environment and that are likely to come from CAFOs will be discussed. Before beginning a detailed discussion of these organisms, however, we will first discuss pathogenic organisms in general, their effects when released into the environment, and finally, relate the organisms to the CAFO species that is most likely the reservoir for each organism.

4.2.1 Pathogens of Concern at CAFOs

More than 130 microbial pathogens have been identified from all animal species that may be transmitted to humans by various routes (USDA, 1992; USEPA, 1998). Of these, 24 pathogens are likely to originate from animal populations. Historically, fewer than ten have caused significant disease outbreaks among humans. Potential environmental exposure to human populations extending beyond animal handlers exists for cryptosporidiosis, giardiasis, campylobacteriosis, salmonellosis, colibacillosis, leptospirosis, listeriosis, and yersiniosis; and many large-scale outbreaks have been attributed to each of these pathogens. Pathogens include bacteria, fungi, viruses, helminths (parasitic worms), and protozoa. Not all pathogens are present at every CAFO. Understanding the distribution of pathogenic organisms makes it easier to design strategies that will reduce risk. Table 4.1 lists commonly occurring diseases and the animals that are associated with these diseases. A general discussion of each of these classifications follows.

4.2.1.1 Bacteria

Bacteria are single-celled, prokaryotic microorganisms that are capable of causing disease in larger organisms, although most bacteria are non-pathogenic. They may grow and proliferate within higher organisms and are shed in feces. The presence of large volumes of feces in and around animals in CAFOs provides a breeding ground for many bacteria. The bacteria that have been shown to have the widest environmental impact when released into the watershed include *E.coli* 0157:H7, *Salmonella*, *Campylobacter*, *Yersinia*, and *Listeria*. The primary concern is that disease outbreaks may occur after

Table 4.1 Diseases and animals commonly identified as sources of the causative organisms.

	Hogs	Poultry		Cattle	
Disease		Turkeys	Layers	Beef	Dairy
Colibacillosis				*	*
Salmonellosis	*	*	*	*	*
Campylobacteriosis		*	*	*	*
Listeriosis				*	*
Yersiniosis	*				
Protozoa				*	*
Cryptosporidiosis				*	*
Giardiasis				*	*
Fungi					
Viruses	*	*	*	*	*
Helminths					
Endotoxins	*	*	*	*	*

contact with these organisms via swimming, eating shellfish, eating contaminated food, or drinking contaminated water.

4.2.1.2 Fungi

Fungi are either single celled organisms or multicelluar, eucaryotic organisms that may cause disease in other organisms. Fungal diseases are commonly difficult to treat and may persist for long periods of time. Common diseases include candidiasis, histoplasmosis, aspergillosis, and dermatomycosis.

4.2.1.3 Viruses

Viruses consist of nucleic acid molecules packed within a surrounding protein coat. Viruses only actively replicate when they have invaded a host cell. The virus genes take over the host cell metabolism to make more virus particles at the expense of the host cell. There is some evidence that reoviruses and many enteroviruses may be transmitted from animals to man. Also, a number of rotaviruses are known to cause diarrhea in both cattle and humans. Among farm workers, vesicular stomatitis is frequently transmitted from sheep to humans, and the potential spread of cow pox virus (vaccinia) to humans was the basis for the classical immunological practice of vaccination. Present day surveys indicate that rabies is more likely to be transmitted from cattle to man than from either cats or dogs. At this time much less specific information is known about the actual transmission of viral diseases from livestock to humans.

4.2.1.4 Helminths

Intestinal parasitic worms occupy space in the host organism's intestinal tract. The worms absorb nutrients from the host and thereby create a burden on the host. The prevalence of worms has declined in the United States. Transmission is frequently through oral-fecal routes or from exposure through food contaminated with manure.

4.2.1.5 Protozoa

Cryptosporidium parvum: Among humans cryptosporidiosis is caused by the protozoan parasite, and it has recently been determined that there are two separate genotypes, Type 1 (human) and Type 2 (bovine), that can cause human infections. For the Type 2 genotype, the infective dose may vary from 10 to

1000 oocysts and infection is generally more severe in children and immuno-compromised individuals. Virtually all cattle herds carry some level of cryptosporidiosis, and persistence and spread in the environment is aided by passive transfer from rodents and birds. Infected animals can shed more than one billion oocysts per gram of manure. Many large-scale waterborne outbreaks have occurred in the United States. Conventional drinking water disinfectants such as chlorine and chlorine dioxide are not effective in killing *C. parvum.* The standard water treatment processes of coagulation, flocculation, and filtration are thought to be effective in removing this parasite when operating normally.

Giardia lamblia: Giardiasis among humans may be traced to many possible sources including foodborne and waterborne transmission. It has been estimated that 2% of the population has been infected with this organism, and more outbreaks result from a waterborne origin than those caused by contaminated food sources. Wild animal populations such as deer, beavers, and bears may be the cause; however, more than 50% of dairy and beef cattle herds in the United States are infected with this organism. Infection may result from ingestion of only one oocyst, and once diarrhea occurs it may last up to two weeks. An ELISA assay for the detection of oocysts is readily available, and a vaccine for giardiasis is available for dogs and cats.

4.2.2 Disease Descriptions

Some of the diseases involved in significant waterborne disease outbreaks are summarized below.

Enterohaemorrhagic Colibacillosis (Escherichia coli (EHEC) O157:H7 **).** There are many serotypes of *Escherichia coli* from animal sources that may infect humans. This group of diseases is referred to as colibacillosis. CAFOs, specifically cattle operations, may be sources of the organisms. However, among the various enteropathogenic and enterotoxigenic forms, *E. coli* O157:H7 clearly has the most serious manifestations. The hemorrhagic-toxigenic symptoms may often lead to death in 5-7% of infected individuals. The infective dose is thought to range between 10 and 1000 organisms. Contamination with cattle feces is known to be the most likely source of infection in the U. S. with foodborne infections ranking highest; however, waterborne and recreational exposure is also associated with this disease. Interestingly, outside of the United States isolation of cultures of *E. coli* O157: H7 is associated with sheep. Although swine and poultry carry many strains of *E. coli,* the specific Strain O157:H7 has not been isolated from these farm species. Three *E. coli* outbreaks (one in Montana in 1995, one in Illinois in 1996, and one in Connecticut in 1996) were traced to organic lettuce growers. It is suspected that the lettuce was contaminated by infected cow manure (Nelson, 1997).

Campylobacteriosis ***(Campylobacter jejuni)***: This organism is the leading cause of bacterial diarrhea in the United States, the most common source being chickens, or more correctly, fecal contamination of poultry meat. This organism is also commonly transmitted by cattle, birds, and even flies. While the digestive tract of chickens contains many species of *Campylobacter,* it appears that most human infections are caused by four thermophilic strains of this organism. *C. jejuni* causes a watery diarrhea that is only occasionally bloody. Other symptoms include fever, abdominal pain, nausea, headache, and muscle pain. The illness usually lasts two to five days, but reinfection is common and treatment with antibiotics (preferably erythromycin) is not usually necessary. Surveys show that 20-100% of retail chickens are contaminated. When human outbreaks occur they are usually small (less than 50 individuals) although one large outbreak (2,000 people) occurred in Bennington, VT in 1978. Guillain-Barre syndrome may occur as a sequel to this infection as well as meningitis, recurrent colitis, and acute cholecystitis, but these occurrences are rare. Although chickens are the primary animal species associated with this organism, transmission from infected milk is relatively common.

Table 4.3 Sources of common zoonotic diseases on farms.

	Poultry			Swine	Cattle	
Pathogen	Broilers	Turkeys	Layers		Dairy	Beef
Listeria Monocytogenes					▲	▲
Crytosporidium parvum					▲	▲
Giardia lamblia					▲	▲
Salmonella sp.	▲	▲	▲	▲	▲	▲
Pathogenic *E. coli*					▲	▲
Yersinia enterocolitica				▲		
Leptospira sp.				▲	▲	▲
Campylobacter sp.	▲	▲	▲	▲	▲	▲
Brucella sp.				▲	▲	▲
Erysipelothrix rhusiopathiae		▲		▲		

The gram positive bacterium *Listeria monocytogenes* is widely distributed in the environment and is associated with decaying vegetation, soil, sewage, and feces of animals. Many cases of human listeriosis have been associated with consumption of fresh vegetables possibly contaminated with manure from ruminant animals. *L. monocytogenes* may grow on a variety of vegetables even at refrigeration temperatures. (Brackett, 1999) Therefore, the potential for introduction and transmission of *L. monocytogenes* from manure and soil amended with raw or poorly treated manure on produce may be greater than vegetables grown in soil amended with treated manure.

4.3 Antibiotics

Antibiotics are used extensively in animal production. Approximately 2.5 million kilograms of antibiotics per year are used on livestock in the United States (Kolpin et al., 2000). Of this amount, about 10% is used to treat active infections while the remaining nearly 90% is used for growth promotion and prophylactic care.

Antibiotics may be beneficial in agriculture, but there are growing concerns about the effects of antibiotics in the environment, especially the possibility of the increase in populations of drug-resistant microbes. An increase in drug resistant microbes could make it more difficult to treat diseases in animals and humans. Almost 50% of the antimicrobial agents in North America are used by agriculture. The majority of agricultural use is for growth promotion in farm animals. Growth promotion uses low doses of antibiotics that may lead to more bacterial resistance than higher doses used therapeutically (McGreer, 1998).

Antibiotic residue may be found in animal by-products (manure and urine). This waste may come in contact with humans, other animals, and surface and sub-surface waters through run-off and leaching. The concentrated use of antibiotics at CAFOs makes it more likely to have antibiotic residue and antibiotic resistant microbes in the vicinity.

Wide use of antibiotics may lead to development of resistance among the microorganisms that the antibiotics are being used to control. Antibiotic resistance develops in microbial populations due to the selective pressure exerted on the population by the antibiotic. If the level of antibiotic used is inadequate to completely eliminate the microorganisms from the animals some members of the population will survive. These organisms will continue to increase their resistance to the antibiotic until the antibiotics are no longer effective in controlling populations or diseases. The enzymatic capacity for resistance to antibiotics may be transferred in the environment by different mechanisms. Plasmids may be transferred directly from microorganism to microorganism, by bacteriophages, or upon cell lysis, leading to the uptake of free plasmids by other organisms. Increasing microbial resistance to antibiotics raises the possibility of hard-to-control animal sickness and require use of multiple antibiotics for treatment. Microbes could then become resistant to multiple antibiotics. Since the antibiotics may also be spread throughout the environment via manure and urine, other microbes that come into contact may also become resistant. This includes not only microbes that lead to animal diseases but to human maladies as well. Since the antibiotics used for animals are often the same for humans, different antibiotics may have to be used to fight the resistant microbes. One possibility to prevent this particular problem would be to limit the use of “human” antibiotics on animals.

4.3.1 Case studies on the effect of antibiotics related to CAFOs on the environment:

4.3.1.1 Case 1 – Chesapeake Bay

In the Chesapeake Bay area, manure from a chicken CAFO was used to fertilize fields. The runoff from these fields fed into the Pocomoke River changing the ecology of the river. Recently an outbreak of *Pfiesteria piscicida*, which is toxic to fish and human health, was attributed to the influx of antibiotics from the field runoff. A study has shown that this strain of *Pfiesteria piscicida* found in the Pocomoke River is antibiotic resistant whereas other strains from similar rivers do not show the same antibiotic resistances (Isbister et al., 2000).

4.3.1.2 Case 2 – Iowa Swine Operations

A study conducted by the Iowa Department of Public Health on the effects of CAFOs on the environment showed the presence of antibiotics and antibiotic-resistant microbes in the earthen manure lagoons. The tests revealed an antibiotic in an earthen manure lagoon monitoring well. Four different antibiotics (tetracyclines, sulfonamides, β-lactams, and macrolides) were found in detectable concentrations (Table 4.4).

Table 4.4. Antibiotic Levels in the Lagoons and one Monitoring Well (adapted from Table 7) (Iowa Dept. Public Health, 1998)

Collection Sites (Farm)	Tetracycline (μg/L)	Sulfonamide (μg/L)	β-Lactam (μg/L)	Macrolide (μg/L)
Lagoon (1)	250	>20	<2	227
Lagoon (2)	11	>20	<2	<10
Lagoon (3)	150	>20	<2	60
Lagoon (4)	68	>20	3.5	<10
Lagoon (5)	66	>20	2.1	81
Lagoon (7)	540	>20	2.1	275
Lagoon (8)	110	>20	2.9	15
Monitoring Well (8)	<1	7.6	<2	<10

E. coli, Enteroccus, and, *Salmonella* were obtained from the lagoons, wells, and drainage ditches on the sites. All these microbes showed varying antibiotic resistance (Iowa Dept. Public Health, 1998).

4.3.1.3 Case 3 – Shoal Creek

Researchers studying bacteria in Shoal Creek, located in Barry County, Missouri, found detectable concentrations of antibiotics in the creek. This northwest section of the county produces 33 million broiler chickens and 300,000 turkeys annually. The antibiotic source was found to be a chicken CAFO located upstream from where the antibiotics were found. Antibiotics used to treat both animals and humans as well as human only (located downstream of sewage plant effluents) were also found. Further study on the impact of the antibiotics to the watershed and ecological structure of Shoal Creek is on-going (Penprase, 2001).

4.3.1.4 Case 4 – A National Reconnaissance

The U.S. Geological Survey tested water samples from 139 streams in 30 states in 1999 and 2000. The selection of sampling sites was biased toward streams susceptible to contamination (i.e., downstream of intense urbanization and livestock production). The samples were tested for pharmaceuticals, hormones, and other organic wastewater contaminants. Of the 95 organic wastewater contaminants tested, approximately 20 antibiotics were measured and only eight were not found in the samples (however, some of them may have been present in the stream sediment due to “their apparent affinity for sorption to sediment.”

Figure 4.3 shows the frequency of detection and percent of total measured concentration for the contaminants, by category (Kolpin, et al. 2002).

The widespread use of antibiotics in agriculture, especially CAFOs, is now becoming an area of investigation in the United States.

4.4 Endocrine Disrupting Chemicals Associated with Concentrated Animal Feeding Operations

Endocrine disruptors are a class of chemicals of growing interest to the environmental community. The U.S. Environmental Protection Agency’s (EPA) Risk Assessment Forum defined an endocrine disrupting chemical (EDC) as “an exogenous agent that interferes with the synthesis, secretion, transport, binding, action, or elimination of natural hormones in the body that are responsible for the maintenance of homeostasis, reproduction, development and/or behavior (EPA 1997) ”. Most of us are more familiar with chemicals of concern that have a specific health outcome such as lung cancer. However, EDCs are a class of chemicals defined by their mode of action and may result in a variety of health outcomes. For example, an EDC may initiate a health-related outcome in humans or wildlife by binding to and stimulating estrogen or androgen receptors.

Steroid hormones are chemicals of concern to endocrine health associated with CAFOs. Steroid hormones are used by many animals to facilitate the control of their body systems. Mammals, birds, reptiles, and fish produce virtually the same steroid hormones and possess receptors that bind the steroids to receive their control messages (McLachlan 2001). In this section, the term hormones will refer to steroid hormones. Until risk assessments are completed, it is assumed that all endocrine active compounds that have the potential to interact with the environment are chemicals of concern. Thus, the chemicals of concern are those hormones naturally produced and excreted by animals and those hormones administered to animals as drugs and are excreted. These animals remove hormones from their bodies by excreting them

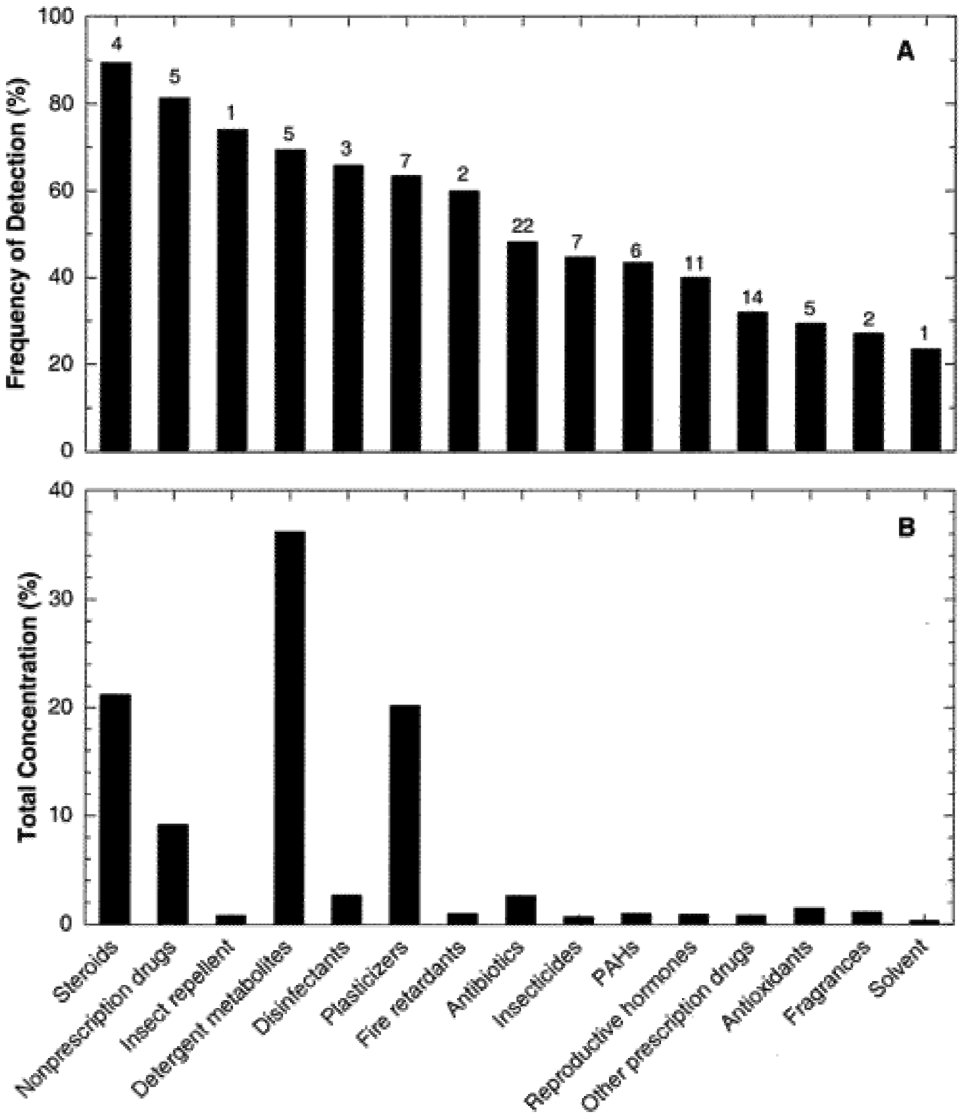


Figure 4.3. Frequency of detection of organic wastewater contaminants by general use category (4A), and percent of total measured concentration of organic wastewater contaminants by general use category (4B). Number of compounds in each category shown above bar (Kolpin, et al., 2002).

in urine or feces. Many of the methods of storage, treatment, and disposal of animal wastes at CAFOs allow contact of the waste with the environment. Since many animal species respond to the same hormones, it may be possible to disrupt the natural state of the endocrine systems in wildlife exposed to waste from CAFOs. If CAFO-generated hormones are transported to water bodies (surface or ground water), exposure to humans may be possible.

The classes of natural (biogenic) hormones that may be excreted by animals include estrogens, androgen, progesterones, and thyroid hormones. Although ideally all hormones would be considered in this risk management evaluation, there is almost no information available about natural hormones and animal feeding operations other than estrogens and, to a lesser extent, androgens. There is no information available on CAFOS and thyroid hormones. Thus, the focus of this section will be on natural estrogens and veterinary hormones.

The chemical structures of the primary natural estrogens are shown in Figure 4.4. Here, they are shown in their biologically-active forms. Generally, hormones the body wishes to excrete are conjugated with glucoronides or sulfonides. Conjugation eliminates their biological activity and increases their solubility in water. Most literature concludes that excreted, conjugated hormones are deconjugated relatively quickly in the environment by enzymes produced by common bacteria (Schiffer, Daxenberger et al. 2001). It will be assumed that hormones in contact with the environment are not conjugated. The most active estrogen is 17β estradiol, while estrone and estriol are metabolites of estradiol with much less biological activity.

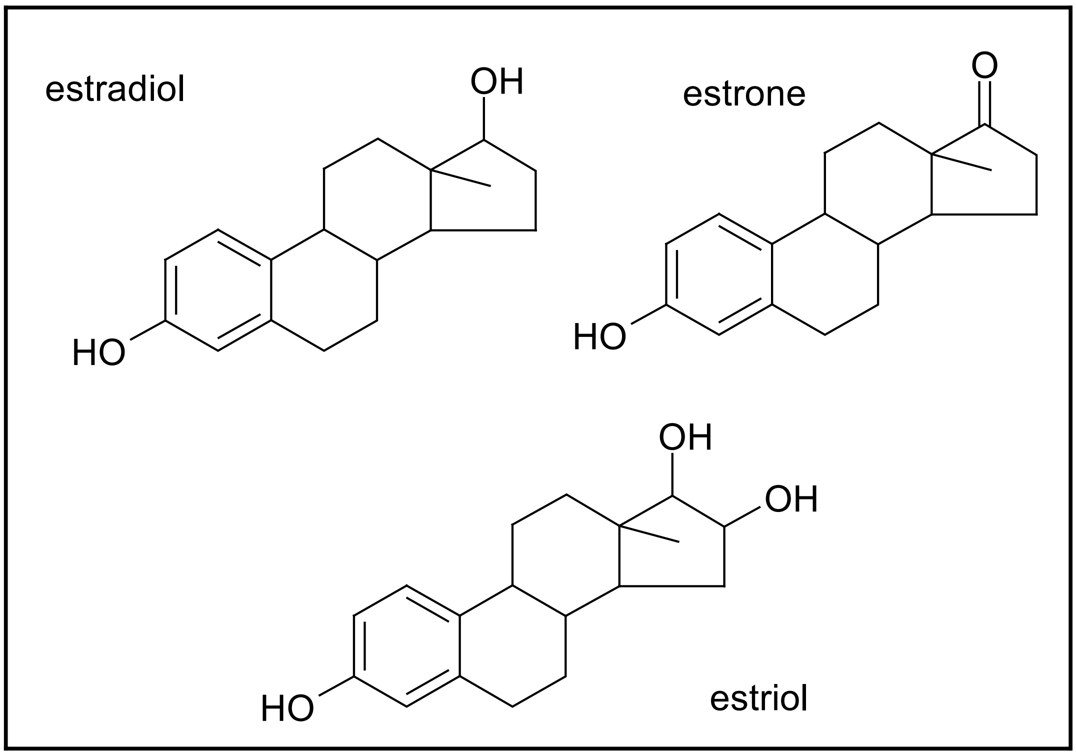


Figure 4.4. Structure of biogenic hormones.

4.4.1 Xenobiotic Hormones

The U.S. Food and Drug Administration (FDA) has approved the veterinary use of the six hormones (Table 1) and only for cattle and sheep (21 CFR, Chapter 1, Part 522). Patented forms of the natural hormones are often used in cattle and sheep production. These include estradiol benzoate (17β-estradiol 3-benzoate) and estradiol valerate (17β-estradiol 17-pentanoate), testosterone propionate, and various derivatives of progesterone, generically called progestins. Xenobiotic hormones administered to cattle and sheep include trenbolone acetate (TbA), melengestrol acetate (MGA), and zeranol. Zeranol is an estrogen mimic. TbA is hydrolyzed *in vivo* to the biologically active chemical, trenbolone-17β (TbOH-17β) (Schiffer, Daxenberger et al. 2001). TbOH-17β acts as an androgen, and an antiglucocorticoid. TbOH -17β

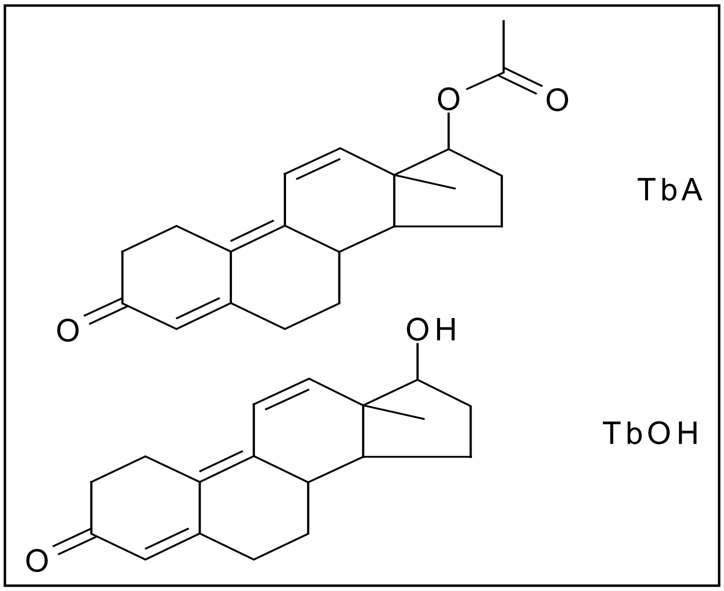


Figure 4.5. Chemical structure of Trenbolone acetate and hydroxide.

may be metabolized to TbOH-17α∊ which is 40 times less active than TbOH- 17β. Zeranol is an estrogen mimic. The chemical structures of these compounds are shown in Figure 4.5.

MGA is used for estrus synchronization or induction to improve feed efficiency and weight gain in heifers (Schiffer, Daxenberger et al. 2001). MGA acts as a progesterone and glucocorticoid.

The parent veterinary drug, trenbelone acetate (TbA), is metabolized to the biologically active chemical, trenbelone-17β (TbOH-17β) and TbOH-17α. The β and α are isomers where the methyl and hydroxyl groups are *cis* and *trans*, respectively.

Since steroid hormones are the signal molecules of the endocrine system, organisms exposed to these hormones have the potential for adverse endocrine related effects. The consequences of excess estrogen in humans may be dramatic (Williams Textbook, 1998) and effects at low doses are possible (Anderson, 1999). Unintentional exposure of wildlife to estrogens has focused mostly on fish: vitellogenin production in male fish has been observed when exposed as little as 1 ng/l 17β estradiol or 25 ng/l estrone (Routledge, 1998). Other estrogen-related health effects observed in wildlife include abnormalities in reproductive organ development and sex change. *In vitro* assays that measure binding to human steroid receptors have shown that TbOH -17β binds to the human androgen receptor as strongly as the natural human androgen, dihydrotestosterone, and MGA binds 3.5-times stronger to the human progesterone receptor than progesterone itself (Bauer, Daxenberger et al. 2000).

4.4.2 Uses of Hormones in CAFOs

Farm animals generate, use, metabolize, and excrete natural hormones, the type and quantity depending on the animal, sex, and reproductive state.

The FDA has approved the veterinary use for cattle of the hormones listed in Table 4.5 in single hormone or dual hormone doses (21 CFR, Chapter 1, Part 522). The delivery of the hormones is typically

Table 4.5. Hormones Approved for Veterinary Use in Cattle

Hormone	Biological Activity	Commercial Forms
17β-estradiol	estrogenic	estradiol benzoate, estrodiol valerate
testosterone	androgenic	testosterone propionate
progesterone	progesteronic	progestin
trenbelone acetate	androgenic	same
melengestrol acetate	progesteronic	same
zeranol	estrogenic	same

accomplished by ear implant (although delivery of MGA in feed is approved by the FDA). The FDA has approved several dual hormone implants, including an implant containing 20 mg TbA and an implant containing 20 mg estradiol benzoate with 200 mg testosterone propionate. Data on the rate of use of these hormones in the United States were not found.

Arcand-Hoy *et al.*(Arcand-Hoy, Nimrod et al. 1998) estimated the use of exogenous estradiol (presumably the sum of the use of simple estradiol and the benzoate and valerate forms) to farm animals to be 580 kg/yr in the United States.

4.4.3 Release of Hormones to the Environment

Since hormones are present in animal excreted waste and in their bodies, excreted waste (urine and feces) and animal carcasses that come into contact with the environment must be considered as likely sources of hormones to the environment. Although the hormone content of waste has not been systematically studied, a relatively large total mass of hormones is released yearly given the estimated 291 billion pounds of manure generated annually in the United States (EPA 2001). The avenues of release of animal waste into the environment at CAFOs are described in detail in other sections of this RME. These releases may be associated with leakage from storage lagoons, runoff from composting operations, land application of waste, and other scenarios. There are very little data to quantify the release rates of hormones to the environment from CAFOs. One study found that chicken litter may contain > 100μg/kg estrogen and that runoff from a field receiving poultry waste contained up to 3.5 μg/l estradiol (Shore, Cornell et al. 1995). A similar study found 1.3 μg/l estradiol in runoff from land applied with poultry waste (litter) (Nichols, Daniel et al. 1997). Testosterone was found in rooster litter up to 670 μg/kg (Shore, Harel-Markowitz et al. 1993). In another study, MGA and metabolites of TbA were measured in the dung of cattle given implants of MGA or TbA (Schiffer, Daxenberger et al. 2001). The maximum levels found in the dung were 7.8, 75, 4.3 μg/kg of MGA, TbOH-17α, and TbOH -17β, respectively. Although there is little data, the U.S. EPA acknowledges that hormones should be considered in assessing the environmental impact of CAFOs (EPA 2001).

A recent news article quoted as yet unpublished work by U.S. EPA and university researchers regarding a study of the hormonal character of a stream associated with a cattle feedlot in Nebraska (Raloff, 2002). The research found that water collected downstream of the feedlot had significantly higher androgenic activity than water collected upstream.

4.5 Metals

4.5.1 Use of Metals in Animal Feed

Animals in CAFOS produce a great amount of manure that is applied to land as fertilizer. The metal content of animal waste is in question. Metals are being supplied to farm animals via diet. This review of the literature investigates the disbursement of the nutrient-rich excreta and the effects that are or may be encountered.

Metals in discussion here are copper, zinc and arsenic. While trace amounts of some elements are necessary for life, quantities above and beyond those amounts are fed to swine and poultry as growth promoters. Usually arsenic (often in the form of "roxarsone", Christen, 2001) is fed to chickens for this purpose, even though arsenic is not a required nutrient; exaggerated amounts of copper and zinc (often in the form of $CuSO_4$ and ZnO or $ZnSO_4$, respectively) are typically used in the swine diets. Possible adverse effects reported in the literature include the risk of phytotoxicity, groundwater contamination, and deposition in river sediment that may eventually release to pollute the water, the effect of manure application on grazing animals and also the result of using chicken litter for livestock feed.

The use of excess metals to promote growth is practiced in many countries. For example, Canada (DeLange, 1997), Great Britain (Nicholson, 1999), Japan (Eneji, 2001), France (Martinez, 2000), Germany (Rothe, 1994), Spain (Alonzo, 2000), Denmark (Tom-Petersen, 2001) and others have engaged in research to address issues similar to those of concern in the United States. Though the study parameters and methods of research may differ, overall, there are questions and conclusions that are nevertheless relevant to the demands of this discussion and are therefore taken into consideration.

The following table (Table 4.6) presents dietary/manure content data to give the reader an idea of the amounts of copper and zinc consumed by pigs when fed diets that achieve normal growth and those that promote growth. Arsenic is not a dietary requirement for poultry, the growth promoting level 5-10 ppm yields manure with 15-45 ppm (Muller, 2002; Chaney, 2002; Alonso, 2000; Ohio State Univ Bulletin, 1998).

Table 4.6 Copper and zinc in swine diets

Swine Diets (ppm)	Required Cu	High Cu	Required Zn	High Zn
Weanling/piglet	6	125-250	80-100	2000-3000
Manure (ppm)	~5.4	~113-225	~72-90	~1800-2700

4.5.2 Mobility of metals in soil

Mobility of the excreted metals has been addressed by some sources. Martinez (2000) examined the copper and zinc balances in soil after five years of repeated pig slurry applications. The results showed that most of the nutrient copper and zinc (80% of what was applied) remains in the top 0-20 cm of the soil layer. Tables 4.7 and 4.8 show soil analysis data for copper and zinc.

5 STRESSOR TRANSPORT

In the large quantities present at CAFOs, animal manure contains enough watershed stressors to be a significant source of environmental pollution. This section describes the ways in which the stressors in manure may be released into the environment. Overland transport in wet weather flow, subsurface transport to and through groundwater, and airborne transport and deposition are the primary pathways by which the environmental stressors in animal manure reach the environment. Understanding these pathways is important in developing strategies for managing the environmental risk posed by animal manure.

This section of the RME describes overland transport in wet weather flow, subsurface transport, air transport, and deposition in that order.

5.1 Transport Mechanisms

5.1.1 Overland Transport in Wet Weather Flow

The impact of wet weather flow and sediments from confined animal feeding operations (CAFOs) could be significant to maintaining a watershed environmental quality. Wet weather flow may provide conditions that result in the transport of contaminants and sediments to a receiving water. Sediment may prove a significant stressor to a watershed as sediment itself or as a medium for the transport of other stressors such as nutrients, pathogens, or chemical stressors. The processes responsible for the generation, transport, and deposition of sediment into a receiving water are primarily erosion, overland flow, and deposition. The effects of these physical and chemical processes will be dependent on the type of CAFO and the operations of facilities and their waste handling strategies. This section outlines some of the principal physical and chemical processes affecting sediment impacts from CAFOs, how these processes impact typical CAFO operations, and to identify areas of research as related to the reduction of sediment impacts on watersheds from CAFOs.

5.1.2 Physical and Chemical Processes Affecting Sediment Impacts

Three primary components of runoff are overland flow or surface runoff, interflow and groundwater flow. Overland flow is the portion of precipitation that flows over the ground surface until reaching a receiving point, such as a channel, stream, or pond. Overland flow occurs typically after the infiltration capacity of the soil has been exceeded. Interflow, also referred to as sub-surface storm flow, is the portion of precipitation that travels just under the soil surface until it reaches a receiving point. Groundwater flow, also referred to as baseflow or dry-weather flow, is the portion of precipitation that infiltrates the soil and percolates deeper until reaching the water table, and later potentially emerging as a component of stream flow downgradient from the infiltration zone.

5.1.3 Overland Flow

When precipitation first reaches the ground surface, it begins to infiltrate the soil. The rate of infiltration, called the infiltration capacity, decreases over time. This decrease is primarily due to the saturation of the soil void volumes. Once the soil becomes saturated, infiltration continues at an approximately constant rate, assuming that the precipitation event continues at an intensity equal to or greater than the infiltration capacity. In general, the infiltration rate for clayey soils is less than that for sandy soils.

If the intensity and duration of precipitation is great enough to exceed the infiltration capacity of the soil, water will begin flowing over the ground surface as surface runoff. Some of this runoff flows into small puddles and ponds, and is termed depression storage. Runoff retained in depression storage may experience further infiltration or if the capacity of the depression is exceeded, overland flow will continue either until another depression, a stream, or receiving water body is encountered.

The wide variability in soil type, topography and vegetative cover within a watershed, coupled with the inconsistency of precipitation, results in some areas contributing a larger portion of runoff to stream flow and other areas contributing much less or not at all. The partial area contribution concept has been used to describe this behavior and it has been noted that in some watersheds as little as 1-3 % of the total basin contributes overland runoff to stream flow.

5.1.4 Interflow

The portion of infiltrated water that travels under the soil surface toward a receiving water body is interflow or sub-surface storm flow, and the movement of interflow is much slower than overland flow. This component of runoff is typically important in areas with permeable soil overlying less permeable soils or sub-surface materials, such as bedrock or clay, as may be the case of farm fields that are plowed and have a high percentage of organic material incorporated into the soil structure.

In many watersheds, the concept of variable source area contribution is important or dominates runoff closer to stream channels or receiving water bodies with shallow water tables, or where shallow impervious materials underlie the surficial soils. A variable source area in general is an area that expands or contracts depending on the precipitation event and initial soil moisture conditions, and occurs when soils become saturated from below due to a rising water table. As precipitation continues, the soils become saturated by the rising water table which in turn expands the area over which runoff will occur.

5.1.5 Groundwater flow

Groundwater flow, also referred to as baseflow or dry-weather flow may account for a substantial percentage of subsurface runoff from a watershed or to a receiving water body. Precipitation that continues to infiltrate the soil surface after the soil is saturated, and does not become interflow, percolates downward by capillary action and gravity until reaching the water table or an impermeable geologic unit. The area within a watershed, where infiltrating precipitation eventually reaches the water table and becomes groundwater, is termed a recharge area. Groundwater flows from areas of high potential (recharge area) to areas of low potential (discharge area). Recharge areas are typically topographically higher in elevation than discharge areas that are usually incidental with a stream, river, or pond.

5.2 How These Processes Impact Typical CAFO Operations

Runoff, and the various components of runoff have varying degrees of importance in the context of CAFOs. The area of consideration at the individual CAFO is important when determining if runoff may be a concern. Runoff may occur from several areas, including the roof of a barn or other type of shelter used to house animals, external feeding areas that may or may not be paved, and may or may not be diverted to a lagoon or holding pond, pasture lands used for animal grazing, and crop lands that receive animal waste as a nutrient source.

typically over a smooth, lightly sloped soil and results from overland flow. This results in a gradual uniform removal of soil particles. However, sheet erosion seldom occurs without forming rill erosion. Rill erosion is the result of pockets of water forming in small depressions. The water leaving these pockets form small rivulets of flow, which erode small channels into the soil. The small channels cut are called rills. Sheet and rill erosion are typically due to overland flow. Left unchecked, the small channels enlarge to form larger channels that eventually combine to form still larger channels. As these channels increase in size their water carrying capacity increases, which consequently results in a greater capacity to erode the soil. Once these channels work down through the soil structure, they form what is known as gully erosion. Gully erosion is the combined process of waterfall erosion, channel erosion, and freeze/thaw erosion. Gully erosion is easily identified and typically indicates severe neglect. This form of erosion may significantly add to the sediment load of a nearby receiving water.

Erosion generates the particles that are carried to the receiving water to become suspended solids and sediment. Once in the receiving water, in-stream processes control whether the SSAS are deposited or carried downstream to be deposited later. These in-stream processes are beyond the scope of this work and for the most part are not necessary to the issue of managing SSAS from CAFOs.

5.2.2 Stress due to SSAS

SSAS may act as a stressor directly on an aquatic system or indirectly by transporting particle bound stressors. As a direct stressor, SSAS may significantly increase the turbidity in receiving water. This increased turbidity may dramatically reduce the primary production of the water column by limiting the light penetration (USEPA, 2001b). Depending on the physical and chemical characteristics of the SSAS, the turbidity may persist downstream even with significant dilution and/or settling time. SSAS may also result in siltation of a receiving water. Siltation may result in a loss of critical habitat, loss of water carrying capacity, and increased need for dredging or other waterway maintenance.

SSAS may also serve as a significant source of particle bound stressors. Contaminants that are particle bound may increase the aquatic exposure in the receiving water by renewed exposure through resuspension and redeposition. These particle-bound contaminants may include nutrients, pathogens, metals, and organic contaminants. Nutrients such as nitrogen, phosphorus, and potassium may be carried by SSAS to a receiving water. CAFO wastes are typically high in these components (USEPA, 2001a) and depending on the chemical form of the nutrient, the SSAS may serve to transport these stressors. Pathogens are also found in CAFO wastes and may be associated with soil particles and sediments. The interactions between pathogens and SSAS are beyond the scope of this report. In addition, organic contaminants (such as EDCs, antibiotics, etc) trace metals, and salts may be associated with SSAS. These stressors are addressed in other sections of this document.

SSAS may also act as a stressor by reducing the available dissolved oxygen in a receiving water. The organic content of CAFO waste is animal specific. In general, beef/dairy waste has a high organic content in the form of undigested cellulose. Swine waste and poultry waste are lower in organic content. The organic content is important as it provides an organic substrate for microbial activity. This microbial activity uses available dissolved oxygen in the water column. If the oxygen demand exceeds the available dissolved oxygen (DO) and the rate of re-aeration, the DO may drop to levels that are critical for maintaining a viable ecosystem. The oxygen demand is commonly measured as either a biochemical oxygen demand (BOD), which is the oxygen demand required to biologically stabilize the biodegradable components, or a chemical oxygen demand (COD), which is the oxygen demand needed to chemically oxidize organic and inorganic components regardless of their biodegradability (Millar et al., 1965). With all the considerations of efficient management of SSAS and other stressors, economic design constraints must be considered in the optimization of the design. The management strategies may not be so cost prohibitive that the CAFO operator cannot afford the management. In the economic considerations, the design should account for the impact on production, as well. For example, the design cannot be for a ten acre detention basin on a five acre CAFO.

CAFOs offer a challenge to manage their impact on the environment and the economic production of the animal product. However, the concentrated nature of their design offers an opportunity to engineer an efficient and economic management solution and in the end potentially to reduce the overall waste load to the environment from animal production whether confined or traditional.

5.3 Groundwater Transport

5.3.1 Statement of Problem

Storage and handling of animal waste in CAFOs and related agricultural practices are contributing to groundwater contamination, and may have severe impact on surface water quality, since 40 percent of the average stream flow is derived from ground water discharge as base flow (U.S.EPA 1993b in EPA-821-R-01-003). Dairy operations were identified as the major source of groundwater contamination by nitrate in excess of the MCL in the Chino Basin, California (U.S. EPA, 1998, Aton et al., 1988). This presents potentially widespread impacts, since water from the Chino Basin is used to recharge the primary source of drinking water for residents of heavily populated Orange County. In southeastern Delaware and the Eastern shore of Maryland, over 20% of wells were found to have nitrate levels exceeding the MCL (U.S. EPA, 1998, Ritter et. al., 1989). Measured nitrate levels in ground water beneath Delaware poultry houses have been as high as 100 mg/l (Ritter et. al., 1989). Fractured aquifers (e.g., karst terrains developed in carbonate rocks) underlie extensive, important agricultural areas in the eastern half of the United States (from Iowa, to New Mexico and Texas, to Florida and Puerto Rico, and to Pennsylvania and New York) are particularly vulnerable to nitrate by preferential transport (LeGrand and Stringfield, 1973). Evidence indicates that leachate from lagoons located in well-drained soils (e.g., loamy sand) may severely impact groundwater quality (EPA-821-R-01-003, Ritter and Chirnside, 1990), and that the use of manure in agriculture may cause bacterial contamination in karst aquifers (Boyer, 1999). Since rural areas in the nation generally rely on ground water as a drinking water source, they are at greater risk of nitrate poisoning than those drawing from public water supplies (U.S.EPA, 1998, Nolan and Ruddy, 1996). Nutrients, pathogens, salts, toxic metals, antibiotics, and hormones derived or excreted from animal waste and carcasses have the potential for groundwater contamination and thus may cause an environmental problem. Nitrate and pathogens in ground water impact human and animal health, and leaching salts may cause underlying groundwater to be unsuitable for human consumption (U.S.EPA, 1998).

The cited case studies in California, Delaware, and Maryland are examples of nationwide problems of subsurface water and groundwater contamination by confined animal operations and related agriculture, including others in the Midwest. They underscore the importance of managing animal feeding operations to minimize impacts on water quality and public health. The effectiveness of practices to control contaminant losses from animal waste storage facilities and farmlands treated with animal manure depends, among other factors, on the type of contaminants and their likely pathways in the subsurface and ground water. Considerable scientific advances have been achieved in testing, measuring, and modeling the behavior and fate and transport of pollutants in the environment in general, and in the subsurface in particular. However, research is needed to further develop scientifically sound methods for assessing and managing the impact of CAFOs on ground water. With the adoption of the Watershed Protection approach (WPA) as a strategy for hydrogeology, climate, and geography), available material, and economics. Leaching of pathogens or soluble pollutants such as nitrate from earthen impoundments and leaky underground storage tanks constitutes a major concern when the potential of groundwater pollution is a primary component of the risk-management criteria. In general CAFOs should be located away from areas with high leaching potential, such as highly permeable underlying bedrock and soil (EPA, 2001). For example, lagoons should be located on soils with low to moderate permeability or on soils that may form a seal through sedimentation and biological action. Most CAFO facilities are either paved or highly compacted, and therefore relatively impervious. Seepage from storage facilities may be minimized by soil compaction, self-sealing, liners, and soil amendment (EPA, 2001). The associated cost varies across the different measures, with concrete and synthetic liners being the most expensive. A risk-based management approach would require comparing associated costs with the possibility of failure of alternative measures designed to prevent the potential for groundwater pollution at an acceptable level of risk.

Self-sealing with manure solids or by fine organic matter and bacterial cells reduces infiltration and therefore minimizes the leaching potential after a finite period of facility operation (say, a few months). Although this is the least expensive alternative, early in the life of a facility significant leaching may occur leading to increased potential for groundwater contamination by pollutants such as nitrate and pathogens. Relying on self-sealing alone may not be an effective means for reducing leaching potential (Frarey et al., 1994; U.S.EPA, 1998). Sealing is generally effective for cattle manure and in fine-textured soils (high clay content). Liners made of concrete, synthetic material, or compacted clay may be needed under some site conditions (EPA, 2001): 1) a shallow water table; 2) an underlying aquifer used for a domestic water supply or of ecological significance; and 3) highly permeable underlying soil or bedrock (e.g., coarse sand, fractured limestone) (Figure 5.4-5.5). Clay-lined lagoons have the potential to leak and impact groundwater quality (EPA, 1998; Ritter and Chirnside, 1990), since they are susceptible to burrowing worms and cracking as they age. Appropriately sealed below ground storage tanks are effective means for preventing seepage of manure to ground water in sites with porous soils and fractured bedrock.

From a watershed prospective, any practice that reduces infiltration or seepage will reduce the capacity of the soil profile to transmit pathogens and soluble pollutants, specifically nitrate, to ground water. The optimal choice will ultimately depend on incurred costs and acceptable risk level of potential groundwater and surface-water pollution.

5.3.5 Farming Practices

Manure is a beneficial soil amendment and contains nutrients valuable for plants; when managed appropriately this may reduce costs associated with the use of commercial fertilizers. However, stockpiling and land application of manure in excess of crop requirements carry environmental risks, such as surface water and groundwater loading of nutrients (Schepers and Francis, 1998). Composted manure improves soil properties while providing plant nutrients and may save energy by replacing commercial fertilizers; e.g., 3 billion Btu/acre (Deluca and Deluca, 1997). Compost has an advantage over raw manure as it destroys plant and human pathogens and insect larvae.

Ideal management of manure requires: 1) application of manure at agronomic rates; and 2) site management (e.g., tillage, crop residue management, grazing management), which minimize nutrient losses from topsoil and surface water and groundwater loading of pathogens by runoff and leaching. Sound application rates and timing of application reduces losses of nitrogen, especially nitrate, and phosphorus in subsurface drainage water (Randall et. al., 2000). Manure should be applied at agronomic rates, frequently

Photo courtesy of USDA NRCS.

Figure 5.4. Concrete manure storage tank. Structures of this type will prevent leakage of waste into groundwater.

throughout the growing season, rather than a few concentrated applications. This will prevent rapid leaching in coarse-textured soils (high in sand) and avoid runoff in fine-textured soils (high in clay). Although application of manure at agronomic rates reduces nitrogen transport to ground water, it does not eliminate the risk for groundwater pollution entirely (EPA, 1998). This is because: 1) nitrate is highly mobile and may move below the root zone before being taken up by plants; 2) uncontrollable recharge events, such as rain, may cause leaching of excess nitrogen below the root zone; 3) much of the nitrogen applied is in organic form; however, when mineralized it is released in an inorganic form (ammonium and nitrate) potentially available for transport to ground water (not as much if in the ammonium form, due to adsorption to soil particles); and 4) nitrogen transport is affected by manure application method (e.g., drip irrigation, spray irrigation, knifing, etc.). Potential transport of nitrate to ground water is greater in areas of high soil permeability and shallow water tables; thus, application in these areas should be managed appropriately. A great potential exists for nitrogen mineralization when feedlots are abandoned, leading to leaching of nitrate through the soil profile to ground water (Mielke and Ellis, 1976). Planting corn and alfalfa in abandoned feedlots may remove nitrogen as it mineralizes.

Photo courtesy of USDA NRCS.

Figure 5.5. A new lagoon with a synthetic geotextile liner to prevent seepage into groundwater.

Groundwaters in areas of sandy soil, limestone formations, or sinkholes are particularly vulnerable to pathogen transport (EPA, 1998). Pathogens are also prone to movement via macropores. Tillage in the zone above tiles disrupts macropores and reduces transport of nutrients and pathogens to tile drains and ground water (Shiptalo and Gibbs, 2000). Shearing of the macropores by tillage appears to limit microbial transport (Dean and Foran, 1992; and Randall et al., 2000). No-till soils have higher earthworm populations, thus more earth-formed macropores (Shiptalo and Gibbs, 2000). Application of manure immediately after irrigation and in the vicinity of tile drains should be avoided to prevent movement of pathogens (e.g., fecal coliforms) to drainage effluent (Geohring et al., 1999). Factors that need to be considered for minimizing the loss of microorganisms in runoff and leaching include (USDA, 2000): 1) climate conditions; 2) waste application techniques and timing; 3) location of applications.

There is a potential for phosphorus to leach into ground water through sandy soils with high phosphorus content. Land-applied phosphorus is much less mobile than nitrogen because the mineralized (inorganic phosphate) form is highly adsorbed onto soil particles. High application rates may result in the accumulation of particulate and soluble forms of P that are potentially available for transport through earthworm burrows and other preferential paths to tile drains and the water table.

From a watershed prospective, measures to reduce movement of nutrients and pathogens through the soil matrix and flow-through macropores (preferential flow) would reduce the potential for groundwater pollution. This would require sound farm practices focused on application rates and timing of manure application based on local climatic conditions and location. Different levels of management may be

6 Air Transport and Deposition

Water and air quality issues are related. There has been a lack of CAFO-related research to deal with both water and air quality issues in a holistic (systems) approach while maintaining high standards of confined livestock productivity, animal health, and production cost efficiency (Sweeten 2001; Sweeten et al., 2000). Concentrated animal feeding operations may consist of open lots or confinement buildings, manure/wastewater storage or treatment systems, land application areas, and facilities to handle animal mortalities. CAFOs may generate many types of wastes, which include manure (feces and urine), waste feed, water, bedding dust, and waste water. Air emissions originate from the decomposition of these different types of wastes from the point of generation through the management and treatment of these wastes on the site. The rate at which the air emissions are generated will vary as a result of several operational variables (housing type, animal species, and waste management system), and weather conditions (humidity, temperature, wind direction and the time of a wind release). The air emission burden on the atmosphere is the product of the contaminant concentration and the airflow rate (USEPA 2001).

6.1 Current Air Quality Issues Associated with Agriculture

Six major pollutants have been identified and attributed to air emissions from animal housing areas, animal waste treatment and storage areas, and application of animal waste to the land. An overview of these pollutants follows.

6.1.1 Ammonia

Ammonia is an inorganic nitrogen compound that is easily emitted to the atmosphere from animal wastes (USEPA 2001). Ammonia is one of the fixed gases of aerobic and anaerobic decomposition of organic wastes. The major source of ammonia in animal manure is urea from urine or uric acid (in poultry). During microbial breakdown of fecal material in confinement buildings, on feedlot surfaces, in stockpiles, and in lagoons or runoff retention ponds, additional ammonia and amines are produced. Ammonia evolution rates are a function of time, temperature, pH of the manure surface, and level of biological activity. Ammonia volatilization is probably the most important pathway for on-site loss of nitrogen in animal manure to air and water resources. When ammonia is present as part of an aqueous solution, it reacts with acid to rapidly form the ammonium ion, with little release of ammonia to the atmosphere. Most animal manures, feedlot surfaces and lagoons would typically be a non-acidic environment with a pH greater than 7.0, where a rapid loss of ammonia to the atmosphere will occur. Total nitrogen losses as ammonia may exceed 50% (Sweeten et al., 2000; USEPA 2001).

Anaerobic lagoon and waste storage ponds are main components of the waste management systems at many CAFO sites. These systems depend on microorganisms to mineralize organic nitrogen to ammonium and ammonia. The ammonia will continually volatilize from the surface of the lagoon and pond. As much as 70%-80% of the nitrogen in a lagoon changes from liquid to gas, which will escape into the atmosphere in a process known as ammonia volatilization. Depending on the amount of carbon-rich bedding used, the more carbon, the lower the ammonia emissions. Bedding is used when the manure is not liquefied, and the bedding with absorbed manure and urine is stored in a solid form. The bedding creates a porous mixture wherein free air space provides conditions suitable for aerobic microbes to flourish. The decomposition of solid manure by aerobic bacteria begins a heating process known as composting. This decomposition process produces heat, water vapor, carbon dioxide, and ammonia. Only ammonia is odorous, and its emissions are low if the farmers use enough carbon-rich bedding to keep wet spots in the

Photo courtesy of USDA NRCS.

Figure 7.1. Tractor drawn liquid manure application after corn harvest.

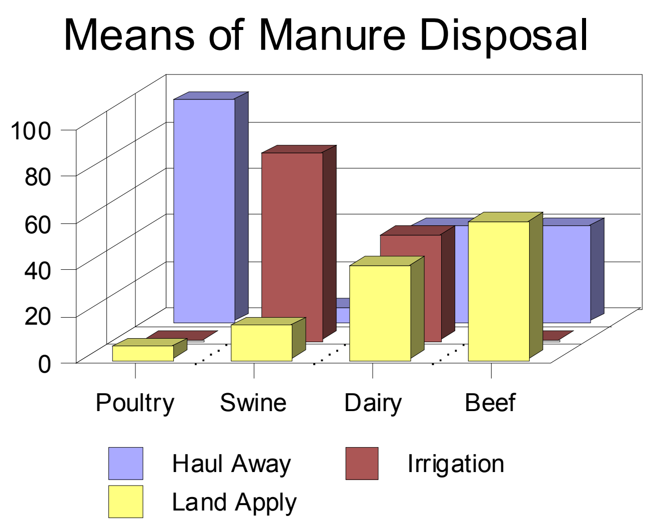


Figure 7.2. Means of manure disposal by animal sector.

7.2.2 Potential Problems Associated with Manure Applications

Although the problems associated with nutrients, pathogens, EDCs, and antibiotics in manure are common to all species of livestock, some additional problems are posed by the way in which the manure is disposed. This is related to the moisture content of the manure, which is related to the species of livestock in question. As shown in Figure 7.2, almost all of the manure generated by poultry facilities is sent off-site for disposal. Environmental pollution resulting from runoff is probably not a big problem at these facilities as a result of this practice. Nevertheless, myriad problems could result from the off-site transport of poultry waste because the nutrient and pathogen load of the waste will be out of the direct control of the originating facility.

Over-enrichment with N and P may occur when liquid waste is sprayed on land as is done at swine CAFOs. Air pollution may result from volatilization of NH_3 when downwind transport occurs as a result of spray irrigation using liquid waste and wastewater. Runoff of oxygen demanding substances, nutrients, and pathogenic organisms to water bodies may accelerate eutrophication of receiving water and spread pathogenic microorganisms throughout the watershed. (Baxter-Potter and Gilliland, 1988; Culley and Phillips, 1982; Doran and Linn, 1979; Doran et al., 1981; Edwards and Daniel, 1992; Gagliardi and Kerns, 2000, Giddens and Barnett, 1980; Gilley and Eghball, 1998; Jawson et al., 1982; Larsen-Royce et al., 1994; Pell 1997; Smith et al., 1985; Wolf et al., 1988).

Transport of nutrients and microorganisms to groundwater may also occur from both the application of liquid waste and the spreading of solid manure on land. Another avenue for nutrient losses exists in the leaching of soluble nutrients either to groundwater or drainage tile (Entry and Farmer, 2001; Evans et al., 1984; Gangbazo et al., 1995; Simpson 1990). N applied in manure as NH_4^+ will exchange on to soil cation exchange sites. This form of N does not readily move, but may be nitrified to NO_2^- and NO_3^- (Eghball 2000) that are freely mobile in soil water. Subsequently, denitrification may reduce the NO_3/ NO_2 to N_2O or N_2 (Rochette et al., 2000; Stevens et al., 2001)

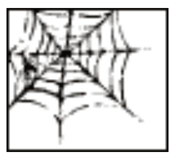
Even the subsurface injection of solid manure may contaminate water sources as the result of channel flow through the vadose zone. The channels may take the form of worm burrows, root channels, or animal burrows. P usually rapidly converts to insoluble forms, but with high application rates and rainfall, P will move as soluble P. Water-soluble organic N and P may also move into groundwater or drainage tile. Movement of NO_3^- into groundwater may increase NO_3^- levels above the federal standards of 10 mg/L. Too much NO_3^- in water presents a risk to very young children by causing methemoglobinemia (already been said). Loss of N and P to drainage tile primarily represents loss of the fertilizer value of the applied manure. It also increases the potential for eutrophication of receiving waters.

The bacterial load of animal waste either applied to the soil surface or injected below ground may enter the channels existing in the soil and migrate into drain tile. If water flow is relatively large, the water may transport organisms including pathogenic organisms to receiving streams, lakes, or ponds. This pathway is easily overlooked as it is assumed that water entering drain tile has been filtered through the overlying soil. Studies of the movement of bacteria through the soil profile are recent. Entry and Farmer, 2001 examined coliform and nutrient movement in a sand aquifer below fields irrigated with river water. Smith et al., (1985) also showed that *E. coli* could move through soil most easily in undisturbed soil columns. Tilled soil was more effective in retarding the movement of the organisms. Gagliardi and Kerns, (2000) reported that *E. coli* O157:H7 could move through agricultural soils under different management practices. Patni et al., (1984) studied the bacterial quality of water in tile drains under manured and fertilized cropland. Their results showed that bacteria could move easily through the soil profile. Shipitalo and Gibbs, (2000) showed that injected manure could move to tile drains within minutes of application through worm burrows. The width of the transmission zone was about one meter at the soil surface.

Because movement of microorganisms through soil profiles has been observed, it is also likely that EDCs and antibiotics may move with the water flowing through the same channels that allow passage of the microorganisms.

Archived Publication

This information provided in this document is for reference. Please be aware that the information in this document may be outdated or superseded by additional information.

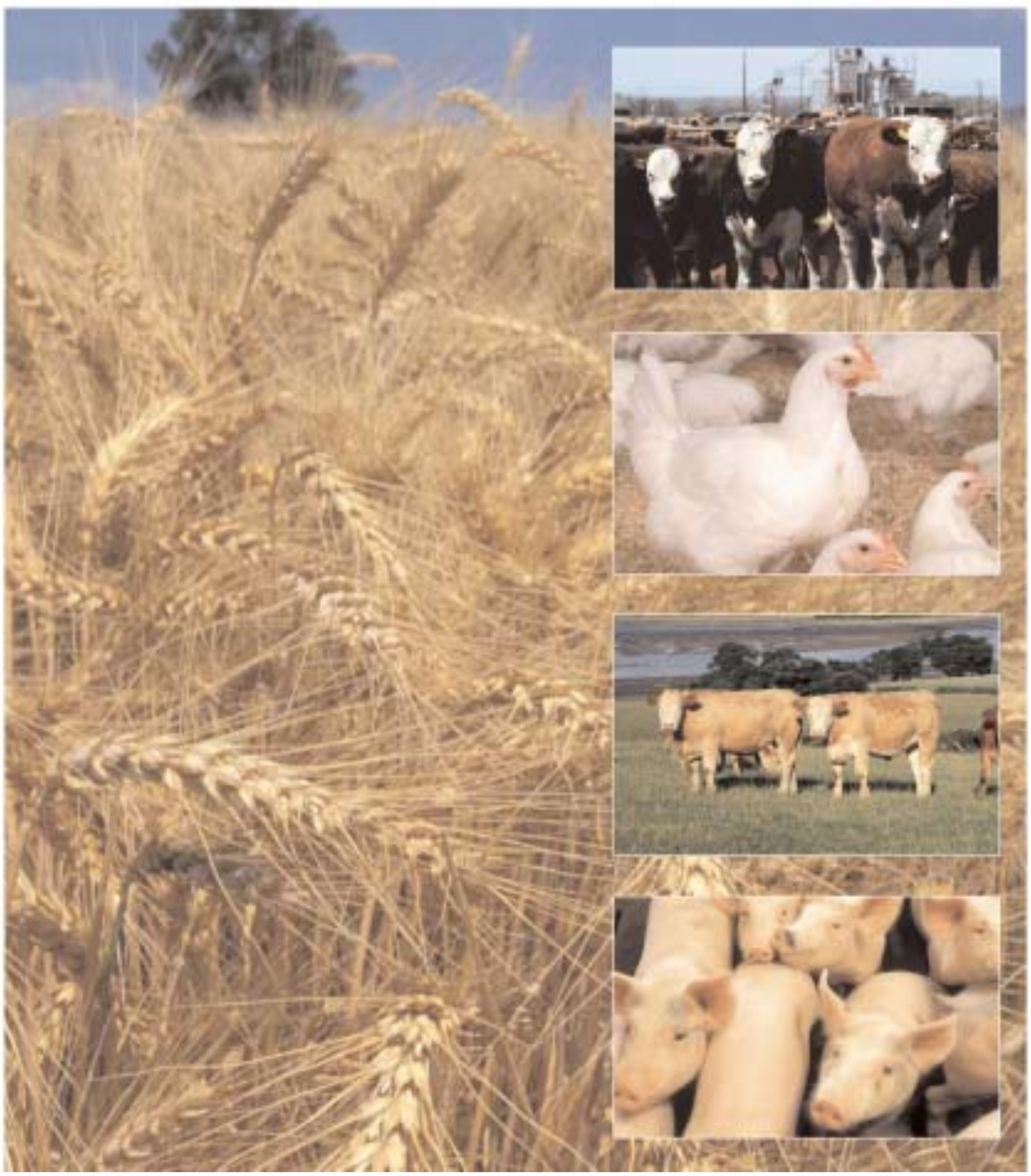


EPA promulgated regulations for Concentrated Animal Feeding Operations (CAFOs) in February 12, 2003 that expanded the number of operations covered by the CAFO regulations and included requirements to address the land application of manure from CAFOs. The rule became effective on April 14, 2003. NPDES-authorized states were required to modify their programs by February 2005 and develop state technical standards for nutrient management. On February 28, 2005, in response to litigation brought by various organizations, the Second Circuit court issued its decision in *Waterkeeper Alliance et al. v. EPA*, 399 F.3d 486 (2d Cir. 2005). EPA has updated the CAFO rule to reflect the changes requested by the Court. Visit www.epa.gov/npdes/caforule to view the 2008 CAFO Final Rule and supporting documents.

EPA United States Environmental Protection Agency

Managing Manure Nutrients at Concentrated Animal Feeding Operations

December 2004



U.S. Environmental Protection Agency
Office of Water (4303T)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

EPA-821-B-04-009

CHAPTER 2: OPERATION, MAINTENANCE, AND RECORDKEEPING REQUIREMENTS FOR THE PRODUCTION AREA

This chapter discusses the operation, maintenance, and recordkeeping requirements for a CAFO *production area*. The production area at a CAFO includes the *animal confinement area*, the *manure storage area*, the *raw material storage area*, and the *waste containment area*. It also includes areas where eggs are washed or processed and areas used for the storage, handling, treatment, or disposal of dead animals (i.e., mortalities). Throughout this chapter, "manure" means manure, litter, and manure combined with other process wastewaters. The terms "process wastewaters," "production area," and "land application area" are also used throughout this chapter. The effluent guidelines described in this chapter apply only to Large CAFOs. The NPDES requirements apply to all CAFOs. This document uses "CAFO rules" to mean both the effluent guidelines and the NPDES permit requirements. Permit writers, at their discretion on a case-by-case basis, may want to consider the information in this chapter pertinent to small and medium CAFOs on a case-by-case basis. The legal definitions are provided in the text box on the next page.

Photo by USDA NRCS

Runoff from raw material storage such as silos and feed bunkers is included in the definition of process wastewater, and must be handled to meet the effluent guidelines production area requirements. Some examples of water that come into contact with raw materials, products, or byproducts include water that comes into contact with spilled feed, contaminated milk, spent foot bath water, and other trace quantities of chemicals used at the operation.

Production areas include all of the following:

- *Animal confinement area* - area within a CAFO where animals are confined for a period of time for feeding or maintenance purposes.
- *Manure storage area* - area where manure and other wastes (e.g., bedding, compost, raw materials commingled with manure, or flush water) collected from the animal confinement area are stored or treated prior to final disposal.

- *Raw-materials storage area* - area where materials used in an animal feeding operation are stored.

- *Waste containment area* - area where wastes other than manure (e.g., contaminated storm water) from the production area are contained prior to final use or disposal.

All field storage and stockpiles of manure and raw materials are defined as production area. A CAFO may have more than one production area. For example, a poultry operation may have long term litter storage sheds or stockpiles (*manure storage area*s) that are remotely located from the poultry houses (*animal confinement areas*); or a CAFO may handle mortalities at an area remotely located from the animal confinement area. The CAFO requirements apply to all such production areas.

The definition of “production area” makes no distinction between short-term or temporary storage areas. Note in particular, however, that at layer and broiler operations, whether uncovered stockpiles of litter exist only temporarily or for a longer period of time *can* make a difference as to the facility’s regulatory status. At these operations, uncovered stockpiles of litter generally constitute a “liquid manure handling system,” and operations with a liquid manure handling system are defined in the regulations as Large CAFOs at a lower threshold number of animals than other operations. However, the permit authority may authorize some limited period of no more than 15 days for temporary storage of litter (e.g., where this time is needed to allow for contract hauling arrangements), within which time the uncovered stockpile of litter would not be deemed to be a liquid manure handling system. See Chapter 1 of this document and section 3.2.3 of the *Permit Writers’ Guidance* for more information.

Process Wastewater, Production Area, and Land Application Definitions

§412.2(d) Process wastewater means water directly or indirectly used in the operation of the CAFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other CAFO facilities; direct contact swimming, washing, or spray cooling of animals; or duct control. Process wastewater also includes any water which comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding.

§412.2(h) Production area means that part of an AFO that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment area includes but is not limited to settling basins, and areas within berms and diversions which separate uncontaminated storm water. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of mortalities.

§412.2(e) Land application area means land under the control of an AFO owner or operator, whether it is owned, rented, or leased, to which manure, litter, or process wastewater from the production area is or may be applied.

The production area definition does not include the owner/operator’s office or homestead, and does not include the field areas to which manure and process wastewater may

C. Mortalities, Direct Contact, and Chemical Disposal

To prevent contamination of the nation's waters, the regulations require CAFOs to ensure proper management of dead animals to ensure that they are not disposed of in any liquid manure, storm water, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities to prevent the direct contact of confined animals waters of the U.S. The regulations also require CAFOs to ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, storm water, or process wastewater storage or treatment system unless the system is specifically designed to treat such chemicals and other contaminants. CAFOs must properly handle animal mortalities, prevent animals from direct contact with surface water, and properly dispose of chemicals. These regulatory requirements are discussed below.

Mortality Handling

§122.42(e)(1)(ii) Ensure proper management of mortalities (i.e., dead animals) to ensure that they are not disposed of in a liquid manure, storm water, or process wastewater storage or treatment system that is not specifically designed to treat animal mortalities.

§412.37(a)(4) Mortalities must not be disposed of in any liquid manure or process wastewater handling system, and must be handled in such a way as to prevent the discharge of pollutants to surface waters, unless alternative technologies pursuant to §412.31(a)(2) and approved by the Director are designed to handle mortalities.

1. Management of Animal Mortalities

Despite improved health and production practices, intermittent mortality occurs at animal feeding operations. In some cases, a CAFO may need to handle catastrophic mortality. The CAFO should ensure the proper handling and disposal of dead animals to ensure biosecurity, to avoid creating nuisance conditions, and to manage any pathogens decaying carcasses produce. All CAFOs must not dispose of dead animals in a liquid manure, storm water, or process wastewater storage or treatment system unless the system is designed specifically to treat mortalities (see 40 CFR 122.42(e)(1)(ii)). In addition, Large CAFOs subject to the effluent guidelines may not dispose of mortalities in any liquid manure or process wastewater system unless alternative technologies pursuant to the *Voluntary Alternative Performance Standards* have been approved by the Director (see 40 CFR 412.37(a)(4)). For example, homogenization of mortalities may be an appropriate method of treatment, but subsequent disposal in a runoff pond is not.


Photo by USDA NRCS

Mortality disposal methods include burial, composting, incineration, and rendering. CAFOs should determine the most appropriate method based on the type(s) of animal(s) maintained at the operation, state and local laws, and storage capabilities. For example, many poultry producers previously used fabricated pits for burying dead birds, but due to potential contamination of groundwater from pollutants leaching from these pits, many states now prohibit burial. Currently, many poultry producers compost dead birds between layers of litter and straw. In many states, burial is now allowed only during instances of catastrophic mortality.

Due to the size of cattle carcasses, frequency of autopsies, and economics of mortality handling, most beef and dairy cow producers use rendering as their primary method of mortality disposal. Swine producers bury, incinerate, render, and compost their dead animals. During the last several years, however, more swine producers have switched from burial to composting.

CAFOs should consider incorporating a mortality management strategy into the Nutrient Management Plan that includes the following five components identified in ANSI GELPP 005-2002 *Mortality Management*:

- A schedule for collecting, storing, and disposing of carcasses;
- A description of how mortalities will be stored on site prior to disposal;
- A description of the final method for mortality disposals;
- A contingency plan that addresses reasonable foreseeable issues such as mass mortality due to mechanical failures or weather, loss of contract transporter for rendering, and euthanization due to disease outbreaks; and
- Records of mortality disposal (e.g., date, numbers of animal, final disposition).

To prevent the transmission of possible diseases, CAFOs should try to remove all carcasses from the animal living areas within 24 hours, minimize insect and rodent populations in the mortality storage areas, and use mortality storage areas with impermeable bases. Below are specific recommendations for each mortality disposal method as described in the ANSI *Mortality Management* standard:

- Off-Site Rendering: The CAFO's contingency plan should include at least one alternative carcass hauler and, if practical, one alternative rendering facility or other facility capable of properly disposing of carcasses.
- Composting: CAFOs must ensure that clean water is diverted from the composting areas. The composting facility should be constructed with an impermeable base and roofed, carcasses should be prepared properly for composting, carcasses should be placed in the compost structure properly, and all carcasses should be covered completely by the compost amendment.
- Burial: CAFOs should ensure that the burial locations are not in sensitive areas (e.g., floodplains, areas with shallow water tables, sandy soils, near surface water, or near groundwater wells), carcasses are prepared properly, and carcasses are covered properly.

- Incineration: CAFOs should ensure that the incinerator is operational, the capacity of the incinerator is not exceeded, and the incinerator is maintained and secured properly.

Additional information on the proper management of animal mortalities can be found in "NRCS Practice Standard Animal Mortality Facility-316." This standard provides information for using freezer units, disposal and burial pits, incinerators, and considerations for planning normal and catastrophic animal mortality management.

2. Direct Contact of Animals With Surface Water

> **Additional Conditions Applicable to CAFOs**
>
> **§122.42(e)(1)(iv)** Prevent direct contact of confined animals with waters of the United States.

To help ensure that wastes generated by animals confined in a production area do not contaminate waters of the U.S., CAFOs must prevent direct contact by the animals with such waters. Direct contact means an animal is standing in a water body or walks through it. For example, if a cow walks through a stream in a production area, there is direct contact with the stream by the cow. Fences are a common method of preventing animals from contacting surface water bodies. CAFOs that use fencing in the production area to control animals' access should check fence lines regularly and repair any damaged sections as soon as they are identified. CAFOs should also provide an alternative water source for the animals to discourage walking through streams.

Photo by USDA NRCS

3. Disposal of Chemicals

> **Additional Conditions Applicable to CAFOs**
>
> **§122.42(e)(1)(v)** Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.

CAFOs must not dispose of chemicals and other contaminants handled on-site into a manure, litter, process wastewater, or storm water storage or treatment system unless the system is specifically designed to treat these chemicals and other contaminants. If the storm water storage or treatment system is not designed to handle chemicals and other contaminants, disposing of the materials in those systems could cause the treatment system to fail, and could discharge pollutants. For example, expired or wasted antibiotics must not be disposed of in a confinement building pit or flushed out of hospital pens into the liquid manure storage areas. Biological treatment systems such as lagoons and digesters are sensitive to certain chemical loads, and these treatment systems could fail.

CAFOs should minimize the use of potentially harmful chemicals/contaminants and ensure these products are used and disposed of properly. For example, it may not be

- Records documenting current design of any manure or litter storage structures, including volume for solids accumulation, design treatment volume, total design volume, and approximate number of days of storage capacity. The documentation should also reflect any significant changes to these systems, such as changes to the waste handling system due to expanded or reduced number of animals.

- Records of the date, time, and estimated volume of any overflow.

Appendix C contains a sample checklist for the records that must be kept for a production area at a Large CAFO.

E. Additional Voluntary Controls

In addition to the requirements described above, there are many other controls that CAFOs can implement to increase the efficiency and environmental protection of storage structures. CAFOs should consult their state and local regulatory authorities to make sure these voluntary controls are not already required or prohibited. Examples of voluntary controls include groundwater protection controls and lagoon covers. They are discussed below.

1. <u>Groundwater Protection Controls</u>

Various controls are available to reduce the potential for the discharge of pollutants to the groundwater. These include, but are not limited to, storage structure liners and groundwater monitoring.

Liners prevent pollutants from leaching into the groundwater from the bottom and sides of a storage structure. They can be made of natural (e.g., heavy clay) or synthetic (e.g., plastic or rubber) materials. To be effective, liners must be inspected periodically to ensure they are not leaking. CAFOs should check with their permitting authority for any state requirements concerning lagoon liners. For example, California currently requires waste management units at CAFOs to be lined with or underlined with soils containing at least 10 percent clay and not more than 10 percent gravel or artificial materials of equivalent impermeability; Idaho currently requires a 2-foot compacted layer of heavy soil, concrete or asphalt, or synthetic membrane liners. Other states may also require additional monitoring or controls to protect groundwater (and drinking water) resources.

Groundwater can be monitored periodically to check for pollutant infiltration from a storage structure. Monitoring provides an early warning that there may be a problem with a storage structure and allows early correction of the problem. Monitoring typically requires installing at least one well up-gradient and two to three wells down-gradient from the storage structure. CAFOs should conduct a comprehensive hydrological assessment prior to installing the monitoring wells to ensure that the wells are located properly to detect pollutant releases to the groundwater. Groundwater in some areas is susceptible to seasonal variations of flow and may even change directions of flow. Monitoring of the groundwater beneath a storage structure in a production area is a good idea in areas where there is a strong likelihood of pollutants reaching the groundwater. These situations include areas where the storage structure is located over karst terrain and where the groundwater table is very shallow.

Note that ground water controls may not always be voluntary. On a site-specific basis a NPDES permit may set additional requirements on groundwater discharges where the groundwater has a direct hydrologic connection to surface water. In addition as noted above, a CAFO may be subject to certain ground water controls based on state or local regulatory authorities that are separate from the Clean Water Act NPDES requirements. The CAFO should consult with their state permit authority for more information.

2. Lagoon Covers

Though the CAFO rules do not require the use of lagoon covers, one way to reduce the potential for pollutant discharges from storage lagoons is to install an impermeable cover over the lagoons. Covered lagoon systems have been used successfully in all areas of the country including cold climates. They can now be designed and constructed from materials to resist freezing, high winds, and other extreme weather conditions that may have precluded their use in the past. However, in some instances, covers are an attractive alternative to help reduce the potential for pollutants discharged to surface water bodies by decreasing the volume of storm water that has to be stored. Therefore, CAFOs may be able to design a smaller lagoon to manage all manure and wastewater if it is covered. This will minimize the amount of land that has to be devoted to the impoundment and, in turn, reduces excavation costs. In wet climates, the use of covers can drastically reduce the costs of land application and hauling of manure by eliminating a lot of non-contact water, especially direct precipitation. In many cases the use of a cover can reduce evaporation and the associated loss of nitrogen which in turn may result in significant odor reduction. The additional conserved nitrogen can often be beneficially used by crops. Volatilization of nitrogen is generally viewed as unfavorable, and new treatment technologies specifically include volatilization controls.

Some covered lagoons can also be converted into anaerobic digesters which rely upon a bacterial process to produce methane gas while decomposing organic wastes. The methane generated from the anaerobic digestion can be burned in an engine generator to produce electricity or in a boiler to produce heat. Digesting manure may reduce odor emission, fly production, and may help control some pathogens. CAFOs should be cautioned that digesters still require effluent holding.

Expanding CAFOs in particular may wish to install a constant volume treatment cell in lieu of expanding the existing lagoon. The old lagoon may then be used as the effluent holding cell. As detailed in the ASAE Standard EP403.3 *Design of Anaerobic Lagoons for Animal Waste Management*, CAFOs may use multiple cell lagoons when allowed by local conditions and/or regulations. When operated in a series, the volume of the primary cell should be at least equal to the sum of the treatment volume and sludge accumulation volume. When operated in parallel, each cell's volume should be designed based on the anticipated loadings.

CHAPTER 4: OPERATION, MAINTENANCE, AND RECORDKEEPING REQUIREMENTS FOR THE LAND APPLICATION AREA

The requirements discussed in this chapter apply when manure, litter, or process wastewater is applied to the land application area. A *land application area* is the land under the CAFO owner or operator's control, whether it is owned, rented or leased, to which manure, litter, or process wastewater from the production area is or may be applied (40 CFR 122.23(b)(3) and 412.2(e)). Operational control of land includes ownership, rental agreements, leases, and access agreements. This may also include situations where a farmer releases control over the land application area and the CAFO determines when and how much manure is applied to fields not otherwise owned, rented, or leased by the CAFO to another entity.

CAFOs must develop and implement a Nutrient Management Plan to help manage manure, including setting forth a plan for land application. Requirements for developing and implementing a Nutrient Management Plan can be found in 40 CFR 122.42 and 412.4. Among these are the requirements to address the form, source, amount, timing, and method of application of nutrients on each filed to achieve realistic production goals, while minimizing nitrogen and phosphorus movement to surface waters. Furthermore, CAFOs should routinely re-evaluate the environmental impacts of the land application of nutrients from animal manure, wastes, commercial fertilizers, biosolids, and any other nutrient sources.

EPA recommends all AFOs (including Large CAFOs) implement the practices discussed in this manual for all land on which manure, litter, or process wastewater is placed to maximize the value of manure and to minimize the potential for runoff of pollutants from the land application area. The following activities are required by the CAFO rules for land application of manure and are discussed in this chapter:

- Identify testing protocols for manure, litter, process wastewater, and soil;
- Establish protocols to land apply manure (including development and implementation of a Nutrient Management Plan);
- Maintain records; and
- Identify appropriate site-specific conservation practices to control runoff.

Section E of this chapter discusses voluntary conservation and pollution prevention strategies.

A. Testing Protocols for Manure, Litter, and Soil

> **Additional Conditions Applicable to Specified Categories of NPDES Permits**
>
> **§122.42(e)(1)(vii)** Identify protocols for appropriate testing of manure, litter, process wastewater, and soil.

To manage manure, litter, and process wastewater properly, applicators must know how much manure is produced and its composition. CAFOs must also know the composition of the soil where manure is to be land applied to calculate an appropriate application rate for the manure. The rate and method of application should consider the soil holding capacity, the nutrient requirements of the crops, slope of the field, nutrients available to the crops from other sources (e.g., nutrients in the soil, nutrients from commercial fertilizer), the physical state of the manure, litter, and process wastewater (e.g., solid, liquid, semi-solid), and the potential for leaching and runoff of any pollutants (including nutrients).

1. Collecting Manure for Land Application

Before samples can be collected that are representative of what will be land applied, and before the CAFO can estimate the total quantity of manure nutrients to be land applied, the CAFO should consider the complete system of manure collection in place at the production area. The ease of collecting all livestock and poultry waste often depends on the amount of freedom given to the animals. If animals are allowed to move freely within a given space, manure will be deposited randomly; animals confined to an area are more likely to defecate in the same places. Waste collection can be automated (e.g., scrape and flush dairy barns) or manual (e.g., removal of waste from a dry lot with a front-end loader). Some CAFOs improve the efficiency of manure collection (i.e., decrease losses) by paving alleys and by installing gutters and slotted floors with mechanical and hydraulic equipment.

CAFOs should implement pollution prevention practices to keep production and collection of unnecessary waste to a minimum. For example, many CAFOs reduce the volume of contaminated runoff from open holding areas by restricting the size of the open holding areas, roofing part of the holding area, and installing gutters and diversions to direct uncontaminated water away from the holding areas. See Chapter 2.1 of this document for more information on clean water diversions. CAFOs may also cover manure stockpiles in the feedlot to reduce nutrient losses and reduce contaminants in runoff. CAFOs can further reduce the generation of waste by minimizing the amount of fresh water used to flush milking parlors and eggwash areas, and using recycled water from a lagoon or holding basin to flush animal housing areas. In addition, a few CAFOs have retrofit flush systems with dry manure handling systems (such as belts, dry bedding systems, scrapers, or v-shaped pits) to significantly reduce the amount of water used in manure handling. This can significantly reduce the costs for CAFOs to both haul and land apply manure.

For unroofed confinement areas such as dry lots, CAFOs must have a system for collecting and containing contaminated runoff. CAFOs can accomplish this by using curbs at the edge of paved lots and reception pits where the runoff exits the lots, or by using diversions, sediment basins, and underground outlets at unpaved lots. At unpaved beef feedlots, operators can carefully remove manure so as not to break the partial seal on the soil the manure has created. This seal, though not completely impermeable, does help reduce the downward movement (leaching) of contaminated water. CAFOs should routinely add soil to earthen lots to fill in holes and to assist with retaining the originally designed grade of the lot.

The amount of manure generated at a CAFO is linked directly to the number of animals maintained. However, because the composition and concentration of manure changes as it ages, the amount collected and applied to the land is often less than the amount initially generated by the animals. To estimate the amount of manure, litter, and other process wastewater that will be available for land application, CAFOs should calculate the quantity of manure, litter, and other process wastewater stored on site and the quantity of manure, litter, and process wastewater removed from the production area for uses other than application to the CAFO's land application areas. Any estimates should include all process wastewater such as milk parlor wash water and egg wash water, if appropriate. See Appendix D for methods for estimating the amount of animal waste in a pile, pond, or lagoon.

2. Manure Sampling and Testing

The CAFO rules require that samples of manure be collected and analyzed for nitrogen and phosphorus a minimum of once per year (412.4(c)(3)). Because the nutrient content of manure may vary throughout the year and depends on many site-specific factors (e.g., composition of feed ration, number of different rations, type and amount of bedding, amount of water added or lost), results of representative annual nutrient sampling helps the CAFO develop the appropriate rate at which to land apply manure. Although the CAFO rules require that manure be analyzed only for nitrogen and phosphorus, CAFOs should consider analyzing the manure for percentage of dry matter, ammonium nitrogen, calcium, manganese, magnesium, sulfur, zinc, copper, pH, and electrical conductivity (a common measurement of total dissolved salts) to better assess the resource value of the manure. CAFOs can also conduct additional analyses on pathogen levels. CAFOs should check with their permitting authority for the list of analyses to be conducted and with their state and local Cooperative Extension Offices for acceptable procedures and sources of analysis.

Note that a CAFO should collect samples from all manure storage areas, both liquid and dry, as well as any wastewater or storm water storage areas, in order to obtain representative test results.

Photo by USDA NRCS

To develop better estimates of the nutrient content of manure, ideally CAFOs should sample manure each time it is removed from the production area. Collect samples as close to the time of land application as possible, leaving sufficient time between sampling and land application to obtain and interpret the results of the analyses. If bedding is provided for the animals, CAFOs should include both spent bedding and manure in the representative samples. CAFOs should sample each form of animal waste stored on site (e.g., stockpiled solids, separated solids, lagoon or pond liquid, lagoon or pond sludge) not only because the composition of each will be different, but because they often are applied to the land separately from each other. For example, liquids from a holding pond may be irrigated weekly to a neighboring field, whereas the solids may be land applied just once or twice per year to remotely located fields. See Appendix E for a description and examples of commonly used sampling procedures for solid waste, semi-solid waste, liquid waste, and poultry litter.

3. Soil Sampling and Testing

> **Soil Sampling**
>
> ANSI GELPP 004-2002, *Manure Utilization,* standard recommends sampling soils every three years and analyzing them for, at minimum, nitrate content, available phosphorus content, pH, and buffer pH.
>
> EPA also recommends periodically analyzing the soil sample for nitrogen, potassium, pH, salinity, metals, micronutrients, and organic matte to better assess the soil conditions at a land application site.

Soil testing is an important tool for estimating nutrients available for uptake by a crop. A soil test is a laboratory procedure that measures the plant-available portion of soil nutrients. This measurement is used to predict the amount of nutrients that will be available during the growing season. In a traditional soil test, analyses are conducted for pH, nitrogen, phosphorus, potassium, soil organic matter, and electrical conductivity. The CAFO rules require that soil be analyzed for phosphorus at least once every five years. When conducting soil sampling, a

Irrigation Technologies

Irrigation application systems may be grouped under two broad system types: gravity flow and pressurized. Gravity-flow systems are particularly predominant in the arid West. Many irrigation systems rely on gravity to distribute water across the field. Land treatments (such as soil borders and furrows) are used to help control lateral water movement and channel water flow down the field. Water losses are comparatively high under traditional gravity-flow systems due to percolation losses below the crop-root zone and water runoff at the end of the field. See the text box at right for potential challenges of gravity-flow irrigation in meeting the CAFO requirements.

Gravity-Flow Irrigation

Water is conveyed to the field by means of open ditches, above-ground pipe (including gated pipe) or underground pipe, and released along the upper end of the field through siphon tubes, ditch gates, or pipe valves. Such systems are generally designed for irrigation water, and many CAFOs have not traditionally accounted for the irrigated manure nutrients. Some irrigation systems may offer nutrient management challenges to CAFOs including: uneven nutrient distribution, flooding and pooling, excessive volatilization of nitrogen, excessive leaching, and other potential difficulties in meeting technical standards established in their state.

Pressurized systems-including sprinkler and low-flow irrigation systems-use pressure to distribute water. Sprinkler system use is highest in the Pacific Northwest, Northern Plains, and in Eastern States. Center-pivot technology serves as the foundation for many technological innovations—such as low-pressure center pivot, linear-move, and low-energy precision application systems—that combine high application efficiencies with reduced energy and labor requirements. For more detail on irrigation water application technologies and a discussion of irrigation water management, see ARS' Irrigation Water Management in *Agricultural Resources and Environmental Indicators at http://www.ers.usda.gov/publications/ah712/AH7124-6.PDF*.

Low spot where water is ponding will reduce efficiency. Photo by USDA

8. Application Timing

Timing of manure application is an important consideration for nutrient availability. The longer manure nutrients are in the soil before crops take up the nutrients, the more those nutrients, especially nitrogen, can be lost through volatilization, denitrification, leaching, and surface runoff. CAFOs should consider the hydrological cycle and hydrological sensitivity of each field when making management decisions.

Best Management Practices (BMPs) for Land Application of Manure, Litter, and Process Wastewater

§412.4(c)(2)(i)) Include a field-specific assessment of the potential for nitrogen and phosphorus transport from the field to surface waters, and address the form, source, amount, timing, and method of application of nutrients on each field to achieve realistic production goals, while minimizing nitrogen and phosphorus movement to surface waters.

- Spring applications. Applications made during this time are best for conserving nutrients because the threat of surface runoff and leaching diminish in late spring. This time period also is favorable because it is just before the period of maximum crop uptake, allowing for more efficient nutrient utilization.

CHAPTER 7: AVOIDING COMMON DEFICIENCIES

Historically, the majority of discharges from CAFOs occur from manure handling systems and during the land application of manure. In most cases, the discharge did not occur during a rainfall event. In many cases, the discharge could have been avoided through better planning, management, and operation of the CAFO. Even though proper operation and maintenance is a standard permit condition, it is often helpful to simply be aware of the types of deficiencies that may ultimately lead to a discharge. This chapter focuses on the more common deficiencies that may lead to permit violations, pollutant discharges, or both, and provides some tools CAFOs may use to avoid such deficiencies.

Disclaimer: The purpose of this chapter is to give examples of practices that could lead to a CAFO being out of compliance with its permit requirements. These examples are not intended to comprehensively describe the CAFO regulatory requirements and the full set of practices that are necessary for a CAFO to remain in compliance. For more information, visit the Agriculture Compliance Assistance Center website at http://www.epa.gov/agriculture/.

A. Proactive Management

Norton et. al. (1996) developed a dual approach of developing management plans and conducting farm inspections for addressing key aspects of pollution risk management: proactive management and reactive management. Proactive management involves identifying the potential for any discharge, assessing what can be done to minimize the risk of discharge, and then taking steps to ensure the potential discharge does not occur. In contrast, reactive management deals with the actions necessary to respond to a discharge and then implementing measures to prevent an incident from reoccurring. Many state spill response plan requirements and the Environmental Management System guidelines for ISO14000 certification (ASQ,1996) require addressing incidents such that they do not recur.

Example: Permit Violations in North Carolina

A review of permit violations on concentrated animal feeding operations in North Carolina found that two hundred eighty-five (285) discharges occurred between 1996 and 2000. Forty-two percent (42%) of discharges from swine facilities were related to the land application of lagoon effluent and thirty-nine percent (39%) were from the manure handling systems. Lagoon liquid levels were observed to be exceeding the lagoon's 25-year, 24-hour storm storage level at over 80% of all visits.

Source: Sheffield, 2002.

Resources are available to help a CAFO to determine an accurate environmental profile for their operation. For example, the National Livestock Producers Association (NLPA) and Environmental Management Solutions, LLC, formed a clearinghouse for the On-Farm Assessment and Environmental Review (OFAER) program. The OFAER Program provides a free, confidential assessment of animal production facilities and is available to the producer through NLPA. The program helps give producers an edge regarding the public's perception of their operation and offers cost savings by taking advantage of a third party's animal production and environmental stewardship knowledge. The OFAER program can help all operations learn what strengths and challenges face the operation, as well as offer helpful recommendations concerning these issues. For more information see http://www.nlpa.org/html/ofaer_program.shtml or contact America's Clean Water Foundation at http://www.acwf.org/projects/ofaer.html for more information on the assessment program and to download the OFAER environmental assistance program's *Form A: Producer Checklist*.

CAFOs may request compliance assistance from EPA's Agriculture Compliance Assistance Center. For more information see http://www.epa.gov/agriculture/.

CAFOs may also contact the state agriculture and environmental agencies for other resources.

B. Common Deficiencies

1. Inadequacy of Storage Capacity

The minimum storage period for livestock and poultry manures is not specifically defined by the CAFO regulations. The NRCS recommends that manure storage facilities have a minimum of 6 months of storage capacity. As discussed in Chapter 2 of this document, a case-by-case evaluation of the appropriateness of the storage period specified in a NMP based on the proposed nutrient utilization strategy is necessary for a balanced assessment of other acceptable storage periods. See Chapter 2 for more information on adequate storage.

2. Infrequent Dewatering of Storage Structures

A well-designed manure storage facility must also be well managed to prevent the development of environmental concerns. Management decisions relative to startup and loading (especially anaerobic lagoons), manure removal, monitoring of structure integrity and other issues, and maintenance of appearance and aesthetics play critical roles in a well-managed storage facilities. Probably the single most important requirement in operating and maintaining a manure storage facility is to ensure that the facility does not overflow or discharge. Discharges from manure storage facilities may violate permit requirements and other state or local regulations; result in large fines or penalties; and, at the very least, represent a potential environmental hazard. Manure removal from storage according to the storage period selected is the most critical activity in preventing discharge. Many discharge problems have occurred because producers were unable to manage the activities necessary to remove manure from storage in a timely manner.

3. Pumpdown Practices

Lagoon effluent and holding pond water is usually removed by pumping equipment similar to irrigation equipment. Hand carry, solid set, stationary big gun, traveling gun, drag-hose systems, and center pivot equipment have all been used to land apply liquids. Experience has shown that unplanned discharges and spills sometimes occur with pumping activities. Sources of such unplanned discharges include burst or ruptured piping, leaking joints, operation of loading pumps past the full point of hauling equipment, and other factors. Hence, pumping activities should be closely monitored, especially in the "startup" phase, to ensure that no spills or discharges occur. Continuous pumping systems such as drag-hose or irrigation systems can be equipped with automatic shut-off devices (which usually sense pressure) to minimize the risk of discharge in the event of pipe failure. In some situations lagoon liquid may be applied through permanent irrigation systems that are used to apply water for crop production. For this type of system backflow/anti-siphon devices should be installed to preclude the chance of contamination of the fresh water supply. All process wastewater pumped out must be accounted for in the overall nutrient balance calculated in the CAFO's NMP.

4. Lagoon Agitation

Lagoons may or may not be agitated. When they are not agitated, considerable nutrient buildup in the bottom sludge will occur. Agitation is a critical operation in maintaining available storage in liquid manure systems. Some facilities have designed storage structures equipped with pumps to allow wastewater application without additional agitation. Failure to properly agitate will likely result in a continuing buildup of settled solids that are not removed. The result is less and less available storage capacity as time goes by.

Agitation of manure resuspends settled solids and ensures that most or all of the manure will flow to the inlet of the pump or removal device. Additionally, agitation homogenizes the manure mixture and provides a more consistent nutrient analysis as the manure is being land applied. Agitation of manure storage facilities releases gases that may increase odor levels and present a health hazard. Consideration should be given to weather and wind conditions, time of day, and day of the week to minimize the possibility of odor conflicts while agitating. Some CAFOs may be subject to local or state requirements for agitation.

5. Representative Manure Samples

It is inappropriate to sample the more dilute liquid from the top of storage facility, and then agitate the solids during land application activities. If a storage facility will be agitated just prior to or during land application, manure samples for nutrient analysis, in order to be considered representative, should be obtained after the facility is well agitated. In most cases, the results of such an analysis will not be available before land-applying the manure. In these cases, analysis results from the most recent pumping events can be used to anticipate the present analysis (and estimate the proper application rate). The present analysis, when available, can be used to calculate the nutrients actually applied. The CAFO must include this information in the records and address it in the NMP.

6. Animal Mortality Practices

NMPs developed as a condition of an NPDES permit must ensure proper management of typical and catastrophic animal mortalities, as described earlier in this document. It is important for the CAFO also to identify and review any applicable State and local regulations concerning animal mortalities. In many cases, state or local laws and ordinances may prohibit the use of specific animal mortality practices. The plan must comply with any state or local requirements. These regulations can often be found at the State Department of Agriculture of the State Health Department. The permit authority, as well, should take note of any such State or local requirements prior to reviewing a NMP as part of a permit application review or conducting an inspection.

Potential issues concerning compliance with the requirements for handling animal mortality include the following:

- Underestimating the number of mortalities;
- Inappropriate technology selection based on type and number of animals;
- Incorrect sizing of storage and treatment facilities;
- Failure to address catastrophic mortality; and
- Failure to identify or meet state and local requirements.

7. Chemical Handling

CAFOs must ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants (40 CFR 122.42(e)(1)). Examples include pesticides, hazardous and toxic chemicals, and petroleum products/by-products. This standard does not impose any new use restrictions that do not already exist. Many chemicals will disrupt the biological treatment processes that may be a part of a CAFO's waste handling and storage system. Any chemicals that enter manure and wastewater storage structures could be discharged to surface water during land application of the manure and wastewater or during spills or other accidental releases.

In general, poor housekeeping is an indicator of improper storage and handling of chemicals and an increased potential for contamination of manure and wastewater structures. The CAFO's NMP should identify where chemicals are stored, where any mixing and loading are conducted, how empty containers and waste materials are disposed of, and what practices are employed to prevent chemicals from inappropriately entering the manure and wastewater storage structures.

In addition, livestock operations may be subject to section 311 of the CWA, which addresses pollution from oil and hazardous substance releases. The regulations established by EPA to implement this portion of the CWA have two sets of requirements — the Spill Prevention

APPENDIX O - EXAMPLE TECHNICAL STANDARD

EXAMPLE EPA NUTRIENT MANAGEMENT TECHNICAL STANDARD

I. Authority

- 40 CFR 122.42
- 40 CFR 123.36
- 40 CFR 412.4
- 40 CFR 412.37

II. Applicability

This technical standard applies to all land under the control of a CAFO owner or operator, whether it is owned, rented, leased, or under an access agreement, to which manure, litter, process wastewater or sludge from the production area is or may be applied, in States, Indian Country, and other Territories and Jurisdictions where US EPA has NPDES permit authority.

III. Definition

Nutrient management is a planned process to protect water quality by managing the amount, source, placement, form, timing and method of application of agricultural nutrients and soil amendments utilized for the production of crop, forage, fiber, and forest products. It is supplying essential nutrients in adequate amounts to balance and maintain the soil for healthy biology and quality plants while avoiding conditions inimical to the ecosystem.

IV. Purposes

A. Minimize pollution of waters of the United States from agricultural nutrient sources.

B. Budget and supply nutrients for plant production

C. Properly use manure, litter, process wastewater, and/or other organic by-products as a plant nutrient source.

D. Maintain or improve the physical, chemical, and biological condition of the soil.

V. Criteria

A. Nutrient Management Plans Shall Meet the Following General Criteria

A nutrient management plan (NMP) is a site specific, documented, management tool, prepared for reference and used by the producer or landowner, recording how nutrients are and will be used to achieve plant production and water quality protection.

1. NMPs shall comply with all applicable federal, State, and local laws and regulations. The CAFO must reviewed the NMP annually.

2. Plans for nutrient management shall be in accordance with the requirements of 40 CFR 122.42, 412.4 and 412.37. Sources of information, among other things, to assist in the development of the plan can be found in the policy requirements of the NRCS General Manual Title 450, Part 401.03 (Technical Guides, Policy and

d. On alkaline soils, potassium should be applied near the time needed by the crop to minimize leaching.

e. Calcium carbonate accumulations that inhibit root growth for some plants are common in many low-rainfall alkaline soils. This calcareous layer helps maintain high pH levels and constrains the availability of micronutrients. Balance the soil to optimize plant growth and nutrient uptake.

4. Flooded ground (*Flood irrigation is not a part of this definition*)

a. Nutrient, solid or liquid, shall not be applied to flooded soils.

b. Agricultural waste shall not be land-applied on soils that are frequently flooded, as defined by the National Cooperative Soil Survey, during the period when flooding is expected.

c. Manure, litter, sludge, process wastewater, and/or other organic by-products may be applied to occasionally flooded areas during seasons when flooding is not expected and actively growing vegetation is present on over 50% of the field.

5. Saturated ground

a. Liquid manure and process wastewater shall not be applied on saturated soil where the manure or process wastewater may discharge to waters of the United States. The rate of application for liquid manure or process wastewater application on unsaturated soils shall not exceed the infiltration rate and moisture holding capacity of the soil after taking the antecedent moisture and temperature of the soil into account.

b. Avoid soil compaction on soils with high moisture content.

6. Drainage management

Subsurface drainage expedites the transport of nitrate-nitrogen from the soil zone with the result that a significant amount of unused nitrogen (nitrate N) from farm fields ends up in nearby streams and other surface waters.

a. The use of cover crops to utilize residual nitrates is recommended.

b. Fields that are subsurface (tile) drained require additional precautions. When liquid wastes are applied to fields with subsurface (tile) drains, the liquid can follow soil macropores directly to the tile drains, creating a surface water pollution hazard from direct tile discharge.

i. Do not apply application rates (volume) that would exceed the lesser of the available water capacity (AWC) in the upper 8 inches, or 13,000 gallons/acre per application. See Appendix E, **Available Water Capacity (AWC) Practical Soil Moisture Interpretations for Various Soils, Textures, and Conditions to Determine Liquid Waste Volume Applications not to Exceed AWC, to Determine AWC** and the amount (volume) that can be applied to reach the AWC.

University of Idaho Extension

CIS 1156

Dairy Manure Field Applications— How Much is Too Much?

by Amber Moore and Jim Ippolito

Applying dairy manure to agricultural fields has been shown to increase crop yields, improve the water-holding capacity of the soil, and enhance soil fertility. However, when manures are applied to fields at high rates over a period of several years, nutrients can accumulate, causing eutrophication in drainage waterways; degradation of drinking water; nutrient toxicities in plants; nutrient deficiencies in plants; disruptions in soil microbial populations; and nutritional imbalances for grazing animals. Growers and dairy producers also run the risk of violating state and federal regulations designed to avoid these issues.

In this publication, we will help you understand the reasoning behind laws that limit the application of specific nutrients in dairy manure. We will also provide a few general recommendations on how to avoid overloading fields with nutrients, and how to reclaim a field once you have exceeded these thresholds. The recommendations presented in this paper are suggestions, and do not have any regulatory implications. However, to enjoy the benefits of dairy manure applications instead of the pitfalls, please take note.

Phosphorus

Phosphorus (P) tends to be the nutrient of greatest concern when it comes to animal manure field applications. When dairy manure is applied based on the nitrogen (N) needs of the crop, P is typically applied at 3 to 6 times the amount of P that the crop can use.

"Eutrophication" can occur if P enters waterways through soil erosion and runoff. Eutrophication—excessive aquatic plant growth and decay from increased P and N concentrations—can cause dissolved oxygen concentrations to decrease so much that aquatic plants and animals suffocate. In order to avoid eutrophication, the Total Maximum Daily Load (TMDL) for total P in the southern Idaho waterways is only 0.075 parts per million (ppm) as established by EPA Region 10.

Phosphorus that accumulates in soil can contribute to eutrophication. Therefore, in Idaho, regulations for soil test P are in place to prevent the accumulation of P in soils, since this excess P can run off into surface water. The NRCS Conservation Practice Standard—Idaho Statute Code 590 establishes the Idaho Phosphorus Threshold (IDPTH) at 40 ppm when using the Olsen soil test P (at a 0-12" soil depth) on fields that have surface water runoff exiting the field.

Another problem with excessive phosphorus accumulations in soils is the potential for phosphorus leaching from the soil into the groundwater. This was originally thought to be a non-issue, since P binds strongly to calcium, soil particles, and organic matter. However, more and more researchers are finding that phosphorus does leach into the groundwater in areas that have received manure applications for long periods of time.

Because the calcium in free lime binds strongly to phosphorus, phosphorus leaching will likely be less prevalent in Idaho than other regions of the U.S. due to the high lime content of our soils. Still, if more P is applied than can be chemically bound, leaching can occur. Sandy soils are particularly vulnerable to P leaching. At this time, there seem to be more questions than answers in terms of phosphorus leaching and Idaho soils.

To lower the risk of P leaching into groundwater, the IDPTH for fields with subsurface water drainage (groundwater) is 20 ppm using Olsen soil test P (18-24" soil depth) if the field has a water table less than 5 feet below the soil surface, and 30 ppm with a water table more than 5 feet below the soil surface. For more information on Code 590, go to: http://efotg.nrcs.usda.gov/references/public/ID/590.pdf.

If your soil test P exceeds the IDPTH, dairy manure can still be applied, but you must not exceed the P uptake of the succeeding crop. In other words, whatever P you apply must be fully used up by the crops.

Fertilizer guides from the University of Idaho and from other universities in the western region of the U.S. can help growers determine how much P will be needed by their crops.

Zinc (Zn) deficiency in plants is another concern with excessive P in the soil. Phosphorus and zinc interact in the root. Excessive concentrations of P in the root hinder Zn from being transported to leaves to support growth. The good news is that Zn deficiency is less common on manured soils, as the Zn in manure is chelated to organic compounds and readily available to plants. That said, Zn deficiencies could still occur, as Zn deficiencies on manured soils have not been extensively researched or investigated.

If your soil tests exceed the maximum legal levels of P, you may want to consider stopping applications of P until the P level decreases. Some people may worry that their crop yields will suffer if they do not fertilize with P. If your soil is already high in P, this should not be an issue. Most crops will not show an increased yield when Olsen soil test P concentrations exceed 20 ppm.

While P in the soil will decrease naturally over time, one of the most common methods for removing P from soils is crop removal. Crops such as corn grown for silage, alfalfa grown for hay, and triticale, can be useful for lowering P concentrations. "Mitigating High-Phosphorus Soils" (Bulletin 851) contains a wealth of information on lowering P concentrations related to dairy manure applications: http://info.ag.uidaho.edu/pdf/BUL/BUL0851.pdf.

To prevent accumulations of P in the soil, you should closely monitor:

1) the amount of P that you are applying to your soils;

2) soil test P concentration; and

3) the P requirements for your crop.

Nitrogen

Idaho Statute Code 590 allows for manures to be applied based on nitrogen needs on soils with Olsen P concentrations that do not exceed the IDPTH. In this case it is assumed that the crop uses the majority of the N from manure. While this is generally true, the amount of manure N remaining at the end of the season depends on the manure and its application rate relative to crop N requirements. For example, manures that overwinter on fallow soils contain organic N and ammonium compounds that will slowly mineralize to form nitrates, which might be taken up by the following crop, or might move further down into the soil, beyond root systems, and leach into groundwater.

Nitrate, an inorganic and plant available form of N, is highly mobile and can therefore easily move into shallow groundwater resources when not utilized by plants. The movement of nitrates into drinking water and into waterways can pose serious environmental and health threats. Nitrates can also cause eutrophication in lakes and streams. Nitrates in drinking water from groundwater wells can cause blue baby syndrome (methemoglobinemia), a human disorder in which nitrate replaces oxygen in hemoglobin, causing a suffocation effect in the bloodstream that can turn skin pigment a gray or bluish color.

As a prevention measure, the Environmental Protection Agency (EPA) limits nitrate concentrations in drinking wells and in waterways to 10 ppm nitrate-N. The Idaho Department of Environmental Quality well monitoring program has shown an increase in groundwater wells exceeding 10 ppm nitrate-N in agricultural areas. While it is difficult to say whether dairy manure, fertilizers, septic systems, or another source is to blame, it is recommended that all agricultural entities employ conservation practices to prevent nitrate from contaminating groundwater and surface waterways.

Many growers make the assumption that the slate is wiped clean every year as far as nitrogen accumulation in their soils. However, stable organic N compounds in manure continue to accumulate in soil with annual manure applications. Stable organic nitrogen compounds can take as long as 5 years or longer to mineralize into the ammonium and nitrate forms available to plants. Continued application of manures can build up these reserves, thus contributing more nitrogen to the soil than the plants can use.

To prevent nitrate leaching, and to prevent costly over-applications of supplemental N fertilizers, you can:

1) determine total N, ammonium, and nitrate content in manure;

2) determine ammonium and nitrate concentrations in the soil prior to planting;

3) apply manure in fall on fields with plant residue;

4) apply dairy lagoon water during periods of high nutrient uptake;

5) grow winter cover crops after fall manure applications; and

6) account for available N in manure when estimating N fertilizer amounts to avoid over-application of N.

For information on N availability and manures, refer to "Estimating Plant-available Nitrogen from Manure" (EM 8954-E), http://extension.oregonstate.edu/catalog/pdf/em/em8954-e.pdf, and "Fertilizing with Manure" (PNW0533), which can be accessed at: http://cru.cahe.wsu.edu/CEPublications/pnw0533/pnw0533.pdf.

Copper

Experts are becoming concerned about the accumulation of copper (Cu) in the soil because of the application of dairy wastes to agricultural fields. Copper sulfate ($CuSO_4$) from cattle foot baths is washed out of dairy barns and into wastewater lagoons. The addition of $CuSO_4$ baths increased Cu concentration significantly in manure slurry from 4.8 g/1000 L to 88.6 g/1000 L (Miner Institute, 2006). The copper-enriched dairy waste is then applied to agricultural crops, thus raising concerns about how soils and plants are impacted by these Cu additions.

Because soluble Cu binds strongly to soils and organic matter in alkaline soils (soil pH > 7), very little of the applied Cu is plant-available in southern Idaho. Overall, the potential for Cu toxicities in plants is relatively small given the amount of Cu applied through dairy waste.

Preliminary results from the USDA ARS in Kimberly, Idaho, showed that DTPA-extractable Cu concentrations ranging from 1 to 154 ppm in a calcareous soil had no effect on alfalfa or corn silage biomass yields. At concentrations of 323 ppm and greater, plant survival was drastically impeded (Ippolito and Tarkalson, unpublished data). However, these high concentrations greatly exceed rates typically seen for dairy manure applications.

In a similar study in New York, Flis et al. (2006) applied copper sulfate at 0, 6.3, and 12.6 lbs Cu/acre to corn silage, orchardgrass, and timothy grass, using Cu rates equivalent to those typical of dairy waste applications. Corresponding soil Cu concentrations were 11, 13, and 18 ppm, respectively. The varying Cu application rates had no effect on grass or corn silage yields, although tillering and regrowth rates were significantly reduced for the grasses.

While these results are encouraging, repeated applications of dairy wastes could potentially raise Cu concentrations to levels toxic to plants. Once this happens, there is very little a grower can do to reclaim the field. A small number of fields in Idaho that have received frequent applications of lagoon water have shown evidence of Cu toxicity. Because Cu is so tightly bound by the soil, and so little is removed by crops, it is very difficult to quickly lower soil concentrations. If you wait until Cu plant toxicity symptoms occur (including plant death), you will continue to see Cu toxicities on that field for an indefinite period of time.

In terms of regulation, there is an existing EPA 503 "worst case scenario" standard that limits annual loading of Cu from biosolids to 66 lbs Cu/acre, and lifetime loading to 1,339 lbs Cu/acre. Reaching these limits is almost impossible with dairy waste applications, and would devastate most agricultural crops long before the lifetime loading limits were met. New York and Illinois have set lower lifetime loading limits for Cu at 75 and 250 lbs/acre, respectively, to avoid the potential of irreversible toxic accumulations of Cu in the soil.

While more studies are needed to develop an official threshold for Cu in Idaho soils, based on what we know, it would be advisable to cease Cu additions to soils with greater than 50 ppm DTPA-extractable Cu. To determine if you currently have a Cu accumulation problem in your soil, or to identify a developing accumulation, request an analysis for DTPA-extractable Cu every 2 to 3 years from a soil testing laboratory accredited by the Idaho State Department of Agriculture.

Mario de Haro Marti with the University of Idaho is also investigating the use of electrolysis for removing soluble copper from dairy lagoon water.

Copper concentrations can be lowered in dairy waste by:

1) reducing the amount of copper sulfate used in foot baths;

2) reducing the overall frequency of foot baths;

3) improving hoof trimming and stall surfaces; and

4) disposing of the Cu waste in an alternative location to the lagoon.

Soluble salts

Accumulations of sodium (Na), potassium (K), calcium (Ca), and/or magnesium (Mg) salts do not pose any serious human health or environmental threats (that we know of), and therefore soluble concentrations of salts in soils and waterways are not regulated by federal, state, or local government agencies.

However, salt accumulations can cause toxicities in plants, induce water stress, seal soil surfaces, and lower crop yields. Also, if there is an imbalance in the concentrations of calcium, potassium, and magnesium cations, a deficiency can occur due to cation competition. For example, if there are high concentrations of potassium in the soil, whether from manure, potassium fertilizer, or another source, the plant can take up a disproportionate amount of potassium cations in comparison to calcium and magnesium cations, thus triggering calcium and/or magnesium deficiencies in the plant.

Forage plants, such as alfalfa, will increase their uptake of K as concentrations in the soil increase, thus increasing K concentrations within the plant tissue. This can be of great concern for beef and dairy cattle grazing. Excessive animal intakes of K can cause grass tetany from a lack of magnesium absorption (which can lead to udder edema). Milk fever has also been linked to high forage K tissue concentrations. Potassium concentrations in forages used for grazing should not exceed 2.0% on a dry weight basis.

If you frequently apply manures and/or other salt sources to your fields, we recommend analyzing your soil for electrical conductivity, sodium, potassium, magnesium, and calcium concentrations on a yearly basis. Guidelines for soil analysis, interpretation, and reclamation of salt-affected soil are listed in the publication "Managing Salt-affected Soils for Crop Production" (PNW 601-E), which can be found at: http://extension.oregonstate.edu/catalog/pdf/pnw/pnw601-e.pdf

To reap the benefits of manure applications without the worry of overloading your soils, follow these basic guidelines:

1) Know the environmental, regulatory, plant nutrition, human health, and animal consumption limits for P, N, Cu, and soluble salts.

2) Stay on top of soil, plant tissue, manure, groundwater, and stream analysis for key nutrients within your cropping system.

3) Know the signs of nutrient overloading.

4) Reclaim overloaded soils earlier rather than later.

5) Develop manure application rates that are based on common sense, and not just on regulations.

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University of Idaho Extension

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April 2009

period, providing interested parties with an opportunity to further address potential impacts to waters of the state. Additionally, EPA will seek input from the appropriate DEQ regional office in determining whether a new discharger, or new source seeking coverage to discharge to an impaired water body, will contribute to the existing impairment and whether additional limits or controls are necessary for the discharger to comply with the impaired waters and TMDL provisions in Idaho WQS. Therefore, the permit is designed to ensure compliance with appropriate wasteload allocations in any applicable TMDL.

In summary, the terms and conditions contained in the CAFO GP, coupled with the conditions in this certification, ensure compliance with the narrative and numeric criteria in the WQS. Therefore, DEQ has determined the permit will protect and maintain existing and designated beneficial uses and is in compliance with the Tier I provisions of Idaho's WQS (IDAPA 58.01.02.051.01 and 58.01.02.052.07).

Protection of High-Quality Waters (Tier II Protection)

Water bodies that fully support their beneficial uses are recognized as high quality waters and are provided Tier II protection in addition to Tier I protection. Water quality parameters applicable to existing or designated beneficial uses must be maintained and protected under Tier II, unless a lowering of water quality is deemed necessary to accommodate important economic or social development. For general permits, the Department conducts an antidegradation review, including any Tier II analysis, at the time at which general permits are certified (IDAPA 58.01.02.052.03).

For a new permit, the effect on water quality is determined by reviewing the difference between the existing receiving water quality and the water quality that would result from the activity or discharge as proposed in the new permit (IDAPA 58.01.02.052.03). Discharges of manure, litter, or process wastewater from CAFO facilities are not allowed under the terms and conditions of this general permit, except in limited circumstances provided in Part II.A.1.

DEQ believes the new CAFO GP is at least as stringent as the existing CAFO GP. Therefore, existing activities or discharges currently covered by the existing GP should not cause degradation, provided the activity or discharge is not increasing. As long as CAFO operations are in compliance with the effluent limitation guidelines found at 40 CFR Part 412, the effluent limitations and standards in the permit, and the NMP requirements in the permit, and conditions of this certification, DEQ believes that the prohibitions on discharges from CAFO facilities in this permit ensure that CAFO operations are not likely to cause adverse changes in water quality. DEQ has concluded that as long as permittees operate consistent with the terms of the NPDES discharge permit and the requirements set forth in this certification, there is reasonable assurance that existing and designated beneficial uses will be protected and maintained and there will be no lowering of water quality in any high quality waters (IDAPA 58.01.02.051.02 and IDAPA 58.01.02.052.08).

Protection of Outstanding Resource Waters (Tier III Protection)

Idaho's antidegradation policy requires that the quality of ORWs be maintained and protected from the impacts of point and nonpoint source activities (IDAPA 58.01.02.051.03). As mentioned previously, no water bodies in Idaho have been designated as ORWs.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
800 E. Park Blvd, Plaza IV, Suite 220
Boise, Idaho 83712

NMFS Tracking No.: WCRO-2019-01789

July 11, 2019

Jamey Stoddard
Environmental Scientist
United States Environmental Protection Agency, Region 10
Division of Water
1200 Sixth Avenue, Suite 155
Seattle, Washington 98101-3123

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Concentrated Animal Feeding Operations General Permit (One Project), HUCs 17060101, 17060102, 17060301, 17060302, 17060303, 17060304, 17060305, 17060306, 17060201, 17060202, 17060203, 17060204, 17060205, 17060206, 17060207, 17060208, 17060209, 17060210, Snake River Basin, Idaho

Dear Mr. Stoddard:

On June 11, 2019, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the U.S. Environmental Protection Agency (EPA) Concentrated Animal Feeding Operations (CAFO) General Permit under the Clean Water Act (CWA) is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the Endangered Species Act (ESA). This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination you made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. In this case, NMFS concluded the action would not adversely affect EFH. Thus, consultation under the MSA is not required for this action.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public

Consultation History

In January 2018, NMFS and the EPA discussed the renewal of the NPDES Permit for CAFO in the state of Idaho. Consultation was assigned to Jennifer Gatzke in the Northern Snake Basin Office on June 13, 2018. On April 18, 2019, the EPA sent a draft BE for review to NMFS. A formal request for consultation, along with the final BE was received on 6/11/2019 and informal consultation was initiated.

ENDANGERED SPECIES ACT

Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is NLAA listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

In the proposed 5-year permit, the EPA establishes a suite of effluent limitations, setback requirements, waste storage and management, monitoring and inspection requirements, discharge notifications, and other conditions governing the discharge of pollutants to waters of the United States. These requirements, in addition to those defined by the State of Idaho and the NRCS, are described in more detail in the BE and the permit. The requirements which help minimize effects to listed salmon and steelhead in Idaho are summarized below.

The effects of CAFOs authorized by the proposed action are reasonably likely to include: excess nutrients, declining dissolved oxygen, increased suspended solids/turbidity, introduction of salts and trace elements, increasing temperature, and the addition of antibiotics, pesticides, hormones, and/or pathogens.

Effluent Limitations

Under the proposed general permit, CAFOs are not allowed to discharge manure, litter, or process wastewater pollutants into waters of the United States from the production area, unless the CAFO is in compliance with the general permit. The permit requires that the production area is properly designed, constructed, operated, and maintained to contain all manure, litter, process wastewater, and the runoff and direct precipitation from a 25-year, 24-hour storm event. Also, the design storage volume (see Figure 1) must be large enough to contain all manure, litter, and process waste water accumulated during the storage period including the following: (1) The normal precipitation less evaporation during the storage period; (2) the normal runoff during the storage period; (3) the direct precipitation from a 25-year, 24-hour storm event; (4) the runoff from the 25-year, 24-hour storm event from the production area; (5) the residual solids after

24 hours. The permittee must also notify the Idaho Department of Agriculture and the appropriate Idaho Department of Environmental Quality regional office in writing within 5 working days of the discharge. The notification must include: (1) A description of the discharge, its cause, a description of the flow path to the receiving water body, and an estimate of the flow and volume discharged; and (2) the period of non-compliance, including exact dates and times, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate and prevent recurrence of the discharge. If a CAFO discharges pollutants to waters of the U.S. from the production area, the discharge is authorized only when precipitation causes an overflow of pollutants into waters of the U.S. and if the production area is designed, constructed, operated, and maintained to contain all manure, litter, process wastewater, and the runoff and direct precipitation from the 25-year, 24-hour storm event. If the discharge does not meet these criteria, the discharge is not authorized under the Permit and the CAFO is in violation of the CWA.

Species Determination

The proposed action has the potential to adversely affect ESA-listed steelhead and salmon. Potential effects pathways include: introduction of nutrients (nitrate, nitrogen, phosphorous, ammonia), depleted dissolved oxygen (decaying algal blooms), increased suspended solids/sediment (physical irritants and turbidity), addition of chemicals (pesticides, hormones, salts, trace elements), redd trampling, and fish disturbance. Any of these pathways could impair salmonid behavioral patterns such as migration, feeding, sheltering, and rearing. Potential adverse effects to ESA-listed steelhead will be effectively minimized for the following reasons:

1. The potential for effluent discharge is discountable due to design criteria, particularly the facility design requirements as described above and in more detail in the BE and NPDES permit;

2. During a storm event large enough to cause a potential discharge, the volume of water would be great enough to dilute any toxins to insignificant levels;

3. The potential for sediment introduction is discountable because of the setback requirements and/or vegetative buffer; and

4. The potential for redd trampling and fish disturbance from livestock is discountable since livestock are restricted from drinking directly from streams or other natural water sources.

Based on the best available information and successful implementation of conservation measures described in the BE, NMFS concurs with the EPA's finding that the subject action is NLAA ESA-listed Snake River Basin steelhead, Snake River sockeye salmon, and Snake River spring/summer and fall Chinook salmon.

Fact Sheet

The U.S. Environmental Protection Agency (EPA)
Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

Concentrated Animal Feeding Operations in the State of Idaho

Public Comment Start Date: October 23, 2019
Public Comment Expiration Date: December 9, 2019

Technical Contact: Nicholas Peak
208-378-5765
peak.nicholas@epa.gov

EPA Proposes to Reissue NPDES Permit No. IDG010000

The U.S. Environmental Protection Agency (EPA) proposes to reissue a National Pollutant Discharge Elimination System (NPDES) general permit for concentrated animal feeding operations (CAFOs) in Idaho excluding Tribal lands (Draft Permit). The draft permit proposes to establish conditions for the discharge of pollutants from these CAFOs to waters of the United States.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures;
- descriptions of the types of facilities and discharges covered under the General Permit;
- a description of proposed effluent limitations and other provisions of the draft General Permit; and
- technical material supporting the conditions in the Draft Permit

Public Comment

Persons wishing to comment on the draft permit may do so in writing by the expiration date of the public notice. All comments must be in writing and must include the commenter's name, address, telephone number, the permit name, and the permit number. Comments must include a concise statement of their basis and any relevant facts the commenter believes EPA should consider in making its decision regarding the conditions and limitations in the final permit. All written comments and requests must be submitted to the attention of the Director, Water Division, at the following address: U.S. EPA, Region 10, 1200 6th Avenue, Suite 155, WD 19-

In situations where technology-based effluent limitations are not sufficient to meet water quality standards, the permitting authority must develop more stringent water quality-based effluent limitations on a site- specific basis. NPDES permits may include BMPs as water quality-based effluent limitations where numeric limits are infeasible or where the use of BMPs is reasonably necessary to meet water quality- based effluent limitations [40 CFR § 122.44(k)(3) and (4)].

For impaired waters with an EPA approved TMDL, permit provisions must be consistent with the assumptions and requirements of any available WLA [40 CFR § 122.44(d)(vii)(B)]. For impaired waters without an EPA approved or established TMDL, additional requirements must be consistent with water quality standards. Owners/operators of CAFOs that discharge to an impaired water, with or without a TMDL, must implement and maintain any control measures or conditions required by the permit, and include these control measures or conditions in the NMP.

IDEQ has developed, and EPA has approved, 75 TMDLs for Idaho waterbodies for pollutants commonly associated with CAFO discharges, i.e., nutrients and bacteria (see Table 2).

Table 2: Approved Nutrient and Bacteria TMDLs in the State of Idaho

#	Major Basin	Subbasins	TMDL	Issued	Pollutant(s)
1.	Bear River	Bear Lake, Central Bear, Lower Bear-Malad, Middle Bear	Bear River/Malad River Subbasin Assessment and TMDL Plan	June 29, 2006	Total P, Total N, E. coli
2.	Bear River	Bear Lake, Central Bear, Lower Bear-Mald, Middle Bear	Bear River Malad Subbasin TMDL Addendum	September 13, 2013	Total P
3.	Clearwater	Clearwater	Hatwai Creek Subbasin Assessment and TMDLs	December 28, 2010	E. coli, Total P
4.	Clearwater	Clearwater	Jim Ford Creek	June 6, 2000	Fecal coliform, Nutr/Eutr
5.	Clearwater	Clearwater	Lindsay Creek Watershed TMDL	June 26, 2007	E. coli, Nutr/Eutr
6.	Clearwater	Clearwater	Potlatch River TMDLs	February 13, 2009	E. coli, Nutri/Eutr, Total N
7.	Clearwater	Clearwater	Winchester Lake	March 22, 1999	D.O., Fecal coliform, Nutr/Eutr
8.	Clearwater	Lower North Fork, Clearwater	Clearwater River Subbasin, Lower North Fork	January 15, 2003	E. coli

9.	Clearwater	Palouseho	Cow Creek Subbasin TMDL	February 13, 2006	Nutr/Eutr
10.	Clearwater	Palouse	Palouse River (South Fork) TMDL	October 1, 2007	E. coli, Nutr/Eutr
11.	Clearwater	Palouse	Palouse River Subbasin TMDL	March 14, 2005	E. coli, Nutr/Eutr
12.	Clearwater	Palouse	Paradise Creek	February 12, 1998	E. coli, Fecal coliform, NH3, Nutr/Eutr
13.	Clearwater	South Fork Clearwater	Clearwater River (South Fork) TMDL	July 22, 2004	E. coli, D.O., Nutr/Eutr
14.	Clearwater	South Fork Clearwater	Clearwater River, South Fork (Nez Perce Reservation Lanes) TMDL	July 22, 2004	E. coli, D.O., Nutr/Eutr
15.	Clearwater	South Fork Clearwater	Cottonwood Creek	June 6, 2000	NH3, D.O., fecal coliform, Nutr/Eutr
16.	Panhandle	Coeur d'Alene Lake	Black Lake Nutrients TMDL	August 31, 2011	Total P
17.	Panhandle	Coeur d'Alene Lake	Coeur D'Alene Lake and River Subbasin	July 14, 2000	Fecal coliform
18.	Panhandle	Coeur d'Alene Lake	Fernan Lake TMDL (Coeur D'Alene Lake and River 2013 Addendum)	November 6, 2013	Total P
19.	Panhandle	Hangman	Upper Hangman Creek Assessment and TMDLs	August 29, 2007	E. coli
20.	Panhandle	Pend Oreille Lake	Clark Fork/Pend Oreille Basin	April 2, 2001	D.O., Total P
21.	Panhandle	Pend Oreille Lake	Lake Pend Oreille	October 8, 2002	Total P
22.	Panhandle	Pend Oreille Lake	Pack River Nutrients TMDLs	December 31, 2008	Total P
23.	Panhandle	Upper Spokane	Fish Creek Temperature,	June 5, 2008	E. coli

			Sediment and Bacteria TMDLs		
24.	Panhandle	Upper Spokane	Spokane, Upper	January 31, 2001	Total P
25.	Salmon	Hells Canyon, Lower Salmon	Lower Salmon River and Hells Canyon Tributaries TMDLs	February 9, 2010	E. coli
26.	Salmon	Lemhi	Lemhi	March 14, 2000	E. coli, Fecal coliform
27.	Salmon	Lemhi	Lemhi Subbasin TMDLs	February 27, 2013	E. coli
28.	Salmon	Little Salmon	Little Salmon River Subbasin	March 29, 2006	E. coli, Total P
29.	Salmon	Little Salmon	Little Salmon River Subbasin TMDL Addendum	April 10, 2013	E. coli
30.	Salmon	Lower Snake-Asotin	Tammany Creek Watershed TMDL Addendum	December 17, 2010	Total P, E. coli
31.	Salmon	Middle Salmon-Panther	Salmon River, Middle/Panther Creek	July 2, 2001	Total P
32.	Salmon	Pahsimeroi	Pahsimeroi River Addendum 2013 TMDL	April 10, 2014	E. coli
33.	Southwest	Boise-Mores	Boise-Mores Creek TMDLs	February 18, 2010	E. coli
34.	Southwest	Brownlee Reservoir	Brownlee Reservoir - Weiser Flat	September 30, 2003	Total P
35.	Southwest	Brownlee Reservoir, Middle Snake-Payette	Snake River - Hells Canyon TMDL	March 1, 2004	Total P, D.O.
36.	Southwest	Brownlee Reservoir, Middle Snake-Payette	Snake River Hells Canyon TMDL	September 9, 2004	Total P
37.	Southwest	Bruneau	Bruneau River Subbasin	March 13, 2001	Total P, E. coli, D.O.

38.	Southwest	Bruneau	Jacks Creek TMDL (Modification)	November 13, 2007	Total P
39.	Southwest	Bruneau, C.J. Strike Reservoir	King Hill - CJ Strike Reservoir Subbasin Assessment and TMDL	June 21, 2006	D.O., Total P
40.	Southwest	Lower Boise	Boise River, Lower	January 25, 2000	Fecal coliform
41.	Southwest	Lower Boise	Lake Lowell TMDL (Addendum to Lower Boise River Subbasin)	December 6, 2010	Total P
42.	Southwest	Lower Boise	Lower Boise River Sediment and Bacteria TMDLs Addendum	June 3, 2008	Fecal coliform
43.	Southwest	Lower Boise	Lower Boise River TMDL	September 18, 2015	E. coli
44.	Southwest	Lower Boise	Lower Boise River TMDL Total Phosphorus TMDL (2015 Addendum)	December 22, 2015	Total P
45.	Southwest	Middle Snake-Succor	Snake River - Middle/Succor Creek	January 5, 2004	E. coli, Total P, Fecal coliform, Nutr/Eutr
46.	Southwest	North Fork Payette	Cascade Reservoir - Part I	May 13, 1996	Total P
47.	Southwest	North Fork Payette	Cascade Reservoir - Part II	April 19, 1999	Total P
48.	Southwest	Payette	Bissel Creek	October 24, 2003	E. coli
49.	Southwest	Payette	Lower Payette River TMDL 2013 Addendum (Little Willow Creek)	December 11, 2013	E. coli
50.	Southwest	Payette	Payette River, Lower	May 31, 2000	E. coli

51.	Southwest	Weiser	Weiser River Watershed Subbasin TMDL	January 19, 2007	E. coli, Fecal coliform
52.	Upper Snake	American Falls, Blackfoot, Lake Walcott, Portneuf	American Falls Subbasin TMDL	August 6, 2012	Phosphorus
53.	Upper Snake	Big Lost	Big Lost River TMDL (Revised and Updated)	December 14, 2011	E. coli
54.	Upper Snake	Big Wood	Big Wood River TMDL Revision	February 9, 2012	E. coli
55.	Upper Snake	Big Wood	Big Wood River Watershed	May 15, 2002	Total P, E. coli
56.	Upper Snake	Blackfoot	Blackfoot River	April 3, 2002	Nutr/Eutr
57.	Upper Snake	Blackfoot	Blackfoot River Subbasin TMDL (2013 Addendum)	July 26, 2013	E. coli
58.	Upper Snake	Camas	Camas Creek Subbasin TMDL	September 30, 2005	Total P, E. coli
59.	Upper Snake	Goose	Goose Creek TMDL	July 25, 2004	E. coli, D.O., Total P
60.	Upper Snake	Goose, Lake Walcott	Lake Walcott	June 27, 2000	Total P
61.	Upper Snake	Lake Walcott	Lake Walcott TMDL (Marsh Creek) 2013 Addendum	January 23, 2015	E. coli
62.	Upper Snake	Little Wood	Little Wood River Subbasin TMDL	September 30, 2005	Total P, E. coli
63.	Upper Snake	Lower Henrys	Upper and Lower Henry Fork TMDLs	August 17, 2010	E. coli
64.	Upper Snake	Lower Henrys, Teton	Teton River Subbasin	February 24, 2003	Total P
65.	Upper Snake	Palisades	Palisades Subbasin TMDL Addendum	February 10, 2014	E. coli
66.	Upper Snake	Portneuf	Portneuf River	April 16, 2001	Total P, Total N, Fecal coliform

67.	Upper Snake	Portneuf	Portneuf River TMDL	July 29, 2010	E. coli, Total N, Total P
68.	Upper Snake	Raft	Raft River Watershed TMDL	July 27, 2004	Total P, E. coli
69.	Upper Snake	Salmon Falls	Salmon Falls Creek Subbasin TMDLs	February 27, 2008	Total P, Total N, E. coli
70.	Upper Snake	Salmon Falls, Upper Snake-Rock	Snake-Rock, Upper	August 25, 2000	Total P, Fecal coliform
71.	Upper Snake	Teton	Teton River TMDL	September 26, 2003	Total P
72.	Upper Snake	Upper Snake - Rock	Billingsley Creek	August 23, 1993	Total P
73.	Upper Snake	Upper Snake-Rock	Snake River Watershed, Middle	April 25, 1997	Total P
74.	Upper Snake	Upper Snake-Rock	Upper Snake Rock TMDL (Modification)	September 14, 2005	Total P
75.	Upper Snake	Willow	Willow Creek TMDL	June 30, 2004	Total P, Nutr/Eutr

None of Idaho's TMDLs assign specific WLAs to CAFOs. Most of these TMDLs do not directly address loads from animal agriculture. When they are noted, they are included generally as nonpoint source contributions to be addressed through implementation plans for agriculture. One TMDL, *American Falls Subbasin Total Maximum Daily Load Plan: Subbasin Assessment and Loading Analysis* (IDEQ, May 2012) identifies 5 CAFOs as point sources, but does not assign specific wasteload allocations to those discharges. From a pollution abatement stand point it is clear that the TMDL writers considered the standard elements of the CAFO permitting program adequate to control pollutant discharges from CAFOs. Therefore, in order to be consistent with the requirements and assumptions of these TMDLs, the EPA has determined that compliance with the terms and conditions of this permit meets the obligations of the relevant TMDLs and the EPA is not requiring additional controls on nutrient and bacteria sources at CAFOs that have not been assigned operation-specific WLAs.

III. SPECIAL CONDITIONS

A. Nutrient Management Plan

The CAFO operator/owner must develop, submit and implement a Nutrient Management Plan (NMP) [40 CFR §§ 122.42(e)(5) and 412.4(c)(1)]. The NMP shall identify and describe practices

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December 9, 2019

Mr. Dan Opalski
Director of the Water Division
EPA Region 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3188

Submitted via email to: peak.nicholas@epa.gov

Re: Draft NPDES Permit Number IDG010000: Authorization to Discharge under the National Pollutant Discharge Elimination System for Concentrated Animal Feeding Operations

Dear Mr. Opalski,

Thank you for the opportunity to provide comments on the Environmental Protection Agency's ("EPA") Draft Permit Number IDG010000, the NPDES General Permit for Concentrated Animal Feeding Operations (CAFOs) in Idaho ("Draft Permit"). Congress passed the Clean Water Act ("CWA" or "the Act") with the goal of eliminating the discharge of pollutants into waterways of the United States to improve and protect water quality.[1] The cornerstone of achieving this goal is the National Pollutant Discharge Elimination System ("NPDES") permitting program. Unfortunately, a failure to issue NPDES permits has left the CWA's goal unmet in Idaho with respect to CAFOs. Moreover, even if Idaho CAFOs were permitted, the Draft Permit would not adequately protect Idaho waterways. CAFOs are degrading Idaho's surface waters and environment with the enormous amounts of animal waste and other pollutants they generate, and EPA must implement long overdue measures in the final general permit ("Final Permit") to bring this industry's pollution under control and meet its mandate under the CWA.

Food & Water Watch ("FWW") respectfully submits these comments on behalf of itself and Snake River Waterkeeper ("Commenters") to aid EPA in its task of ensuring CAFOs in Idaho comply with the CWA and do not further degrade jurisdictional waters in the State. FWW is a national, nonprofit membership organization that mobilizes regular people to build political power to move bold and uncompromised solutions to the most pressing food, water, and climate problems of our time. FWW uses grassroots organizing, media outreach, public education, research, policy analysis, and litigation to protect people's health, communities, and democracy

[1] 33 U.S.C. § 1251(a).

from the growing destructive power of the most powerful economic interests. FWW has approximately 4,800 members and supporters across Idaho.

Snake River Waterkeeper is a 501(c)(3) non-profit corporation registered in Idaho with the mission of "applying science and law to protect, restore, and sustain waters of the Snake River Basin." As part of its water quality program operation, Snake River Waterkeeper monitors water quality at more than 50 sites across the Basin, investigates citizen reports and pollution concerns, and enforces environmental laws - with the goal of realizing the Clean Water Act's mandate of "swimmable, fishable, and drinkable water" across the 100,000 square mile Basin's full reach. CAFO permit advocacy is part of Snake River Waterkeeper's effort to improve water quality in the Snake River, curb pollution and water resource degradation, increase native fish habitat and natural coldwater species reproduction, and restore native fish populations throughout the Snake River Basin.

Commenters support EPA's efforts to protect Idaho's waterways through certain improvements proposed in the Draft Permit, and particularly the proposed prohibition on applying CAFO waste to snow-covered, frozen, or saturated ground.[2] This common-sense protection will help slow the ongoing contamination of jurisdictional waters in the State. This is an important prohibition since applying manure under these conditions all but ensures runoff into surface waters. Ground that is frozen is unable to absorb the manure, and manure applied in these conditions will mix with runoff water as the top layer of soil begins to melt while the lower layers of soil remain frozen. Similarly, manure applied on top of snow simply runs off with the snow as it melts, either ponding or running off into nearby waterways. Further, there are no crops planted and growing in these conditions to utilize whatever nutrients might be in the waste. There is strong scientific support for this prohibition, and EPA has included similar restrictions in other CAFO permits and strongly encourages other states to do the same.[3] CAFOs should not be allowed to dispose of their waste on fields under these conditions at any time.

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[2] Draft Permit at II.B.10.

[3] *E.g.*, EPA, 821-B-04-009, Managing Manure Nutrients at Concentrated Animal Feeding Operations (Dec. 2004) at 4-14 ("Surface runoff losses are more likely on soils…that are snow-covered or frozen (via runoff once the snow melts or soil thaws)…."), 4-16 ("Research indicates that winter applications increase pollutants in runoff during spring thaw and rainfall events."); M.J. Komiskey et al., *Nutrients and Sediment in Frozen-Ground Runoff from No-Till Fields Receiving Liquid-Dairy and Solid-Beef Manures*, 66(5) J. SOIL & WATER CONSERVATION 303, 311 (Sept./Oct. 2011), http://www.jswconline.org/content/66/5/303.full.pdf+html (last visited Dec. 9, 2019) ("The results of this study indicate that both [liquid diary manure] and [solid beef manure] applied to frozen and snow-covered fields less than one week preceding runoff can significantly contribute to nitrogen and phosphorus losses in runoff."); J. Laporte, *Winter Application of Manure and Other Agricultural Source Materials*, ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS (Sept. 2010, last reviewed Jan. 2019), http://www.omafra.gov.on.ca/english/engineer/facts/10-073.htm (last visited Dec. 9, 2019) ("The risk of runoff to surface water increases when applying on frozen or snow-covered ground. If a thick layer of snow on the soil's surface melts quickly, rapid surface water runoff will flush nutrients to adjacent surface water resources."); Karly Zande, *Raising a Stink: Why Michigan CAFO Regulations Fail to Protect the State's Air and Great Lakes and Are in Need of Revision*, 16 BUFF. ENVT'L. L.J. 1, 51 (2008-2009) ("Manure that is spread on snow-covered or frozen ground is not effective as a fertilizer because it cannot be absorbed, and it easily washes away into the waterways when the snow melts or the ground unfreezes."); EPA, Region 6, NPDES General Permit for Discharges from CAFOs in New Mexico (NMG01000) at II.A.5.b.ii, Appx. D; EPA, 833-F-12-001, NPDES Permit Writers' Manual for Concentrated Animal Feeding Operations at 6-15 (Feb. 2012) (hereinafter NPDES Writers' Manual for CAFOs)

Commenters request several further changes to strengthen the Final Permit in much needed ways. The Permit should:

- Establish a presumption that certain CAFOs discharge to waters of the U.S.;
- Establish additional thresholds requiring individual permit coverage;
- Include long-overdue monitoring requirements that would enable EPA, Idaho officials, and the public to meaningfully oversee CAFOs' compliance with permit terms and conditions;
- Establish effluent limitations for CAFO pollutants with no established Effluent Limitations Guidelines;
- Strengthen soil and CAFO waste sampling requirements;
- Strengthen CAFO waste storage requirements;
- Include additional requirements related to transfers of CAFO waste to third parties;
- Prohibit land application of digested waste from anaerobic digesters;
- Prohibit land application of CAFO waste by spray irrigation systems;
- Prohibit land application of CAFO waste during rainfall or when significant rainfall events are forecasted;
- Regulate discharges from CAFO ventilation systems; and
- Reassess EPA's 25-year, 24-hour storm event standard in light of climate change.

I. EPA's Regulation of CAFOs under the CWA

The goal of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[4] The CWA instructs EPA and states to eliminate water pollution through permits that incorporate both technology-based effluent limitations ("TBELs") and, where necessary, water quality-based effluent limitations ("WQBELs").[5] The Act was designed to ratchet up water quality protections as pollution control technology improves, improving water quality over time through more stringent controls and maintaining high quality water through antidegradation principles.[6]

("In general, EPA strongly encourages states to prohibit application to frozen, snow-covered, or saturated ground….").

[4] 33 U.S.C. § 1251(a).

[5] *Id.* § 1311(b)(1)(A) & (C).

[6] *Id.* § 1311(b)(2)(A) (requiring application of the "best available technology economically achievable" for many pollutants which will improve over time as new and better control technologies become available); 40 C.F.R. § 131.12 (antidegradation policy); *NRDC v. EPA*, 804 F.3d 149, 156 (2d Cir. 2015) ("Congress designed [TBELs] to

The CWA expressly defines CAFOs as "point sources."[7] Congress' decision to include CAFOs in the definition of point source demonstrates an unambiguous intent to control and continuously reduce discharges of pollutants from the CAFO industry through the NPDES program and progressively more demanding TBELs.[8] Yet EPA's regulatory scheme for the industry has allowed most CAFOs nationally – and all CAFOs in Idaho – to evade regulation.

EPA has adopted an overly broad application of the agricultural stormwater exemption found in the Act's definition of "point source."[9] Under this interpretation, EPA considers many discharges of CAFO pollutants from agricultural fields caused by precipitation outside the NPDES permitting regime. The exception has swallowed the rule that CAFO pollution is point source pollution. The result is that the vast majority of water pollution caused by CAFOs is essentially ignored so long as they comply with minimal land application parameters like "agronomic rate"[10] requirements designed not to protect water quality but to maximize crop production. This virtually guarantees there will be unregulated runoff of CAFO pollution to waterways—the very concern that prompted Congress to regulate CAFOs as point sources in the first place.[11] EPA also assumes that CAFO production areas are essentially non-discharging.[12]

Moreover, even where CAFOs are permitted, EPA has not required CAFO permits to contain water quality monitoring requirements as it has done with almost every other industrial category regulated under the CWA. As a result, there is a dearth of data on the actual pollution impacts from CAFOs' routine operations, and even facilities that previously operated under NPDES permits now assert that they do not discharge and are not required to apply for permits. Combined, this framework results in CAFOs being treated as "zero discharge" facilities—a legal fiction even in EPA's estimation.[13] Because of this and EPA's failure to promulgate regulations

be technology-forcing, meaning it should force agencies and permit applicants to adopt technologies that achieve the greatest reductions in pollution.").

[7] 33 U.S.C. § 1362(14).

[8] *See NRDC v. EPA*, 822 F.2d 104, 123-24 (D.C. Cir. 1987) (citing legislative history of the Act) ("the most salient characteristic of this statutory scheme, articulated time and again by its architects and embedded in the statutory language, is that it is technology forcing" and "progressively more demanding").

[9] 33 U.S.C. § 1362(14).

[10] "Agronomic rate" means the amount of nutrients that can be applied to land that is needed and usable by crops or vegetation grown on that land which will minimize runoff and the likelihood that such nutrients will pass below the root zone to groundwater. *See* 40 C.F.R. § 503.11(b) (defining "agronomic rate" for sludge application purposes).

[11] *See* S. Rep. No 92-414, 92-93 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3670 ("Animal and poultry waste, until recent years, has not been considered a major pollutant…. The picture has changed dramatically, however, as development of intensive livestock and poultry production on feedlots and in modern buildings has created massive concentrations of manure in small areas. The recycling capacity of the soil and plant cover has been surpassed…. Precipitation runoff from these areas picks up high concentrations of pollutants which reduce oxygen levels in receiving streams and lakes….").

[12] EPA's ELGs for dairy, cattle, swine, poultry, and veal CAFO production areas prohibit any discharge into waters of the U.S. except when "precipitation causes an overflow of manure, litter, or process wastewater" under limited circumstances. 40 C.F.R. §§ 412.31(a), 412.43(a). The large swine, poultry, and veal CAFO ELGs are almost entirely the same as those for dairy and cattle cows, except that NSPS for new point sources in this category does not contain an exception for 25-year, 24-hour storm events. *Id.* § 412.40-47.

[13] EPA, Office of Water, National Pollutant Discharge Elimination System (NPDES) Information Collection Rulemaking and CAFOs (Sept. 2010) (hereinafter EPA CAFO Information Collection) (estimating that "75 percent of all CAFOs could experience discharges based on standard operational profiles").

requiring CAFOs to apply for NPDES permits,[14] none of Idaho's hundreds of CAFOs are currently operating under any CWA permit whatsoever.[15] Slight improvements to permit requirements absent provisions that will lead to permitting in the first place are thus plainly insufficient.

II. Factual Background of CAFOs in Idaho

Idaho is home to a growing CAFO industry. Idaho is now the third largest dairy producing state with approximately 614,000 dairy cows as of January 1, 2019.[16] The State also hosts other types of CAFOs, including one of the largest beef cattle CAFOs in the nation, housing over 150,000 cattle at a time.[17] Many of these livestock are concentrated in approximately 365 large CAFOs.[18] These CAFOs are primarily located in the Magic and Treasure Valleys of southern Idaho, through which many jurisdictional waters flow, including the Snake River. But there are also CAFOs in other regions throughout the State.[19] The excessive concentration of livestock in these regions is having dire impacts on the State's water resources, including surface water quality.

Widespread impairment of Idaho's waterways is well established and is getting worse.[20] Idaho's most recent 303(d) list includes 1,989 miles of streams and 471 acres of lakes

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[14] FWW submitted a petition to EPA in 2017 explaining in extensive detail exactly how EPA could accomplish this in compliance with the *Waterkeeper Alliance* and *National Pork Producers Council* cases, and why it is important to do so. FWW's petition is included here as Appendix A.

[15] EPA, NPDES CAFO Permitting Status Report: National Summary, Endyear 2018, completed 12/31/18, https://www.epa.gov/sites/production/files/2019-09/documents/cafo_tracksum_endyear_2018.pdf (last visited Dec. 9, 2019).

[16] See data available at https://quickstats.nass.usda.gov/ (last visited Dec. 5, 2019), data included here at Appendix B.

[17] *See* Simplot Livestock Company, http://www.simplot.com/pdf/Simplot_Feedlot_Web_PDF.pdf (last visited Dec. 9, 2019); Michelle Miller, *Take a Look Inside One of the Nation's Largest Cattle Feedlots*, AGDAILY (July 2, 2019), https://www.agdaily.com/livestock/take-a-look-inside-one-of-the-nations-largest-cattle-feedlots/ (last visited Dec. 9, 2019) ("where they have more than 150,000 head of beef cattle").

[18] EPA, NPDES CAFO Permitting Status Report: National Summary, Endyear 2018, completed 12/31/18, https://www.epa.gov/sites/production/files/2019-09/documents/cafo_tracksum_endyear_2018.pdf (last visited Dec. 9, 2019).

[19] *See* Idaho Concerned Area Residents for the Environment, *Interactive Map*, http://www.imrivers.org/idahocares/?page_id=30 (last visited Dec. 9, 2019) (mapping CAFOs in Idaho); Google Maps, *Idaho Dairies and Feedlots*, https://www.google.com/maps/d/viewer?mid=198eQBHIB_H_ZP8y7HskjF50BOkM&ie=UTF8&oe=UTF8&msa=0&ll=45.496314579699344%2C-114.074457&z=7 (last visited Dec. 9, 2019) (mapping and listing known dairies and medium and large beef CAFOs in Idaho).

[20] Idaho Dept. of Environmental Quality, 2016 Integrated Report Map, https://www.deq.idaho.gov/media/60182121/ir-map-2016.pdf (last visited Dec. 9, 2019) (showing concentrations of 303(d) listed waterways and 305(b) "not supporting" waterways in the southern Idaho regions most heavily populated by CAFOs); Snake River Waterkeeper, *Water Quality*, https://www.snakeriverwaterkeeper.org/water-quality/ (last visited Dec. 9, 2019) (noting that "algae blooms occur throughout the calm stretches of the [Snake River in Idaho], depleting its oxygen supply"); Idaho Conservation League, Declining Groundwater Quality in the Eastern Snake Plain Aquifer at 3 (July 2019) (hereinafter ICL GW Report), https://www.idahoconservation.org/wp-content/uploads/2019/07/ICL_GroundWaterReport-07082019-FINAL-Web-1.pdf (last visited Dec. 9, 2019) (finding nitrate contamination is "widespread and growing[,]…phosphorus data indicates that this type of contamination is also growing and has the potential to exacerbate existing problems in the Snake River[, and] data and modeling

contaminated with *E. coli*, 239 miles of streams and 55,509 acres of lakes burdened with excessive nutrients that can lead to conditions fatal for fish and other aquatic species, and 920 miles of streams with unsafe levels of fecal coliform that threaten human health and wildlife. 34,404 miles of rivers and streams and 258,383 acres of lakes are currently not supporting the beneficial uses these waterways would safely support absent pollution.[21] Several Idaho waterways in areas dominated by CAFOs show *E. coli* levels far in excess of the Water Quality Criterion of 126 cfu/100mL geometric mean.[22] Many Idaho waterways passing through CAFO dominated areas also suffer from fecal coliform contamination, nutrient overloads, and oxygen deficiency[23]—likely caused or exacerbated by the discharge of waste from CAFOs.

These impairments to jurisdictional waters are increasing. For example, Idaho waters no longer meeting one or more beneficial use due to *E. coli* contamination have been on the rise since at least 2012.[24] Harmful algal blooms caused at least in part from nutrient loads are also an increasing water quality concern for Idaho.[25] CAFO-generated waste is suspected (and likely) to be a primary culprit behind these increasing impairments,[26] but without permitting and meaningful monitoring there is no way for the public or regulators to know the full extent of the harm.

Yet despite these increasing water quality impairments, EPA's failure to require CAFOs to seek permit coverage – no matter how massive their operation and no matter how extensive their disposal of CAFO waste to Idaho's lands and waters – has resulted in CAFOs operating without any form of NPDES permit. In 2011, over 100 CAFOs in Idaho were operating under an

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studies strongly indicate that nitrate and phosphorus concentrations will continue to increase in the coming decades").

[21] Idaho Dept. of Environmental Quality, 2016 Integrated Report Map, https://www.deq.idaho.gov/media/60182121/ir-map-2016.pdf (last visited Dec. 9, 2019).

[22] *E.g.*, Idaho DEQ, 2016 Integrated Report at Category 5 pg 36 (listing *E. coli* levels with a geometric mean of 1,108 cfu/100ml near Grand View, home to one of the world's largest CAFOs); *id.* at 58 (*E. coli* levels of 811 cfu/100ml in Yahoo Creek, adjacent to CAFO and land application areas); *id.* at 59 (*E. coli* contamination in Pioneer Reservoir, immediately downstream of CAFO and land application areas). Because many Idaho waterways are being impaired by *E. coli* bacteria, TBELs may be inadequate to prevent CAFOs from causing or contributing to water quality standard ("WQS") violations; in such cases, more stringent WQBELs are required.

[23] Idaho DEQ, 2016 Integrated Report at Category 4a pgs 89-113 (TMDLs for Southwest Basin), pgs 113-171 (TMDLs for Upper Snake River Basin). Specific examples include, but are not limited to, C. J. Strike Reservoir with dissolved oxygen and phosphorus (*id.* at Category 4a pgs 89-90); Bruneau River subbasin with *E. coli*, phosphorus, and dissolved oxygen (*id.* at 90-91); Upper Snake-Rock subbasin with phosphorus and fecal coliform (*id.* at 144-49, 152); Salmon Falls Creek subbasin with nitrogen, phosphorus, and *E. coli* (*id.* at 149-51).

[24] Idaho DEQ, 2016 Integrated Report at xvii (showing an increase in *E. coli* contaminated waters added to the State's 303(d) list since 2014); Idaho DEQ, 2014 Integrated Report at xv (showing the same from 2012 to 2014).

[25] Idaho DEQ, 2016 Integrated Report at 17; Idaho DEQ, 2014 Integrated Report at 17. *See also* Idaho DEQ, 2016 Integrated Report at Appx. Q pg. 3 (public comment requesting further investigation into the role dairies and other sources play in this increasing water quality problem, with no meaningful response from Idaho DEQ).

[26] *See, e.g.*, ICL GW Report, *supra* note 20, at 7-8; Twilight Greenaway, *Forget Potatoes: Idaho Now Grows CAFOs*, GRIST (Aug. 26, 2011), https://grist.org/factory-farms/2011-08-25-forget-potatoes-idaho-now-grows-cafos/ (last visited Dec. 9, 2019).

NPDES permit.[27] Today that number is zero.[28] Thus, Idaho's decline in water quality correlates with the complete deregulation of its CAFOs.

CAFOs introduce enormous quantities of waste containing all of these pollutants into Idaho's environment through industry-standard waste management practices.[29] The primary means by which Idaho CAFOs manage and dispose of their animal manure and other waste is by storing it in manure lagoons at production sites and then applying it to nearby agricultural fields (or selling or giving the waste to third parties to apply to their lands at their discretion). Both the storage and disposal of CAFO waste results in discharges of harmful pollutants to waters of the United States, either directly or via groundwater with direct hydrological connection to jurisdictional waters—in fact, the Snake River is a quintessential example of a river fed by groundwater.[30] Manure lagoons are actually designed to leak.[31] And applying CAFO waste to agricultural fields has the potential to discharge pollutants to waterways in several ways: through over-application, runoff in dry weather conditions, tile drainage systems that underlie target fields and channel liquid waste into nearby waters, and drift and runoff from spray irrigation systems used to apply liquid waste, among other pollutant pathways.[32]

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[27] EPA, NPDES CAFO Rule Implementation Status – National Summary, Endyear 2011, completed 12/31/11, https://www.epa.gov/sites/production/files/2015-08/documents/npdes_cafo_rule_implementation_status_-_national_summary_endyear_2011_0.pdf (last visited Dec. 9, 2019).

[28] EPA, NPDES CAFO Permitting Status Report: National Summary, Endyear 2018, completed 12/31/18, https://www.epa.gov/sites/production/files/2019-09/documents/cafo_tracksum_endyear_2018.pdf (last visited Dec. 9, 2019).

[29] *See, e.g.*, EPA CAFO Information Collection, *supra* note 13; FWW, *The Urgent Case for a Ban on Factory Farms*, https://www.foodandwaterwatch.org/insight/urgent-case-ban-factory-farms (last visited Dec. 9, 2019) (with downloadable report); A Greener World, https://agreenerworld.org/challenges-and-opportunities/environmental-pollution/?gclid=EAIaIQobChMIjofJ-t2f5gIVhSCtBh0BOAACEAAYASAAEgIXh_D_BwE (last visited Dec. 9, 2019).

[30] The Snake River Plain, where most of Idaho's CAFOs are located, overlies highly fractured basalt geology that enables pollutants deposited on the surface to easily reach groundwater, which discharges directly into the Snake River either directly or via tributaries. ICL GW Report, *supra* note 20 at 5-6, 9; Digital Atlas of Idaho, *Eastern Snake River Plain – Hydrogeology* (Dec. 1998), https://digitalatlas.cose.isu.edu/hydr/main/srbfr.htm (last visited Dec. 9, 2019); Digital Atlas of Idaho, *What Is Meant by Surface and Ground Water Interaction?*, https://digitalatlas.cose.isu.edu/hydr/main/srbfr.htm (last visited Dec. 9, 2019) ("The Snake River provides an excellent example of a river fed by ground water.").

[31] *See, e.g.*, *Cmty. Ass'n for Restoration of the Envt. v. Cow Palace, LLC*, 80 F. Supp. 3d 1180, 1223 (E.D. Wash. 2015) ("even assuming the lagoons were constructed pursuant to NRCS standards, these standards specifically allow for permeability and, thus, the lagoons are *designed to leak*" (emphasis added)); EPA, 600/R-04/042, Risk Assessment Evaluation for Concentrated Animal Feeding Operations 24 (May 2004) (noting water contamination can be caused by manure lagoons that are known to leak for a variety of reasons); NRCS, Agricultural Waste Management Field Handbook, Chapter 10 at 10D-4 (Aug. 2009), https://www.wcc.nrcs.usda.gov/ftpref/wntsc/AWM/handbook/ch10.pdf (last visited Dec. 9, 2019) (recognizing that even more protective synthetic liners can only "reduce seepage," not eliminate it).

[32] *See, e.g.*, EPA, 833-R-10-006, Implementation Guidance on CAFO Regulations—CAFOs That Discharge or Are Proposing to Discharge (May 28, 2010) (hereinafter 2010 Guidance); LPECL Admin, *Preferential Flow of Manure in Tile Drainage*, LIVESTOCK AND POULTRY ENVT'L. LEARNING COMMUNITY (Mar. 5, 2019), https://lpelc.org/preferential-flow-of-manure-in-tile-drainage/ (last visited Dec. 9, 2019); Michelle B. Nowlin, *Sustainable Production of Swine: Putting Lipstick on a Pig?*, 37 VT. L. REV. 1079, 1086-88 (2013), https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=5812&context=faculty_scholarship (last visited Dec. 9. 2019); Nate Seltenrich, *Manure Irrigation: Environmental Benefits, Potential Human Health Risks*, 125(12) ENVT'L

Leaching from storage facilities, excessive land application of CAFO waste, and other discharges from production and land application areas is almost certainly causing and contributing to widespread water quality impairments in Idaho.[33] The State's waterways are under siege from excessive numbers of animals housed on CAFOs and the necessity of disposing of their waste one way or another, year after year. As explained above, hundreds of state-collected water quality samples have discovered impairments from nutrient overloads, fecal coliform, dissolved oxygen, and *E. coli* many times the 126 cfu/100ml water quality criterion.[34] Nutrient pollution is widespread and dozens of streams, as well as large portions of the Snake River, have been under phosphorus total maximum daily loads ("TMDLs") for years now.[35] These water quality problems threaten the environment, wildlife, and human health throughout Idaho.

III. EPA Must Strengthen the Draft Permit to Protect Idaho's Waterways and Ensure Compliance with the CWA and Permit Conditions

When Congress specifically included CAFOs in the CWA's definition of "point source," it demonstrated an unambiguous intent to control and continuously reduce discharges of pollution from the CAFO industry through the NPDES permitting program.[36] EPA's approach to date has failed, and though the Draft Permit is an improvement to the status quo, it does not comply with the CWA and will not adequately reduce CAFO pollution of Idaho's waterways. CAFOs are and will continue to operate without the necessary oversight required by the CWA absent strong EPA action to ensure that discharging CAFOs must obtain NPDES permits in the first instance, in addition to more protective permit conditions.[37] Unfortunately, EPA's

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HEALTH PERSPECTIVE (Dec. 12, 2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5963588/ (last visited Dec. 9, 2019).

[33] *See, e.g.*, ICL GW Report, *supra* note 20, at 7-9, 13; JoAnn Burkholder et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality,* 115(2) ENVT'L. HEALTH PERSPECTIVE 308, *passim* (2008), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817674/ (last visited Dec. 9, 2019); Carrie Hribar, *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities*, NAT'L ASSN. OF LOCAL BOARDS OF HEALTH (2010), https://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf (last visited Dec. 9, 2019) ("It has been found that states with high concentrations of CAFOs experience on average 20 to 30 serious water quality problems per year as a result of manure management problems."); University of Idaho, *I-Safety*, https://www.uidaho.edu/dfa/administrative-operations/i-safety (last visited Dec. 9, 2019) (documenting a June 2018 "major oil spill at [a] dairy farm").

[34] *See supra* notes 21-24; Idaho DEQ, 2016 Integrated Report at xviii, 40 (listing E. coli contamination as a leading cause of impairment in lakes, rivers, and streams; *id.* list of Category 4a waters (impaired waters with EPA approved TMDLs), list of Category 5 waters (impaired waters needing a TMDL).

[35] *Id.* at Category 4a pgs 89-171 (listing TMDLs for the regions most populated with CAFOs); Idaho DEQ, *Snake River (Upper Snake-Rock) Subbasin*, https://www.deq.idaho.gov/water-quality/surface-water/tmdls/table-of-sbas-tmdls/snake-river-upper-snake-rock-subbasin/ (last visited Dec. 9, 2019) (providing details of the extensive phosphorus and pathogen contamination of a portion of the Upper Snake River that runs through the Magic Valley where CAFOs are prevalent, and where TMDLs have been in place since 1999).

[36] 33 U.S.C. § 1362(14).

[37] As discussed above, no CAFOs currently operate under any NPDES permit whatsoever in Idaho. The ongoing water impairments fairly traceable to CAFOs and their waste management practices highlights the importance of a protective general permit being in place for when these facilities are finally required to seek permit coverage as required under the CWA. These facilities are clearly engaged in widespread, unpermitted discharges of pollutants

fundamentally flawed framework for regulating CAFOs has left them profoundly underregulated, with serious and ongoing consequences to water quality across Idaho. With an expanding CAFO industry and increasingly impaired waters, Idaho needs far more protection that the Draft Permit provides. Idaho's CAFOs are not "zero discharge" facilities, and the Draft Permit does not go far enough.[38]

EPA must strengthen the Draft Permit to meet the mandates of the CWA and to protect Idaho's jurisdictional waters and environment. In particular, Commenters submit the following 12 objections and suggestions for improving the Draft Permit.

A. EPA Should Establish a Presumption of Discharge for Certain CAFOs

To regulate all CAFO dischargers and establish an effective duty to apply standard, EPA must make the requisite factual findings to support the inclusion of provisions in its General Permit that create a presumption of discharge for certain CAFOs. Following *National Pork Producers Council*,[39] which eliminated the duty to apply for CAFOs that propose to discharge based on design or operation characteristics, the number of NPDES-permitted CAFOs in Idaho has dropped from over one hundred to *zero*.[40] Yet EPA has estimated that as many as 75% of CAFOs in fact discharge.[41] Idaho CAFOs are no exception, and EPA cannot allow the status quo of nonregulation of jurisdictional discharges and associated water quality impairments to continue across the State.

EPA has already done much of the work to establish the needed presumptions. While some aspects are no longer applicable since *Pork Producers* and EPA's subsequent rule revision, EPA's 2010 CAFOs that Discharge or are Proposing to Discharge guidance[42] ("2010 Guidance") provides a strong starting point to conduct objective assessments of which categories of Idaho CAFOs discharge based on the conditions and practices at the state's CAFOs that can lead to illegal and unpermitted discharges in the state. The 2010 Guidance explains that some conditions that lead to CAFO discharges – including proximity to waters of the U.S., whether the CAFO is upslope from waters of the U.S., climatic conditions, and drainage of the production area – are "beyond the operator's control,"[43] such that EPA can support a factual determination that all Idaho CAFOs with these conditions are dischargers with a duty to apply for the General Permit.

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that need to be brought under control. *See generally* EPA CAFO Information Collection, *supra* note 13 (estimating that "75 percent of all CAFOs could experience discharges based on standard operational profiles").

[38] *See, e.g.*, Draft Permit at 14 ("Ensuring accurate application rates *reduces probability* of off-site transport [of pollutants]." (emphasis added)); 40 C.F.R. § 412.4(c)(2) (requiring only that BMPs for land applications "minimize phosphorus and nitrogen transport from the field to surface waters").

[39] *Nat'l Pork Producers Council v. EPA*, 635 F.3d 738 (5th Cir. 2011).

[40] *Compare* EPA, NPDES CAFO Rule Implementation Status – National Summary, Endyear 2011, completed 12/31/11, https://www.epa.gov/sites/production/files/2015-08/documents/npdes_cafo_rule_implementation_status_-_national_summary_endyear_2011_0.pdf (last visited Dec. 9, 2019), *with* EPA, NPDES CAFO Permitting Status Report: National Summary, Endyear 2018, completed 12/31/18, https://www.epa.gov/sites/production/files/2019-09/documents/cafo_tracksum_endyear_2018.pdf (last visited Dec. 9, 2019).

[41] EPA, CAFO Information Collection, *supra* note 13.

[42] EPA, 2010 Guidance, *supra* note 32.

[43] *Id*. at 4.

The 2010 Guidance also addresses ventilated livestock confinement buildings as sources of production area discharges of contaminated process wastewater, as these systems can directly discharge pollutants such as manure dust, litter, ammonia, and feathers into nearby waters of the U.S. or conduits to jurisdictional waters, such as production area ditches or channels. While the Guidance limited this discussion to poultry houses, other livestock sectors, including dairies, also emit ammonia and other pollutants via the confinement buildings, whether open air, partially enclosed, or fully enclosed. As discussed below at section III.K, the majority of ventilated or otherwise emitted ammonia will deposit nearby, including in conduits to waters of the U.S. and in waters of the U.S. themselves, where it contributes to nitrogen pollution. Because these systems cause ongoing discharges at many facilities, CAFOs ventilating pollutants from their confinement houses have a duty to apply for an NPDES permit if an objective assessment indicates that this method of operation leads to a discharge of pollutants.

It appears that EPA has not conducted the requisite objective assessments for Idaho CAFOs in the past several years, because the number of permitted operations in the state has dwindled to zero under the agency's watch. Nonetheless, absent appropriate findings that certain CAFOs discharge and a corresponding duty to apply for all discharging CAFOs, the Draft Permit is unlawful. The presumptions of discharge from the production area and duty to apply should likely at a minimum apply to CAFOs located directly upslope from, land applying upslope from, or otherwise located or land applying in close proximity to a water of the U.S. or conduit to water of the U.S.; CAFOs located in a floodplain; and CAFOs discharging via water-polluting emissions and ventilation systems.

B. The Final Permit Should Require Individual NPDES Permits for Very Large CAFOs and CAFOs Located in Already Impaired Watersheds

As a threshold matter, EPA should consider two additional criteria requiring an individual NPDES permit in addition to those outlined at Section I.F of the Draft Permit. First, EPA should consider a numerical animal unit cap for coverage under this General Permit. Very large facilities should not be assumed to have the same water pollution potential as all other, smaller facilities, and EPA should not assume that the same TBELs will adequately protect water quality from large CAFOs of every scale. EPA has itself recognized that general permit conditions may be too generalized to address the unique potential for discharges at extremely large CAFOs, and the Final Permit should reflect that fact.[44]

Second, given Idaho's existing significant water impairments in regions dominated by CAFOs and irrigated agriculture used to dispose of CAFO waste, CAFOs located in or land applying waste in already impaired watersheds should be required to obtain individual NPDES permits. This would allow EPA and state regulators to more effectively analyze the CAFO's likely impact on the impaired waterway and determine the WQBELs and wasteload allocations necessary to attain WQS and implement TMDLs. Assuming that compliance with a general permit—which is by nature generalized and not capable of ensuring those protections uniquely necessary for certain impaired waterways—will stop ongoing impairment, and even improve

[44] *See* EPA, 833-K-10-001, NPDES Permit Writers' Manual at 3-3 (Sept. 2010) (hereinafter NPDES Permit Writer's Manual) (explaining how issuing individual permits allows for catered consideration of pollution potential and WQBELs).

water quality, is incorrect and not supported by a history of water quality problems in Idaho.[45] Individual NPDES permit coverage would be far more effective at meeting the goal of the CWA and bringing CAFO pollution under control.[46]

For example, significant portions of the Snake River watershed are under TMDLs for pathogens and phosphorus,[47] and recent data show levels of nitrate contamination in the hydrologically connected groundwater in the same area are likely to keep rising for 40-50 years even if nitrogen inputs are held constant.[48] This same area is heavily populated by CAFOs.

C. The Final Permit Must Require Effluent Monitoring

The CWA requires that NPDES permits contain conditions, including data collection and reporting, to "assure compliance" with the Act.[49] Furthermore, Section 308 of the Act states that "[w]henever [it is] required to carry out the objective" of the CWA, "(A) the [EPA's] Administrator shall require the owner or operator of any point source to … (iii) install, use, and maintain such monitoring equipment or methods … and (v) provide such other information as he may reasonably require."[50]

EPA's accompanying CWA regulations require all NPDES permits to include certain monitoring and reporting requirements designed to "assure compliance with permit limitations."[51] These regulations include, among other provisions, "requirements to monitor: (i) The mass (or other measurement specified in the permit) for each pollutant limited in the permit; (ii) The volume of effluent discharged from each outfall; [and] (iii) Other measurements as appropriate…."[52] Permit monitoring provisions must further specify the "type, intervals, and frequency [of sampling] sufficient to yield data which are representative of the monitored activity, including, when appropriate, continuous monitoring."[53] Permittees must report monitoring results "with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year."[54] Given these statutory and regulatory requirements, "[g]enerally, 'an NPDES permit is unlawful if a permittee is not required to effectively monitor its permit compliance.'"[55]

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[45] CAFO general permits have been the practice in Idaho for many years (when CAFOs were being issued permit coverage at all), yet water quality continues to be a major problem in areas dominated by CAFOs as explained above at section II.
[46] NPDES Permit Writer's Manual, *supra* note 44, at 3-3.
[47] *See supra* notes 21-23, 35.
[48] ICL GW Report, *supra* note 20, at 13 (finding that "USGS numerical model simulations of nitrate in the [Eastern Snake Plain Aquifer] indicate that it will take 40-50 years for concentrations to rise to the levels expected based on the amount of nitrogen that has been put on the land….").
[49] 33 U.S.C. § 1342(a)(2); *NRDC v. EPA*, 808 F.3d 556, 580 (2d Cir. 2015) ("Under the CWA, NPDES permits must contain conditions that require both *monitoring* and *reporting of monitoring results* of TBELs and WQBELs to ensure compliance." (emphasis in original)).
[50] 33 U.S.C. § 1318(a).
[51] 40 C.F.R. § 122.44(i)(1).
[52] *Id.*
[53] *Id.* § 122.48(b).
[54] *Id.* § 122.44(i)(2).
[55] *NRDC v. EPA*, 808 F.3d at 583 (quoting *NRDC v. City of L.A.*, 725 F.3d 1194, 1207 (9th Cir. 2013)).

EPA must include monitoring requirements that allow for meaningful oversight of Idaho CAFOs' compliance with the Draft Permit's conditions and effluent limitations. This requires representative water quality monitoring at CAFO production sites as well as land application sites adequate to provide oversight of permit compliance. While the Draft Permit prohibits discharges from CAFO production areas except under limited circumstances and requires CAFOs to develop and implement Nutrient Management Plans ("NMP") for the handling, storing, and land application of their waste, the Draft Permit does not include monitoring requirements that would enable EPA, Idaho officials, or the public to ensure their operations are in compliance with these no discharge parameters and effluent limitations. As explained by the Second Circuit, "NPDES permits must contain conditions that require both *monitoring* and *reporting of monitoring results* of TBELs and WQBELs to ensure compliance."[56] The Draft Permit's failure to require such monitoring plainly violates the CWA and leaves regulators and the public to guess whether and how CAFOs are violating the law.

The sampling and monitoring requirements the Draft Permit does contain are insufficient to satisfy the CWA or EPA regulations. The soil and manure sampling requirements included in the Draft Permit look at the nitrogen and phosphorus content of CAFO waste and target fields, helping calculate agronomic rates of application, but have nothing to do with whether discharges are occurring that impact jurisdictional waters.[57] Nothing about this sampling tells whether waste was actually applied appropriately and in accordance with a CAFO's NMP. And the requirement to monitor manure spills and other obvious, discrete discharges from wastewater or manure storage structures also does not suffice because it takes place after a known violation, rather than being representative and serving to assure compliance.[58]

EPA must determine what monitoring is representative for a particular CAFO applicant. It will likely include monitoring surface water and/or groundwater where a direct hydrological connection exists between groundwater and jurisdictional waters, monitoring discharge points from production areas, such as ditches that may carry contaminated wastewater off-site and into waterways.[59] Representative monitoring must also include monitoring requirements for tile drain outfalls at fields where CAFO waste is land applied, where such systems are in place. Tile drain systems are conduits underlying agricultural fields designed to shed excess moisture, and where liquid manure is applied can directly discharge pollutants to surface waters or conduits to surface

[56] *NRDC v. EPA*, 808 F.3d at 580 (emphasis in original).
[57] *See* Draft Permit at II.B.6, III.A.2.g.
[58] *See* Draft Permit at IV.D.
[59] Direct hydrological connections exist between Idaho's groundwater and jurisdictional waterways in regions of Idaho most heavily populated by CAFOs. *See* ICL GW Report, *supra* note 20, at 5-6, 9; *supra* note 19. Other states require exactly this to ensure compliance with NPDES permits and protect water quality. *See* California General NPDES Permit No. CAG011001 for CAFOs within the North Coast Region, at Attachment E Monitoring and Reporting Program.

waters.[60] This is necessary to monitor compliance with the Draft Permit's "no dry weather discharge" provision.[61]

Until EPA requires representative effluent monitoring where appropriate to document discharges from CAFO production and land application areas, many of the terms and conditions of the Draft Permit will remain mere words on paper. EPA may not excuse CAFOs from the monitoring required of all NPDES permittees simply because it has created a legal fiction that these operations do not discharge. But even if that were the case, zero is an effluent limit, and the CWA requires CAFOs to demonstrate their compliance with it.

D. The Final Permit Must Require BPJ Limits for CAFO Pollutants with No ELG

EPA essentially treats CAFO waste as only containing nutrients that are beneficial to crop production if applied at agronomic rates.[62] Under this approach, any other pollutants of concern that may be found in CAFO waste, but that are not beneficial to or utilized by crops, are not considered or regulated under the NPDES program. Yet CAFO waste contains a variety of other pollutants including solids (feed, hair, feathers, etc.); salts; trace elements such as arsenic, copper, selenium, zinc, cadmium, molybdenum, nickel, lead, iron, manganese, aluminum, and pesticide ingredients; pathogens (bacteria, viruses, protozoa, fungi, prions, and helminths); antimicrobials (antibiotics and vaccines); hormones (both natural and synthetic); pesticides; soaps; and disinfectants.[63]

Regarding pollutants for which no ELG has been established, EPA regulations require case-by-case effluent limitations based on Best Professional Judgment ("BPJ").[64] BPJ effluent limitations can take the form of numerical limitations or BMPs. Recent EPA guidance further clarifies that permitting agencies must establish BPJ limits for pollutant discharges not covered by the applicable ELGs:

[60] *See* LPECL Admin, *Preferential Flow of Manure in Tile Drainage*, Livestock and Poultry Environmental Learning Community (Mar. 5, 2019), https://lpelc.org/preferential-flow-of-manure-in-tile-drainage/ (last visited Dec. 9, 2019) ("Application of liquid animal manures to soils with subsurface drainage has been linked to contamination of the effluent with nutrients, particulate organic matter, estrogens, bacteria, and antibiotics." (citations omitted)); California General NPDES Permit No. CAG011001 for CAFOs within the North Coast Region at F-31 to F-32 ("Tile drainage water may contain various agricultural pollutants, including nutrients and salts."). Many other states require tile drain outfall monitoring. *See, e.g.*, Michigan DEQ, NPDES Permit No. MIG010000 for CAFOs (2015) at B.3.b.4 (requiring inspection before and after application).
[61] Draft Permit at II.B.9.
[62] *See* Draft Permit Section II.B (focusing exclusively on the nutrients in CAFO waste land applications); *id.* at Section III.A.2.g.i (only requiring manure to be tested for phosphorus and nitrogen).
[63] EPA, Office of Water, 820-R-13-002, Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality (July 2013), at 2; University of Idaho Extension, CIS 1156, Dairy Manure Field Applications—How Much Is too Much?, https://www.extension.uidaho.edu/publishing/pdf/CIS/CIS1156.pdf (last visited Dec. 9, 2019) (discussing soluble salts accumulation and "concern[] about the accumulation of copper (Cu) in the soil because of the application of dairy wastes to agricultural fields").
[64] 40 C.F.R. § 125.3; 33 U.S.C. § 1342(a)(1) (authorizing EPA to issue permit conditions "necessary to carry out the provisions of the [CWA]").

> Where EPA has not promulgated technology-based effluent guidelines for a particular class or category of industrial discharger, *or where the technology-based effluent guidelines do not address all wastestreams or pollutants discharged by the industrial discharger*, EPA must establish technology-based effluent limitations on a case-by-case basis in individual NPDES permits, based on its best professional judgment or "BPJ."
>
> . . .
>
> *[A]n authorized state must include technology-based effluent limitations in its permits for pollutants not addressed by the effluent guidelines for that industry*. 33 USC § 1314(b); 40 CFR § 122.44(a)(1), 123.25, 125.3. In the absence of an effluent guideline for those pollutants, the CWA requires permitting authorities to conduct the "BPJ" analysis discussed above on a case-by-case basis for those pollutants in each permit.[65]

CAFOs are capable of discharging a variety of pollutants with no established ELGs, as explained further in sections E and K. This includes CAFO waste handled at production areas and land applied to fields, as well as discharges of pollutants from CAFO ventilation systems. Many pollutants found in CAFO waste applied to agricultural fields are not subject to agronomic rate considerations because they are not nutrients available for use by crops. Instead, they must be treated as what they are: pollutants that CAFOs produce, handle, and dispose of in ways that potentially result in discharges to jurisdictional waters. These pollutants and those discharged by ventilation systems do not have ELGs and thus require EPA to develop BPJ limitations sufficient to protect against unpermitted discharges to jurisdictional waters.

E. The Draft Permit Requires Inadequate Sampling of Soils and CAFO Waste

FWW supports EPA's requirement of annual soil tests for land application sites in the Draft Permit,[66] which is more protective than its ELG requirement of a phosphorus soil test only every five years.[67] However, a timeframe for when sampling must occur and clear requirements for representative sampling would be an appropriate additional safeguard. It is critical that current and actual soil conditions are understood before CAFO waste is applied to agricultural fields. As the University of Idaho Bulletin # 704 regarding soil sampling states, "soil sampling is also one of the most important steps in a sound crop fertilization program."[68] CAFOs "should take soil samples as close as possible[,]" ideally "2 to 4 weeks before . . . fertilizing the crop."[69] Because the University of Idaho Bulletin # 704 does not mandate this common sense practice, FWW asks that EPA establish a clear period of time prior to waste application in which CAFOs

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[65] James A. Hanlon, Director, EPA Office of Wastewater Management, *National Pollutant Discharge Elimination System (NPDES) Permitting of Wastewater Discharges from Flue Gas Desulfurization (FGD) and Coal Combustion Residuals (CCR) Impoundments at Steam Electric Power Plants*, at Attachment A 1-2 (Jun. 7, 2010). Although this Memorandum discussed coal plant discharge limits, the statutory requirement to establish technology-based limits using BPJ is equally applicable across industries.
[66] Draft Permit at II.B.6.
[67] 40 C.F.R. 412.4(c)(3).
[68] Draft Permit Appendix G, at 2.
[69] *Id.*

must conduct this sampling to avoid early sampling that does not capture actual and current soil conditions. For example, if soil samples are taken early in the year, potentially many months before land applications will occur, actual soil conditions may no longer be understood and CAFO waste may be overapplied. A variety of factors could make dated soil samples inappropriate tools for ensuring agronomic rate applications including other nutrient applications, drift from nutrient applications to nearby fields, or re-deposition of nitrogen lost to the atmosphere from CAFO waste from volatilization during storage and handling.[70]

The Draft Permit should also make clear that soil samples must be representative of actual conditions on the target field. As University of Idaho Bulletin # 704 notes, "[a]n absolute minimum of 10 subsamples from each sampling unit" should be taken, especially for irregular fields, as this is "necessary to obtain an acceptable [overall] sample."[71] Since the Bulletin is merely suggestive, EPA should include a clear and mandatory permit condition along these lines.

Similarly, FWW supports at least annual manure sampling as outlined in the Draft Permit,[72] but EPA should establish more stringent requirements. First, EPA should make clear in the Final Permit that such manure samples must be representative of the material that will be applied by the CAFO. University of Idaho Manure and Wastewater Sampling CIS 1139 notes that "proper sampling is the key to reliable manure analysis," but only suggests the need for multiple and representative samples.[73] Requiring "compliance" with such open-ended and non-mandatory technical standards is inadequate; EPA must go farther and require multiple, representative samples in such a way as to ensure accurate understanding of what the CAFO is spreading onto fields.[74]

And as with soil sampling, EPA should mandate that manure sampling be conducted shortly before land application. The Draft Permit gives passing reference to University of Idaho Manure and Wastewater Sampling CIS 1139, but does not mandate anything from the guidance and fails to mention anything regarding when samples must be taken.[75] CIS 1139 suggests that CAFOs conduct manure sampling "as close to the date of application as practical…or within 30 days" at the earliest.[76] EPA should clearly incorporate and mandate this standard. If manure is

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[70] *See* PennState Extension, *Pennsylvania Nutrient Management Program: Irrigation of Liquid Manures*, https://extension.psu.edu/programs/nutrient-management/educational/manure-storage-and-handling/irrigation-of-liquid-manures (last visited Dec. 9, 2019) (noting a "typical problem[] with irrigating liquid manure include[s]… overspray or drift of liquid manure onto neighboring properties"); Larry J. Puckett, USGS National Water-Quality Assessment Program, Water-Resources Investigations Report 94-4001 (last modified Dec. 7, 2016), *Nonpoint and Point Sources of Nitrogen in Major Watersheds of the United States*, https://pubs.usgs.gov/wri/wri944001/wri944001.html (last visited Dec. 9, 2019) (explaining that concentrated animal agriculture causes atmospheric nitrogen deposition); USDA, Economic Research Service, Managing Manure to Improve Air and Water Quality at 5, https://www.ers.usda.gov/webdocs/publications/46336/28994_err9b.pdf?v=0 (last visited Dec. 9, 2019) (showing that nitrogen off gasses from animal waste lagoons and CAFO ventilation systems).

[71] Draft Permit Appendix G, at 4.

[72] Draft Permit at II.B.6.

[73] Draft Permit Appendix F.

[74] University of Idaho Manure and Wastewater Sampling CIS 1139 suggests "at least eight" sample sites for storage lagoon liquid, for example. Draft Permit Appendix F, at 2.

[75] Draft Permit at III.A.g.i.

[76] Draft Permit Appendix F, at 1.

land applied at different times throughout the year, the Draft Permit should require sampling shortly prior to each and every period of application.

Additionally, EPA should expand the pollutants for which CAFOs must conduct sampling. The Draft Permit requires that manure only be sampled for nitrogen and phosphorous.[77] But, as explained above, CAFO waste is known to contain an array of other pollutants of concern.[78] EPA should require CAFO waste that will be applied to fields be analyzed for all of the constituent pollutants that EPA has already found it likely to contain, and these sampling requirements should correspond to the pollutants for which EPA determines it must establish BPJ effluent limits. If laboratory analysis determines that other pollutants of concern are present in the samples, appropriate restrictions on land application practices must be in place to ensure harmful constituents are not disposed of on agricultural fields in such a way that will likely lead to a discharge to surface waters.

F. The Final Permit Should Contain Stronger Waste Storage Requirements

Appropriate waste storage structures are an integral part of ensuring CAFOs do not discharge pollutants in violation of permit conditions. EPA should include two additional permit conditions and revise one provision pertaining to waste storage structures.

First, EPA should include phase-out requirements for old manure lagoons and other storage facilities that no longer meet the most current EPA and NRCS standards. Antiquated storage facilities pose an unacceptable threat, and should not be allowed to simply continue operating until they fail. As noted above, the regions of Idaho most populated with CAFOs overlie highly fractured basalt geology that allows nutrients to infiltrate groundwater, which is well-documented to have direct hydrological connection to jurisdictional waters.[79]

Second, EPA should develop its own standards for the technical specifications of waste storage facilities. The Draft Permit relies on NRCS standards,[80] which have proven insufficient after years of water quality impairments across the United States. In fact, NRCS standards expressly allow for leaks of pollutants, which can result in discharges of pollutants to jurisdictional waters.[81] Specifically, EPA should require that all waste impoundment structures that are not virtually impermeable (such as concrete manure storage facilities) phase in synthetic liners with leak monitoring systems as soon as practicable. Synthetic liners with leak detection

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[77] Draft Permit at II.B.6.
[78] *See supra* note 63 and accompanying text.
[79] *See supra* note 30.
[80] Draft Permit at III.B.; *see* NRCS, 359-CPS-1, Conservation Practice Standard No. 359: Waste Treatment Lagoon (Oct. 2003).
[81] NRCS, 359-CPS-1, Conservation Practice Standard No. 359: Waste Treatment Lagoon at 1, 4 (Oct. 2003) (discussing "minimizing the potential of lagoon liner seepage," and cross-referencing Agricultural Waste Management Field Handbook, Appendix 10D); NRCS, Agricultural Waste Management Field Handbook, Chapter 10 at 10D-4 (Aug. 2009), https://www.wcc.nrcs.usda.gov/ftpref/wntsc/AWM/handbook/ch10.pdf (last visited Dec. 9, 2019) (recognizing that even the more protective synthetic liners can only "reduce seepage," not eliminate it).

systems are in use at some CAFOs already, and are the appropriate BAT standard that Idaho CAFOs should be held to.[82]

Finally, EPA should revise the Draft Permit Section III.A.2.a.i to eliminate the ability of a CAFO to seek coverage under this permit without having in place sufficient waste storage capacity. As written, the Draft Permit appears to enable a CAFO to begin or continue housing animals even if its waste storage capacity evaluation determines the facility has "less than the minimum capacity requirements specified in Section II.A.1." This does not make sense and could easily lead to CAFOs operating without needed capacity when the time comes—instead, every CAFO must have adequate waste storage capacity *before* its Notice of Intent is approved.[83]

G. EPA Should Establish Additional Requirements for Transfers of CAFO Waste to Third Parties

As written, the Draft Permit's safeguards for avoiding discharges of pollutants to jurisdictional waterways via land application only apply to "land under the control of the CAFO owner/operator,"[84] and the requirements for when a CAFO instead transfers its waste are extremely sparse. EPA must include additional safeguards for when CAFO owners/operators transfer CAFO waste by sale or gift to third parties. This is a necessary and appropriate addition because as NPDES-permitted industrial facilities, CAFO waste management practices of all kinds are central to attaining the goal of the CWA. Absent greater protections, CAFOs have an incentive to transfer their waste to third parties without conducting any due diligence as to the likely impacts on water quality; third party land application brings all the same risks of water quality impairments attendant to a CAFO's own land application. When a CAFO generates waste, which has a high potential to pollute jurisdictional waters, it should be required to responsibly deal with that waste, even when doing so means transferring it to a third party.

In addition to the conditions outlined at III.D of the Draft Permit, CAFO owners/operators should be required to do the following before being permitted to transfer waste to a third party: communicate to any recipient all land application guidelines and best management practices that would apply were the CAFO land applying the waste to lands under its control, inquire as to whether the third party intends to responsibly handle and utilize the waste and receive an affirmative response, inquire where and in what quantities the recipient intends to land apply any of the transferred waste, and record and report the preceding items to EPA and Idaho officials. CAFO owners/operators should retain some degree of responsibility for

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[82] *See, e.g.*, Enviroscan, *Liner Leak Detection*, http://www.enviroscan.com/home/liner-leak-detection (last visited Dec. 9, 2019) (explaining that "many, if not most, liners have leaks" and describing its product services to detect such leaks); Press Release, Western Environmental Law Center (Dec. 12, 2016), WA Industrial Dairy Installs Court-Ordered Manure Lagoon Liners to Protect Groundwater, https://westernlaw.org/wa-industrial-dairy-installs-court-ordered-manure-lagoon-liners-protect-groundwater-news-rel/ (last visited Dec. 9, 2019).

[83] As a stark example of the consequences of allowing a CAFO to populate with animals prematurely, without adequate storage capacity and preparation, EPA needs to look no further than across the border to eastern Oregon and the failed Lost Valley mega-dairy. *See, e.g.*, Courtney Flatt, *Troubled Oregon Dairy Announces Shut Down*, OPB (Oct. 24, 2018), https://www.opb.org/news/article/oregon-lost-valley-dairy-shut-down/ (last visited Dec. 9, 2019) ("Most of the environmental problems at the dairy stemmed from improper storage of manure and other waste and mismanagement.").

[84] Draft Permit at 9.

how and to whom they transfer their waste, lest this loophole become a go-to avenue for disposing of a CAFO's waste irresponsibly. These measures are necessary to safeguard against CAFOs transferring waste to another person who is incapable of responsibly handling such wastes and from CAFO owners/operators using third parties to do what they themselves are prohibited from doing under the terms of their NMP and this General Permit.

H. Land Application of Waste from Anaerobic Digesters

An increasing number of CAFOs in Idaho are using or are considering using anaerobic digesters to capture methane from animal waste generated at CAFOs.[85] EPA may not ignore the use of digestate—the leftover solid and liquid waste after methane capture—as a fertilizer for land applications. Digestate poses heightened risks to water quality, and merely spreading this digestate on fields as though it were no different than undigested CAFO waste is not BAT, in violation of the CWA and EPA's regulations. NRCS warns that nitrogen, phosphorus, and other elements in digestate are more water soluble than in undigested CAFO waste, making it more prone to leaching and runoff and posing a unique risk to surface water.[86] Until EPA conducts a thorough assessment of the water pollution implications of land applying digestate, and how this affects agronomic rates, the Draft Permit should prohibit the use of liquid or solid digestate in land application practices.

I. The Final Permit Must Prohibit Spray Irrigation

The Draft Permit should expressly prohibit spray irrigation of manure given the unique risks associate with this practice.[87] Using spray irrigation threatens surface waters because this practice can result in excessive application that causes waste ponding, leaching, and potential dry weather runoff.[88] Spray irrigation also has the potential to cause drift to surface waters nearby

[85] American Biogas Council, *Biogas State Profile: Idaho* (last updated Aug. 7, 2015), https://americanbiogascouncil.org/wp-content/uploads/2019/08/ID-State-Biogas-Profle.pdf (last visited Dec. 9, 2019); Laurie Welch, *Company Announces $240 Million Plan to Build 6 Anaerobic Digesters Near Burley*, MagicValley.com (June 4, 2019), https://magicvalley.com/business/agriculture/company-announces-million-plan-to-build-anaerobic-digesters-near-burley/article_b6f1b9c7-90c0-558f-a007-31a85f0a52e7.html (last visited Dec. 9, 2019).

[86] NRCS, 366-CPS-1, Conservation Practice Standard No. 366: Anaerobic Digester, at 6 ("Land application of digester effluent, compared with fresh manure, may have a higher risk for both ground and surface water quality problems. Compounds such as nitrogen, phosphorus, and other elements become more soluble due to anaerobic digestion and therefore have higher potential to move with water.").

[87] Center-pivot spray irrigation systems used by Idaho CAFOs are prevalent. *See* Ronald E. Sheffield, Matthew W. Thompson, University of Idaho College of Agricultural and Life Sciences Research Bulletin: RES164, Odor Assessments of Idaho Livestock Farms and Manure Application Practices (2004), https://www.extension.uidaho.edu/publishing/pdf/RES/RES0164.pdf (last visited Dec. 9, 2019).

[88] *See* Wisc. Manure Irrigation Workgroup, Considerations for the Use of Manure Irrigation Practices at 40 (Apr. 2016), https://green.extension.wisc.edu/files/2017/09/Manure-Irrigation-Workgroup-Report-2016.pdf (last visited Dec. 9, 2019) (hereinafter Considerations for the Use of Manure Irrigation Practices); Water Watch Wisconsin, *Manure Spray Under Scrutiny*, Wisc. Center for Investigative Journalism (Apr. 27, 2014), https://www.wisconsinwatch.org/2014/04/manure-spraying-under-scrutiny/ (last visited Dec. 9, 2019) (hereinafter *Manure Spray Under Scrutiny*).

target fields.[89] These irrigation systems are also reliant on pipes and hoses to connect lagoons with sprayfields, which can leak or break, resulting in unpermitted discharges.[90]

Spray irrigation also results in higher rates of evaporation and volatilization of a range of CAFO pollutants.[91] Several studies have found that when manure is not incorporated into soil after application, more than half of the manure ammonia is lost, likely due to volatilization.[92] This directly impacts surface waters because volatilized ammonia will re-deposit into waterways.[93]

J. EPA Must Prohibit Land Applications When Current or Impending Rainfall Is Capable of Producing Unauthorized Discharge

The Draft Permit does not appear to include a condition requiring, or even suggesting, CAFOs delay land applications of waste if current or impending precipitation capable of producing an unauthorized discharge is forecasted. This is a typical requirement in other CAFO NPDES permits, and one EPA strongly encourages delegated states to implement;[94] EPA should clearly require it in this permit as well. Even the currently operative CAFO general permit from 2012 contains this consideration by incorporating NRCS Conservation Practice 590.[95] As a result, if the Final Permit does not include this prohibition and lacks a considered justification and finding of necessity, it would violate the CWA's express anti-backsliding prohibition.[96]

When the National Weather Service forecasts rainfall exceeding one-half inch, or less if a lesser rainfall event is capable of producing unauthorized discharge, during the planned time of application or within 24 hours after the planned time of application, CAFOs must delay land application because rainfall onto freshly applied waste is likely to result in discharges. Such a requirement follows logically from the restrictions already deemed essential in the Draft Permit,

[89] Considerations for the Use of Manure Irrigation Practices, *supra* note 88, at 30-33, 40-42; Nate Seltenrich, *Manure Irrigation: Environmental Benefits, Potential Human Health Risks*, 125(12) ENVT'L HEALTH PERSPECTIVE (Dec. 12, 2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5963588/ (last visited Dec. 9, 2019); *Manure Spray Under Scrutiny*, *supra* note 88.

[90] NRDC, Cesspools of Shame: How Factory Farm Lagoons and Sprayfields Threaten Environmental and Public Health at 29 (July 2001), https://www.nrdc.org/sites/default/files/cesspools.pdf (last visited Dec. 9, 2019) (hereinafter Cesspools of Shame).

[91] *Id.* at 17; Iowa State University Extension, Using Manure Nutrients for Crop Production at Tbl. 2 (May 2016), https://store.extension.iastate.edu/product/Using-Manure-Nutrients-for-Crop-Production (last visited Dec. 9, 2019) (follow free "download" link to view document) (showing that spray irrigation has the highest volatilization rate of various application practices).

[92] Cesspools of Shame, *supra* note 90, at 37.

[93] *See, e.g.*, Cassey Ng, *Agriculture and Water Pollution Risks*, 3 UTAH AGRICULTURE SCIENCE J. 34, 38 (Nov. 2017), https://www.researchgate.net/profile/Casey_Ng3/publication/320867723_Agriculture_and_Water_Pollution_Risks/links/59ffe1b9aca272347a2aff22/Agriculture-and-Water-Pollution-Risks.pdf (last visited Dec. 9, 2019) ("Volatilized ammonia is eventually deposited into waterways.").

[94] *See* EPA, NPDES Writers' Manual for CAFOs, *supra* note 3, at 6-15 ("In general, EPA strongly encourages states to prohibit application to frozen, snow-covered, or saturated ground, and when the forecast calls for rain in an amount that is likely to produce runoff…."); EPA, Region 6, NPDES General Permit for Discharges from CAFOs in New Mexico (NMG01000) at II.A.5.b.ii.

[95] 2012 General Permit Appendix B pg 7.

[96] 33 U.S.C. § 1342(o).

namely the prohibition on applying to saturated ground. There is no reason to only prohibit applying waste when rain has already saturated ground, but not when rainfall is actively or imminently going to produce similar conditions that make unauthorized discharges likely.

K. Discharges from Ventilation Systems

The Final Permit should also make clear that discharges from CAFO ventilation systems are point source discharges covered by the CWA, and establish permit conditions necessary to protect waterways from this pollution. The term "pollutant" is defined very broadly in the CWA,[97] and EPA's position is that CAFO ventilation fans are capable of discharges covered by the CWA.[98] These ventilation systems are used by various types of facilities, and can directly discharge pollutants such as manure, dust, litter, ammonia, and animal debris (feathers, hair, etc.) into nearby jurisdictional waters or conduits to jurisdictional waters, such as production area ditches or channels.

EPA must include BPJ conditions in the Permit regarding the use of ventilation systems. As EPA has stated, "there are other circumstances where a permit writer must use BPJ or special permit conditions to address specific discharges at CAFOs that are not included in the ELG. For example, the CAFO ELG does not address … pollutants (such as manure, feathers, and feed) that have fallen to the ground immediately downward from confinement building exhaust ducts and ventilation fans …."[99]

L. Reassess 25-year, 24-hour Storm Event Standards

EPA should require Idaho CAFOs to plan for the extreme precipitation events made increasingly more common by climate change.[100] Extreme precipitation events are likely to cause overflows of stored waste at CAFO production areas designed to specifications based on outdated historical precipitation patterns. The consequences of storage lagoon overflows are dire, as shown by recent events elsewhere in the nation.[101] The Draft Permit does not specifically define this standard, but a CAFO operator could reasonably look to EPA's regulatory definition for guidance to determine the nature of a "25-year, 24-hour storm event" for their operation. Unfortunately, EPA anchors its regulatory definition to nearly 60-year-old NRCS data.[102] Given

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[97] 33 U.S.C. § 1362(6).

[98] EPA, 2010 Guidance, *supra* note 32, at 2, 14; *see Nat'l Pork Producers Council*, 635 F.3d at 748 (discussing EPA's position that "litter released through confinement house ventilation fans" would be covered discharges, and essentially agreeing with this assessment, holding that EPA's position "merely restate[s] section 1342's prohibition against discharging pollutants without an NPDES permit").

[99] EPA, NPDES Writers' Manual for CAFOs, *supra* note 3, at 4-18.

[100] NOAA National Centers for Envt'l Information, *State Climate Summaries: Idaho*, https://statesummaries.ncics.org/chapter/id/ (last visited Dec. 9, 2019) ("the number of extreme precipitation events (days with precipitation greater than 1 inch) has been above the long-term average over the past decade").

[101] *See, e.g.*, Kendra Pierre-Louis, *Lagoons of Pig Waste Are Overflowing after Florence. Yes, That's As Nasty As It Sounds.*, NEW YORK TIMES (Sept. 19, 2018), https://www.nytimes.com/2018/09/19/climate/florence-hog-farms.html (last visited Dec. 9, 2019).

[102] 40 C.F.R. § 412.2(i) (relying on National Weather Service Technical Paper No. 40 from May 1961). EPA's ELGs for certain CAFOs calls for waste storage capacity based on "actual climate data for the previous 30 years." 40 C.F.R. § 412.46(a)(1)(iii). This may still not be protective enough, but this at least should be clearly incorporated into the final Permit and applied to all CAFOs in Idaho.

that dated and no longer applicable set of metrics, EPA should establish a more protective and accurate standard based on the most current data that ensures CAFOs' waste impoundments are capable of accommodating today's more extreme 25-year, 24-hour storms. EPA has asked other state authorities to do just this.[103] If EPA does not require Idaho CAFOs to prepare for current conditions, facilities will be able to avail themselves of a permit shield for overflows and other discharges resulting from storms that are no longer 25-year, 24-hour events, but rather are the new normal.

IV. CONCLUSION

CAFOs in Idaho are having serious impacts on the State's jurisdictional waters, and EPA needs to bring these facilities' pollution under control to protect and improve water quality as required by the CWA. Commenters appreciate the steps forward EPA has included in the Draft Permit, but respectfully request that it strengthen the Permit with the above conditions and requirements that are necessary to protect water quality in Idaho from an out-of-control CAFO industry. And to give the Permit effect and make these improvements lead to actual improvements in water quality, EPA must establish a presumption of discharge for certain CAFOs that requires them to obtain NPDES permit coverage. Please contact us with any questions you may have regarding any of the above comments and why the proposed revisions are necessary in Idaho. Thank you for your attention and consideration.

Sincerely,

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[103] Email from Julianne Socha, EPA Region 5 Water Division, to Sylvia Heaton et al., Michigan Dept. of Environment, Great Lakes, and Energy, at para. 13 (Sept. 25, 2019) (obtained via public records request) (include here as Appendix C) (noting that the Michigan draft general permit for CAFOs references a 1992 source and states that "EPA encourages the State to use the most current rainfall probability data available to establish magnitudes of rainfall events" for the 25-year, 24-hour rainfall event standard included in permit Certificates of Coverage).

Appendix A

BEFORE THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

FOOD & WATER WATCH, ARKANSAS RIGHTS KOALITION, ASSATEAGUE COASTAL TRUST (MARYLAND), ASSOCIATION OF IRRITATED RESIDENTS (CALIFORNIA), BUFFALO RIVER WATERSHED ALLIANCE (ARKANSAS), CENTER FOR BIOLOGICAL DIVERSITY, CENTER FOR FOOD SAFETY, CONCERNED CITIZENS AGAINST INDUSTRIAL CAFOS (MARYLAND), DAKOTA RURAL ACTION (SOUTH DAKOTA), DALLAS COUNTY FARMERS AND NEIGHBORS (IOWA), DES MOINES WATER WORKS (IOWA), DODGE COUNTY CONCERNED CITIZENS (MINNESOTA), DON'T WASTE ARIZONA, THE ENVIRONMENTAL INTEGRITY PROJECT, GRAND RIVERKEEPER (OKLAHOMA), HELPING OTHERS MAINTAIN ENVIRONMENTAL STANDARDS (ILLINOIS), ILLINOIS CITIZENS FOR CLEAN AIR & WATER, INSTITUTE FOR AGRICULTURE AND TRADE POLICY, INTERFAITH WORKER JUSTICE (NEW MEXICO), IOWA CITIZENS FOR COMMUNITY IMPROVEMENT, JEFFERSON COUNTY FARMERS & NEIGHBORS (IOWA), JOHNS HOPKINS CENTER FOR A LIVABLE FUTURE, KEWAUNEE CITIZENS ADVOCATING RESPONSIBLE ENVIRONMENTAL STEWARDSHIP (WISCONSIN), LAND STEWARDSHIP PROJECT (MINNESOTA), MIDWEST ENVIRONMENTAL ADVOCATES (WISCONSIN), MISSOURI RURAL CRISIS CENTER, MOMS ACROSS AMERICA EASTERN SHORE CHAPTER (MARYLAND), MONTGOMERY TOWNSHIP FRIENDS OF FAMILY FARMS (PENNSYLVANIA), NORTH CAROLINA ENVIRONMENTAL JUSTICE NETWORK, OZARK RIVER STEWARDS (ARKANSAS), PATUXENT RIVERKEEPER (MARYLAND), POWESHIEK COMMUNITY ACTION TO RESTORE ENVIRONMENTAL STEWARDSHIP (IOWA), PRESERVE OUR SHORE ACCOMACK COUNTY (VIRGINIA), AND RIO VALLE CONCERNED CITIZENS (NEW MEXICO),

Petitioners,

v.

SCOTT PRUITT, ADMINISTRATOR,
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

PETITION TO REVISE THE CLEAN WATER ACT REGULATIONS FOR CONCENTRATED ANIMAL FEEDING OPERATIONS

TABLE OF CONTENTS

I. INTRODUCTION

The goal of the Clean Water Act (CWA or Act) is to eliminate the discharge of pollutants into waterways.[1] As one way of making progress toward that goal, the Act generally instructs the Environmental Protection Agency (EPA) to regulate polluters by identifying, and requiring the use of, state-of-the-art pollution-control technology for each industry. EPA has made significant strides in meeting its CWA mandate to regulate point source pollution from most industrial and municipal sources. However, the Agency has made very little progress in its efforts to regulate pollution from concentrated animal feeding operations (CAFOs). As a result, the agricultural sector, including CAFOs, remains largely unregulated and is now the nation's leading source of water quality impairments.[2] The Agency's current CAFO regulations are plainly not up to the task of protecting our waterways from industrial livestock operations.

EPA has attempted to improve its CAFO regulatory scheme over the past fifteen years, but has been largely unsuccessful, in part due to adverse judicial decisions, and in part due to the Agency's failure to craft strong regulations. Court challenges to EPA's rules are responsible for some of EPA's setbacks; the *Waterkeeper Alliance* and *National Pork Producers Council* decisions limited the universe of CAFOs required to obtain CWA permits under EPA's current regulatory approach. Yet the core elements of CAFO permits established in EPA's 2003 CAFO rule are also inadequate, and are still in effect. The current regulations fail to require water monitoring, do not prohibit practices known to harm water quality, generally ignore numerous pollutants of concern, place critical decisions about waste management in the hands of state agencies, and exempt most chronic CAFO discharges from permit requirements through an unreasonably broad reading of the agricultural stormwater exemption.[3] In short, the existing regulations are far too weak, and do not apply to enough of the industry, to protect water quality.

EPA must take further action to fulfill its CWA obligations, and the Agency's 2003 and 2008 rulemaking attempts do not in any way lessen this duty. EPA maintains clear authority to strengthen its approach to CAFO regulation in numerous ways, and has amassed a large volume of new information about CAFO pollution since it put forth the 2001 proposal that largely shaped the current regulations. This petition lays out a regulatory course of action for EPA to better use its authority to control CAFO pollution and further the objectives of the Act.

[1] 33 U.S.C. § 1251(a)(1).
[2] National Pollutant Discharge Elimination System Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations, 68 Fed. Reg. 7179, 7237 (Feb. 12, 2003) (codified at 40 C.F.R. pts. 9, 122, 123, 412) [hereinafter 2003 CAFO Rule].
[3] *Id.* § 122.23(e). This exemption excludes "agricultural stormwater discharge" from the definition of "point source" though the former term is not defined in the Act. 42 U.S.C. § 1362(14).

Food & Water Watch, Arkansas Rights Koalition, Assateague Coastal Trust (Maryland), Association of Irritated Residents (California), Buffalo River Watershed Alliance (Arkansas), Center for Biological Diversity, Center for Food Safety, Concerned Citizens Against Industrial CAFOs (Maryland), Dakota Rural Action (South Dakota), Dallas County Farmers and Neighbors (Iowa), Des Moines Water Works (Iowa), Dodge County Concerned Citizens (Minnesota), Don't Waste Arizona, the Environmental Integrity Project, Grand Riverkeeper (Oklahoma), Helping Others Maintain Environmental Standards (Illinois), Illinois Citizens for Clean Air & Water, Institute for Agriculture and Trade Policy, Interfaith Worker Justice (New Mexico), Iowa Citizens for Community Improvement, Jefferson County Farmers & Neighbors (Iowa), Johns Hopkins Center for a Livable Future, Kewaunee Citizens Advocating Responsible Environmental Stewardship (Wisconsin), Land Stewardship Project (Minnesota), Midwest Environmental Advocates (Wisconsin), Missouri Rural Crisis Center, Moms Across America Eastern Shore Chapter (Maryland), Montgomery Township Friends of Family Farms (Pennsylvania), North Carolina Environmental Justice Network, Ozark River Stewards (Arkansas), Patuxent Riverkeeper (Maryland), Poweshiek Community Action to Restore Environmental Stewardship (Iowa), Preserve Our Shore Accomack County (Virginia), and Rio Valle Concerned Citizens (New Mexico) (collectively, Petitioners) hereby petition EPA to promulgate new CAFO regulations pursuant to the Administrative Procedure Act (APA), 5 U.S.C. § 551 et seq., and the CWA, 33 U.S.C. § 1251 et seq. The Petitioners collectively represent millions of citizens from across the United States, including many individuals adversely impacted by CAFO water pollution in their communities.

A. Legal Background

a. Citizens' Right to Petition and EPA's Duty to Respond

The citizen right to petition the government originates in the First Amendment,[4] and is codified and applied to federal agency regulations through the APA's requirement that "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule."[5] The APA also imposes an affirmative obligation on EPA to timely respond to this petition, by requiring that "[w]ith due regard for the convenience and necessity of the parties or their representatives and within a reasonable time, each agency shall proceed to conclude a matter presented to it."[6] In the event EPA seeks to deny the petition in whole or in part, it must provide "[p]rompt notice" to the petitioners.[7]

The APA further grants a right of judicial review to "[a] person suffering legal wrong

[4] U.S. Const. amend. I ("Congress shall make no law . . . abridging . . . the right of the people . . . to petition the Government for a redress of grievances").
[5] 5 U.S.C. § 553(e).
[6] *Id.* § 555(b).
[7] *Id.* § 555(e).

because of agency action, or adversely affected or aggrieved by agency action,"[8] which is defined to include the "failure to act."[9] In the event EPA fails to timely respond or improperly denies the petition in whole or part, courts "shall compel agency action unlawfully withheld or unreasonably delayed,"[10] and "hold unlawful and set aside agency action, findings, and conclusions found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."[11]

b. EPA's Duty to Regulate CAFOs under the Clean Water Act

The CWA's objective is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" by eliminating discharges of pollutants into navigable waters.[12] The National Pollutant Discharge Elimination System (NPDES) permitting program is the primary pollution control mechanism available to EPA and the states to regulate point source discharges."[13] When Congress specifically included "concentrated animal feeding operations" in the CWA's definition of "point source,"[14] it demonstrated unambiguous intent to control and continuously reduce discharges of pollution from the CAFO industry through the NPDES program. Developing and implementing effective CAFO NPDES regulations is therefore one of EPA's clearest CWA obligations.

These regulations must ensure that the entire universe of discharging CAFOs is required to obtain NPDES permits, and that those permits will impose adequate conditions to track and restrict the industry's pollution. The CWA requires EPA to meet certain criteria when establishing the permit requirements for a discharging industry. EPA imposes NPDES permit requirements through the development of national Effluent Limitation Guidelines (ELGs) for industrial source categories. ELGs establish the pollution control levels that industries and facilities must achieve for various types of pollutants, and must be based on several technology-based standards for different categories of pollutants.

Existing facilities are subject to: best available technology economically achievable (BAT) for priority and nonconventional pollutants, which include nitrogen, phosphorus, metals, and pharmaceuticals; best conventional pollutant control technology (BCT) for conventional pollutants, which include fecal coliform, biochemical oxygen demand, pH, oil and grease, and total suspended solids; and best practicable control technology currently available (BPT) for all

[8] *Id.* § 702.
[9] *Id.* § 551(13).
[10] *Id.* § 706(1).
[11] *Id.* § 706(2)(A).
[12] 33 U.S.C. § 1251(a).
[13] *Id.* § 1342.
[14] *Id.* § 1362(14).

pollutants. New sources are subject to more stringent new source performance standards (NSPS) for all pollutants, based on the best available demonstrated control technology (BADT).[15]

EPA must consider various criteria when deriving each standard. BAT must take into account, *inter alia*, facility age, cost of achieving pollution reduction, and non-water quality environmental impacts. BCT must also take these factors into account, but in addition to the requirements that technologies be both available and economically achievable, EPA must consider the reasonableness of the relationship between a technology's cost and the pollution reductions achieved.[16] New source performance standards must "reflect[] the greatest degree of effluent reduction which the Administrator determines to be achievable . . . including, where practicable, a standard permitting no discharge of pollutants."[17]

Such technology-based effluent limitations (TBELs) afford the *minimum* level of water quality protection required by the CWA,[18] and permits must establish such limits for all pollutants present in a discharge.[19] EPA has made clear that state permit writers must address pollutants omitted from federal ELGs by including best professional judgment (BPJ) limits on a case-by-case basis,[20] yet state CAFO permits typically do not control metals, pharmaceuticals, or other pollutants of concern with BPJ limits. EPA has authority to remedy this by including controls for the full suite of CAFO pollutants in its CAFO ELGs.

EPA must annually review, and if appropriate, revise, its ELGs for each source category.[21] In its Final 2014 Effluent Guidelines Program Plan, the most recent final plan at the time of filing, EPA excluded the CAFO point source category from review altogether because it

[15] *Id*. §§ 1311(b)(2)(A), 1314(b)(4)(A), 1314(b)(1)(A), 1316.
[16] *Id*. §§ 1314(b)(2)(B), 1314(b)(4)(B); Revised National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines for Concentrated Animal Feeding Operations in Response to the Waterkeeper Decision, 73 Fed. Reg. 70418, 70463 (Nov. 20, 2008) [hereinafter 2008 CAFO Rule].
[17] 33 U.S.C. § 1316(a)(1).
[18] 40 C.F.R. § 122.44 ("[E]ach NPDES permit shall include conditions meeting the following requirements . . . Technology-based effluent limitations and standards based on: effluent limitations and standards promulgated under section 301 of the CWA, or new source performance standards promulgated under section 306 of CWA, on [sic] case-by-case effluent limitations determined under section 402(a)(1) of CWA, or a combination of the three, in accordance with § 125.3 of this chapter"); 40 C.F.R. § 125.3 ("Technology-based treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a permit issued under section 402 of the Act").
[19] 40 C.F.R. § 125.3(a)(2), requiring permits to contain technology-based limits for "conventional pollutants," "all toxic pollutants," and "all pollutants which are neither toxic nor conventional pollutants."
[20] *See* 33 U.S.C. § 1311(b)(2)(A); 40 C.F.R. § 125.3(c)-(d); James A. Hanlon, Director, EPA Office of Wastewater Management, *National Pollutant Discharge Elimination System (NPDES) Permitting of Wastewater Discharges from Flue Gas Desulfurization (FGD) and Coal Combustion Residuals (CCR) Impoundments at Steam Electric Power Plants*, Attachment A 1-2 (Jun. 7, 2010) [hereinafter Hanlon BPJ Memo]. Although this Memorandum discussed coal plant discharge limits, the statutory requirement to establish technology-based limits using BPJ is equally applicable across industries.
[21] 33 U.S.C. §§ 1311(e) (requiring that effluent limits be applied to all point sources of discharge of pollutants); 1314(b) (EPA must revise such regulations, at least annually if appropriate). *See also* 33 U.S.C. § 1311(d) (requiring EPA to review, and if appropriate revise, BAT limits every five years). Effluent limitations include "any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters." 33 U.S.C. § 1362.

had revised the CAFO ELGs within the past seven years.[22] In its 2015 Annual Review, EPA determined that the CAFO category was not an ELG priority and that ELG revisions are not warranted, and consequently did not propose any review of the CAFO ELGs in the 2016 draft Program Plan.[23] Yet the condition of America's waterways undeniably demonstrates that the current ELGs are not adequate. When EPA completes its 2016 Program Plan, the November 20, 2008 rule will have been in effect for more than seven years, and EPA must review and revise its CAFO NPDES regulations and ELGs without further delay.[24]

B. Factual Background

The continued growth, consolidation, and increase in operational scale in the CAFO industry over the past several decades, along with growing evidence of the industry's widespread contamination of waterways, demonstrates that EPA's CAFO regulations are inadequate to control CAFO discharges to the extent required under the CWA. Due to the absence of adequate federal and state oversight, CAFOs have become a significant source of water pollution across the U.S.

a. Growth and Consolidation in Animal Production

Animal production has changed dramatically over the last several decades, with a strong trend toward larger facilities and regional concentration of livestock and poultry operations.[25] A majority of animals are now raised in confinement, and may be transferred between several industrial-scale facilities at different stages of their growth.[26] While the total number of livestock

[22] EPA, Final 2014 Effluent Guidelines Program Plan Sec. 3.2.1, T. 3-1 ("In general, EPA removed an industrial point source category from further consideration during a review cycle if EPA established, revised, or reviewed the category's ELGs within seven years prior to the annual reviews") (July 2015), https://www.epa.gov/sites/production/files/2015-09/documents/final-2014-effluent-guidelines-program-plan_july-2015.pdf.
[23] EPA, Preliminary 2016 Effluent Guidelines Program Plan Sec. 10-1 (June 2016), https://www.epa.gov/sites/production/files/2016-06/documents/prelim-2016-eg-plan_june-2016.pdf. This determination is hard to reconcile with EPA's continued listing of CAFOs as one of its water "enforcement priorities," with the goals of using innovative monitoring and pollution control technologies to reduce CAFO water pollution impacts. *See* EPA, National Enforcement Initiative: Preventing Animal Waste from Contaminating Surface and Ground Water, https://www.epa.gov/enforcement/national-enforcement-initiative-preventing-animal-waste-contaminating-surface-and-ground (last visited Feb. 10, 2017).
[24] In fact, EPA has not undergone a comprehensive review of the CAFO regulations since 2003, when it proposed substantive changes to the CAFO regulations. Aside from affirmatively finding that the BCT limitations in the 2003 rule represent BCT for fecal coliform, the 2008 rule did not revisit the technology-based effluent limits for CAFO pollutants, nor did the minor amendments published without notice and comment in 2012.
[25] Claudia Copeland, *Animal Waste and Hazardous Substances: Current Laws and Legislative Issues*, CRS Report RL33691 1 (Nov. 8, 2011) [hereinafter *Animal Waste and Hazardous Substances*], https://fas.org/sgp/crs/misc/RL33691.pdf.
[26] EPA, *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality*, EPA 820-R-13-002 5 (July 2013) [hereinafter EPA Literature Review],

animals raised has grown, the number of farms has declined substantially.[27] In fact, since the 1950s the production of livestock and poultry in the U.S. has more than doubled, while the number of operations has decreased by 80%.[28] As a result of this growth, factory farm livestock produced an estimated thirteen times as much waste as the entire U.S. population in 2012.[29]

CAFOs and entire livestock sectors are also increasingly concentrated in certain watersheds and areas of the country, which has increased water quality risks as waste production surpasses land available for disposal. The Government Accountability Office has analyzed this trend, finding that EPA's approach to CAFO regulation under the CWA has been under-protective of water quality, and has allowed CAFO manure generation to surpass cropland in some regions, leading to contamination of surface and ground waters in counties with insufficient cropland to agronomically utilize manure nutrients.[30] Reviewing this trend towards consolidation of manure nutrient production nationwide, the U.S. Department of Agriculture similarly found dramatic increases in manure nutrients relative to the ability of cropland to utilize them between 1982 and 1997.[31]

b. CAFO Water Pollution Impacts

Standard CAFO operation and waste disposal practices have led to widespread water pollution. Numerous studies identify agriculture as the nation's leading contributor to water quality impairments in rivers and lakes, with manure responsible for a significant share of that

https://www.scribd.com/document/214717740/Literature-Review-of-Contaminants-in-Livestock-and-Poultry-Manure-and-Implications-for-Water-Quality.

[27] *Id*. at 1. For example, the number of dairy farms fell by about 40% between 1999 and 2008, but during the same period, the number of dairy cows decreased by only 16%, while total milk production increased by 18%. John C. Becker & John H. Howard, *A Historical View of the Solutions Offered to Regulate Concentrate Animal Feeding Operations under the Clean Water Act: What Has Been Learned*, 3 Ky. J. Equine Agric. & Nat. Res. L. 71, 75 (2010). Similarly, between 1994 and 2001 the number of hog farms in the U.S. decreased by approximately 120,000 while the number of hogs remained relatively stable. Susan M. Brehm, *From Red Barn to Facility: Changing Environmental Liability to Fit the Changing Structure of Livestock Production*, 93 Cal. L. Rev. 797, 801 (2005). The poultry market peaked even earlier, with the number of broiler chicken farms dropping 35% between 1969 and 1992, while the number of chickens produced tripled. John Marks, *Regulating Agricultural Pollution in Georgia: Recent Trends and the Debate over Integrator Liability*, 18 Ga. State Univ. L. Rev. 1031, 1035 (2002).

[28] EPA Literature Review at 1.

[29] EPA, National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, Proposed Rule, 76 Fed. Reg. 65431, 65433 (Oct. 21, 2011) [hereinafter Proposed CAFO Reporting Rule]; Food & Water Watch, *Factory Farm Nation 2015 Edition* 3 (2015) [hereinafter *Factory Farm Nation*], http://www.foodandwaterwatch.org/sites/default/files/factory-farm-nation-report-may-2015.pdf.

[30] GAO, *Concentrated Animal Feeding Operations: EPA Needs More Information and a Clearly Defined Strategy to Protect Air and Water Quality from Pollutants of Concern* 21-22 (2008), http://www.gao.gov/assets/290/280229.pdf [hereinafter GAO CAFO Report]. *See also Animal Waste and Hazardous Substances* at 1 (noting that in 1997 USDA estimated that 66,000 operations had nitrogen in excess of the "assimilative capacity of the soil," while 89,000 operations had a similar excess in phosphorous).

[31] Robert L. Kellogg, et al., *Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the U.S.*, USDA Pub. No. nps00-0579 75 (2000), http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012133.pdf. This does not address other manure pollutants that are not agronomically valuable in any quantity.

pollution.[32] Twenty–nine states have specifically identified AFOs as contributing to their water quality impairments,[33] and states with high concentrations of CAFOs "experience on average 20 to 30 serious water quality problems per year as a result of manure management problems."[34] EPA has acknowledged that "[w]ater quality impacts from CAFOs may be due, in part, to inadequate compliance with existing regulations or to limitations in CAFO permitting programs."[35]

Surface water pollution from CAFOs occurs through two major pathways—production areas and land application fields. Spills, runoff, and other unintentional discharges may occur from numerous parts of a CAFO production area, such as manure lagoons, pits, or stockpiles, feed storage areas, livestock confinement ventilation fans, and mortality management areas. A number of factors, including poor facility design, equipment failure, operator error, and extreme weather events, lead to discharges. Operators may also cause releases intentionally if inadequate storage, poor planning, or rainfall accumulation results in overly full waste impoundments.[36]

Surface water pollution from CAFO production areas in various livestock sectors is widespread and has impacted waterways across the country. Hundreds of documented overflows and catastrophic failures of manure storage systems have resulted in large discharges, which in turn have caused toxic stream conditions and large fish kills in numerous states, including Iowa, Wisconsin, Minnesota, Michigan, Missouri, Illinois, New York, Virginia, and North Carolina.[37] In addition, earthen lagoons, and even most lined lagoons, are not designed to retain all wastewater. These storage systems are designed to allow seepage and/or leaking of manure into groundwater, which can lead to jurisdictional discharges into nearby surface waters.[38] Even deep

[32] David Osterberg and David Wallinga, *Addressing Externalities from Swine Production to Reduce Public Health & Environmental Impacts*, 94 Am. J. Pub. Health 1703, 1704 (Oct. 2004) (estimating that "[c]urrent farming practices are responsible for 70% of the pollution in the nation's rivers and streams"); Claudia Copeland, *Air Quality Issues and Animal Agriculture—A Primer*, CRS Report RL32948 9 (Apr. 11, 2007) [hereinafter *Air Quality Primer*], http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RL32948.pdf.

[33] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434, citing EPA, National Water Quality Inventory: Report to Congress—2004 Reporting Cycle, EPA–841–R–08–001 (Jan. 2009).

[34] Carrie Hribar, Nat'l Ass'n of Local Bds. of Health, *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities* 4 (2010) [hereinafter *Understanding CAFOs and Their Impact on Communities*], http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf.

[35] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434.

[36] *Id.*

[37] *See, e.g.*, EPA Literature Review at 49 (reviewing reported incidences of fish kills); Iowa DNR, Manure Discharge Chart, http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials (last visited Feb. 10, 2017); David Jackson and Gary Marx, Chicago Tribune, Spills of Pig Waste Kill Hundreds of Thousands of Fish in Illinois (Aug. 5, 2016), http://www.chicagotribune.com/news/watchdog/pork/ct-pig-farms-pollution-met-20160802-story.html; Lee Bergquist and Kevin Crowe, Milwaukee Journal Sentinel, Manure Spills in 2013 the Highest in Seven Years Statewide (Dec. 5, 2013), http://archive.jsonline.com/news/wisconsin/manure-spills-in-2013-the-highest-in-seven-years-statewide-b99157574z1-234701931.html; Sara Peach, National Geographic, What to Do about Pig Poop? North Carolina Fights a Rising Tide (Oct. 30, 3014), http://news.nationalgeographic.com/news/2014/10/141028-hog-farms-waste-pollution-methane-north-carolina-environment/.

[38] *See* Natural Resources Conservation Service (NRCS), Conservation Practice Standard 359: Waste Treatment Lagoon (Jul. 2004), https://efotg.sc.egov.usda.gov/references/public/AL/tg359.pdf. *See also, e.g.*, Animal Waste

pit systems that retain waste below confinement buildings, as are common in the hog industry, are reliant on pumping systems and are prone to structural and equipment failures that cause discharges to surface and groundwater.[39]

CAFO discharges also occur due to waste application to cropland in excess of crop needs or under conditions that lead to runoff, such as on frozen, saturated, or sloped ground, or when crops are not in place to uptake nutrients. Many manure application fields also contain direct conduits to waterways, such as tile lines, ditches, grassed waterways, or sinkholes, and application practices do not always properly account for the need for setbacks from these features. As a result of application under any of these circumstances, precipitation, erosion, and other natural processes carry excess nutrients and other CAFO pollutants off of land application fields and into surface waters and conduits to surface waters. Collectively, these discharges are responsible for widespread degradation of U.S. waterways, and due to inadequate tracking and regulation, the full magnitude of their water pollution impacts remains unknown.

CAFO wastes contain numerous pollutants that pose substantial threats to human health and the environment. Specifically, these wastes include nitrogen, phosphorous, pathogens, salts, heavy metals, trace elements, antibiotics, pesticides, and hormones.[40] Pathogens associated with CAFO manure include *E. coli*, *Salmonella*, and *Giardia*,[41] which endanger those who come into contact with contaminated water through swimming, boating, or other recreational activities. EPA has found that "[m]ore than 150 pathogens associated with industrial livestock production are also associated with risks to humans, including the six human pathogens that account for more than 90% of food and waterborne diseases."[42] Various pathogens in CAFO waste can cause symptoms such as diarrhea and an increased risk for severe illness or death.[43]

Management Plan for Lost Valley Ranch Dairy App. A, discussing expected leakage rates from double lined lagoons, http://www.oregon.gov/ODA/programs/NaturalResources/Pages/CAFO.aspx. Although groundwater is not regulated as water of the United States, EPA has a longstanding position that point source discharges into groundwater that then discharge to surface waters via a "direct hydrological connection" are jurisdictional and subject to NPDES permitting requirements. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, Proposed Rule, 66 Fed. Reg. 2960, 3016 (Jan. 12, 2001) [hereinafter 2001 Proposed CAFO Rule].

[39] *See, e.g.*, Iowa DNR, Manure Discharge Chart, http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials.

[40] EPA Literature Review at 2. *See also* 2001 Proposed CAFO Rule, 66 Fed. Reg. at 2976-79; *Air Quality Primer* at 9; *Understanding CAFOs and Their Impact on Communities* 2-3 (Animal wastes contain a variety of pollutants, primarily nutrients, such as nitrogen and phosphorous, as well as organic matter, solids, pathogens such as *E. coli*, odorous/volatile compounds, growth hormones, antibiotics, chemicals used as additives to the manure or to clean equipment, silage leachate from corn feed, or copper sulfate used in footbaths for cows.); David Osterberg & David Wallinga, *Addressing Externalities from Swine Production to Reduce Public Health & Environmental Impacts*, 94 Am. J. Pub. Health at 1704.

[41] Claudia Copeland, *Animal Waste and Water Quality: EPA Regulation of Concentrated Animal Feeding Operations (CAFOs)*, CRS Rep. RL31851 5 (Feb. 16, 2010) [hereinafter *Animal Waste and Water Quality*], http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RL31851.pdf.

[42] 2003 CAFO Rule, 68 Fed. Reg. at 7236.

[43] *Understanding CAFOs and Their Impact on Communities* at 8-9.

Nutrients, primarily nitrogen and phosphorus, are also primary pollutants of concern in CAFO waste, due to their impacts on aquatic ecosystems and public health. Excess nitrogen and phosphorus lead to eutrophication of surface waters,[44] generate algal blooms that can produce toxins harmful to wild animals, aquatic life, and humans who come into contact with them,[45] and cause hypoxic "dead zones," such as occur annually in the Gulf of Mexico and the Chesapeake Bay. EPA has recognized that "[n]utrient pollution is one of America's most widespread, costly and challenging environmental problems."[46]

Antimicrobials, including medically important antibiotics, are also common constituents of CAFO waste, and have been detected in both surface and groundwater samples collected near CAFOs.[47] EPA has found that 80-90% of some administered antibiotics end up in animal waste.[48] While antibiotics are often used to promote the growth of livestock, as well as to fight disease in crowded, unsanitary CAFO environments, their use also promotes antibiotic–resistant infections in livestock and humans and the dissemination of antibiotic–resistant bacteria in waterways near CAFOs and their land application areas. The proliferation of antibiotic–resistant bacteria makes it more difficult to treat infections in humans, significantly increasing the likelihood of hospitalization and the average length of hospitalization in those who become infected.[49]

EPA has previously found that heavy metals including "arsenic, cadmium, iron, lead, manganese, and nickel," some of which are added to feed as micronutrients to promote animal growth, "are commonly found in CAFO manure, litter, and process wastewater."[50] Just as with antibiotics fed to livestock, 80-90% of added arsenic, zinc, and copper are excreted in manure, and subsequent land application can lead to metal accumulation in soils and metal-contaminated runoff to waterways. When metal pollutants are present in CAFO discharges, they can damage aquatic ecosystems and cause a broad set of human health impacts."[51] Researchers have found that the full impacts of metal pollution from CAFO waste, both alone and in combination with

[44] Shauna R. Collins, *Striking the Proper Balance Between the* Carrot *and the* Stick *Approaches to Animal Feeding Operation Regulation*, 2012 U. Ill. L. Rev. 923, 932 (2012).
[45] EPA Literature Review at 47.
[46] EPA, Nutrient Pollution: The Problem, https://www.epa.gov/nutrientpollution/problem (last visited Feb. 10, 2017).
[47] *See, e.g.*, Joanne C. Chee-Sanford et al., *Fate and Transport of Antibiotic Residues and Antibiotic Resistance Genes following Land Application of Manure Waste*, 38 J. Envtl. Quality 1086 (2009); Yi Luo et al., *Trends in Antibiotic Resistance Genes Occurrence in the Haihe River, China*, 44 Envtl. Sci. Tech. 7220 (2010); Pew Commission on Industrial Farm Animal Production, *Putting Meat on the Table: Industrial Farm Animal Production in America* 15-16 (2008), http://www.pewtrusts.org/~/media/legacy/uploadedfiles/peg/publications/report/pcifapfinalpdf.pdf.
[48] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434.
[49] Shane Rogers & John Haines, *Detecting and Mitigating the Environmental Impact of Fecal Pathogens Originating from Confined Animal Feeding Operations: Review*, EPA/600/R-06/021 15 (Sept. 2005).
[50] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434.
[51] *Id*.

other contaminants, are inadequately understood.[52]

CAFO wastes can also contain large quantities of hormones—both naturally produced and synthetic.[53] While acknowledging that hormone quantities are difficult to estimate due to the lack of reporting requirements, one study estimated that approximately 722,852 pounds of naturally–produced estrogens, androgens, and progestogens were excreted by cattle, swine, and poultry in 2000; accounting for all synthetic hormones in manure, the use of which does not have to be reported, would drive this figure even higher.[54] Hormones and their metabolites are also found in the environment surrounding livestock and poultry facilities, including streams, creeks, and surface waters downstream from beef cattle feedlots,[55] where they can cause serious damage to the endocrine and reproductive systems of aquatic species, lab rats, and human cells.[56]

While CAFO pollution is widespread, it also disproportionately impacts environmental justice communities. Research to date has focused primarily on the hog industry, and several studies have shown that "a disproportionate number of swine CAFOs are located in low-income and nonwhite areas."[57] One study analyzed the locations of large hog CAFOs in 17 states, including Iowa, North Carolina, and Minnesota, which are leaders in hog production where CAFOs had been rapidly expanding. In these three states, the researchers found disproportionate siting and expansion of large hog CAFOs in African American communities in the 1980s and 1990s, and concluded that as hog production shifts from small-scale to large-scale, racial inequity in CAFO siting intensifies.[58] A 2011 study of 16 North Carolina communities concluded that in general, "[i]ndustrial hog operations in North Carolina are disproportionately located in low-income communities of color."[59]

Although many studies have focused on the hog sector, these environmental justice impacts do extend to communities affected by other livestock sectors. EPA recently conducted its own limited analysis of CAFO location in relation to environmental justice populations of concern, and identified areas at risk of disproportional impacts from virtually every CAFO livestock sector: the Delmarva Peninsula, characterized by broiler chicken operations; the Iowa-Minnesota border, characterized by hog, egg layer, and beef feedlot operations; the Carolina

[52] JoAnn Burkholder et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, 115 Envtl. Health Perspectives 308, 308-309 (2007) [hereinafter *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*], http://ir.uiowa.edu/cgi/viewcontent.cgi?article=1025&context=oeh_pubs.
[53] EPA Literature Review at 40-41.
[54] *Id.*
[55] *Id.* at 45.
[56] GAO CAFO Report at 24.
[57] Kelley Donham, Steven Wing, et al., *Community Health and Socioeconomic Issues Surrounding Concentrated Animal Feeding Operations*, 115 Envtl. Health Perspectives 317, 318 (2007).

[58] Jeremy Arney, Janice E. Johnston, and Paul B. Stretesky, *Environmental Inequity: An Analysis of Large-Scale Hog Operations in 17 States, 1982-1997*, 68 Rural Sociology 231, 244 (2003).
[59] Schinasi, et al., *Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations*, 22 Epidemiology 7 (March 2011).

lowlands, characterized by hog, broiler, and turkey operations; and the California central valley, characterized by dairy operations. All of these regions have both large numbers of CAFOs and large minority and low-income populations.[60]

Recognition of these environmental justice impacts is growing; the Department of Justice recently cited to the disproportionate impact of a Mississippi egg layer operation's water pollution on a low-income community in its 2015 Implementation Progress Report on Environmental Justice,[61] and Maryland's Wicomico County Health Department was recently compelled to conduct a Health Impact Assessment for a proposed 10-house broiler operation in an 80% African American community.[62] EPA's External Civil Rights Compliance Office also recently investigated North Carolina's swine permitting program and found "the possibility that African Americans, Latinos, and Native Americans have been subjected to discrimination as the result of [North Carolina Department of Environmental Quality's] operation of the [program] . . . ."[63]

CAFO pollution also poses a considerable threat to wildlife in the United States. Exposure to the contaminants discharged from these operations, including heavy metals, pharmaceuticals, and pesticides can harm or kill aquatic species. The fish kill events caused by some CAFO discharges, for example, harm not only these observable fish populations, but are also generally indicative of larger aquatic species losses. Relatedly, reproductive and endocrine disruption from exposure to pharmaceuticals in farm animal waste can result in the reduction and imbalance of impacted species' population numbers.[64] Pollution from CAFOs further harms wildlife and ecosystems though loss of ecosystem biodiversity, including through conversion and encroachment of essential species habitat.[65] These harms are particularly acute for endangered

[60] EPA Office of Water, National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, Analysis under Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations 4 (Oct. 3, 2011).
[61] U.S. Dep't of Justice, 2015 Implementation Progress Report on Environmental Justice 23, https://www.justice.gov/ej/file/870526/download.
[62] Wicomico County Health Dep't, Health Impact Assessment: Proposed Concentrated Animal Feeding Operation in Wicomico County (Apr. 2016), https://www.wicomicohealth.org/file/0/0/Health%20Impact%20Assessment.pdf.
[63] Letter of Concern from Lilian S. Dorka, Director, EPA External Civil Rights Compliance Office to William G. Ross, Jr., Acting Sec'y, N.C. Dep't of Envtl. Quality 1 (Jan. 12, 2017), http://blogs.law.unc.edu/documents/civilrights/epalettertodeq011217.pdf.
[64] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 2981; Food and Agriculture Organization of the United Nations, Livestock's Long Shadow, 209-11 (2008); World Health Organization and United Nationals Environmental Programme, State of the Science of Endocrine Disrupting Chemicals – 2012 vii - xv (2013), http://www.who.int/ceh/publications/endocrine/en/; *see also* J.K. Leet, et al., *Environmental hormones and their impacts on sex differentiation in fathead minnows*, 158 Aquatic Toxicology 98, 98 (2015), https://www.researchgate.net/publication/267870556_Environmental_Hormones_and_Their_Impacts_on_Sex_Differentiation_in_Fathead_Minnows; Ripley, et al., *Utilization of protein expression profiles as indicators of environmental impairment of smallmouth bass (Micropterus dolomieu) from the Shenandoah River, Virginia, USA*, 27 Envtl. Toxicology and Chemistry 1756, 1756 (2008).
[65] USDA, Agricultural Waste Management Field Handbook, Agricultural Wastes, Air, and Animal Resources 3-3 (2012), http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=31441.wba ("Adding wastes to a stream can lower oxygen levels to such an extent that fish and other aquatic life are forced to migrate from the polluted area or die for lack of oxygen."); FWS, Endangered and Threatened Wildlife and Plants; Final Rule to List

and threatened species, where prolonged insecurity or heightened pollution exposure can result in the extirpation and, potentially, extinction of impacted species.[66]

Widespread CAFO water pollution is significantly damaging public health and ecosystems, and although the full extent of this pollution is unknown due to the lack of CAFO permitting and water pollution monitoring, there is overwhelming evidence of EPA's failure to live up to its CWA mandate. The contamination, both expressly authorized and simply overlooked, under EPA's current regulatory approach poses a direct threat to water quality, aquatic ecosystems, and human health. It is therefore incumbent upon EPA to promulgate revised CAFO rules that more effectively confront the environmental and public health risks posed by water pollution from these facilities.

c. Inadequate CAFO Regulation under the Clean Water Act

After more than 40 years of CWA implementation, EPA has acknowledged that it still lacks basic information about where the nation's CAFOs are located and which facilities are discharging pollutants into jurisdictional waterways without required permits.[67] EPA estimates that only approximately 40% of CAFOs are currently regulated under the NPDES program,[68] while as many as 75% discharge as a result of their "standard operational profiles."[69] Despite these major gaps in information and regulation, EPA proved unwilling to stand up to CAFO industry pressure when it abandoned the only nationwide effort it has undertaken in decades to fill these gaps by developing a comprehensive inventory of CAFOs.[70]

This failure by EPA to develop or maintain a CAFO inventory has meant that states must identify CAFOs and determine which are subject to regulation with little guidance or oversight from EPA. Predictably, this has resulted in a patchwork of state programs, inconsistent amounts

the Topeka Shiner as Endangered, 63 Fed. Reg. 69016, 69017 (Dec. 15, 1998) (For endangered Topeka Shiner populations, "[t]he action most likely impacting the species to the greatest degree in the past is sedimentation and eutrophication . . . resulting from intensive agricultural development . . . . Feedlot operations on or near streams are also known to impact prairie fishes due to organic input resulting in eutrophication."); Blehert, et al., USGS, Investigation of Bacterial Pathogens Associated with Concentrated Animal Feeding Operations (CAFOs) and their Potential Impacts on a National Wildlife Refuge in Oklahoma: Final Report, Project 2N44, 200120004 2 (July 24, 2004).

[66] *See, e.g.,* FWS, CAFOs Feed a Growing Problem, Endangered Species Bulletin, Vol. XXIV No. 1 (January/February 1999), http://www.thefreelibrary.com/CAFOs+Feed+a+Growing+Problem.-a054466913 (In 1998, an 11 million gallon spill of liquid waste from a large poultry operation damaged a wetland vernal pool system in the Merced National Wildlife Refuge, killing endangered vernal pool fairy shrimp and vernal pool tadpole shrimp.).

[67] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65436.

[68] In 2010, EPA estimated that approximately forty percent of an estimated 19,200 CAFOs were covered by NPDES permits. EPA, National Pollutant Discharge Elimination System (NPDES) Information Collection Rulemaking and CAFOs 1 (Sept. 2010) [hereinafter EPA 2010 NPDES Estimate].

[69] *Id.*

[70] National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, Withdrawal, 77 Fed. Reg. 42679 (Jul. 20, 2012).

and qualities of available information, and widely varying approaches to NPDES permitting. For example, Michigan requires all CAFOs with the potential to discharge to obtain a NPDES permit, and this requirement has been upheld by the state's court of appeals.[71] Wisconsin generally requires all Large CAFOs to obtain NPDES permits,[72] while Iowa has refused to issue a single permit to any of its thousands of confinement operations, despite hundreds of documented discharges.[73] In South Dakota, the state has proposed to allow CAFO operators to choose whether to apply for a NPDES permit or a state no-discharge permit.[74] And Delaware regulations purportedly require all CAFOs that propose to discharge to obtain permits, but the state had only recently begun granting its first CAFO NPDES permits (general permit coverage for broiler chicken operations that land-apply) at the date of this petition's filing.[75]

EPA has not prioritized permitting, even where CAFOs have had documented discharges. In its 2008 CAFO Rule preamble and a memo issued by EPA's James Hanlon in response to the *Pork Producers* decision, EPA improperly conflates the legal question of whether a violation is ongoing for purposes of establishing jurisdiction to maintain a CWA citizen suit with the distinct question of whether a facility is a point source discharger subject to NPDES permitting requirements.[76] Based on this flawed analysis, even CAFOs with documented jurisdictional discharges are often not required, or even encouraged, to obtain NPDES permits, because they can claim to have "permanently remedied" the cause of their violations. This loophole is ripe for abuse, and as we can see in the case of Iowa, where *no* confinements with known discharges have obtained permits, such abuse is rampant.

For these reasons, as well as the additional deficiencies in EPA's approach explained throughout this petition, EPA and states have never come close to satisfying the CWA's obligations to permit discharging CAFOs and exercise proper oversight. EPA remains apparently ignorant of the fact that its regulations on paper have not translated to effective regulation in the real world. For example, Allison Wiedeman of the EPA's Water Permits Division was quoted in early 2016 as saying, in describing the current state of CAFO CWA permitting, "[w]e see that it's working. We know that these facilities have to have permits if they discharge, and so all I can

[71] *See Mich. Farm Bureau et al. v. Mich. Dep't of Envtl. Quality*, 292 Mich. App. 106, 108 (Mar. 29, 2011).
[72] Wis. Admin. Code Ch. NR 243.11 (2015).
[73] *See* Iowa Dep't of Nat. Res., 2016 Annual Report for Work Plan Agreement Between the Iowa Department of Natural Resources and the Environmental Protection Agency Region 7 (Aug. 1, 2016), http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials.
[74] S.D. Dep't of Env't and Natural Res., Draft General Water Pollution Control Permit for CAFOs (Oct. 2015), http://denr.sd.gov/des/fp/publicnotices/DraftGeneralPermitPN.pdf.
[75] *See* DNREC, Division of Water, Concentrated Animal Feeding Operations, http://www.dnrec.delaware.gov/wr/Information/Pages/CAFO.aspx (last visited Jan. 30, 2017).
[76] 2008 CAFO Rule, 73 Fed. Reg. at 70423; James A. Hanlon, Director, EPA Office of Wastewater Management, *Concentrated Animal Feeding Program Update after* National Pork Producers Council v. EPA (Dec. 8, 2011) (both exclusively citing CWA citizen suit case law).

tell you right now is that the process is working."[77] This head-in-the-sand approach does not protect communities from illegal CAFO pollution.

C. Summary of Relief Requested

Petitioners request that EPA promulgate new CAFO rules that will effectively implement the CWA's pollution control mandate. Specifically, Petitioners request the following relief:

1. EPA should establish an evidentiary presumption that certain CAFOs discharge and are either subject to NPDES permitting or must rebut the presumption by demonstrating they do not discharge;
2. EPA should revise its interpretation of the agricultural stormwater exemption such that no discharges resulting from CAFO activities are exempt as non-point source pollution;
3. EPA must ensure that integrators who meet the CWA definition of owner or operator are co-permitted with contract producers, as the statute has always required;
4. EPA should revise certain definitions in the CAFO regulations;
5. EPA should revise the requirements applicable to all CAFOs, including by requiring water quality monitoring in CAFO NPDES permits to ensure compliance with the CWA and permit terms; and
6. EPA should revise the CAFO ELGs to address additional CAFO pollutants of concern, prohibit practices known to harm water quality, and otherwise strengthen existing requirements.

Petitioners further request that EPA open a docket for this petition and solicit public input on the proposed rule changes.

II. ARGUMENT

EPA's current CAFO regulations are failing to achieve the mandates of the CWA to permit point source dischargers of pollution, require pollution reductions based on appropriate technology-based standards, and ultimately eliminate point source discharges to navigable waters.[78] To meet these mandates, EPA must make certain critical changes to its CAFO regulations.

[77] Keri Brown, Nat'l Public Radio, When a Chicken Farm Moves Next Door, Odor May Not Be The Only Problem (Jan. 24, 2016), http://www.npr.org/sections/thesalt/2016/01/24/463976110/when-a-chicken-farm-moves-next-door-odor-may-not-be-the-only-problem. Even more recently, former EPA Administrator Gina McCarthy expressed her view that cleaning up agricultural pollution is largely up to voluntary industry practices and the USDA, because EPA is not "in a position to demand it of them." Jenny Hopkinson, Politico Pro Agriculture Whiteboard, EPA's McCarthy: Better That USDA Tell Farmers to Up Their Environmental Game (Oct. 18, 2016).
[78] *See* 33 U.S.C. § 1251(a)(1).

This petition lays out a roadmap for necessary and effective changes EPA must make to its CAFO regulations, addressing the two overarching issues of permit coverage and permit effectiveness. As detailed herein, EPA's existing authority enables it to put a regulatory scheme in place that would ensure all CAFO dischargers are subject to NPDES permits and that those permits adequately limit CAFO discharges and protect water quality. Any action that falls short of achieving these fundamental requirements of the Act would be arbitrary and capricious.

A. EPA's CAFO Regulations Must Ensure that All Discharging CAFOs Obtain NPDES Permits

The CWA prohibits the "discharge of a pollutant" by any person from any point source, unless in compliance with a NPDES permit.[79] Nonetheless, as discussed *supra*, EPA's CAFO regulations have failed for decades to reliably bring discharging CAFOs into the NPDES permitting program. Furthermore, the incentive for a majority of CAFOs to seek coverage was diminished by the Fifth Circuit's holding in *National Pork Producers Council v. EPA*, which invalidated the "duty to apply" for a NPDES permit under the 2008 CAFO rules.[80] The lack of a duty to apply has made it difficult for EPA and states to determine whether CAFOs are discharging and to ensure that all CAFO polluters obtain permits.[81]

This general lack of oversight, along with specific regulatory deficiencies, has allowed polluting facilities to evade permitting requirements for decades. The common-sense amendments to EPA's regulatory approach discussed below would close the loopholes that have allowed so many of these point sources to remain unregulated.

a. EPA Should Establish an Evidentiary Presumption that CAFOs with Certain Characteristics Actually Discharge

The overall lack of complete information about the universe of discharging CAFOs, and the persistent and widespread failures by states and EPA to issue CAFO permits to discharging facilities, demonstrates that EPA's current regulations are simply not resulting in permits when required by the CWA. Therefore, in order to create an effective permitting system, EPA must require all CAFOs with certain characteristics—including but not limited to those that have had a documented discharge to a water of the U.S.—to obtain NPDES permits. To do so in a way that is consistent with recent case law, EPA must establish a presumption that certain operations actually discharge, as opposed to having the potential to discharge or proposing to discharge. EPA has clear authority to establish such a presumption, and abundant evidence with which to support it.

[79] 33 U.S.C. § 1311(a).
[80] *See Nat'l Pork Producers Council v. EPA*, 635 F.3d 738, 751 (5th Cir. 2011).
[81] GAO CAFO Report at 17-18 (concluding that data collected by EPA and states on the number of CAFOs, discharge status of CAFOs, and number of permits issued by state authorities are unreliable).

i. EPA Has Clear Authority to Establish a Presumption that Certain CAFOs Discharge

Recent judicial decisions have undermined EPA's previous efforts to require polluting CAFOs to obtain NPDES permits. In *Waterkeeper Alliance v. EPA*, the Second Circuit vacated the requirement for each large CAFO to apply for a permit, or to secure a determination from the relevant permitting authority that that CAFO has "'no potential to discharge' manure, litter or process wastewater."[82] The court held that this requirement exceeded EPA's statutory jurisdiction under the Act because "unless there is a 'discharge of any pollutant,' there is no violation of the Act, and point sources are . . . [not] statutorily obligated to seek or obtain an NPDES permit." [83] The Fifth Circuit echoed this holding in *National Pork Producers Council v. EPA*,[84] vacating a similar requirement that CAFOs that "proposed to discharge" must apply for permits. The practical result of these cases and EPA's interpretation of them has been to place the burden on citizens and regulators to identify discharging CAFOs that require permits *and* demonstrate that discharges are likely to recur—a 'catch me if you can' system that has resulted in widespread failure to require permits at the state level.[85]

However, these decisions do not foreclose further action by EPA. While EPA's authority to require NPDES permits is limited to those CAFOs that actually discharge, the Second Circuit noted, in a footnote to the *Waterkeeper* decision, that EPA had not argued that the administrative record in that case "support[ed] a regulatory presumption to the effect that Large CAFOs *actually* discharge."[86] As such, the court did not consider whether EPA "might properly presume that Large CAFOs—or some subset thereof—actually discharge."[87] The court thus suggested that EPA may be able to martial evidence to support a regulatory presumption that all or certain categories of CAFOs discharge.[88]

Under well–settled principles of administrative law, agencies have the power to establish evidentiary presumptions.[89] EPA recognized this authority when it proposed establishing a

[82] *Waterkeeper Alliance v. EPA*, 399 F.3d 486, 506 (2d Cir. 2005).
[83] *Id.* at 504.
[84] *Nat'l Pork Producers Council*, 635 F.3d at 750-51.
[85] As discussed *supra*, even when facilities experience documented discharges, some states allow operators to "remedy" the cause of the violation rather than apply for NPDES permits.
[86] *Waterkeeper Alliance*, 399 F.3d at 506 n.22.
[87] *Id.* (citing *NLRB v. Curtin Matheson Scientific, Inc.*, 494 U.S. 775 (1990); *Nat'l Mining Ass'n v. Babbitt*, 172 F.3d 906 (D.C. Cir. 1999)).
[88] In the subsequent *Nat'l Pork Producers Council* case, EPA did not argue that it had established such a presumption in the 2008 CAFO rulemaking; indeed, it argued the opposite. *See* Final Brief of Respondent U.S. EPA at 62, *Nat'l Pork Producers Council*, 635 F.3d 738 (argument heading: "Nothing in 40 C.F.R. § 122.23(j) Alters the Evidentiary Burden for a CAFO Alleged to Have Discharged Without a Permit"). The court therefore offered no opinion on whether an evidentiary presumption could be properly invoked to shift the burden of producing evidence of no-discharge to the regulated entity.
[89] *See e.g., NLRB v. Baptist Hospital*, 442 U.S. 773, 787 (1979); *Nat'l Mining Ass'n v. U.S. Dept. of Interior*, 177 F.3d 1, 6 (D.C. Cir. 1999); *U.S. Steel Corp. v. Astrue*, 495 F.3d 1272, 1284 (11th Cir. 2007); *Cole v. USDA*, 33 F.3d

rebuttable presumption that CAFO lagoons discharge to surface water via groundwater, suggesting a requirement that CAFOs either conduct groundwater pollution monitoring or rebut the presumption of discharge by providing a hydrologist's report demonstrating that no such connection exists at a facility.[90] A court will deem such an evidentiary presumption valid so long as a there is "some rational connection between the fact proved and the ultimate fact presumed, and [] the inference of one fact from proof of another [is] not so unreasonable as to be a purely arbitrary mandate."[91] Regulatory presumptions, i.e., evidentiary presumptions established through rulemaking, are therefore entitled to substantial deference.[92] It follows that, by establishing an evidentiary presumption that certain CAFOs actually discharge, EPA can validly either treat them as discharging facilities or require them to produce evidence that they do not discharge, and therefore should not be subject to the NPDES program.[93] Moreover, case law strongly supports the use of this kind of legal device to increase administrative efficiency, and as a solution to the paucity of reported data pertaining to individual facilities.[94]

ii. EPA Has Sufficient Evidence to Support a Presumption that CAFOs with Certain Characteristics Discharge

In this case, there is overwhelming evidence that many CAFOs actually discharge, so an evidentiary presumption to that effect is appropriate and necessary. EPA's own data already reflect much more than the "rational connection" between the design, construction, and operation of many CAFOs, and their actual discharges, that would be needed to uphold such a

1263, 1267 (11th Cir. 1994); *Holland Livestock Ranch v. U.S.*, 714 F.2d 90, 92 (9th Cir. 1983); *Chem. Mfrs. Ass'n v. Dep't of Transp*., 105 F.3d 702, 705 (D.C. Cir. 1997).

[90] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3040.

[91] *Mobile, Jackson & Kansas City R. Co. v. Turnipseed*, 219 U.S. 35, 43 (1910); *See also NLRB v. Baptist Hospital*, 442 U.S. at 787; *Atchison, T. & S. F. Ry. Co. v. ICC*, 580 F.2d 623, 629 (D.C. Cir. 1978); *Nat'l Mining Ass'n v. Babbitt*, 172 F.3d at 912. That the fact presumed does not always and inevitably follow from the predicate fact has no bearing on the validity of an evidentiary presumption. *See Cole v. USDA*, 33 F.3d at 1270 ("The mere statement that the fact presumed does not *always follow necessarily* from the predicate fact obviously leaves ample room for some lesser, though still rational, connection between the two," thus the mere possibility of circumstances in which the relationship might not hold true was insufficient to invalidate a regulatory presumption).

[92] *NLRB v. Baptist Hospital*, 442 U.S. at 796 (Justice Brennan concurring); *NLRB v. Los Angeles New Hospital*, 640 F.2d 1017, 1020 (9th Cir. 1981); *N.Y. Foreign Freight Forwarders & Brokers Ass'n v. Fed. Mar. Comm'n*, 337 F.2d 289, 295 (2d Cir. 1964).

[93] The effect of an evidentiary presumption is to shift the burden of proof, but not the burden of persuasion, to the party against whom the presumption is invoked. *See* Fed. R. Evid. 301 ("In a civil case, unless a federal statute or those rules provide otherwise, the party against whom a presumption is directed has the burden of producing evidence to rebut the presumption. But this rule does not shift the burden of persuasion, which remains on the party who had it originally.").

[94] *Chem. Mfrs. Ass'n v. Dep't of Transp.*, 105 F.3d at 706 (upholding an evidentiary presumption, established by rule, as an exercise of the agency's "reasoned judgment," and a "sensible, timesaving device"); *Nat'l Mining Ass'n v. Babbitt*, 172 F.3d at 912 (finding an evidentiary presumption is permissible "when proof of one fact renders the existence of another fact so probable that it is sensible and timesaving to assume the truth [of the inferred fact] . . . until the adversary disproves it"). *See also* 2003 CAFO Rule, 68 Fed. Reg. at 7201 ("It is [] much easier for CAFOs to avoid permitting by not reporting their discharges [than it is for operations in other industries]. EPA continues to believe that imposing a duty to apply for all CAFOs is appropriate given that the current regulatory requirements are being misinterpreted or ignored.").

presumption. Two sets of factors are closely correlated with a CAFO's tendency to discharge, and should inform the creation of one or more evidentiary presumptions. First, even under EPA's untenably broad construction of the agricultural stormwater exemption, CAFOs that apply manure to land as fertilizer should be presumed to discharge, because nutrient management tools are simply not calculated to eliminate discharges, even if optimally designed and perfectly implemented, and should be assumed to result in discharges to surface waters and groundwater with a direct hydrologic connection to surface waters.[95] Second, CAFOs with certain production area characteristics that inevitably cause discharges—such as ditches and conduits that flow to jurisdictional waters, barns that spew pollutants from ventilation systems, or certain types of waste storage structures—should also be presumed to discharge. EPA has already done much of the analysis needed to support a presumption related to facilities with certain production area characteristics, and has concluded that 75% of CAFOs do in fact discharge based on their "standard operational profiles."[96]

1. Land Application Discharges

Land application of manure through spreading, spraying, injection, or incorporation is one of the most common methods of disposal of CAFO waste.[97] Yet EPA's current regulations effectively assume that dry weather land application in accordance with a nutrient management plan (NMP) will result in zero discharge, such that no permit is required. Although the regulations do not expressly state that land application in accordance with an NMP renders a permit unnecessary, the NMP is ostensibly designed to "ensure appropriate agricultural utilization of the nutrients . . . ."[98] As a result, many large CAFOs elect not to obtain permits based on reliance on an NMP.[99] Land application of waste is likely the leading source of CAFO water pollution and must be more effectively addressed through NPDES permitting.

As explained in more detail *infra*, EPA's primary assumption that land application does not result in discharges, absent a precipitation event, is fundamentally at odds with scientific

[95] *See* discussion *infra* Section II.A.b., asserting that such land application discharges should never be exempt from the definition of a point source discharge.

[96] EPA 2010 NPDES Estimate at 1. EPA should also presume that facilities that have experienced one or more documented discharges do in fact discharge, and must obtain permits. The current regulatory scheme defies logic by in effect presuming that a facility with a record of unpermitted pollution will never pollute again, and does not require operators to make any affirmative showing that they have made all necessary modifications to the facility to cease all continuous or sporadic discharges.

[97] *Understanding CAFOs and Their Impact on Communities* at 2.

[98] 40 C.F.R. § 122.23(e).

[99] In Iowa, for example, thousands of large confinement hog CAFOs apply waste according to state "manure management plans," but at the time of filing, not a single one had been issued a NPDES permit. Due to the CAFO rules' limitations, even increased EPA oversight of Iowa's NPDES program, in part resulting from EPA's findings that the Iowa Department of Natural Resources fails to issue permits to CAFOs when necessary, has not compelled permitting of confinement operations. *See* Iowa Dep't Natural Res., EPA/DNR Work Plan Materials, http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials.

research. Despite the legal fiction implied in EPA's rules, NMPs are not designed as zero discharge plans, either for nutrients or for other CAFO waste pollutants.[100] Numerous studies have recognized that runoff and leaching of contaminants from animal waste occurs even where it is applied at recommended application rates.[101] Because land application practices result in actual discharges, EPA has strong grounds on which to presume that all land-applying CAFOs discharge and have a duty to apply for NPDES permits.[102]

EPA's CAFO effluent guidelines do acknowledge that NMPs are not truly zero discharge, by requiring that *permitted* CAFOs' NMPs "minimiz[e]" nutrient runoff to surface waters.[103] Yet the current rules inexplicably allow Large CAFOs to land apply *without* NPDES permits, in effect assuming that these CAFOs' NMPs are even better and will result in *zero* dry weather discharge. This inherently contradictory scheme fails to protect waterways and has led to far less permitting than the CWA requires. The evidence clearly supports—and in fact dictates—a determination that all CAFOs that land apply waste discharge and require NPDES permits.[104]

2. Production Area Characteristics

Similarly, EPA should presume that CAFOs with certain production area characteristics actually discharge. The production area of a CAFO generally includes, but is not limited to, the animal confinement, raw materials storage, mortalities management, and waste containment areas.[105] Numerous studies and EPA guidance documents recognize that facilities with certain characteristics are associated with discharges to surface waters.

After promulgating the 2008 CAFO Rule, EPA published a guidance document identifying certain features of CAFO production areas, both manmade and beyond the operator's

[100] *See infra* Section II.B.b.iii.
[101] *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality* at 308 (surveying literature that found high concentrations of nitrogen in surface waters adjacent to sprayfields where animal waste was applied at recommended rates); *see also* L.M. Risse, et al., *Land Application of Manure for Beneficial Reuse,* National Center for Manure and Animal Waste Management White Papers iii (2001), https://www.ars.usda.gov/ARSUserFiles/66120900/SoilManagementAndCarbonSequestration/2001ajfB02.pdf ("Even under ideal conditions, there is still a significant risk of losses to the environment. Agricultural systems leak and elimination of non-point source impacts is practically impossible.").

[102] This petition also requests that EPA strengthen its requirements for land application practices to better protect water quality. However, these two proposals are not in the alternative; because even the requested improvements to the land application regulations would still not eliminate resulting discharges, the presumption of discharge is appropriate and necessary for all CAFOs that land apply, even assuming significantly more stringent nutrient management requirements.
[103] 40 C.F.R. § 412.4(c).
[104] The regulations' failure to account for most non-nutrient pollutants underscores the fact that NMPs are not zero discharge plans. EPA should make further regulatory revisions regarding the agricultural stormwater exemption and the CAFO definitions, as discussed *infra*, to enable it to also require NPDES permits for wet–weather CAFO land application discharges and Medium AFOs that land apply, via establishment of similar presumptions.
[105] 40 C.F.R. § 122.23(b)(8).

control, which support a presumption of discharge.[106] These include: proximity of the CAFO to jurisdictional waters, and whether the CAFO is upslope from such waters; climatic conditions, including whether precipitation exceeds evaporation; type of waste storage system, and the capacity, quality of construction, and presence and extent of built–in safeguards of the storage system; drainage of the production area; and exposure of animal waste and feed to precipitation or other water.[107] As noted previously, EPA has enough information to assess what aspects of CAFO operations are resulting in discharges, and has already used this information to estimate that up to 75% of CAFOs do in fact discharge as a result of their "standard operational profiles;"[108] it therefore can and should re-evaluate these factors in light of available discharge data and establish a list of criteria related to the production area for which it will establish a presumption of discharge.

Ventilation systems also lead to surface water discharges.[109] Chicken house ventilation fans, for example, constantly and intentionally release pollutants such as ammonia, manure, dust, feathers, and feed,[110] and often these pollutants are not kept out of waterways. Many CAFOs are "designed to channel precipitation runoff from the areas around the houses away from the confinement area."[111] At such facilities, contaminants vented from poultry houses will deposit in ditches or waterways that traverse or border production areas.[112] Facilities can also discharge

[106] EPA, *Implementation Guidance on CAFO Regulations—CAFOs that Discharge or Are Proposing to Discharge* (May 28, 2010), http://www.epa.gov/npdes/pubs/cafo_implementation_guidance.pdf [hereinafter CAFOs that Discharge Guidance].
[107] *Id.* at 2. EPA identified additional factors specific to the production area that determine whether a CAFO will discharge, including:

(1) Whether there are structural controls in place to divert clean water and what condition they are in;
(2) Inspection and maintenance schedules for clean water diversion controls, such as berms, gutters, and channels;
(3) Whether design and maintenance of pipes, valves, ditches, drains, etc. associated with the collection of manure and wastewater from the animal confinement area prevents spills and leakage;
(4) Whether any secondary containment to manage contaminated runoff is designed, operated and maintained to handle all pollutant loads; and
(5) Whether the animal confinement area prevents animals from having direct contact with waters of the U.S.

Id. at 5.

[108] EPA 2010 NPDES Estimate at 1.
[109] EPA guidance indicates that a number of factors contribute to the likelihood that a ventilated confinement house system will discharge, including the way water is drained from the site and proximity to jurisdictional waters. CAFOs that Discharge Guidance at 13.
[110] *Understanding CAFOs and Their Impact on Communities* at 5.
[111] CAFOs that Discharge Guidance at 13.
[112] *See* EPA, NPDES Permit Writers' Manual for Concentrated Animal Feeding Operations, EPA 833-F-2-001 4-18 (2012) [hereinafter Permit Writers' Manual] (noting that pollutants including manure, feathers, and feed fall to the ground immediately downward from confinement building exhaust ducts and ventilation fans and "are carried by precipitation-related or other runoff to waters of the U.S."); *see also Nat'l Cotton Council v. EPA*, 553 F.3d 927, 939-40 (6th Cir. 2009), finding that pesticide pollutants deposited into waterways after their release from a point source, similar to ventilated ammonia emissions that deposit in waterways, are subject to NPDES permitting requirements.

directly via deposition of ventilated pollutants into waterways. A North Carolina trial court has recognized that this constitutes a jurisdictional discharge, finding that ammonia and other pollutants that reach jurisdictional waters after being expelled by ventilation fans are subject to NPDES permitting requirements.[113] EPA should presume that both CAFOs in close proximity to waterways or conduits to waterways that fail to capture ventilated pollutants, as well as CAFOs designed to channel precipitation and production area pollutants off of the facility into ditches and waterways, do in fact discharge.

These findings with respect to land application practices and specific production area characteristics reflect a larger body of evidence that demonstrates that CAFOs with certain practices and characteristics are not only prone to discharge, but they do *in fact* discharge. EPA should use its technical expertise and available research to identify the full suite of practices and characteristics that support presumptions that certain CAFOs discharge in fact, and adopt presumptions based on these determinations. Because the evidence demonstrates that many CAFOs actually discharge pollutants, as opposed to merely having the potential to discharge or proposing to discharge, EPA has clear authority to establish an evidentiary presumption to that effect, notwithstanding the decisions of the Second and Fifth Circuits on previous CAFO rulemakings.

iii. Establishing a Presumption that Certain CAFOs Discharge is Necessary to Achieve the Purposes of the Act

The stated objective of the CWA is not merely to reduce, but to eliminate pollution discharges to navigable waters.[114] Yet the current regime essentially allows CAFOs to determine for themselves whether they are subject to regulation, an approach that has resulted in wildly inconsistent and inadequate permitting at the state level, along with widespread unregulated pollution from CAFOs.[115] Moreover, this scheme's 'zero discharge' fiction discourages states from establishing water quality based effluent limitations (WQBELs) for CAFO discharges into impaired waters, which further hinders proper implementation of the Act and undermines its mandate to achieve compliance with water quality standards. A rebuttable presumption that certain CAFOs discharge is necessary to mitigate these failings and meet EPA's obligations under the CWA.

Under EPA's current approach, the majority of CAFOs are responsible for determining for themselves whether they discharge or are exempt from permitting requirements. But EPA has

[113] *Rose Acre Farms, Inc. v. N.C. Dep't of Env't and Natural Res.*, No. 12-CVS-10 ¶¶ 54, 55 (Jan. 4, 2013).
[114] 33 U.S.C. § 1251(a)(1).
[115] *See, e.g.*, T.J. Centner, *Challenging NPDES Permits Granted without Public Participation*, 38 Boston Coll. Envtl. Aff. L. Rev. 1, 8 (2011) (noting that regulation of unpermitted CAFOs under state law "has been unsuccessful"); Jillian P. Fry, et al., *Investigating the Role of State Permitting and Agriculture Agencies in Addressing Public Health Concerns Related to Industrial Food Animal Production*, 9 PLOS 1 2 (2014), http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0089870.

acknowledged that CAFO operators will not voluntarily subject themselves to regulations, and will therefore not apply for CAFO permits if they are not required to do so.[116] In the preamble to the 2001 proposed CAFO rule, EPA noted that only about 2,500 of the 12,000 CAFOs that should have applied for permits at the time had done so.[117] Based on the continued CAFO–related impairment of neighboring watersheds, EPA concluded that many of these large facilities were "actually discharging" and should have applied for a permit.[118] Years later, the *Waterkeeper* court similarly found that owners and operators of discharging Large CAFOs have historically "improperly tried to circumvent the permitting process."[119] The history of the CAFO regulations' implementation demonstrates, therefore, that CAFOs, and particularly those facilities with no history of documented discharges, have little incentive to seek permit coverage absent a regulatory presumption that they must.[120]

Requiring permit coverage of facilities that actually discharge is not only consistent with the purposes of the Act, but it is necessary to effectuate the *Waterkeeper* court's call for regulation "in fact, not just in principle."[121] Given the overwhelming evidence that CAFO facilities and land application areas are significant sources of point source pollution, and that they are not effectively regulated under the current NPDES program, a decision not to establish a presumption that certain CAFOs actually discharge would be arbitrary and capricious. Moreover, as the next section will discuss, a presumption that all CAFOs that land apply also discharge pollutants would independently follow from a more reasonable interpretation of the agricultural stormwater exemption.

b. EPA Must Revise its Interpretation of the Agricultural Stormwater Exemption to Give Effect to Congress' Intent that No CAFO–Related Discharges Are Exempt from the Act's Permitting Requirements

The failure of the current permitting scheme to effectively limit pollutant discharges from CAFOs is also attributable in part to EPA's strained interpretation of the agricultural stormwater exemption. Despite the fact that the environmental impacts from land application of manure are well known, EPA has adopted an overly broad reading of the agricultural stormwater exemption that has tied its hands from regulating much of this CAFO pollution. This reading, which defines precipitation-related discharges of manure as non-point source pollution when land-applied in accordance with an NMP, rather than as point source pollution subject to the NPDES program, is

[116] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 2963.
[117] *Id.*
[118] 2003 CAFO Rule, 68 Fed. Reg. at 7180.
[119] *Waterkeeper Alliance*, 399 F.3d at 506, n.22.
[120] Cases holding EPA lacks authority to assess administrative penalties for the failure to apply for a NPDES permit have made the situation worse by removing much of the incentive for sporadic dischargers to apply for NPDES permits. *See Service Oil v. EPA*, 590 F.3d 545, 550-51 (8th Cir. 2009), *Nat'l Pork Producers Council*, 635 F.3d at 752-53.
[121] *Waterkeeper Alliance,* 399 F.3d at 498.

contrary to the language and purpose of the Act. Moreover, it virtually guarantees that there will be unregulated runoff of CAFO pollution to waterways—the very concern that prompted Congress to regulate CAFOs as point sources in the first place.[122]

In light of mounting evidence that the current interpretation and permit scheme have generally failed to result in CAFO permitting, allowing pollution from this industry to continue degrading waterways across the country, EPA's current interpretation of the exemption is arbitrary and capricious, and contrary to the CWA. EPA must therefore revise its interpretation of the exemption by bringing it in line with the statutory directive to regulate CAFO discharges as point source pollution.

i. EPA's Current Interpretation of the Agricultural Stormwater Exemption

The CWA specifically excludes "agricultural stormwater" from the definition of point source, but does not define the term, leaving some discretion to EPA to interpret the exemption's scope in light of the statutory context. EPA's current CAFO regulations define "agricultural stormwater discharge" as "a precipitation-related discharge of manure, litter or process waste water from land areas under the control of a CAFO" where such materials have been applied "in accordance with site specific nutrient management practices."[123] CAFO discharges associated with precipitation are therefore considered non–point source pollution, and are exempt from permitting requirements under the NPDES program.

This interpretation has made it virtually impossible for EPA and state regulators to ensure that discharges are actually caused by precipitation events, rather than by over–application of CAFO wastes to fields, or otherwise improper manure management. The rules impose minimal requirements before a CAFO operator is permitted to avail him or herself of this blanket exemption from regulation under the Act. Unpermitted Large CAFOs are simply instructed to maintain on–site documentation demonstrating nutrient management practices that "ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater" in

[122] *See* S. Rep. No. 92-414, 92-93 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3670 ("Animal and poultry waste, until recent years, has not been considered a major pollutant . . . . The picture has changed dramatically, however, as development of intensive livestock and poultry production on feedlots and in modern buildings has created massive concentrations of manure in small areas. The recycling capacity of the soil and plant cover has been surpassed . . . . Precipitation runoff from these areas picks up high concentrations of pollutants which reduce oxygen levels in receiving streams and lakes . . . . [W]aste management systems are required to prevent waste generated in concentrated production areas from causing serious harm to surface and ground waters."). While the *Waterkeeper Alliance* court did not find this legislative history dispositive on the meaning of the subsequently enacted exemption, it underscores the ambiguity in the statute that affords EPA authority to revise its interpretation.
[123] 40 C.F.R. § 122.23(e).

order to qualify for the exemption.[124] CAFO operators must make such documentation available to EPA or state permitting agencies upon request.[125]

These site-specific NMPs are never submitted to regulatory authorities unless EPA or state agencies specifically request to review a plan, and the rules do not require any independent verification that NMPs are calculated to ensure land application of wastes occurs at agronomic rates.[126] Consequently, despite the fact that land application is a predominant means of CAFO waste disposal,[127] there is no federal requirement that EPA or state permitting authorities exercise *any* oversight to ensure animal wastes will be applied to land at agronomic rates[128] and that any discharges are precipitation-related. The current permitting requirements therefore incentivize CAFO operators to over–apply animal wastes to cropland, while claiming any confirmed discharges are exempt from permitting as agricultural stormwater and avoiding regulation under the NPDES program.

ii. EPA Has Clear Authority to Revise its Interpretation of the Agricultural Stormwater Exemption as Requested in this Petition

Because the term "agricultural stormwater" is not defined in the CWA, the statute is somewhat ambiguous as to the scope of the agricultural stormwater exemption, and EPA is free to revise its interpretation so long as it reflects a permissible construction of the statute.[129] It is well–settled that agencies are "free to change course as their expertise and experience may suggest or require."[130] Over the past decade, the Agency has continued to amass evidence of widespread CAFO land application pollution, increasing scale and concentration of CAFOs and their waste, and persistent failures to require permits for CAFOs whose land application contribute to water impairments under the existing regulatory scheme—precisely the type of circumstances in which an updating of statutory interpretation is reasonable and necessary. The *Waterkeeper* decision in no way diminishes EPA's authority to revise its interpretation. While the *Waterkeeper* court upheld EPA's current interpretation of the agricultural stormwater

[124] *Id.*; *Id.* § 122.42(e)(1)(vi)-(ix) (specifying additional criteria that land application practices must meet in order to qualify for the "agricultural stormwater exemption").
[125] *Id.* § 122.23(e)(2).
[126] State laws may impose additional requirements.
[127] Marc Ribaudo, et al., *Consequences of Federal Manure Management Proposals: Cost to Swine Operations from Land Applying Manure* 1 (paper presented at American Agricultural Economics Association Meeting, Long Beach, CA, July 28-30, 2002), http://ageconsearch.umn.edu/bitstream/19735/1/sp02ri01.pdf.
[128] Though, as discussed elsewhere in this Petition, even "agronomic" application rates are not capable of achieving zero discharge.
[129] *Chevron v. NRDC*, 467 U.S. 837, 863-64 (1984) ("the fact that the agency has from time to time changed its interpretation of [a statutory term] does not . . . lead us to conclude that no deference should be accorded the agency's interpretation of the statute").
[130] *Ramaprakash v. FAA*, 346 F.3d 1121, 1124 (D.C. Cir. 2003) (citing *Greater Boston Television Corp. v. FCC,* 444 F.2d 841, 852 (D.C. Cir. 1970)).

discharge exemption against challenges from environmental groups, it did so based on deference principles, clearly indicating that other interpretations may be more reasonable.[131]

More than a decade after the *Waterkeeper* decision, there is a growing body of factual evidence demonstrating that the current interpretation is in fact unreasonable because it subverts the central purpose of the Act. Evidence of widespread CAFO pollution escaping CWA regulation necessitates a revision of EPA's current interpretation. EPA must adopt the interpretation that no discharges from CAFOs—including from land application areas under the control of the CAFO—are exempt from the definition of point source pursuant to the agricultural stormwater exemption. Even assuming the *Waterkeeper* court properly deferred to EPA's current interpretation in 2005, a mutually exclusive reading of the two terms is the most reasonable interpretation of the agricultural stormwater exemption because it effectuates the plain language of the statute, which provides that CAFOs are to be regulated as point sources, and aims to eliminate pollution from such sources. EPA's revised interpretation of the agricultural stormwater discharge exemption would be entitled to substantial deference, so long as the Agency provides a reasonable explanation for the revision.[132]

iii. The Language and History of the Statute Indicate Congress' Intent to Regulate All CAFO Pollution

Beginning with the 1972 drafting of the Water Pollution Control Act Amendments, Congress made a policy judgment that CAFO wastes were fundamentally different from other types of agricultural pollution. The 1972 Act Amendments encoded this policy judgment, recognizing that the volume and concentration of waste produced by CAFOs necessitated treating these types of facilities differently than other sources of agricultural pollution.[133] There is no general exemption from compliance with the CWA for agricultural pollution sources. To the contrary, the Act broadly prohibits the "discharge of a pollutant," including agricultural wastes,[134] by any person from any point source, including CAFOs.[135] The Act's default rule therefore requires regulation of CAFOs under the NPDES program, as distinct from other sources of agricultural pollution, which were historically exempt.

[131] *Waterkeeper Alliance,* 399 F.3d at 507 ("Congress has not addressed the precise issue . . . as a result, the operative question we must consider becomes, pursuant to *Chevron*, whether the CAFO Rule's exemption for 'precipitation-related' land application discharges is grounded in a 'permissible construction' of the Clean Water Act."). In other words, the Court at that time found that EPA's interpretation was a permissible one, but not necessarily the most reasonable or the only reasonable interpretation of the statute. *Id*. at 509.
[132] *Chevron*, 467 U.S. at 863-64; *FCC v. Fox Television Stations*, 556 U.S. 502, 515 (2009). The Supreme Court has noted that agency inconsistency "is not a basis for declining to analyze the agency's interpretation under the *Chevron* framework." *Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 981 (2005).
[133] *See* S. Rep. No. 92-414, 92-93 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3670. *See also Cmty. Ass'n for Restoration of the Env't v. Sid Koopman Dairy*, 54 F.Supp.2d 976, 981 (E.D. Wash. 1999) (finding that it would "avoid the clear intent of Congress as expressed in the CWA and by EPA in its NPDES regulations" to exempt discharges resulting from the land application of manure from the definition of "point source").
[134] 33 U.S.C. § 1362(6).
[135] *Id*. §§ 1311(a), 1362(14).

The legislative and regulatory history of the 1987 Amendment, which established the agricultural stormwater exemption, make clear that the terms "agricultural stormwater" and "concentrated animal feeding operation" are most logically read as being mutually exclusive. While Congress did not explain the relationship between the new term "agricultural stormwater" and the existing "concentrated animal feeding operation,"[136] the new language was merely added to the end of the definition of "point source," without any alteration of the existing text. Because there is no indication in the statute or in the legislative history that Congress sought to re–address the status of CAFOs as point sources, the 1987 Amendment cannot be read to amend this existing policy judgment. To the contrary, it is well–settled law that "Congress does not alter a regulatory scheme's fundamental details in vague terms or ancillary provisions."[137]

Here, Congress left no indication that it had reconsidered its reasons for including CAFOs in the definition of point source. Nor did it discuss the definition of "agricultural stormwater" in a way that could justify a departure from the meaning of that term as it was understood at the time. Rather, the 1987 Amendment is best read to codify already–existing exemptions for certain types of non–point source agricultural pollution and clarify that the non-exclusive definition of point source was not intended to sweep such non-CAFO farm runoff into the regulatory scheme. By retaining the term "concentrated animal feeding operation," unqualified, in the definition of "point source," the legislative history makes clear that the addition of the "agricultural stormwater" exclusion was not intended to alter the scope of the NPDES program with respect to CAFOs.

The regulatory history preceding the statutory amendment supports the conclusion that Congress did not intend to include any CAFO–related discharges within the meaning of "agricultural stormwater." Prior to the 1987 Amendment, EPA had already established certain agricultural exemptions from the point source definition through rulemaking. The 1980 CWA implementing regulations excluded certain types of agricultural discharges from NPDES permit requirements.[138] Specifically, the regulations excluded from the permit program "[a]ny introduction of pollutants from non–point–source agricultural and silvicultural activities, including runoff from orchards, cultivated crops, pastures, range lands, and forest lands, *but not discharges from concentrated animal feeding operations*."[139] In other words, while certain non–point source agricultural runoff was exempt from NPDES program requirements under the regulations, waste from CAFOs was not considered non–point source pollution, and was therefore ineligible for the exemption. As such, the 1987 addition of an "agricultural stormwater

[136] *Waterkeeper Alliance*, 399 F.3d at 507 ("the Act makes absolutely no attempt to reconcile the two [provisions]").
[137] *See Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 458 (2001).
[138] *Consolidated Permit Regulations: RCRA Hazardous Waste, SDWA Underground Injection Control; CWA National Pollutant Discharge Elimination System; CWA Section 404 Dredge or Fill Programs; and CAA Prevention of Significant Deterioration*, 45 Fed. Reg. 33290, 33442 (May 19, 1980) (codified in relevant part at 40 C.F.R. § 122.3(e)); *see also* 48 Fed. Reg. 14146-01 (Apr. 1, 1983) (reorganized version of permit program requirements).
[139] *Id.* (emphasis added). This exclusion was challenged in *NRDC v. EPA*, No. 80-1607 (filed June 3, 1980), but that challenge was dismissed as a result of the agricultural stormwater discharge amendment in 1987. *See* National Pollutant Discharge Elimination System Permit Requirements, 54 Fed. Reg. 246-01, 247 (Jan. 4, 1989).

discharge" exemption is most reasonably read to codify EPA's then–existing exemption for certain non-CAFO-related agricultural pollution.[140] Congress did not indicate any intent to depart from the existing regulatory scheme, so the agricultural stormwater exemption cannot be read to cover CAFO–related discharges.[141]

Because the current interpretation allows the exception to swallow the rule, EPA must adopt the position that no CAFO–related discharges are exempt from regulation as point source pollution under the agricultural stormwater discharge exemption. EPA has authority to revise its interpretation of the exemption, and the proposal to read "CAFO" and "agricultural stormwater" as mutually exclusive would not only be entitled to substantial deference, but would be the most natural reading of the Act, its legislative history, and its regulatory history. A revised interpretation of the agricultural stormwater exemption would also best implement the policy choice underlying Congress' decision to treat CAFOs as point sources of pollution and its intent to eliminate point source discharges of pollution to waters of the U.S.

c. EPA Must Ensure that Permitting Agencies Co-Permit Integrators and other Operators with Producers

EPA has long understood that entities that "exercise substantial operational control over CAFOs" meet the CWA regulatory definition of "operator" and should therefore be co-permitted or required to hold a separate NPDES permit.[142] In the 2001 proposed CAFO rule, EPA acknowledged that integrators are increasingly exercising control over where CAFOs are located, how they raise animals, and how they manage waste, including through production contracts and direct ownership of CAFO livestock.[143] As EPA pointed out, even in 2001 "[p]roduction contracting dominate[d] U.S. broiler and turkey production," and 40% and 30% of eggs and hogs, respectively, were produced under contract.[144] By 2014 just four companies controlled production of nearly one third of U.S. layer hens, and by 2012 more than 60% of hogs were raised under contract and packers owned more than one in twenty cattle slaughtered.[145]

These dramatic increases in processor consolidation and control over CAFOs directly impacts water quality, in part because CAFOs "tend to locate in close proximity to feed and meat packing plants," which leads to increased concentration and "thus rais[es] the potential for increased environmental pressure in those areas."[146] In the tightly controlled broiler chicken industry, this has led to such regional concentration that "in many regions, the scale at which

[140] *See Concerned Area Residents for the Env't v. Southview Farm*, 34 F.3d 114, 123 (2d Cir. 1994) (holding that CAFOs, which are defined by the Act as "point sources," are "not to be treated as [] agricultural nonpoint source operation[s]").
[141] *See Whitman v. Am. Trucking Ass'ns*, 531 U.S. at 458.
[142] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3023.
[143] *Id*. at 3024.
[144] *Id*.
[145] *Factory Farm Nation* at 10, 11, 15.
[146] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3024.

chicken litter is produced is far more than crops can absorb."[147] Moreover, "[e]very aspect of the birds' care is regulated by the integrator," and as a result, contract growers "do not have control over the inputs . . . including feed, medication, and the chickens themselves."[148] Many of these inputs, such as pharmaceuticals, will end up in the chicken litter. Integrators' many requirements thereby dictate their contract CAFOs' day to day operations, as well as the location, quantity, and characteristics of the waste they produce.

Because integrators and other corporate entities are a driving force behind so many CAFOs' operations and exercise so much control over them, EPA's 2001 proposed rule solicited input on whether it should establish specific factors, such as ownership of CAFO animals or contractual agreements that dictate CAFO activities, that permitting agencies must consider in identifying "substantial operational control." Recognizing that many of these integrators and other entities already meet the definition of an "operator," EPA explained that its "proposal would *clarify*" that such entities "are subject to NPDES permitting requirements."[149] EPA went further and stated unequivocally that it "believes that ownership of the animals establishes an ownership interest in the pollutant generating activity at the CAFO that is sufficient to hold the owner of the animal responsible for the discharge of pollutants from the CAFO."[150] Despite all of these findings, EPA decided to maintain the status quo in the 2003 final rule.

The past 15 years have demonstrated that EPA's hands-off approach has granted far too much discretion to states. In the absence of clear requirements from EPA explaining which entities meet the definition of an operator and must have permits, permitting agencies are simply not requiring co-permitting. In fact, in 2015 the Center for Progressive Reform found that *no states* are co-permitting integrators with their CAFO producers under their delegated NPDES programs.[151] Just as EPA predicted in 2001, a scheme that leaves operator determinations to the state agency has meant that "the state . . . might not make them at all" and operators have continued to "inappropriately . . . avoid liability."[152]

EPA has more recently revisited the idea that unpermitted integrators are operators and should be permitted. In 2010, EPA issued its Chesapeake Bay Compliance and Enforcement Strategy, which was meant to complement the multi-jurisdictional Chesapeake Bay Total Maximum Daily Loads (TMDL) effort to restore the Bay. In the Strategy EPA named CAFO integrator liability enforcement actions in the Bay region among the "immediate" actions it could

[147] Rural Advancement Foundation International-USA, Under Contract: Farmers and the Fine Print, Viewers Guide 24 (2017), http://rafiusa.org/undercontractfilm/press-kit/.
[148] *Id*. at 20.
[149] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3024 (emphasis added).
[150] *Id*. at 3025.
[151] Ctr. for Progressive Reform, *Integrator Liability: Legal Tools to Hold the Biggest Chicken Companies Responsible for Waste* 3, http://www.progressivereform.org/articles/Integrator_Liability_IssueAlert_1502.pdf (Mar. 2015).

[152] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3025.

take to drive pollution reductions while the Bay states put longer-term TMDL programs into place.[153] More than six years later, it has failed to initiate any such actions, and took no action to support citizen litigants when they sued Perdue in federal court for illegal discharges from a Maryland contract operation.[154]

Corporations such as Perdue and Tyson exercise substantial control over their contractors' production process and collect the profits generated. In light of their substantial stake in the venture, they should share in the liability that may result from discharges. Placing the entire permitting burden on producers is not only unfair, but also inefficient: if contracted farmers are wholly liable for the costs associated with water pollution, the integrators who control their operations will have no incentive to minimize the extent of such pollution. Co-permitting integrators would be an equitable step that would also create a sensible incentive scheme and likely to lead to the development of more cost-effective waste management systems.

EPA has already established that many of these corporate entities are CWA operators, but it must now clarify by regulation which entities meet the definition of an operator and are required to obtain NPDES permits. It will be entitled to substantial deference for a reasonable articulation of "substantial operational control," similar to that proposed in 2001. However, EPA must establish a more bright-line test for substantial operational control, rather than leaving that determination to state permitting agencies as previously proposed.[155] In light of the lack of integrator liability for operators that exercise increasing control over CAFOs and their pollution, a failure to impose unambiguous co-permitting requirements on integrators and state permitting agencies would be arbitrary and capricious.

d. EPA Should Revise the CAFO and Production Area Definitions and Designation Authorities, 40 C.F.R. § 122.23(b)-(c)

EPA should revise the definition of production area to resolve uncertainty created by courts, and should revise the CAFO definitions because as written, the current definitions prevent effective regulation of medium and small AFOs that are nonetheless significant sources of water pollution. Moreover, they create incentives for operators to avoid regulation by maintaining herd sizes just below the regulatory threshold. Specifically, EPA should revise its

[153] EPA Office of Enforcement and Compliance Assurance, Chesapeake Bay Compliance and Enforcement Strategy 4 (May 2010), http://www.epa.gov/oecaerth/civil/initiatives/chesapeake-strategy-enforcement.pdf.
[154] *See Waterkeeper Alliance, Inc. v. Alan Hudson*, No. WMN–10–487, 2012 WL 6651930 (D. Md. Dec. 20, 2012). Perdue ultimately prevailed in this case when the court did not find sufficient proof of a discharge from the broiler operation. But the judge's prior order denying Perdue's Motion to Dismiss recognized that integrators who exercise sufficient control over contractors may be held liable as CWA operators. Memorandum on Motions to Dismiss, *Assateague Coastkeeper et al. v. Alan and Kristin Hudson Farm et al.*, 727 F. Supp. 2d 433 (D. Md. Jul. 21, 2010).

[155] *See* 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3025 ("The proposed regulations would provide that a person is an 'operator' when 'the Director determines' that the person exercises substantial operational control over the CAFO.").

CAFO definitions to either eliminate or shrink the "Medium CAFO" category and to make it easier for both state agencies and EPA to designate a Small (or Medium, if EPA retains that category) AFO as a CAFO, such that facilities with the same environmental impact as Large CAFOs are subject to the same degree of environmental regulation.[156]

i. EPA Should Revise the Definition of Production Area

EPA's existing definition of "production area" is appropriately broad and non-exclusive. A reasonable interpretation of this definition should ensure that all Large CAFO-related discharges are subject to the ELGs if they are not from land application areas, and should preclude any application of the agricultural stormwater exemption to discharges from non-land application areas associated with a CAFO. However, the 2014 *Alt v. EPA* decision adopted a strained interpretation of the production area, creating the new concept of a CAFO "farmyard" that it declared eligible for the agricultural stormwater exemption, and thereby created uncertainty where none had previously existed.[157] EPA failed to appeal that erroneous District Court decision, and must now eliminate any purported ambiguity or regulatory gaps through its rulemaking authority.

Of course, if EPA acts to properly limit the scope of the agricultural stormwater exemption, that revision would remedy much of the uncertainty created by *Alt*. However, EPA should additionally clarify the scope of the production area to ensure that all areas associated with the CAFO facility are subject to the CAFO ELGs. EPA can do this by simply adding language to the existing production area definition explaining that each CAFO has a single, contiguous production area that encompasses all listed aspects of the operation and all areas in between, and that the agricultural stormwater exemption may never be applied to discharges from the CAFO production area.

[156] The regulations divide AFOs into three groups—Large, Medium, and Small, based on the number of animals raised at the facility. All large AFOs are considered Large CAFOs, based solely on the size threshold. But a Medium AFO is only considered a CAFO if it both meets the specified size threshold and satisfies one of two conditions: (1) the facility must discharge pollutants to a water of the U.S. through a man–made ditch, flushing system, or other similar man–made device; or (2) the facility must discharge pollutants directly into a water of the U.S which originates outside of and passes over, across, or through the facility, or otherwise comes into direct contact with the animals confined in the facility. "Small CAFO" is defined in the regulations as any AFO "that is designated as a CAFO and is not a Medium CAFO." Irrespective of size threshold, AFOs can be designated as CAFOs by the appropriate NPDES permitting authority if, upon inspection of the operation, the authority determines that the facility "is a significant contributor of pollutants to waters of the United States." 40 C.F.R. § 122.23(b)-(c). In making this designation, permitting authorities are directed to consider: (1) the size of the AFO and the amount of waste reaching waters of the U.S.; (2) the location of the AFO relative to jurisdictional waters; (3) the means of conveyance of animal wastes and process waste waters to waters of the U.S.; (4) the slope, vegetation, rainfall, and other factors affecting likelihood or frequency of discharge; and (5) other relevant factors. *Id.* § 122.23(c)(2).

[157] *Alt v. EPA*, 979 F. Supp. 2d 701, 711 (N.D. W. Va., Oct. 23, 2013).

ii. EPA Should Revise or Eliminate the "Medium CAFO" Category

While the environmental concerns associated with many Medium AFOs differ only in scale, not type, from those caused by Large CAFOs, EPA's default position under the current regulations is to leave the former unregulated. However, there is evidence that Medium AFOs are significant polluters,[158] and EPA's current approach does not adequately ensure that polluting Medium AFOs are designated as CAFOs or that designated CAFOs are sufficiently regulated.

The current definition of "Medium CAFO" inhibits effective regulation of these facilities in two ways. First, a Medium AFO can only be defined as a CAFO if the operation discharges from the production area directly or via a manmade conveyance, and can only be designated as a CAFO after an on–site inspection demonstrates that it is a significant contributor of pollutants to a water of the U.S.[159] This means that Medium AFOs have no incentive or obligation to seek NPDES permit coverage until they have been caught directly discharging into a jurisdictional water, nor do they have any incentive or obligation to control their land application discharges. Even the most egregious over-application of waste on cropland or application in circumstances that lead to discharges are not grounds for CAFO designation. As discussed elsewhere in this Petition, even permitted CAFOs' NMPs are not "zero discharge" plans; the application practices of facilities with no plans whatsoever are even more likely to lead to discharges. Second, even where Medium (or Small) AFOs are designated as CAFOs, EPA has not promulgated federal ELGs for these facilities, leaving permitting authorities to establish BPJ effluent limitations for these operations on an ad hoc basis.[160]

Despite EPA's failure to comprehensively track the nation's CAFOs, literature and anecdotal evidence indicate that the current size–based Large CAFO definition has incentivized AFO operators to skirt environmental regulations by maintaining animal numbers just under the Large CAFO threshold. One empirical study found, for example, that in the four years after promulgation of the 2003 CAFO Rule, "7.7% of potentially regulated operations near the threshold 'avoided' [regulation] by remaining just below the cutoff."[161] The same study found that "avoidance" is even more prominent among new facilities than among existing

[158] *See, e.g.*, J. Mark Powell, et al., *Environmental Policy and Factors that Impact Manure Management on Wisconsin Dairy Farms*, Proceedings of the Symposium on the State of the Science of Animal Manure 3-4 (2005) (Wisconsin dairy farms with small and medium herd sizes have the lowest manure collection rates, and are often located close to streams or springs; these farms may require "particular attention" with respect to manure management).
[159] 40 C.F.R. §§ 122.23(b)(6), (c).
[160] *Id*. § 412; Permit Writers' Manual at 4-17; EPA, *Producers' Compliance Guide for CAFOs* 5 (2003), https://www.epa.gov/sites/production/files/2015-06/documents/compliance-cafos.pdf.
[161] Stacy Sneeringer and Nigel Key, *Effects of Size-Based Environmental Regulations: Evidence of Regulatory Avoidance*, 93 Am. J. Agric. Econ. 1189, 1190 (2011), http://faculty.smu.edu/millimet/classes/eco7377/papers/sneeringer%20key%202011.pdf.

operations.[162] Summarizing its findings, the study concluded that increased numbers of operations just under the regulatory thresholds between 1997 and 2007 coincided with increased environmental regulations—namely EPA's 2003 CAFO Rule.[163]

Producer–oriented publications from various agricultural extension networks further support this common–sense finding. In a document entitled "How to Avoid CAFO Status," soil specialists at the Colorado State University Cooperative Extension recommended that AFO operators inspect their facilities to determine whether any of the size or discharge criteria that would render such facilities CAFOs were met—and if so, "change it, so you won't be defined or designated as a CAFO in the future."[164]

While EPA adopted this three–tiered system in order to ease states' burdens in revising CAFO regulations, many of which had included this structure prior to the 2003 Rule,[165] as implemented, this system arbitrarily exempts a large number of operations approaching the Large CAFO size threshold and their land application practices from regulation, and encourages circumvention of laws governing permitted facilities. Given these failings, EPA should either eliminate the "Medium CAFO" category altogether and expand the Large CAFO category to include these facilities, or remove the requirement that a Medium AFO directly discharge from the production area to qualify as a CAFO. Such a revision, particularly if made in conjunction with the proposed revision to the agricultural stormwater exemption, would bring many discharging Medium AFOs into the NPDES permit program and significantly benefit water quality.

iii. EPA Should Impose Meaningful Limits on States' Discretion in Designating AFOs as CAFOs

Current CAFO regulations allow states an inordinate amount of discretion in determining whether to regulate Small or Medium AFOs by designating them as CAFOs. Such a designation requires that a facility be "a significant contributor of pollutants to waters of the United States."[166] The term "significant" is not defined in the regulations, however, so state permitting authorities have an enormous amount of leeway in determining whether to designate an AFO as

[162] *Id.* at 1202 (noting that "new entrants exhibit a 10.5% avoidance rate, while that for continuing operations is only 5.2%").
[163] *Id.* at 1207-09; *see also* Bradley Crawford, *Going Half Hog: CAFOs Downscale in the Face of Regulation*, Chicago Policy Review (May 3, 2012), http://chicagopolicyreview.org/2012/05/03/going-half-hog/.
[164] Jessica G. Davis, How to Avoid CAFO Status, Colorado State University Cooperative Extension.
[165] *See* 2003 CAFO Rule, 68 Fed. Reg. at 7189-90 (stating that eliminating the three-tier structure "at this point in time would be unnecessarily disruptive in a number of States that currently have three-tier CAFO programs in place.").
[166] 40 C.F.R § 122.23(c). In making this designation, permitting authorities are directed to consider: (1) the size of the AFO and the amount of waste reaching waters of the U.S.; (2) the location of the AFO relative to jurisdictional waters; (3) the means of conveyance of animal wastes and process waste waters to waters of the U.S.; (4) the slope, vegetation, rainfall, and other factors affecting likelihood or frequency of discharge; and (5) other relevant factors. *Id.* § 122.23(c)(2).

a CAFO. Moreover, this term is so vague that it essentially precludes citizens from contesting the determination of the state agency.

While the regulations provide an open–ended list of criteria that permitting authorities may consider in making such a determination, the rules give no indication of how permitting authorities are to weigh these criteria. The complete lack of standards or accountability for state designation of Small CAFOs, in practice, renders this tier of the CAFO definition a nullity, despite the fact that even Small AFOs can cause large discharges and severe water quality impacts.[167] EPA should therefore revise the definition of "Small CAFO" to apply the current criteria for the Medium CAFO definition – if a Small AFO discharges from the production area, it should be defined as a CAFO. It simply defies logic to permit direct discharges from any size of AFO into jurisdictional waters without imposing basic NPDES permit requirements. Finally, EPA should expand its own authority to designate an AFO as a CAFO in other circumstances when the state permitting agency fails to act. This authority should not hinge on a finding that an AFO is contributing to a downstream water quality impairment.[168]

Overall, EPA's current CAFO regulations have failed to effectively bring discharging CAFOs and AFOs into the NPDES program, and EPA must establish presumptions that certain CAFOs discharge, close the agricultural stormwater loophole, affirm that integrators who qualify as operators must obtain permits, and update its CAFO definitions to reflect the fact that a functional program must better control pollution from Medium and Small AFOs. Any course of action short of adopting this set of revisions will allow the status quo of unregulated CAFO pollution to continue.

B. EPA MUST STRENGTHEN CAFO NPDES PERMITS TO ADEQUATELY PROTECT WATER QUALITY

Under EPA's current regulations and effluent guidelines, even the minority of CAFOs that have NPDES permits are inadequately regulated. The regulations applicable to all CAFOs purport to require CAFOs to maintain adequate waste storage and implement NMPs, and the effluent guidelines applicable to Large CAFOs further impose a zero discharge requirement on the production area under most circumstances and require various best management practices and minimization of runoff from land application areas. Yet the CAFO rules suffer from unclear language and fail to require the basic water quality monitoring required of virtually every other point source category, instead relying only on annual reports of waste applications. Such

[167] *See, e.g.*, Adam Rodewald, Green Bay Press-Gazette, Manure Spills Putting Water Supply at Risk (Feb. 8, 2015), http://www.greenbaypressgazette.com/story/news/investigations/2015/02/06/manure-spills-water-supply/22983669/; Bob Dohr, Green Bay Press-Gazette, One Million Gallons of Manure Dumped in Spencer Wetland (Aug. 13, 2014), http://www.greenbaypressgazette.com/story/news/local/2014/08/12/farm-cited-manure-discharge/13983497/ (discussing a 120-head Wisconsin dairy that spilled an estimated one million gallons of manure from a storage tank into a wetland and the Eau Pleine River between 2013 and 2014).
[168] 40 C.F.R. § 122.23(c)(1).

monitoring is essential, particularly given the other weaknesses in EPA's permit scheme. EPA's CAFO ELGs do not apply to Small or Medium CAFOs, leaving these permits' limits up to states. The ELGs also fail to prohibit certain practices that inherently pose threats to water quality from both the production and land application areas, and rely on state-based nutrient management requirements derived to maximize crop yield, rather than protect water quality. This approach addresses CAFO waste as though it is merely manure, and as a result EPA has also entirely overlooked numerous pollutants of concern.

To ensure that CAFO permits adequately protect water quality and provide necessary transparency and enforceability, EPA must adopt common-sense waste management and monitoring requirements, strengthen the basic requirements applicable to all CAFOs, regulate all important CAFO pollutants through the CAFO ELGs, and otherwise strengthen the CAFO ELGs to prohibit practices known to harm water quality.

a. EPA Must Strengthen and Clarify the Requirements Applicable to All CAFOs, 40 C.F.R. § 122.42(e)

While it is commendable that EPA has established industry-specific regulations for CAFO NPDES permits in addition to the ELGs, unlike many other regulated industries, the regulations lack clarity and accountability. The Large CAFO ELGs do not adequately make up for these shortcomings.

i. EPA Must Require Water Quality Monitoring in CAFO NPDES Permits

EPA has long failed to require CAFOs to meet one of the most basic requirements of NPDES permits—water quality monitoring capable of assuring compliance with permit terms. The CWA's permitting provisions require that NPDES permits contain conditions, including conditions on data collection and reporting, to "ensure compliance" with the Act.[169] The accompanying CWA regulations clearly require all NPDES permits to include certain monitoring and reporting requirements designed to "assure compliance with permit limitations . . . ."[170] These include, *inter alia*, "requirements to monitor" "[t]he mass (or other measurement specified in the permit) for each pollutant limited in the permit," "[t]he volume of effluent discharged from

[169] 33. U.S.C. § 1342. *See also NRDC v. EPA*, 808 F.3d 556, 580 (2d Cir. 2015) ("Under the CWA, NPDES permits must contain conditions that require both *monitoring* and *reporting of monitoring results* of TBELs and WQBELs to ensure compliance.").

[170] 40 C.F.R. § 122.41(i)(1). Moreover, because these monitoring requirements apply to all NPDES permits, EPA's rejection of groundwater and surface water monitoring requirements in determining BAT for the CAFO industry, and the *Waterkeeper* court's deference to EPA's rejection of groundwater monitoring, is irrelevant to this consideration. The question of surface water monitoring as part of BAT was not before the court, nor was the question of surface water monitoring as a general requirement of NPDES permits. *Waterkeeper Alliance*, 399 F.3d at 513-15.

each outfall," or "[o]ther measurements as appropriate."[171] Permit monitoring provisions must further specify the "type, intervals, and frequency [of sampling] sufficient to yield data which are representative of the monitored activity, including, when appropriate, continuous monitoring."[172] Permittees must report monitoring results "on a frequency dependent on the nature and effect of the discharge, but in no case less than once a year."[173] In light of these statutory and regulatory requirements, "[g]enerally, 'an NPDES permit is unlawful if a permittee is not required to effectively monitor its permit compliance.'"[174]

CAFOs are point sources subject to these permitting provisions, and persistent pollution from these sources has demonstrated that facility-level effluent monitoring on or adjacent to CAFO production and land application areas is necessary to meet the objectives of the CWA. Yet permitting agencies have overwhelmingly failed to incorporate any of these required monitoring provisions into CAFO NPDES permits. EPA must fill this regulatory gap by directly addressing monitoring in the CAFO regulations. To properly implement compliance monitoring, CAFO permits must require monitoring for, *inter alia*, pH, total nitrogen, ammonia nitrogen, nitrate, total phosphorus, specific conductance, biochemical oxygen demand, fecal coliform, temperature, and total suspended solids,[175] and must require such monitoring at points of discharge from the production and land application areas, as identified on a site-specific basis by a certified nutrient management planner. CAFO monitoring plans must be designed based on consistent EPA criteria for representative sampling and subject to public notice and comment prior to permit issuance.

EPA rejected water quality monitoring requirements in the 2003 CAFO Rule, citing "concerns regarding the difficulty of designing and implementing" an effective monitoring program, and "because the addition of in-stream monitoring does not by itself achieve any better controls on the discharges from CAFOs . . . ."[176] EPA did not revisit that decision in the 2008

[171] 40 C.F.R. § 122.44(i).

[172] 40 C.F.R. §§ 122.48(b), 122.44(i)(1). *See also* 40 C.F.R. § 122.41(j)(1). Section 308 of the CWA provides further support for monitoring, stating that "whenever [it is] required to carry out the objective" of the CWA, a permitting agency "(A) shall require the owner or operator of any point source to . . . (iii) install, use, and maintain such monitoring equipment or methods . . . as may reasonably be require[d]." 33 U.S.C. § 1318(a)(1)(A)(iii).

[173] 40 C.F.R. § 122.44(i)(2). The regulations further set out required monitoring methodologies, 40 C.F.R. § 136, and state that all NPDES permits must specify "[r]equirements concerning the proper use, maintenance, and installation, when appropriate, of monitoring equipment or methods." 40 C.F.R. § 122.48(a).

[174] *NRDC v. EPA*, 808 F.3d at 583, quoting *NRDC v. Cty. of L.A.*, 725 F.3d 1194, 1207 (9th Cir. 2013).

[175] *See, e.g.,* Ca. Reg'l Water Quality Control Bd., North Coast Region, General NPDES Permit No. CAG011001, NPDES Permit for CAFOs, Attachment E – Monitoring and Reporting Program at E-4 [hereinafter CA CAFO Permit], http://www.waterboards.ca.gov/northcoast/water_issues/programs/dairies/pdf/120127/npdes/120127_12_0001_NPDES_CAFO.pdf. This California CAFO General Permit requires surface and groundwater monitoring for numerous pollutant parameters. EPA should also require monitoring for additional pollutants of concern added to the CAFO ELGs, as proposed *infra*.

[176] 2003 CAFO Rule, 68 Fed. Reg. at 7217.

CAFO Rule.[177] But while EPA may believe that CAFO monitoring is more difficult than with other point source industry sectors, there are no exemptions from these basic compliance monitoring requirements. Moreover, various states have demonstrated that such monitoring is in fact practicable and affordable. California, for example, issues CAFO permits with representative effluent monitoring requirements for numerous CAFO pollutants of concern at both production and land application area discharge points.[178] Maryland also has language in its CAFO General Permit authorizing the state to require operators to design a monitoring plan to sample various manure pollutants and pesticides that could be present at potential production and land application area discharge points, to "evaluate the effectiveness" of the facility's nutrient management plan and thereby assure compliance.[179] Contrary to EPA's 2003 findings, it is now practicable to design and implement such CAFO monitoring requirements.

Outside of the CAFO permitting context, other states have found it possible to derive monitoring methods for pollution runoff from agricultural operations, or to require operations to derive their own methods on a case-by-case basis. The emergence of pollution credit trading programs has created the incentive for such monitoring to verify agricultural credit generation where states do not merely rely on modeling, such as in Oregon, where the creation of credits must be accompanied by a monitoring plan, and Ohio, where soil and water conservation professionals must monitor water quality to assess the effectiveness of agricultural credit sellers' practices.[180] Evidently it is possible to develop representative monitoring of pollution from agricultural sources when those sources and permitting agencies have the incentive to do so; EPA cannot credibly claim that such monitoring is impracticable or ineffective while concurrently allowing states to use similar methods to verify credits and ostensibly demonstrate permit compliance in trading programs.

No existing CAFO requirements satisfy these monitoring requirements. The limited manure and soil nutrient sampling required under EPA's regulations is helpful in attempting to determine an agronomic rate for waste application, but does not provide any information relevant to the CWA's requirement that NPDES permits must assure compliance with water quality

[177] No group challenged this deficiency of the 2003 and 2008 CAFO Rules, and no court has upheld the agency's decision to ignore these requirements.
[178] CA CAFO Permit at Attachment E.
[179] Md. Dep't of the Env't, General Discharge Permit for Animal Feeding Operations, Part V.A. (Dec. 1, 2014), http://www.mde.state.md.us/programs/Land/RecyclingandOperationsprogram/AFO/Documents/gd_permit%20signed.pdf.
[180] *See, e.g.,* Oregon Water Quality Trading Program Regulations, OAR 340-039-0025(5)(g), http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_039.html; Ohio Water Quality Trading Regulations, OAC 3745-5-04(K), http://epa.ohio.gov/portals/35/rules/05-04.pdf. While these two programs are not specifically designed to assure compliance with effluent limitations and leave too much discretion to individual agricultural polluters to design monitoring plans, they demonstrate that such site-by-site agricultural monitoring requirements do not suffer from the "prohibitive[] expens[e]" or "severe technological limitations" necessary for EPA to lawfully omit them from CAFO permits. *See NRDC v. EPA*, 808 F.3d at 582.

standards[181] or EPA's CAFO ELG requirements to prevent production area discharges and minimize the potential for nutrient pollution from land application fields. EPA's regulations applicable to all NPDES permits speak for themselves, and must be given effect in permitting of CAFOs. In place of the 'honor system' currently in effect, EPA must require all permitted CAFOs to conduct periodic, representative water sampling and submit the results regularly via discharge monitoring reports—just like other industries are required to do. Absent such monitoring requirements, determining CAFO compliance with permit provisions becomes essentially impossible and CAFOs cannot reliably be held accountable for violations of permit terms.

ii. EPA Must Strengthen Annual Reporting Requirements

EPA should add to the CAFO annual reporting requirements, 40 C.F.R. § 122.42(e)(4). The annual report should of course include the results of the water quality monitoring discussed *supra*, though these results should also be submitted the permitting agency and EPA and made available to the public within 30 days of the monitoring event. The annual report should also include a summary of any discharges from land areas under the control of the CAFO; currently only production area discharges are subject to annual reporting requirements. In addition, the annual report should include not only the estimated amount of manure transferred to other persons, but also all of the manure transfer documentation that CAFOs are currently required only to keep on site pursuant to 40 C.F.R. § 122.42(e)(3). These common-sense additions to the existing annual report requirements will provide regulators and the public with far more of the information they need to assess a facility's compliance status without imposing significantly greater administrative burdens on permittees.

b. EPA Must Revise the Large CAFO Effluent Guidelines, 40 C.F.R. § 412

EPA's Large CAFO ELGs purport to prevent all production area discharges, absent a major storm event, and minimize the potential for nutrient runoff from land application.[182] Specifically, land application practices must be subject to best management practices (BMPs) specified in 40 C.F.R. § 412.4.[183] BMPs for land application include the requirement that a CAFO utilizing land application develop a nutrient management plan meeting nine minimum

[181] 40 C.F.R. § 122.4(d). For the same reason, EPA's 2003 rejection of monitoring in part because monitoring does not itself reduce CAFO pollution, 68 Fed. Reg. at 7217, is not a valid reason to omit monitoring requirements because as explained, that is not the purpose of monitoring requirements. Monitoring is required to demonstrate compliance, not to achieve it.

[182] 40 C.F.R. § 412.31(a) (explaining BPT for dairy cows and cattle other than veal calves); 412.32 (explaining BCT for the same); 412.33 (explaining BAT for the same); 412.43 (explaining BPT for swine, poultry, and veal calves); 412.44 (explaining BCT for the same); 412.45 (explaining BAT for the same).

[183] *See also* 40 C.F.R. §§ 412.31(b); 412.33(b); 412.43(b); 412.44(b); 412.45(b).

elements;[184] determine application rates for manure, litter, and other process wastewater that minimize phosphorous and nitrogen transport to surface waters; sample and analyze manure and soil; inspect land application equipment for leaks; and comply with setback requirements.[185]

But as evidenced by manure spills and widespread water contamination, these ELGs are failing to adequately control CAFO pollution. The regulations only require states to set BPJ limits for pollutants from Medium and Small CAFOs, ignore numerous pollutants of concern, leave various waste pathways unregulated, and fail to prohibit practices that are known to harm water quality and that prevent CAFOs from meeting narrative effluent limits. In short, they fall far short of representing the appropriate level of technology for reducing CAFO pollution.

i. The CAFO ELGs Should Apply to All CAFOs

In the 2001 CAFO rule preamble, EPA considered broadening the applicability of the CAFO ELGs beyond Large CAFOs to establish broader water quality protections and more uniform permit requirements, but its final 2003 rule maintained the status quo established in the 1970's.[186] EPA's rationale for leaving Small and Medium CAFO technology-based effluent limit determinations up to state permit writers was primarily out of a concern for flexibility and cost-effectiveness, as well as a finding that smaller facilities were more likely to have adequate land for manure disposal.[187] But the past decade has shown that the current approach is inadequate to protect water quality, and this is one aspect of the regulations where EPA could easily improve the quality and consistency of permits for a class of operations. If EPA applies the CAFO ELGs to all CAFOs, it will lessen the resource burden on state permit writers and improve water quality outcomes from this category of NPDES permits. Moreover, if EPA adopts certain rule changes discussed *supra*, particularly the revised Medium CAFO and agricultural stormwater definitions, far more facilities currently classified as non-CAFO AFOs will be subject to NPDES permitting requirements, increasing the cost benefits of uniform ELGs for state agencies and the

[184] NMP requirements are spelled out in 40 C.F.R.§ 122.42, which requires that NMPs: (1) ensure adequate storage of manure, litter, and process wastewater; (2) ensure proper management of mortalities; (3) ensure that clean water is diverted from the production area; (4) prevent direct contact of confined animals with waters of the U.S.; (5) ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water or treatment system; (6) identify appropriate site specific conservation practices to be implemented (BMPs); (7) identify protocols for testing of manure, litter, process wastewater, and soil; (8) establish protocols to land apply manure, litter, or process wastewater in accordance with site specific nutrient management practices; and (9) identify records that will be maintained to document implementation and management of these requirements. 40 C.F.R. § 122.42(e)(1)(i)-(ix).
[185] 40 C.F.R. § 412.4(c)(1)-(5). The regulations also provide two alternatives to compliance with setback requirements. CAFOs can instead implement vegetated buffers meeting certain standards, or demonstrate that alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent to, or better than, the otherwise required setback. 40 C.F.R. § 412.4(c)(5).
[186] 2003 CAFO Rule, 68 Fed. Reg. at 7208.
[187] *Id*.

regulatory certainty for operators.[188] At the very least, EPA should revisit its analysis of whether certain size classes of CAFOs have adequate land base for manure disposal, as this is a primary basis for EPA's differential treatment of these operations. The updated analysis should rely on current data and acknowledge the gaps in EPA's information about the CAFO universe, adopting conservative assumptions where critical information is unavailable.

ii. EPA Must Establish Application Disclosure requirements, BAT and NSPS Limits, and Monitoring Requirements for Additional CAFO Pollutants of Concern

EPA's long-standing approach to regulating CAFO discharges is reliant on the fundamental misconception that CAFO waste is comprised solely of manure. This approach has led EPA to disregard numerous pollutants of concern and instead simply regulate fecal coliform and certain constituents of CAFO waste that have agronomic value. This failure to establish BAT and NSPS limits for numerous pollutants that are not even currently disclosed in permit applications, in combination with the regulations' failure to require basic water quality monitoring, has led to a regulatory scheme in which CAFOs can use unknown combinations and quantities of metals, pharmaceuticals, cleaning products, and synthetic hormones, and then dispose of what ends up in the waste stream without demonstrated, effective controls. EPA must require CAFOs to disclose their use of these pollutants in permit applications, analyze the most effective means to prevent discharges of these pollutants, which are generally not agronomically useful and cannot be assumed to be utilized by crops, establish BAT and NSPS standards for CAFOs to control these pollutants, and incorporate these standards into the CAFO ELGs.

EPA's NPDES regulations require most applicants for NPDES permits to disclose pollutants of concern in their discharge in their permit application. For example, industrial facilities and large publicly owned treatment works must disclose any of a long list of hazardous substances if they will likely be present in their effluent, and provide monitoring data.[189] This is the only way for a permitting agency to ensure that it has established adequate limits to protect water quality, and a lack of such information hinders public participation in the permitting process. But inexplicably, EPA does not require CAFOs to disclose any pollutants beyond providing the quantity of "manure, litter, and wastewater" generated.[190] EPA must remedy this by establishing effluent limits on the full suite of CAFO pollutants of concern and incorporating application disclosure requirements into CAFO permit application Form 2B.

[188] Even if EPA adopts the recommended changes to the CAFO definitions, which would re-define certain CAFOs as Large CAFOs, broadening the applicability of the ELGs to all CAFOs would benefit water quality and streamline permitting for state agencies—particularly if adopted in conjunction with the proposals, discussed *infra*, to strengthen the ELGs and make them more protective of water quality.
[189] 40 C.F.R. §§ 122.21(2)(i), (iv); EPA NPDES Forms 2A and 2C.
[190] EPA NPDES Form 2B.

Each of the constituents listed above meets the CWA definition of a "pollutant." Most of these substances are added to livestock feed, and EPA has established that the significant majority ends up in the animals' manure. EPA regulates the various heavy metals sometimes used by CAFOs as feed additives as priority pollutants, and has noted their harmful impacts on aquatic life, as well as crops and public health.[191] Pharmaceuticals and synthetic hormones added to livestock feed also plainly constitute pollutants. The CWA's broad pollutant definition includes all "biological materials," which clearly include biological pharmaceutical additives. And in the case of non-biological pharmaceutical and hormone agents, once they have fulfilled their purpose and been excreted in livestock waste, they are no longer serving a useful purpose and qualify as "chemical wastes."[192]

EPA acknowledges that its CAFO ELGs do not address all pollution that CAFOs discharge from the production area,[193] but it also fails to address other important pollutants discharged from both production and land application areas, and state permitting agencies are not acting to fill either of these gaps. Although permitting agencies are required to establish BPJ limits for pollutants that are not regulated under ELGs,[194] Petitioners are unaware of any state or EPA permits that address these pollutants, likely due both to the lack of CAFO monitoring requirements and the fact that the agricultural stormwater loophole enables states to simply assume without evidence that there are only minimal point source discharges of these constituents of CAFO waste. EPA and state agencies are not free to ignore these pollutants altogether, and the only reasonable way to ensure that permits adequately control all relevant pollutants is to establish BAT and NSPS standards for these pollutants and address them in the CAFO ELGs.

In addition to analyzing the availability of BMPs to reduce runoff from CAFO production and land application areas, the Agency has abundant recent evidence to inform an analysis of the costs of reducing or removing various feed additives from the waste stream altogether. Examples of tested pollution-reduction strategies include voluntary actions to remove arsenicals from poultry feed and certain companies' decisions to reduce use of medically important antibiotics, in both cases without any significant adverse economic consequences.[195] CAFO operators have the

[191] *See* 40 C.F.R. § 423, App. A; 76 Fed. Reg. at 65434.
[192] 33 U.S.C. § 1362(6); *Nat'l Cotton Council*, 553 F.3d at 935-38.
[193] EPA has noted that the current CAFO ELGs do not address "plate chiller waste, filter backwash water, chemicals used in the production area (for disinfection) or pollutants that have fallen to the ground immediately downward from confinement building exhaust ducts and ventilation fans and are carried by precipitation-related or other runoff to waters of the US." Permit Writers' Manual at 4-18. This does not acknowledge metals, pharmaceuticals, or other pollutants of concern.
[194] *See* Hanlon BPJ Memo at Attachment A, pgs. 1-2 ("[A]n authorized state must include technology-based effluent limitations in its permits for pollutants not addressed by the effluent guidelines for that industry. 33 USC § 1314(b); 40 CFR § 122.44(a)(1), 123.25, 125.3. In the absence of an effluent guideline for those pollutants, the CWA requires permitting authorities to conduct the "BPJ" analysis discussed above on a case-by-case basis for those pollutants in each permit.").

[195] In fact, recent USDA research indicates that the economic impact on producers of banning all growth promoting antibiotics—not only those used in human medicine—would be minimal. *See, e.g.*, Stacy Sneeringer, James

ability to directly and significantly reduce the presence of metals and pharmaceuticals in their waste stream through modifying livestock feed inputs, and EPA cannot simply assume that the existing ELGs adequately address these pollutants. Some of these pollutants do not naturally break down or die like coliform bacteria, and may run off or move through soils differently than other pollutants, rendering different BMPs more effective at reducing their discharges and necessitating different BAT requirements.

Regarding metals, EPA's 2003 Rule estimated that the proposed regulations would only reduce Large and Medium CAFOs' metal discharges by 5%, and that assumed incorrectly that all Large CAFOs would obtain permits.[196] Given the low rates of permitting since, it follows that any reductions in metal pollution from the recent series of CAFO regulations have been negligible. EPA needs to address these pollutants directly by independently analyzing what technologies and practices are currently available to obtain results that are more protective of water quality. A useful analogy is sewage sludge, which shares certain characteristics with animal waste. EPA's sewage sludge application regulations impose metal concentration, cumulative loading, and annual loading limits. This is a stark example of EPA's inconsistent approaches to regulating human and animal wastes, and also provides a logical starting point in assessing BAT for CAFO applications of these pollutants.[197]

iii. The CAFO ELGs' NMP Requirements Must Prioritize Protecting Water Quality

Even in the absence of discharge monitoring requirements and the data they would provide, it is apparent that EPA's reliance on states to establish effective nutrient management requirements has failed to protect water quality. The CAFO regulations must provide a stronger backstop against weak state permitting provisions. Specifically, EPA must establish stronger federal requirements to minimize harmful runoff, rather than relying almost solely on NMPs and on state-promulgated technical standards.

MacDonald, et al., *Economics of Antibiotic Use in U.S. Livestock Production,* ERR-200, USDA Econ. Res. Serv. 55 (Nov. 2015), https://www.ers.usda.gov/webdocs/publications/err200/55529_err200.pdf?v=42401; Choices, Economics of Antibiotic Use in U.S. Swine and Poultry Production (2015), http://www.choicesmagazine.org/choices-magazine/theme-articles/theme-overview/economics-of-antibiotic-use-in-us-swine-and-poultry-production. Research has also indicated that "[s]ome antibiotics no longer work as growth promoters or yield a result so slight that the additional profit does not even cover the cost of the antibiotics, yielding a net loss." Food & Water Watch, *Antibiotic Resistance 101: How Antibiotic Misuse on Factory Farms Can Make You Sick* 13 (Mar. 2015), http://www.foodandwaterwatch.org/sites/default/files/Antibiotic%20Resistance%20101%20Report%20March%202015.pdf, citing Bonnie Marshall and Stuart Levy, *Food Animals and Antimicrobials: Impacts on Human Health*, 24 Clinical Microbiology Reviews 718, 723 (2011); S.S. Dritz et al., *Effects of Administration of Antimicrobials in Feed on Growth Rate and Feed Efficiency of Pigs in Multisite Production Systems*, 220 J. Am. Veterinary Med. Ass'n. 1690, 1690 (2002); J.P. Graham et al, *Growth Promoting Antibiotics in Food Animal Production: An Economic Analysis*, 121 Public Health Reports 79, 79 (2006).

[196] 2003 CAFO Rule, 68 Fed. Reg. at 7239.
[197] 40 C.F.R. § 503.13.

Research increasingly demonstrates that CAFO NMPs and other BMPs do not minimize pollution to the degree previously assumed. NMPs are designed to optimize crop yield, by specifying agronomically optimal nutrient goals, and therefore are not designed to minimize runoff to surface and ground water. Even when nutrient management planners have created site-specific nutrient application standards, inaccuracies in estimates of water delivery and utilization by crops and differential nutrient uptake rates by plants limit NMP effectiveness.[198] As a result, the NMP approach alone does not achieve the rates of pollution reduction required by the CWA.

Moreover, while EPA and states have identified certain nutrient management practices known to harm water quality (*see infra*, section B.b.iv), the federal regulations stop short of prohibiting these practices. These shortcomings weaken the efficacy of the CAFO regulatory program, and have resulted in a patchwork of state regulations pertaining to CAFOs with widely varying degrees of effectiveness. While some variation in land application restrictions may be appropriate due to varying climates, soils, crops, and other site–specific characteristics that will affect which practices will best protect water quality, EPA must reduce its reliance on state–based nutrient management planning. A stronger baseline of nationally–applicable standards is needed to make water quality protection, rather than crop yield, the primary consideration of CAFO nutrient management, and to ensure that states do not engage in a regulatory "race to the bottom."[199]

For CAFOs that land apply wastes, the ELGs require states to establish technical standards for nutrient management. Technical standards must address the form, source, amount, timing, and method of application of nutrients on each field, based on a field-specific assessment of the potential for nitrogen and phosphorous transport from the field to waterways.[200] These standards are supposed to be calculated to achieve realistic production goals while minimizing nitrogen and phosphorous movement to waters of the U.S.[201]

[198] *See, e.g.*, EPA, *Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site: An Assessment of Nutrient Management Plans* 66 (Mar. 2011), http://nepis.epa.gov/Adobe/PDF/P100DOTV.pdf.
[199] *See, e.g.,* Stacy Sneeringer & Regina Hogle, *Variation in Environmental Regulations in California and Effects on Dairy Location*, 37 Agric. & Res. Econ. Rev. 133, 135 (2008) (surveying academic articles that have tested and supported the hypothesis that environmental regulations influence the location of dairies).
[200] 40 C.F.R. § 412.4(c)(2) (determination of application rates).
[201] *Id.*; *see also* Permit Writers' Manual at 6-12. EPA relies on the NRCS, a branch of USDA, to develop technical standards for nutrient management. *See* 2003 CAFO Rule, 68 Fed. Reg. at 7209 (allowing permitting authorities to rely on NRCS practice standards to meet required technical standards); 2008 CAFO Rule, 73 Fed. Reg. at 70430 (reiterating that permit applicants may rely on NRCS' technical guidance for CNMPs to fulfill NMP eligibility requirements).

Research has demonstrated, however, that "just having a NMP does not reduce excess nutrient application nor does it guarantee improvements in water quality."[202] The dual goals, expressed in EPA's regulations and state technical standards, of maximizing production and minimizing pollution are often incompatible, and when in doubt, state standards typically authorize operators to over–apply animal wastes and other supplements in order to ensure that crops have sufficient nutrients to ensure optimal growth.[203] As one researcher explained, "it cannot be assumed that there is a direct relationship between the soil test calibration for crop response to [nutrients] and surface runoff enrichment potential . . . . At what levels should recommendations for [nutrient] application change from being agronomic to environmentally based?"[204] Under the current regulations, states have too much discretion in balancing these competing interests.

Nutrient management requirements typically rely on the idea of a nutrient budget, limited either by nitrogen or phosphorous, in order to determine how much animal waste or other fertilizer can be applied to a crop.[205] NMPs should consider all nutrient input sources, and compare these to volatilization, mineralization, and plant uptake rates, as well as factors affecting the risk of loss, such as slope, in order to determine the amount of additional nutrients that can be added to a crop.[206] After taking all of these factors into account, "nutrient management planners [] assume that if waste is applied in accordance with an NMP, all CAFO contaminants will be taken up, inactivated, retained, or degraded in the root zone, so that surface and groundwater are inherently protected."[207] But while these calculations seek to consider relevant factors and involve some direct measurement of nutrient concentrations, they also rely on assumptions about the movement of water and physical and chemical interactions that may or may not reflect actual conditions.[208] As a result, these simplified models of nutrient uptake and transport ultimately fail to achieve environmentally optimal results.

[202] R. Shepard, *Nutrient Management Planning: Is it the Answer to Better Management?*, 60 J. Soil and Water Conservation 171, 176 (2005).
[203] USDA, Nitrogen in Agricultural Systems: Implications for Conservation Policy 4, 46 (Sept. 2011), https://www.ers.usda.gov/webdocs/publications/err127/6767_err127.pdf?v=41056 (describing simultaneous environmental and economic optimization of nitrogen management as "a juggling act" and noting that reducing application rates may increase farmers' perceived risk of reduced yields); Robert Flynn, *Regulatory vs Agronomic Protection of Groundwater in New Mexico: A Case Study in Nutrient Management* 6 Western Nutrient Mgmt. Conference 165, 168 (2005) (noting that farmers "are not likely to allow crops to become deficient in nitrogen"); Andrew Sharpley, *Agricultural Phosphorous, Water Quality, and Poultry Production: Are They Compatible?* 78 Poultry Sci. 660, 668 (1999) (noting the importance of measuring the phosphorus content of both manure to be applied and that is already in the soil because "there is a tendency among farmers and their advisors to underestimate the fertilizer value of manure without these determinations.").
[204] Andrew Sharpley, *Agricultural Phosphorous, Water Quality, and Poultry Production: Are They Compatible?* at 668.
[205] EPA, *Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site: An Assessment of Nutrient Management Plans* at 5.
[206] *Id.*
[207] *Id*. at 7.
[208] *Id*.

Current nutrient management planning approaches also often allow over-application of phosphorus. Because most crops require more nitrogen than phosphorous, nitrogen-based approaches to manure application are more common than phosphorus-based.[209] This "presents a special problem because the N-to-P ratio in manures is lower than that needed by crops . . . [causing] excess P [to] build[] up to environmentally harmful levels in fields that received repeated applications."[210] EPA has come to similar conclusions when considering liquid dairy waste:

> "[A] potential problem arises when the relative content of nitrogen and phosphorous in lagoon water differs from that in the crop. In this case, NMPs that are designed to meet the nitrogen requirement for crops may result in the over-application of phosphorous."[211]

Other studies, including those looking at dry litter systems, echo this problem, finding that "[b]ecause most NMPs are based on plant N requirements, this invariably means that P is over–applied relative to needs."[212] Once excess phosphorous in soil reaches a particular saturation point, it begins to leach into surface and groundwater.[213] Some states do require that NMPs include phosphorus-based plans under certain circumstances.[214] Nonetheless, these approaches are highly variable, and recent studies demonstrate that phosphorous is often over-applied with respect to crop needs even in states with phosphorus-based plans. A 2014 report by the Environmental Integrity Project found, for example, that 75% of phosphorous from poultry operations on Maryland's Eastern Shore was applied in excess of crop needs.[215]

EPA's regulations should account for the modeling and design deficiencies that undermine the effectiveness of NMPs, rather than assuming that optimizing crop yield will also

[209] University of Georgia Cooperative Extension, *Small Farm Nutrient Management Primer: For Un-permitted Animal Feeding Operations* 4-6 (Jan. 2006), http://extension.uga.edu/publications/files/pdf/B%201293_5.PDF; L.M. Risse, et al., *Land Application of Manure for Beneficial Reuse* at ii.
[210] L.M. Risse, et al., *Land Application of Manure for Beneficial Reuse* at ii.
[211] EPA, *Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site: An Assessment of Nutrient Management Plans* at 8. *See also* University of Georgia Cooperative Extension, *Small Farm Nutrient Management Primer: For Un-permitted Animal Feeding Operations* at 4-6; Risse, et al., *Land Application of Manure for Beneficial Reuse* at 18 ("Nutrients applied from animal manure should match the needs of the crop, but the ratios of N, P, K, and the various micro nutrients excreted by animals are generally different from crop requirements.").
[212] University of Kentucky Research Foundation, *Demonstration of Enhanced Technologies for Land Application of Animal Nutrient Sources in Sensitive Watersheds: Final Progress Report* 2 (2008), http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044927.pdf.
[213] Chesapeake Bay Foundation, *Manure's Impacts on Rivers, Streams, and the Chesapeake Bay* 8 (July 28, 2004), http://www.cbf.org/document.doc?id=137.
[214] *Id.* at 8-9 (noting that Virginia, Delaware, Pennsylvania, and Maryland all require that NMPs account for crop phosphorus needs to some extent).
[215] Environmental Integrity Project, *Manure Overload on Maryland's Eastern Shore* 8 (Dec. 8, 2014), http://dcpgonline.org/uploads/EIP_POULTRY-REPORT_-_Manure_Overload.pdf.

"minimize nitrogen and phosphorous movement to waters of the U.S."[216] At a minimum, EPA must expressly require the use of phosphorous-based plans, rather than nitrogen-based plans, where phosphorus is the limiting nutrient. However, even phosphorus-based plans fail to minimize the over–application of harmful manure constituents like *E. coli* and other pollutants, and EPA must commit to regularly strengthening CAFO nutrient management requirements as the science develops, including by analyzing the results of the requested land application monitoring data discussed *supra*. Put simply, the CWA mandates that EPA and states tip the scales in favor of water quality protection, not crop yield, requiring appropriate technology-based effluent limitations as mandated by the Act. The current NMP regulations fail to do so.

Stronger NMP regulations are also necessary to effectuate the Act's requirements that permits include stricter limits as needed to comply with water quality standards[217] and that permitting authorities may not issue a NPDES permit to a newly constructed or modified facility if discharges from that facility would cause or contribute to the violation of water quality standards.[218] Of course, the current permitting scheme discourages CAFO operators from obtaining permits in the first place, and as a result undermines the Act's mandate to protect water quality through more stringent permits when technology-based permits do not suffice. But even where CAFOs are required to obtain NPDES permits, the legal fiction that NMPs designed to maximize crop yield will also achieve minimal or zero discharge makes it unlikely that a permit writer will seek to establish more stringent requirements when a receiving water is impaired or the CAFO may cause or contribute to a violation of water quality standards.

Even in the case of land application, where EPA's ELGs merely require a few BMPs in addition to the NMP, there is nothing in EPA's rules to enable a permit writer to derive practices sufficiently protective to reduce loadings and ensure the discharge will not cause or contribute to water quality standards violations. Because many discharges under this scheme are assumed to be non-existent or not subject to regulation, and NMPs are already assumed to minimize the potential for runoff, there is no mechanism for permit writers to establish water quality-based permit limits where a receiving water is already impaired. Absent effective regulations that reflect the reality that NMPs are not zero discharge plans and that require discharging CAFOs to obtain permits in the first place, permitting authorities will continue failing to impose WQBELs to protect the uses of individual waterbodies.

[216] *See* 40 C.F.R. 412.4(c)(2).
[217] *See* 33 U.S.C. § 1311(b)(1)(C) (NPDES permits must include "any more stringent limitations . . . necessary to meet water quality standards"); 40 C.F.R. § 122.44(d) (permitting authorities must include WQBELs for pollutants that "have the reasonable potential to cause, or contribute to an excursion above any State water quality standard").
[218] *See* 40 C.F.R. §122.4(i). *See also Friends of Pinto Creek v. EPA*, 504 F.3d 1007, 1014 (9th Cir. 2007).

iv. Technical Standards Must Prohibit Practices Known to Harm Water Quality

As written, EPA's ELGs for Large CAFOs allow CAFO operators to engage in several production and land application area practices known to cause discharges and harm water quality, undermining permits' narrative requirements to eliminate or minimize discharges, respectively. EPA's failure to promulgate CAFO technical standards that prohibit harmful practices is arbitrary and capricious, and contrary to EPA's obligations to develop guidelines sufficient to protect water quality and make progress towards the Act's goal of eliminating pollution.

The CAFO industry has grown and consolidated significantly since EPA conducted its BPT, BCT, BAT, and NSPS analyses for the CAFO ELGs, and its considerations of both the availability of better technologies and the industry's ability to afford certain practices has become outdated. EPA also knows far more now about the impacts of certain CAFO practices than it did in 2003, and should revisit the appropriateness of its current requirements and prohibitions. Moreover, EPA's prior analysis gave outsized consideration to the economic affordability factor; the mounting evidence that the existing ELGs cannot adequately control CAFO pollution, rendering EPA incapable of meeting its CWA obligations, dictates that the agency must reconsider its analysis with a greater focus on achieving acceptable water quality outcomes. Under such an updated and appropriately balanced analysis, the Petitioners believe that the proposed revisions are affordable for the industry as a whole and are appropriate for both new and existing CAFOs. Petitioners specifically request that EPA supplement the requirements of 40 C.F.R. § 412.4 (Best management practices for land application of manure, litter, and process wastewater) to prohibit the practices discussed below.

1. Manure Storage in Unlined and Inadequately Lined Lagoons and Impoundments

Studies have documented the fact that storage of manure in unlined lagoons and impoundments pollutes surface waters through hydrologic discharges,[219] and there is sufficient evidence to support a CAFO ELG provision that prohibits storage of manure and other animal wastes in lagoons without impermeable synthetic liners. While groundwater is not regulated as a

[219] *See, e.g.*, S. Koike, et al., *Monitoring and Source Tracking of Tetracycline Resistance Genes in Lagoons and Groundwater Adjacent to Swine Production Facilities over a 3-Year Period*, 73 Applied Envtl. Microbiology 4813, 4822 (2007) (noting that animal waste seepage from unlined lagoons at two swine CAFOs was associated with the spread of antibiotic resistance genes in bacteria found in groundwater near the facilities); Shai Arnon, et al., *Transport of Testosterone and Estrogen from Dairy-Farm Waste Lagoons to Groundwater*, 42 Envtl. Sci. & Tech. 5521, 5525 (2008) (concluding that clay lining of lagoons "cannot efficiently protect the groundwater environment from waste lagoon leachates under long-term exposure," where a study demonstrated potential seepage of hormones and inorganic contaminants from CAFO waste lagoons to deep groundwater, even where thick layer of clay was present).

water of the U.S., pollution of groundwater often leads to pollution discharges into jurisdictional surface waters through hydrologic connections. As discussed *supra*, such hydrologic discharges of groundwater to jurisdictional waterways are so prevalent that EPA has previously proposed establishing a presumption that CAFO lagoon discharges to groundwater will have a hydrologic connection to surface waters.[220]

The current CAFO rules essentially ignore this discharge pathway, and put the burden on citizens to demonstrate that a CAFO waste structure will cause a jurisdictional discharge. In its Permit Writers' Manual, EPA does recommend that Large CAFOs near a waterbody listed "as impaired due to nutrients, dissolved oxygen or bacteria," or in areas where there is a "reasonable potential" that anticipated discharges will violate water quality standards, should use more protective practices like "installing an impermeable lining in a lagoon or storage pond."[221] This effectively presumes that such facilities will discharge via their lagoons in the absence of effective liners. However, the water pollution risks from unlined lagoons indicate that a mere recommendation is insufficient. EPA must prohibit this practice in order for permitted CAFOs to actually achieve the technology-based standards of zero production area discharges in most weather conditions.

Historically, CAFO operators have not been required to line waste storage impoundments because of the belief that the animal wastes themselves create a protective lining. A recent literature review of lagoon leaching studies demonstrates, however, that leaching rates are highly variable and dependent on site–specific factors such as soil type.[222] Moreover, even where lagoons are lined with soil containing at least 10% clay, "significant leaching can occur through shrink–swell fractures in lagoon sidewalls."[223] In contrast, "[p]roperly constructed and maintained, synthetic liner systems provide excellent protection from groundwater degradation."[224] In short, "synthetic liners can protect groundwater quality, while other liners require substantial post-construction monitoring."[225]

Given current research on the effectiveness of synthetic lagoon liners, and in keeping with the requirement that EPA develop standards which reflect best available technology economically achievable, EPA must directly address hydrologic discharges by imposing technical standards that require the use of the best available synthetic liners at all existing and new waste lagoons. NRCS has extensively analyzed the seepage rates of different liner materials

[220] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3040. Although such a presumption of hydrologic connection is not necessary to impose this BMP requirement on permitted CAFOs, EPA should nonetheless revisit this analysis to provide further evidence in support of a more general presumption of discharge by CAFOs or categories of CAFOs.
[221] Permit Writers' Manual at 4-36.
[222] Thomas Harter, et al., *Assessing Potential Impacts of Livestock Management on Groundwater*, Nicholas Institute for Environmental Policy Solutions 6 (Mar. 2014), http://nicholasinstitute.duke.edu/sites/default/files/ni_r_14-03_sr2_final.pdf (noting studies had found high leaching rates where unlined lagoons were built on sandy or gravelly soils).
[223] *Id.*
[224] *Id.*
[225] *Id.*

and the other factors that affect manure storage system discharges to groundwater, as well as their relative costs, and EPA should use this information and other recent research in deriving its technology standards.[226]

2. Ventilation of Pollutants near Waters or Conduits to Waters of the U.S.

EPA should further amend the CAFO ELGs to address pollution discharges from livestock confinement ventilation systems near waterways, ditches, or other conduits that carry pollutants to waters of the U.S. Ventilated animal houses may release significant quantities of ammonia, feathers, dust, and other pollutants. Where houses are located near waterways, these pollutants can re–deposit directly to surface waters, and where CAFO facilities contain ditches, pipes, or other conduits to surface waters, they can carry ventilated pollutants directly to waterways. The current ELGs do not account for these pollution pathways, despite the fact that EPA has affirmed that discharges of CAFO ventilation system pollutants into jurisdictional waters, or conduits to such waters, constitute prohibited point source discharges.[227]

Ammonia gas that is intentionally vented out of livestock houses provides a concrete example of how significant this uncontrolled pollution pathway can be. According to the Chesapeake Bay TMDL, atmospheric sources of nitrogen contribute roughly one-third of the total nitrogen load to the Chesapeake Bay.[228] In 2010, EPA projected that between 2010 and 2020, roughly half of the atmospheric nitrogen depositing in the Chesapeake Bay watershed was ammonia.[229] In other words, roughly 17% of the enormous nitrogen load currently impairing the Chesapeake Bay comes from atmospheric ammonia. Much of this atmospheric ammonia comes from CAFOs: according to the most recent EPA National Emissions Inventory, 55% of national ammonia emissions come from livestock waste.[230] In areas where CAFOs are concentrated, this proportion is higher. In Maryland, for example, 74% of ammonia emissions come from livestock waste.[231] In short, the emissions of ammonia from CAFOs, including emissions from livestock

[226] *See* NRCS, Agricultural Waste Management Field Handbook Chapter 10, Appendices 10D and 10E (Aug. 2009), http://www.wcc.nrcs.usda.gov/ftpref/wntsc/AWM/handbook/ch10.pdf; NRCS Conservation Practice Standard 521A, Pond Sealing or Lining—Flexible Membrane (Sept. 2011), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046899.pdf.

[227] *See Nat'l Pork Producers Council*, 635 F.3d at 754-56; *see also Rose Acre Farms, Inc. v. N.C. Dep't of Env't and Natural Res.*, No. 12-CVS-10, ¶¶ 54, 55 (Jan. 4, 2013) (finding that ammonia and other pollutants that reach jurisdictional waters after being expelled by CAFO ventilation fans are subject to NPDES permitting requirements, and are not exempt as agricultural stormwater).

[228] EPA, Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment 4-33 (Dec. 29, 2010), https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document.

[229] *Id*. at Appendix L, Table L3.

[230] EPA, 2011 National Emissions Inventory, https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data.

[231] *Id*.

confinement ventilation systems, are directly and substantially contributing to the ongoing impairment of the Chesapeake Bay. This is not a trivial pollution pathway.

The current Large CAFO ELGs ostensibly require existing CAFOs and new dairy and cattle CAFOs to meet a zero discharge standard for the production area, except in the case of a 25–year, 24–hour storm event, and require new hog and poultry CAFOs to achieve a zero discharge production area standard regardless of storm events.[232] However, many CAFOs fail to achieve these requirements in practice, due to the regulations'—and in turn, state permitting agencies'—failure to specifically address ventilation system pollution emissions that become discharges. EPA should require all CAFOs using ventilation systems to either prevent pollutant releases with biofilters or other existing technology, or to capture all ventilated pollution and divert it into the waste containment area to prevent any prohibited discharges of manure, litter, or process wastewater pollutants. To the extent that EPA finds that these technologies cannot eliminate all ventilation system discharges, which is particularly a concern for ammonia, such a finding would only bolster this Petition's argument that CAFOs do in fact discharge, and that a presumption of discharge is necessary to carry out the Act.

3. Application on Frozen, Saturated, or Snow-Covered Ground

EPA and other agencies recognize that spreading manure on frozen, snow–covered, or saturated ground results in high risk of runoff and pollutant transport. In the NPDES Permit Writers' Manual for CAFOs, EPA says that state programs "should either prohibit application of manure and process wastewater on snow, ice, and frozen ground, or include specific protocols that CAFO owners or operators . . . will use to conclude whether application to a frozen or snow–or ice–covered field (or a portion thereof) poses a reasonable risk of runoff."[233] Similarly, NRCS, EPA's primary resource for developing technical standards,[234] advises that "[n]utrients must not be surface–applied if nutrient losses offsite are likely" and warns against spreading on "frozen and/or snow–covered soils, and when the top 2 inches of soil are saturated from rainfall or snow melt."[235] But rather than prohibiting these dangerous practices, EPA merely "strongly encourages" states to adopt such prohibitions themselves.[236] This recommendation has proven inadequate.

The increased likelihood of runoff associated with application of manure to frozen, saturated, or snow–covered ground is widely recognized by agricultural experts, including

[232] 40 C.F.R. § 412.
[233] Permit Writers' Manual at 6-15.
[234] USDA and EPA, *Unified National Strategy for Animal Feeding Operations* Sec. 3.2 (March 9, 1990), http://www.epa.gov/npdes/pubs/finafost.pdf.
[235] NRCS Conservation Practice Standard 590, Nutrient Management 3 (Oct. 2013), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1192371.pdf.
[236] Permit Writers' Manual at 6-16. *See also id.* at 5-30 (listing standards, including prohibiting application of manure to frozen or snow-covered ground, which permit authorities "may include" as technology-based standards).

agricultural extension program technical staff, state agencies, and EPA itself. Liquid or semi–liquid manure cannot easily permeate ground that is already saturated or that is frozen, and thus is much more likely to run off into nearby waterways, particularly when snow or frozen ground begins to melt.[237] Moreover, in areas where soils reach freezing temperatures, there are generally no winter crops available to uptake the nutrients in manure, meaning there is little to no agronomic benefit to winter applications and nutrients are susceptible to loss before any spring crop has been planted.[238] EPA's own peer–reviewed technical guidance similarly concludes that "[f]rom the dual perspectives of nutrient utilization and pollution prevention, [] winter is the least desirable time for land application."[239]

Other authorities, ranging from the state level to international, have also recognized the harms likely to result from land application in winter months and on frozen ground. The International Joint Commission, an international organization created by the Boundary Waters Treaty (ratified by the United States and Canada in 1909), recommends that to protect Lake Erie, all adjacent states should ban the spreading of manure on frozen or snow–covered ground because of the likelihood of those practices polluting surface waters.[240] The Iowa State University Extension acknowledges that "[b]roadcasting manure onto frozen, snow-covered, water-saturated soils increases the potential for nutrient losses with rainfall or snowmelt runoff to surface water systems."[241] Similarly, the Penn State Extension warns that "winter is not the best time to apply manure and should be our last choice,"[242] and the Ohio State University Extension advises that "[w]inter application should not be part of a manure management plan and it should only be viewed as a last resort."[243]

[237] International Joint Commission, *A Balanced Diet for Lake Erie: Reducing Phosphorous Loadings and Harmful Algal Blooms* 75 (2014) [hereinafter 2014 IJC Report], http://www.ijc.org/files/publications/2014%20IJC%20LEEP%20REPORT.pdf.

[238] Ontario Ministry of Agriculture, Food, and Rural Affairs, *Winter Application of Manure and Other Agricultural Source Material*, OMAFRA Fact Sheet 10-073 (Sept. 2010), http://www.omafra.gov.on.ca/english/engineer/facts/10-073.htm#5. Similarly, in a PowerPoint presentation derived from a white paper prepared for EPA by contract company Tetra Tech, Tetra Tech noted that a "comprehensive literature review found no published research to support agronomic factors as a basis for recommending winter manure application." Tetra Tech, *Winter Manure Application and Water Quality: Overview of the Literature* 4 (Oct. 30, 2014), http://bloximages.chicago2.vip.townnews.com/auburnpub.com/content/tncms/assets/v3/editorial/f/ef/fef9f5a8-8a50-53b9-a377-eaf2a11a9362/5483213e3e237.pdf.pdf.

[239] Permit Writers' Manual at App. G-1-2, *Interim Final Technical Guidance for the Application of CAFO Manure on Land in the Winter* (noting that "[w]here there is a reasonable risk [of runoff from application on snow, ice, and frozen soil], EPA strongly prefers that technical standards prohibit application on the field or the pertinent portion thereof during times that the risk exists or may arise").

[240] 2014 IJC Report at 9.

[241] Iowa State Univ. Extension and Outreach, *Using Manure Nutrients for Crop Production* 6 (May 2016), http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1089&context=extension_pubs.

[242] Penn State Extension, *Winter Manure Application Considerations* (Jan. 2013), http://extension.psu.edu/plants/crops/news/2013/01/winter-manure-application-considerations.

[243] Amanda Meddles, Ohio State University Extension, *Properly Applying Manure on Frozen Ground*, Ohio's Country Journal (Jan. 24, 2012), http://ocj.com/2012/01/properly-applying-manure-on-frozen-ground/. *See also* Utah Farmstead Assessment for Ground Water and Surface Water Protection, *How to Manage Stored Manure and*

Despite the broad consensus on the dangers of winter application practices, however, many states with numerous CAFOs and severe winter conditions fail to prohibit such practices in their NPDES implementing regulations.[244] Absent a national prohibition on such irresponsible manure application practices, many operators will fail to maintain adequate storage to avoid winter application, will continue to land apply waste under high-risk conditions, and will continue to adversely impact surface water quality through preventable land application discharges. Moreover, climate change heightens the risk that applying waste under these circumstances poses to water quality. State regulators have understood for more than a decade that intermittent melting spells increase the risk of surface runoff.[245] In regions where the ground once predictably stayed frozen for the entire winter, but where such intermittent melting is now a more frequent occurrence, the relationship between season and runoff potential has changed. EPA should re–evaluate this relationship with recent data, because assumptions about winter runoff potential are likely no longer accurate.[246]

EPA must strengthen the CAFO ELGs to prohibit the spreading of manure on frozen, saturated, or snow–covered ground, or during periods of crop dormancy when such conditions are expected to occur before crop nutrient uptake occurs, because manure application under these conditions is known to lead to surface water discharges, and is therefore inconsistent with the requirement that land application be conducted in such a way that minimizes the risk of nutrient loss. In conjunction with this requirement, EPA must require adequate storage to ensure that operators may not simply dump excess stored manure on fields each spring, as that would also lead to unacceptable risk of pollution runoff. The technology to prevent these land application discharges is clearly available, and anything short of such a prohibition will continue to allow irresponsible manure disposal, rather than application calculated to best protect water quality, and fall short of what the CWA requires.

Protect Your Water 7 (Rev'd Mar. 2012), http://extension.usu.edu/files/publications/factsheet/WQFA-13.pdf (advising on proper manure handling and storage for water protection, and directing that "[m]anure should not be applied to frozen or snow covered ground unless all runoff can be controlled."); Ohio Dep't of Agric., Ohio Dep't of Natural Res., Ohio Envtl. Prot. Agency, Lake Erie Comm'n, *Ohio Lake Erie Phosphorus Task Force II Final Report* 51 (Nov. 2013), http://lakeerie.ohio.gov/portals/0/reports/task_force_report_october_2013.pdf.

[244] *See, e.g.,* Wis. Dep't of Natural Res., WPDES Permit No. WI-0063274-01: Large Dairy CAFO General Permit 3.7.4-3.7.7 (Apr. 4, 2011), http://dnr.wi.gov/topic/AgBusiness/documents/LargeDairyCAFOGP-WPDESPermit.pdf (allowing for liquid and solid manure application on frozen and snow-covered ground under various circumstances) [hereinafter Wis. CAFO Permit]; Ill. Envtl. Prot. Agency, *Considerations for Manure Application Setbacks* 2, http://www.epa.state.il.us/water/permits/cafo/documents/show/602 (providing that application to snow-covered soils is "not recommended" but may be permitted in order to address waste storage concerns); Sierra Club Michigan Chapter, *Why are CAFOs Bad?*, http://www.sierraclub.org/michigan/why-are-cafos-bad (noting that Michigan CAFOs may be permitted, either through their NMP or under an order from the state with specifications for winter application, to apply waste to snow or frozen ground).

[245] *See, e.g.*, Gregg Hoffmann, *Wintertime manure spreading under scrutiny*, WisBusiness (Apr. 7, 2005), http://www.wisbusiness.com/index.iml?Article=34685.

[246] 2014 IJC Report at 78.

4. Spray Irrigation of Manure

The CAFO ELGs should also expressly prohibit all methods of spray irrigation of manure, which threaten surface waters and present significant human health risks. Some of the unique water quality risks associated with spray irrigation relate to the fact that irrigation often takes place at night, center-pivot irrigation may occur without supervision, excessive irrigation can result in waste ponding, and dry weather discharges can occur via drift, surface runoff, and leaching.[247] Over-application via spray irrigation has been cited as a cause of water pollution in states where CAFOs use this application method.[248] Irrigation systems are also reliant on pipes and hoses to connect lagoons with sprayfields, and these can leak or break.[249]

Compared to other forms of irrigation, spray irrigation may also result in higher rates of evaporation and volatilization of a range of CAFO pollutants, including ammonia.[250] Indeed, several studies have found that where manure is not incorporated into soil, more than half of the manure ammonia is lost, likely due to volatilization.[251] This directly impacts water quality, because volatilized ammonia will re-deposit on land and water, where, as we have seen in the context of the Chesapeake Bay, it contributes to algae blooms and dead zones. In addition, spraying methods may result in liquid manure droplets drifting onto neighboring properties, roads, and other areas, where it can subsequently run off into waterways.[252] Spray irrigation is simply incompatible with the goal of agronomic use of manure nutrients, as well as with the CWA's requirements to limit and ultimately eliminate CAFO discharges to waters of the U.S.

Spray irrigation of waste also threatens public health, because it "create[s] a potentially hazardous situation as pathogens may become aerosolized and transported to downwind receptors [and] . . . could potentially be directly inhaled or ingested after they land on fomites, water sources, or food crops."[253] These bioaerosols can contain bacteria, viruses, parasites, fungi,

[247] *See, e.g.*, Wis. Manure Irrigation Workgroup, *Considerations for the Use of Manure Irrigation Practices* 40-42 (Apr. 2016), https://fyi.uwex.edu/manureirrigation/files/2016/04/Manure-Irrigation-Workgroup-Report-2016.pdf.
[248] *See, e.g.*, Ron Seely, Wisconsin Watch, *Manure Spraying Under Scrutiny* (Apr. 27, 2014), http://wisconsinwatch.org/2014/04/manure-spraying-under-scrutiny/.
[249] NRDC, *Cesspools of Shame: How Factory Farm Lagoons and Sprayfields Threaten Environmental and Public Health* 29 (Jul. 2001) [hereinafter *Cesspools of Shame*], http://www.nrdc.org/water/pollution/cesspools/cesspools.pdf.
[250] *Id*. at 17; Iowa State Univ. Extension and Outreach, *Using Manure Nutrients for Crop Production* Table 2 (showing that spray irrigation has the highest volatilization rate of various application practices).
[251] *Cesspools of Shame* at 37.
[252] Penn State Extension, *Irrigation of Liquid Manures*, http://extension.psu.edu/plants/nutrient-management/educational/manure-storage-and-handling/irrigation-of-liquid-manures.
[253] R.S. Dungan, *Board-Invited Review: Fate and Transport of Bioaerosols Associated with Livestock Operations and Manures*, 88 J. Animal Sci. 3693, 3696, 3702 (2010), https://www.animalsciencepublications.org/publications/jas/pdfs/88/11/3693 (noting that spray irrigation methods contribute to the formation of bioaerosols at greater concentrations than found in background environments, and that there is increased potential for exposure to airborne pathogens and microbial by-products both on and off-site of CAFOs as a result of these practices).

and other microbes harmful to human health.[254] As the liquid manure is sprayed into the air, the risk of decreased droplet size and longer transport distances increases, as compared to other forms of manure application.[255] Because it poses threats to water quality as well as public health, EPA should prohibit spray irrigation methods of manure application in the CAFO ELGs.

5. Manure Application on Steep Slopes

Similarly, EPA cautions against, but fails to prohibit spreading of manure—even liquid manure—on steep slopes.[256] Steeply sloped areas often lack soil properties that foster normal plant growth, meaning that it is less likely that nutrients from manure will be fully assimilated by plants, and more likely that these excess nutrients will be transported to surface and ground waters.[257] In EPA's own literature review of academic research relating to livestock and poultry manure impacts, the Agency found land slope to be a key determinant of runoff and of the likelihood of pathogen transport.[258] Regulating this activity is clearly practicable, because several states do restrict the spreading, in winter or otherwise, of manure on sloped land above a certain grade.[259] Nonetheless, EPA and NRCS currently leave it up to the states to determine what grade is acceptable for manure spreading and what precautions, if any, CAFO owners and operators must take when spreading on sloped land.[260] This has resulted in a patchwork of state-based requirements,[261] indicating that a baseline of nationally applicable restrictions is necessary to protect water quality. For example, Illinois allows operators to apply manure to fields with slopes as high as 15%,[262] while Wisconsin does not impose any slope restrictions on manure spreading unless it takes place on frozen or snow-covered ground.[263]

EPA's failure to prohibit spreading on slopes that lead to discharges of nutrients and other pollutants renders permits incapable of achieving the narrative effluent limits in the CAFO ELGs, absent stronger state requirements. EPA has the technical expertise to determine, for various soil and manure types and percentages of solid content, the maximum slope grade

[254] *See* Patricia D. Millner, *Bioaerosols Associated with Animal Production Operations*, 100 Bioresource Tech. 5379, 5379-80 (2009), https://pubag.nal.usda.gov/pubag/downloadPDF.xhtml?id=33386&content=PDF.
[255] Dungan, *Board-Invited Review: Fate and Transport of Bioaerosols Associated with Livestock Operations and Manures* at 3698-99.
[256] Permit Writers' Manual at 5-30.
[257] *Id.* at A-8.
[258] EPA Literature Review at 23, 25.
[259] State regulations vary widely with respect to restrictions related to land application on steep slopes. *See, e.g.,* Envtl. Law & Policy Ctr., *Cultivating Clean Water: State-Based Regulation of Agricultural Runoff Pollution* 47-51 (2010) [hereinafter *Cultivating Clean Water*], http://elpc.org/wp-content/uploads/2010/05/ELPC-Cultivating-Clean-Water-updated-May-5-2010.pdf.
[260] *See* NRCS Standard 590 at 3, which only mentions slope as a consideration factor when allowing nutrient application despite a likelihood of runoff, such as on frozen, snow-covered, or saturated soils.
[261] *See, e.g.*, *Cultivating Clean Water* at 47-51.
[262] Ill. Envtl. Prot. Agency, *Considerations for Manure Application* 2, http://www.epa.state.il.us/water/permits/cafo/documents/show/602.
[263] Wis. Admin. Code Ch. NR 243.14 (2015); Wis. CAFO Permit at Sec. 3.7.

consistent with the requirement to minimize nutrient loss and other discharges of pollutants. It should determine these and strengthen the ELGs to restrict land application accordingly.

6. Manure Storage in Exposed Stockpiles

Storage of manure in uncovered stockpiles also leads to preventable pollutant discharges to surface waters. EPA advises permit writers that "[i]deally, stockpiled manure and litter should be stored under cover on an impervious surface" to minimize pollutant runoff.[264] The EPA Office of Enforcement and Compliance Assurance also recognizes the dangers of this practice, warning that leaving manure in uncovered stockpiles is likely to result in pollutants escaping into the environment.[265] Manure stockpiles can contain vast quantities of waste and pollutants; a poultry litter stockpile generally ranges from 75 to 200 tons of waste, and precipitation events can carry pollutants from an uncovered pile to surface and ground water.[266]

As with the inherently risky practices discussed above, EPA has acknowledged the threat to water quality but has failed to impose appropriate and necessary permit restrictions. While EPA has properly defined stockpiles as part of the CAFO production area,[267] it continues to allow states to create loopholes from adequate regulation. For example, Delaware allows CAFOs to stockpile manure on application fields for up to 90 days, using the phrase "field staging" for the practice, and subsequently fails to impose a zero discharge requirement on the piles. This in effect improperly treats discharges from these piles as land application, rather than production area, discharges.[268]

All exposed stockpiles of litter are most likely to result in discharges of pollutants in the first few days after construction, when nutrients are at their highest levels.[269] As a result, even where stockpiles are considered part of the land application area, rather than the production area, they also fail to meet EPA's land application ELG requirement to "minimiz[e] nitrogen and phosphorus movement to surface waters."[270] Permitting the continued use of uncovered solid waste stockpiles, unless the CAFO operator demonstrates that all runoff and leaching from the piles will be diverted into a waste storage facility, simply fails to meet EPA's requirement to implement BMPs capable of "ensur[ing] appropriate agricultural utilization" of nutrients.[271] EPA must give effect to its zero discharge production area requirements for waste stockpiles by

[264] Permit Writers' Manual at 5-39.
[265] EPA Office of Enforcement and Compliance Assurance, *EPA Targets Clean Water Act Violations at Livestock Feeding Operations*, 10 Enforcement Alert 1, EPA 325-F-09-001 (2009).

[266] Gregory D. Binford and George Malone, Evaluating BMPs for Temporary Stockpiling of Poultry Litter 4 (Dec. 22, 2008), http://mda.maryland.gov/SiteAssets/Pages/Manure/PL_Storage_Report_BINFORD_FINAL.PDF.
[267] 40 C.F.R. § 122.23(b)(8).
[268] Del. Nutrient Mgmt. Program, Del. Conservation Practice Standard: Temporary Field Staging (Jul. 2010), http://dda.delaware.gov/nutrients/downloads/Draft_TechStandards/Temp_Field_Storage.pdf.
[269] Gregory D. Binford and George Malone, Evaluating BMPs for Temporary Stockpiling of Poultry Litter at 12.
[270] 40 C.F.R. § 412.4(c)(2)(i).
[271] 40 C.F.R. § 122.42(e)(1)(viii).

imposing requirements to actually prevent them from discharging. Without a federal BMP specifically mandating stockpile pads and covers for all CAFOs subject to the ELGs, nutrient runoff from manure stockpiles will continue unabated.

v. State Permitting Programs Cannot Effectively Fill the Gaps Left by the Absence of Strong National Standards

Although EPA either discourages the use of these harmful practices or encourages states to prohibit the practice themselves, such suggestions are not adequate stand–ins for effective federal regulation. In a study examining state–based regulation of agricultural pollution, the Environmental Law and Policy Center examined regulatory programs in seven states—California, Delaware, Iowa, Kentucky, Maryland, Oregon, and Wisconsin—and noted that "[t]hus far, no state has demonstrated that measureable water quality improvements have resulted from its regulatory program."[272] State programs often lack adequate resources to fully implement CWA permitting programs for all sources.[273] Documenting violations of BMPs is costly and time consuming, and actions against individual producers often only address small amounts of pollution.[274] These deficiencies may lead state agencies to support interpretations of the CWA that minimize the need for regulatory oversight, rather than electing to go beyond federal requirements.[275] EPA itself has noted that states have not prioritized regulation of feedlot wastes, and that budgetary constraints make it unlikely that states will meet—much less exceed—program and permitting responsibilities under the current rules.[276]

The proliferation of "no more stringent than" laws in several states has erected an additional barrier to effective state regulation. Many states have adopted statutes or rules prohibiting administrative bodies from promulgating environmental protections more stringent than federal rules require. A study conducted by the Environmental Law Institute found that 13 states have enacted broad "no more stringent than" laws that prohibit the state from imposing

[272] *Cultivating Clean Water* at 11 (primarily examining nitrogen and phosphorous pollution caused by the application of animal waste and chemical fertilizers to land).
[273] Clifford Rechtschaffen, *Enforcing the Clean Water Act in the Twenty-First Century: Harnessing the Power of the Public Spotlight*, Center for Progressive Reform White Paper 7 (Oct. 2004); *Animal Waste and Water Quality* at 18 ("it is unclear how state agencies will find the resources needed to carry out their responsibilities under the revised rules without reducing resources for other important activities"); Terence J. Centner, *Regulating the Land Application of Manure from Animal Production Facilities in the USA*, 14 Water Policy 319, 329 (2012) (noting that "[s]tate regulatory agencies do not have the resources to penalize producers who fail to follow BMPs").
[274] Centner, *Regulating the land application of manure from animal production facilities in the USA* at 329.
[275] Terence J. Centner, *Challenging NPDES Permits Granted Without Public Participation*, 38 B.C. Envtl. Aff. L. Rev. 1, 10-11 (2011), http://lawdigitalcommons.bc.edu/ealr/vol38/iss1/2/.
[276] *Animal Waste and Water Quality* at 24; Jillian P. Fry, et al., *Investigating the Role of State Permitting and Agriculture Agencies in Addressing Public Health Concerns Related to Industrial Food Animal Production* at 4 (survey of state policies generated response from a state agency staff member indicating that compliance inspections are only initiated "on a complaint basis" because they "don't have staff or money").

more protective requirements than the minimum required by the CWA and federal regulations.[277] An additional 23 states have adopted laws that make it more difficult to establish state standards that surpass these minimum federal requirements.[278] Consequently, many states are unable to impose additional pollution control measures, even where local conditions may necessitate them to protect water quality. Iowa has even gone so far as to specifically prohibit the state from issuing CAFO NPDES regulations more stringent than required under federal law.[279] Even if EPA had intended that states would prohibit many harmful practices on their own, it is unreasonable to expect that this will happen given numerous state laws that prohibit adoption of more protective rules.

vi. EPA's Assumptions Regarding the Frequency of Storm Events Are No Longer Accurate

To meet its obligations under the CWA, EPA must review and update its process for designating precipitation events with a probable recurrence interval to reflect new weather patterns. Large CAFOs are required to maintain waste storage capacity to contain a 25–year, 24–hour storm event.[280] EPA determines the likelihood and magnitude of such events based on a 1961 National Weather Service rainfall atlas, known as Technical Paper No. 40 (TP40).[281] The Department of Commerce published TP40 in 1961 based on 100 years of rainfall data.[282] However, more recent research calls into question whether TP40 utilizes the best available techniques and data to determine the magnitude of 25–year, 24–hour storm events. Because certain design standards for CAFOs, such as standards for storage lagoons, are based on the anticipated frequency of major storm events, accurately predicting the likelihood and magnitude of such events is critical to preventing the need for manure application at high-risk times of year, as well as storage facility failures and overflows. A method that underestimates the likelihood or magnitude of precipitation events will mean that CAFO structures are designed to fail and reach capacity more frequently.

Due to changing weather patterns, precipitation events that were rare by 1961 standards may not be so infrequent today. Climate research has demonstrated that precipitation patterns are changing, and many places are experiencing a trend towards increased frequency of extreme

[277] Envtl. Law Inst., *State Constraints: State-Imposed Limitations on the Authority of Agencies to Regulate Waters Beyond the Scope of the Federal Clean Water Act* 1 (2013), http://www.eli.org/sites/default/files/eli-pubs/d23-04.pdf.
[278] *Id.*
[279] *Id.* at 93; Iowa Code 459.311(2).
[280] 40 C.F.R. § 412.2(i).
[281] *Id.*
[282] *See* Dep't of Commerce, Weather Bureau, *Technical Paper No. 40, Rainfall Frequency Atlas of the United States* (1961), http://www.nws.noaa.gov/oh/hdsc/PF_documents/TechnicalPaper_No40.pdf.

precipitation events.[283] The U.S. Global Change Research Program has observed an increase in very heavy precipitation events in every region of the country except Hawaii.[284] The Program found that "[t]here is a clear national trend toward a greater amount of precipitation being concentrated in very heavy events . . . ."[285] EPA has recognized this as well, stating "[t]he amount of rain falling in heavy precipitation events is likely to increase in most regions . . . ."[286] Larger and more frequent storm events mean that the current ELGs will likely be insufficient to prevent catastrophic failures, such as breached and overflowing waste lagoons.

Numerous studies indicate that newer, more accurate climate data are available to inform weather–based design standards.[287] For example, in 1992 the Midwestern Climate Center, part of the National Weather Service, in conjunction with the Illinois State Water Survey, released a Rainfall Frequency Atlas of the Midwest.[288] The study aimed to update TP40, which, even in 1992, was considered too old to be reliable.[289] New findings indicated that climate trends since TP40 changed precipitation patterns in the Midwest, and the study authors determined that TP40 did not provide sufficiently detailed spatial analysis for variations in rainfall amounts for given durations and recurrence intervals.[290]

The Southern Regional Climate Center at Louisiana State University created a Rainfall Frequency/Magnitude Atlas for the South–Central United States in 1997 for similar reasons.[291] The primary rationale for that analysis was that "[t]he rainfall frequency and magnitude patterns illustrated in TP40 need to be reexamined" in light of new data and global climate change. In addition, data limitations at the time of TP40's publication were thought to have resulted in an overgeneralized analysis of rainfall events. The authors cite specific findings that demonstrate TP40's inaccuracy, such as research indicating that "the 24-hour, 100-year value from TP40 was exceeded 3 times more often than expected in Michigan," and that both Wisconsin and Illinois had almost double the number of 100–year, 24–hour rain events that TP40 anticipates.[292] For 24–hour rainfall events, the study indicated storms may be three inches greater than TP40 predicts in

[283] *See, e.g.* Jerry Melillo, et al., Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment*, U.S. Global Change Research Program 9 (Rev'd Oct. 2014), http://nca2014.globalchange.gov/downloads.
[284] *Id.*
[285] *Id.*
[286] EPA, Climate Change Science: Future of Climate Change, https://www.epa.gov/climate-change-science/future-climate-change (last accessed Jan. 13, 2017).
[287] NOAA, an agency within the Department of Commerce, also maintains more recent data sources about precipitation frequency by location. *See* Nat'l Oceanic and Atmospheric Admin., Precipitation Frequency Data Server, http://hdsc.nws.noaa.gov/hdsc/pfds/ (last accessed Jan. 13, 2017).
[288] Floyd A. Huff and James R. Angel, Ill. State Water Survey, Bulletin 71, *Rainfall Frequency Atlas of the Midwest* (1992), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_024033.pdf.
[289] *Id.* at 1.
[290] *Id.*
[291] Gregory E. Faiers, et al., La. State Univ. S. Reg'l Climate Ctr., *Rainfall Frequency Magnitude/Atlas for the South-Central United States*, SRCC Technical Report 97-1 (1997), http://www.losc.lsu.edu/tech97_2.pdf.
[292] *Id.* at 1.

some regions.[293] EPA must revise its ELGs to require permitting agencies to use the most up-to-date rainfall data available, to ensure that design standards accurately reflect anticipated weather events.

III. CONCLUSION

Decades after passage of the CWA, CAFOs remain a significant—and substantially unregulated—source of water pollution throughout the United States. EPA's recent efforts at imposing a workable NPDES permitting scheme for the industry have failed on two major fronts: requiring permits of all CAFOs that discharge, and requiring adequate safeguards in the relatively small number of permits issued. Petitioners are aware of the unique challenges in regulating CAFO discharges. However, courts have repeatedly established that "this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all."[294] EPA has significant authority to revise its approach and strengthen its oversight of industrial livestock pollution, and Petitioners believe that EPA has an obligation pursuant to its CWA duties to do so without further delay.

[293] *Id.* at 7.
[294] *NW Envtl. Advocates v. EPA*, 537 F.3d 1006, 1026 (9th Cir. 2008), quoting *NRDC v. Costle*, 568 F.2d 1369, 1380 (D.C. Cir. 1977); *see also Union Elec. Co. v. EPA*, 427 U.S. 246, 268-69 (1976) ("Allowing such [feasibility] claims to be raised . . . would frustrate congressional intent.").

Appendix B

Program	Year	Period	Geo Level	State	State ANSI	watershed_code	Commodity	Data Item	Domain	Domain Category	Value
SURVEY	2019	FIRST OF JAN	STATE	IDAHO	16	0	CATTLE	CATTLE, COWS, MILK - INVENTORY	TOTAL	NOT SPECIFIED	614,000

Appendix C

From:	Socha, Julianne
To:	Sylvia Heaton; McMahon, Megan (DEQ)
Cc:	Thompson, Caitlain; Ackerman, Mark; Schaller, Andrea
Subject:	MIG010000 - EPA preliminary review comments on pre-public notice draft general permit for CAFOs
Date:	Wednesday, September 25, 2019 2:43:00 PM

Hi Sylvia and Megan –

In response to our email exchange on September 24 I am providing preliminary review comments on the PPN draft GP for CAFOs. I have reviewed the pre-public notice draft NPDES General Permit for CAFOs (referred to in the comments below as "the Permit" or "this Permit"), draft fact sheet, and draft public notice, that was submitted to EPA on August 23, 2019. Based on my review and discussions between EGLE and Region 5 held on September 5, September 17 and September 18, 2019, below are Region 5's preliminary comments on the pre-public notice draft GP, draft fact sheet, and draft public notice.

As these are preliminary comments, EPA does intend to review subsequent versions of the Permit to assess how these comments were considered and addressed by the State.

As we discussed on September 5 and 17, I would also like to review templates for forms and reports that are specifically required by the permit. Since all templates for forms and reports are not currently available, on September 17 you shared an Excel spreadsheet listing forms and required submissions in the Permit. Upon availability or by the start of the public notice of the Draft Permit please provide either a pdf file or a website link for the following forms and required submissions identified on the September 17 Excel spreadsheet for EPA review:

- CAFO Inspection Report required in Part I.B.1.c.;
- Notification of New Field Requests;
- Daily Manure Land Application Record required in Part I.B.3.d.1.;
- Land Application summary for Previous Crop Year required in Part I.B.3.d.2.;
- CNMP Template;
- Annual Report Form for CAFOs required by Part I.B.4.d.;
- CNMP Update Form;
- CAFO Discharge Monitoring Report required in Part I.C.1.; and
- Manifest for CAFO Waste required by Part I.C.9.a..

Let me know if you have any questions regarding these preliminary comments. I would like to suggest that we schedule a time prior to the public notice of a Draft Permit to discuss any revisions EGLE plans to make or has made to the Permit in response to these preliminary comments. I look forward to working with you to resolve any issues regarding these preliminary comments.

Preliminary Comments on the pre-public notice permit:

1. 40 C.F.R. § 122.23(b)(8) and Section 323.2104(d) of Part 21 of the Michigan Administrative Code define "production area" to mean the part of an animal feeding operation that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. Both the federal and state definition further define "raw materials storage area" to include feed silos, silage bunkers, and bedding materials. Part II.A. of the Permit includes a definition of production area which does not conform to the definitions established in federal and state rules. The Permit excludes storage of sand that will be used as bedding from the raw materials storage area. Additionally, Part I.B.3.i. of the Permit subjects sites storing sand that will be used as bedding to non-production area storm water management requirements instead of the storage requirements and best management practices required in Part I.B.1. and Part I.B.2. of the Permit.

2. 40 C.F.R. § 122.42(e)(1)(i) requires that any permit issued to a CAFO must include a requirement to implement a nutrient management plan that contains best management practices to ensure adequate storage of manure, litter, and process wastewater. The term "process wastewater" as defined in federal rules at 40 C.F.R. § 122.23(b)(7) and in Part II.A. of the Permit includes egg wash water. Part I.B.1. of the Permit establishes conditions to ensure the permittee has adequate storage. Part I.B.1.a.1. excludes egg wash water from necessary volume design requirements that establish adequate storage. During our discussion on September 17, you mentioned that EGLE regulates discharges and land application of egg wash water under an EGLE permitting authority that is not part of your authorized NPDES program. Egg wash water generated at a large CAFO is considered process water subject to the effluent limitations established in 40 C.F.R. Part 412 and nutrient management plan requirements established in 40 C.F.R. § 122.42(e)(1). Please provide more information on how discharges and land application of egg wash water will be permitted.

3. The federal effluent limitations established for CAFOs in 40 C.F.R. Part 412 provide that CAFOs cannot discharge pollutants from the production area to waters of the United States except that pollutants in a precipitation-caused overflow may be discharged if the production area is designed, constructed, operated and maintained to contain all manure, litter, process wastewaters including the runoff and the direct precipitation from a specified rainfall event. Part I.A. of the Permit provides for no discharge except for a precipitation-caused overflow from a storage structure that meets the criteria established in Part I.B.1. of the Permit.
   a. Part I.B.1. does not appear to account for the direct precipitation from the specified rainfall event. Part I.B.1. provides that CAFO waste storage structures must be designed, constructed, maintained, and operated to contain the total combined volume of the operational volume, the emergency volume, and the freeboard volume. Part I.B.1.a.2. of the Permit provides that the emergency volume is to be kept available to contain large rainfall events, however, this condition specifies that this volume is comprised of all production area waste generated from the 25-year 24-hour rainfall event. "Production area waste" as defined in Part II.A. does not include direct precipitation from the 25-year 24-hour rainfall event.
   b. Additionally, Part I.B.1. does not appear to account for accumulated solids that can be present at the bottom of storage structures. The operational volume established in Part I.B.1.a.1. would be the likely volume to account for accumulated solids. Concrete storage structures, if regularly cleaned, could have little to no accumulated solids but earthen-lined storage structures, even if regularly cleaned, will often have accumulated solids. Many CAFOs in Michigan make use of the Animal Waste Management (AWM) software to estimate production of manure and size of storage structures. During the September 18, 2019 presentation of the AWM software by Natural Resources Conservation Services, EPA noted that AWM assumes zero solids accumulation in its estimates of the size of storage structures.

4. 40 C.F.R. § 122.42(e)(6) provides that a permit issued to a CAFO must require that certain procedures apply when a CAFO owner or operator makes changes to the CAFO's nutrient management plan previously submitted to the state permitting authority. The procedures included in § 122.42(e)(6) impose a mandatory duty on the state to determine if the proposed revisions to a CAFO's nutrient management plan are substantial or nonsubstantial, and a mandatory duty to provide the applicable notice and review of the proposed revisions. 40 C.F.R. § 122.42(e)(6)(iii)(A)-(D) identifies specific revisions to a nutrient management plan that are consider substantial revisions requiring public notice and opportunity for a hearing prior to implementation of the revisions by the CAFO. The Permit addresses revisions to nutrient management plans in two sections, Part I.B.3.a.1. and Part I.B.4.e. Part I.B.3.a.1. is specific to the addition of new land application areas, requires public notice of the new land application areas, and provides a timeline after public notice for use of the new land application areas unless otherwise notified by EGLE. Part I.B.4.e. identifies other revisions to the nutrient management plan that the State considers "significant". These significant revisions do not appear to include the substantial revisions identified at 40 C.F.R. § 122.42(e)(6)(iii)(B)-(D), nor does the permit identify the procedures for notice and review of these significant revisions.

5. 40 C.F.R. § 412.37(a)(1)(i) requires weekly inspections of all storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to storage and

containment structures. Part I.B.2.f.1. of the Permit requires weekly visual inspections of all clean storm water diversion devices and outlets. EPA's review did not find a permit condition that specifically requires weekly inspections of runoff diversion structures and devices channeling contaminated storm water to storage and containment structures. However, Part I.B.1.c.3. of the Permit does require weekly inspections of the collection system, lift stations, mechanical and electrical systems, transfer stations, control structures, and pump stations are properly functioning associated with CAFO waste storage structures. Please consider reviewing the CAFO Inspection Report form required in Part I.B.1.c. of the Permit to ensure this form includes inspections of all runoff diversion structures and devices channeling contaminated storm water, including any storage or containment structures that only contain process wastewater such as runoff from feed storage areas or calf hutch areas.

6. 40 C.F.R. §§ 122.42(e)(2)(i)(A) and 412.37(b) require that CAFOs maintain records to document the implementation and management of minimum elements that are required to be included in a nutrient management plan under § 122.42(e)(1). Requirements for most of the minimum elements established in § 122.42(e)(1) are found in Part I.B.2. of the Permit. EPA's review of the Permit did not find a permit condition that conformed to the documentation and recordkeeping requirements established in §§ 122.42(e)(2)(i)(A) and 412.37(b) for the best management practices required in Part I.B.2.a., c., d., and e. As discussed during our September 17, 2019 conversation, EGLE may be able to include documentation and recordkeeping on the CAFO Inspection Form required by the Permit.

7. Federal regulations establish a records retention requirement in 40 C.F.R. §§ 122.42(e)(2)(i) and 412.37(c) applicable to information and records required by §§ 122.42(e)(1)(ix), 412.4, and 412.37(c)(1)-(10). The more stringent of these recordkeeping requirements is in § 412.37(c), i.e., a CAFO must maintain records on-site for a period of five years from the date they are created. The Permit requires that records be retained for five years but the Permit does not specify five years from the date the record is created. Please consider clarifying in Part I.C.12. of the Permit that records shall be kept for five years from the date they are created.

8. The Permit requires the use of the Michigan Phosphorus Risk Assessment (MPRA) tool in lieu of the Bray P1 numerical limits to determine land application rate prohibitions and restrictions. Part I.B.3.c. provides that existing CAFOs must comply with the land application rate prohibitions and restrictions using MPRA by April 1, 2021. It is EPA's understanding that EGLE will require existing CAFOs to comply with land application rates, restrictions and prohibitions in its most current nutrient management plan until revisions can be made using MPRA but, this is not clear in the Permit. Language should be added to the Permit identifying applicable land application rate prohibitions and restrictions from the effective date of the permit to either April 1, 2021 or the date a revised nutrient management plan that includes the use of MPRA is approved by EGLE, whichever is earlier.

9. Part I.B.4.d.7. of the Permit requires submission of the Land Application Summary for Previous Crop Year form as part of the CAFO's annual report to conform to the federal requirement for an annual report found at 40 C.F.R. § 122.42(e)(4)(viii). Contents of the Land Application Summary for Previous Crop Year form are established in Part I.B.3.d.2. To ensure that the contents of this form conform to the federal requirements in § 122.42(e)(4)(viii) EGLE should confirm that Part I.B.3.d.2.b. and c. require the methodology and calculations showing the actual amounts of nitrogen and phosphorus applied to each field and the amount of any supplemental fertilizer applied to each field.

10. 40 C.F.R. § 412.37(b)(6) requires that records of the date, time and estimated volume of any overflow be retained. Part I.C.1. of the Permit includes requirements for reporting and recordkeeping of overflows. EPA did not find a requirement to retain a record of the estimate volume of any overflow in Part I.C.1. of the Permit. Please confirm that the estimate volume of any overflow is a required element on the CAFO Discharge Monitoring Report required in Part I.C.1. and consider adding "estimate of the volume of any overflow" to the list of information required in Part I.C.1.a. of the Permit.

11. 40 C.F.R. § 412.37(c)(10) requires that dates of manure application equipment inspections be retained. Part I.B.3.b.6. of the Permit requires the permittee to maintain a written record of inspections and calibrations of land application equipment but this Part of the Permit does not specify that the permittee must include the date of inspection in the records. Please confirm that the date of the inspection is a required element on the Land Application Log form required by Part I.B.3.b.6. of the Permit.

12. Part I.C.6. of the Permit establishes procedures a CAFO must follow to ensure continued authorization to discharge under the Permit beyond the Permit's expiration date if the permit expires prior to the State taking action on a CAFO's permit application. It is EPA's understanding from discussions with EGLE staff that Part I.C.6. is also intended to establish the procedures for obtaining coverage under the next general permit and that similar language in Part I.C.6. of the current general permit provides a similar process for submitting an application to obtain coverage under this Permit. It is not clear to EPA that Part I.C.6. of the Permit provides procedures for first-time applicants to seek coverage under the Permit. Please confirm that Rule 2196 of the Michigan Administrative Code, provides procedures comparable to the requirements to obtain coverage under a general permit found in 40 C.F.R. §§ 122.23(d)(1), 122.23(d)(2), and 122.28(b)(2)(i) – (iii) and including the public process required in 40 C.F.R. § 122.23(h)(1) or consider adding information about this process in the Permit.

13. The definition of "25-year, 24-hour rainfall event" or "100-year, 24-hour rainfall event" in Part II.A. of the Permit references a 1992 Huff and Angel source. EPA encourages the State to use the most current rainfall probability data available to establish magnitudes of rainfall events identified in Certificates of Coverage.

14. EPA recommends that Part II.D.7. include that the permittee provides right of entry to not only the Regional Administrator but also his or her designee.

15. EPA recommends that Part II.D.8. remove the requirement that all reports prepared in accordance with the Permit shall be available for public inspection at the offices of the Regional Administrator. EPA will follow the federal procedures for releasing records to the public found in 40 C.F.R. Part 2.

16. The Permit does not apply to duck CAFOs. Please consider adding duck CAFOs to the list of facilities that are not eligible for coverage under the Permit on the title page and remove ducks from the animal types listed in Part I.B.4.d.1.

17. Please consider revising the language in Part I.A.1.a. to make clear that the production area must be properly designed, constructed, operated and maintained as identified in Part I.B.1. of the Permit.

18. Please confirm that the use of the term "solid stackable manure" as used in Part I.B.1.d. is consistent with this term's definition as set forth in Part II.A. of the Permit.

Preliminary comments on the pre-public notice draft Fact Sheet:

19. The Public Comment section of the Fact Sheet indicates that the Department is planning to hold at least two public hearings on the Draft Permit. The Fact Sheet also indicates that the Department will entertain requests for public hearings. Please clarify whether the Department will entertain requests for public hearings in addition to the two scheduled hearings.

Preliminary comments on the pre-public notice draft Public Notice:

20. Please clarify the process by which persons without access to the internet can submit comments on the Draft Permit.

21. Similar to the Fact Sheet, the Public Notice includes the announcement of two public hearings but also provides that persons may request a hearing through MiWaters. Please clarify whether the Department will entertain requests for public hearings in addition to the two scheduled hearings.

julianne

Julianne Socha
Section 2 | Permits Branch | Water Division | Region 5 | U.S. EPA
77 W. Jackson Blvd. WP-16J | Chicago IL 60604
312-886-4436 | socha.julianne@epa.gov

Simplot

J.R. Simplot Company
P.O. Box 27, Boise, Idaho
83707 0027

December 9, 2019

SENT VIA EMAIL TO: peak.nicholas@epa.gov
ORIGINAL TO FOLLOW VIA CERTIFIED MAIL #7018 0400 0000 3245 6918
RETURN RECEIPT REQUESTED

U.S. EPA Region 10
Attn: Director, Water Division
1200 Sixth Avenue, Suite 155 (19-C04)
Seattle, Washington, 98101
Attn: Nicholas Peak

RE: The J.R. Simplot Company Comments on Proposed Reissuance of the National Pollutant Discharge Elimination System (NPDES) General Permit for Concentrated Animal Feeding Operations (CAFOs) in Idaho

The J.R. Simplot Company (Simplot) submits these comments in response to the Water Division's U.S. Environmental Protection Agency's Region X (EPA or Agency) Notice on Proposed Reissuance of the National Pollutant Discharge Elimination System (NPDES) General Permit for Concentrated Animal Feeding Operations (CAFOs) in Idaho, published in the *Federal Register* on October 23, 2019 and appearing at Federal Register Volume 84 Number 205. Simplot is a privately held agribusiness corporation based in Boise, Idaho. The corporation is engaged in a number of businesses including food processing, farming, fertilizer manufacturing, mining, ranching and other enterprises related to agriculture. Simplot operates CAFOs in the Northwest and has extensive knowledge and expertise in such operations especially related to the practicability of implementing regulatory requirements.

General Comments

As indicated in the EPA draft 2019 NPDES General Permit for CAFOs in Idaho Fact Sheet, EPA has authorized Idaho Department of Environmental Quality (IDEQ) to implement a NPDES permit program and IDEQ will obtain permitting authority for general NPDES permits on July 1, 2020. Based on the rapidly approaching transition schedule of these permits from EPA to IDEQ authority, the proposed reissuance of the NPDES General Permit for CAFOs in Idaho should be delayed until after the transition is completed. In addition, the NPDES General Permit for CAFOs in Idaho should be drafted by IDEQ.

In general, this draft 2019 permit has numerous requirements that are more detailed compared to the 2012 NPDES General Permit for CAFOs in Idaho. These more rigorous requirements are overly burdensome in they require a high level of technical knowledge to implement, have a high cost of compliance, and will be time-consuming to implement. These requirements are going to be difficult for a large operation to implement and likely not possible for small operations. We recommend that EPA consider the effect this permit will have on the economic viability of CAFO operations.

1. Whenever precipitation causes an overflow of manure, litter, or process wastewater, pollutants in the overflow may be discharged into waters of the United States provided:

a. The production area is designed, constructed, operated, and maintained to contain all manure, litter, process wastewater, and the runoff and direct precipitation from the 25-year, 24-hour storm event for the location of the CAFO for a storage period of 120 days.

Section 2.a.ii. requires daily visual inspections of all water lines, including drinking water and cooling water lines. Simplot recommends EPA clarify if daily visual inspections apply to aboveground water lines or underground water lines, or both. With regards to frequency of visual water line inspections, Simplot recommends it be revised to weekly rather than daily inspections, as weekly inspections should be sufficient.

<u>II.B. Effluent Limitations and Standards – Effluent Limitations and Standards Applicable to the Land Application Area</u>

Section 2. uses the phrase "to achieve realistic production goals" with respect to the application of nutrients in the NMP. This is a vague term that adds no value to the statement. Simplot recommends changing it to the following: "The NMP must address the form, source, amount, timing, and method of application of nutrients on each field, while minimizing nitrogen and phosphorus movement to surface waters."

<u>III.A. Special Conditions – Nutrient Management Plan (NMP)</u>

There is no timeline requirement for the EPA to review and determine completeness of the NMP in Permit Condition 1. We recommend adding a requirement for EPA to make the determination within 30 days of receipt of the NMP.

The Idaho Animal Waste Management (IDAWM) Software mentioned in Permit Condition 2.a.i. and the Washington NRCS Engineering Technical Note #23 listed in Permit Condition 2.a.ii. appear to be developed for wastewater storage and wet manure. Dry or composted manure are common to all CAFOs. Simplot recommends EPA clarify if dry or composted manure are required to be evaluated using IDAWM Software and Washington NRCS Engineering Technical Note #23. In addition, Simplot recommends EPA clarify if these calculation methods may be utilized for dry or composted manure.

With regards to Permit Condition 2.b., the handling of mortalities does not affect nutrient management and therefore should not be in the NMP. The 2019 NPDES General Permit for CAFOs in Idaho should not prescribe how mortalities are handled other than they need to be handled so as to not contaminate surface water. If this requirement remains for the NMP, Simplot recommends changing Permit Condition 2.b. to the following: "Mortalities shall be handled in such a way as to prevent the discharge of pollutants to waters of the United States."
Permit Condition 2.c. requires clean water be diverted from the production area or requires the facility provide adequate wastewater or manure storage capacity at the facility to contain clean water. It is difficult and costly to divert run on water from adjacent properties.

As an example, at the Simplot operation near Grand View, Idaho, the topography north and east of the facility consists of steep rising terrain to a desert plain above the Snake River. The land bordering the Simplot operation is owned by the federal government and is managed by the U.S. Bureau of Land Management (BLM). This plain reaches elevations above 2,900 feet and drains to the Snake River valley below through a series of "draws". Building diversion structures to totally divert this water is not appropriate or feasible. In fact, to do so would require a number of such structures to be built on federal lands. If such structures were allowed by rules, such a project would go through a number of regulatory processes such as the National Environmental Policy Act (NEPA). Thus, this would be a very cumbersome process with an uncertain outcome.

It is also not feasible to contain run on water at Simplot's Grand View property due to the enormous volume of run on water from thousands of acres of BLM land up-gradient of the facility. Therefore, Simplot recommends Permit Condition 2.c. be removed from the draft 2019 NPDES General Permit for CAFOs in Idaho.

Permit Condition 2.f. requires CAFOs to perform a risk assessment and rate every land application area field for the NMP. The requirement to perform assessments for every field would be overly burdensome in that they would be very expensive and labor intensive. Simplot recommends this Permit Condition 2.f. be removed from the draft 2019 NPDES General Permit for CAFOs in Idaho.

For Permit Condition 2.h., it requires "annual nutrient budgets must be generated to determine land application rates for each field where manure, litter, or process wastewater is applied". Most facilities have the data to calculate nutrient budgets, just not a good system to compile all of the data into one report. It would be costly and time consuming to gather the data for annual nutrient budgets. Simplot recommends the requirement for annual nutrient budgets in Permit Condition 2.h. be removed from the draft 2019 NPDES General Permit for CAFOs in Idaho.

III.A. Special Conditions – Nutrient Management Plan – Changes to the NMP

Section 5.b. lists four items that EPA considers substantial changes, but does not limit it to only these changes. Simplot recommends defining all changes that are considered to be substantial in the permit rather than leaving it vague, so that compliance can be determined from the face of the permit.

Farmers are continually changing crop rotations, adding new ground, trying different rates and methods of application. A facility's NMP could be under constant EPA review or the facility could easily be out of compliance for adding a new crop or adding new land application ground to his operation prior to obtaining Agency approval. Simplot recommends adding flexibility to the criteria defining a substantial NMP change or allow for expedited Agency review in Section 5.b., to account for these types of changes.

December 9, 2019

SENT VIA EMAIL TO: peak.nicholas@epa.gov
ORIGINAL TO FOLLOW VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Director, Water Division
U.S. EPA, Region 10
1200 6th Avenue, Suite 155
WD 19-C04
Seattle, WA 98101-3188

Re: The Idaho Cattle Association Comments on Proposed Reissuance of the Wastewater (NPDES) General Permit for Concentrated Animal Feeding Operations (CAFOs) in Idaho

The Idaho Cattle Association (ICA) is pleased to submit comments regarding the United States Environmental Protection Agency's notice of proposed reissuance of the wastewater general permit for Concentrated Animal Feeding Operations in the state of Idaho. The ICA has nearly 1,000 members representing Idaho's cattle producers and allied industries.

The permitting process outlined is complex, will be time consuming, expensive to implement and includes issues that do not pertain to the Clean Water Act (CWA). Perhaps a few of our largest operators could comply but will be difficult for the average and small producer because of complexity, time requirement, and considerable expense which they cannot afford. This will have the result of most operations not applying for a permit even though some of them perhaps should. This permit, as written, will impose an economic hardship on the State's small agricultural businesses. With that said, the following are some point by point concerns and comments.

The Idaho Cattle Association appreciates the opportunity to comment on this very important issue.

Sincerely,

Dawn Anderson

Dawn Anderson
President
Idaho Cattle Association

C. Facility Closure

- This section of the permit should be omitted from the NPDES. If a facility has terminated coverage under the NPDES closure it should not be regulated by the permit.

IV. Records, Reporting, Monitoring and Notification

B. Annual Reporting Requirements

- ICA recommends that the annual reports only be required to contain field and corresponding application information for fields listed in the facilities NMP that received manure, litter or process wastewater in that given year. Fields that did not receive manure, litter or process wastewater should be allowed to be excluded from the annual report until which time they receive manure, litter or process wastewater. This is the processing utilized by other states in their NMP/NPDES annual reporting processes.
- Many of the reporting requirements are considered confidential. ICA recommends not submitting information in an annual report, but maintaining this information on site, which EPA can review.

C. Notification of Unauthorized Discharges Resulting from Manure, Litter, and Process Wastewater Storage, Handling, On-site Transportation and Application.

Definitions Water of the United States

- ICA recognizes the former WOTUS rule has been vacated and the latest definition needs to be used in the permit.

Definition of a Discharge

- ICA's understanding is that any manure that spills from truck on the way to a stockpile area or field is considered a discharge. It is also ICA's interpretation, leaving a feedlot and driving on to a roadway with manure on your tires you drive through a feed yard, it would be considered a discharge. This standard is unreasonable and would be impossible to manage.

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Attorneys licensed in Idaho
** Also licensed in Washington*
*** Also licensed in Oregon*

Monday, December 09, 2019

Director of the Water Division, USEPA Region 10
c/o Nicholas Peak, EPA Agriculture Advisor
1200 Sixth Avenue, Suite 155, WD 19-C04
Seattle, WA 98101-3188
Via email to *peak.nicholas@epa.gov*
Via facsimile to (206) 553-0165

Re: Idaho Dairymen's Association's Comments on the Proposed Reissuance of NPDES General Permit for Concentrated Animal Feeding Operations Located in Idaho (IDG010000)

Dear Mr. Peak:

This office represents the Idaho Dairymen's Association ("IDA"), an organization that represents the interests of all dairy producers within the state of Idaho. The dairymen of Idaho and IDA have enjoyed a great working relationship with EPA Region 10 and its staff for many years. IDA hopes to maintain this relationship for years to come as the dairy industry and its individual dairy owners are firmly rooted within this region.

This letter contains IDA's comments on Region 10's proposal to reissue National Pollutant Discharge Elimination System ("NPDES") general permit number IDG010000 ("Draft Permit") for Concentrated Animal Feeding Operations ("CAFOs") located in Idaho. IDA's concerns, detailed herein, begin with general comments, followed by specific comments on provisions of the Draft Permit and recommended changes to the Draft Permit's language. Although IDA prefers that these changes be made to the permit itself, if EPA has cause to believe that it cannot make the change directly to the permit, then IDA respectfully requests that the changes it has suggested be incorporated in the fact sheet that will accompany the permit.

Technical Note #23, January 2013 (Appendix D), for each wastewater or manure storage structure. If the evaluation of the CAFO's wastewater or manure storage structures identifies deficiencies in the operation or maintenance of the structures, the CAFO must identify measures to address those deficiencies in its NMP. If the permittee chooses to confirm compliance through the use of an engineer, then the NMP must include the results of the engineer's evaluation. If the permittee chooses to use Technical Note #23, then ~~T~~the NMP must include the results of the evaluation using Washington NRCS Engineering Technical Note #23, January 2013 (Appendix D).

- **Draft Permit § III.A.2.e, page 12: NMP Content - Chemicals**

  - **Concern:** This section begins with the broad statement that a permittee must: "Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals or contaminants." There is no definition of "chemicals or contaminants" in this permit. IDA is concerned that the first sentence may be interpreted to prohibit the continued use of generally accepted industry agents that are required for animal husbandry and to clean milking parlors as mandated by the Pasteurized Milk Ordinance. The agents used for these practices inevitably enter wastewater storage structures. It is unrealistic to separate and divert cleaning and animal husbandry agents from storage structures, or require permittees to "specifically design" their structures to treat them. Preventing a hoof treatment from entering a storage structure, for example, is not realistic or achievable, when cows walk through the water and manure that enters storage structures. Accordingly, this section must be clarified so that it is not interpreted to prohibit the use of these generally accepted industry cleaning (and required by the Pasteurized Milk Ordinance) and animal husbandry agents.

  - **Solution:** IDA recommends amending this section as provided below to provide this clarification for permittees:

    e. Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals or contaminants. For purposes of this permit, agents that have been used for cleaning to comply with the Pasteurized Milk Ordinance and for animal husbandry purposes, such as hoof baths, that are generally accepted by the industry, shall not be considered chemicals or contaminants that may not enter storage systems. All wastes from dipping vats, pest and parasite control units, and other facilities utilized for the management of potentially hazardous or toxic chemicals shall be handled and disposed of in a manner sufficient to prevent pollutants from entering the manure, litter, or process wastewater storage structure or waters of the United States. The NMP must include references to any applicable chemical storage and handling protocols and incorporate specific BMPs and actions that will be taken to prevent the improper disposal of chemicals and other contaminants into any manure, litter, process wastewater, or storm water storage or treatment system. The NMP should also consider chemical handling plans for the protection of wells, water supplies, and any drainage ways that are close to chemical storage and handling areas.

UNITED STATES COURT OF APPEALS

FOR THE NINTH CIRCUIT

FOOD & WATER WATCH and
SNAKE RIVER WATERKEEPER;

Petitioners,

v.

UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY,

Respondent.

No.____________________

PETITION FOR REVIEW

PETITION FOR REVIEW OF AN ACTION BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY

Pursuant to Section 509(b)(1) of the Clean Water Act, 33 U.S.C. § 1369(b)(1), Federal Rule of Appellate Procedure 15, and Ninth Circuit Local Rule 15-1, Food & Water Watch and Snake River Waterkeeper (collectively "Petitioners") hereby petition this Court for review of the Environmental Protection Agency's ("EPA") action in issuing the Final Reissuance of National Pollutant Discharge Elimination System ("NPDES") General Permit for Concentrated Animal Feeding Operations in Idaho (IDG010000). This permit, issued pursuant to the Clean Water Act ("CWA"), 33 U.S.C. §§ 1251 *et seq.*, authorizes discharges of wastewater from concentrated animal feeding operations ("CAFOs") in Idaho. Notice of this action was published in the Federal Register at 85 Fed. Reg. 28,624 (May 13, 2020). A copy of the Federal Register notice is attached hereto as Exhibit A. General Permit IDG010000 will become effective on June 15, 2020. In accordance with 40 C.F.R. § 23.2, the permit is considered issued for the purpose of judicial review beginning two weeks after publication in the Federal Register, or May 27, 2020. Thus, General Permit IDG010000 is ripe for review in this Court. *See* 33 U.S.C. § 1369(b)(1)(F) (authorizing review by the Court of Appeals for EPA action in "issuing or denying any permit under [33 U.S.C. § 1342 (CWA NPDES program)]").

Petitioners are non-profit organizations whose missions include advocating for the protection, preservation, and sound management of waters of the United States. Petitioners have a substantial interest in the EPA's reissuance of General Permit IDG010000 because the federal action taken therein will have adverse impacts on the Petitioners' and their members' interests in the unique resources and ecosystems found in affected waters of the United States.

Respectfully submitted this 4th day of June, 2020.

s/ Tyler Lobdell
Tyler Lobdell (ISB No. 10431)
Food & Water Watch
3449 S Norfolk Way
Boise, Idaho 83706
Telephone: (208) 209-3569

s/ Allison LaPlante
Allison LaPlante (OSB No. 023614)
Earthrise Law Center
Lewis & Clark Law School
1010 S. Terwilliger Boulevard
Portland, Oregon 97219-7799
Telephone: (503) 768-6894
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Counsel for Petitioners Food & Water Watch and Snake River Waterkeeper

UNITED STATES COURT OF APPEALS

FOR THE NINTH CIRCUIT

FOOD & WATER WATCH and SNAKE RIVER WATERKEEPER;	)	
Petitioners,	)	No.____________________
v.	)	
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,	)	
Respondent.	)	

RULE 26.1 DISCLOSURE STATEMENT

Pursuant to Rule 26.1 of the Federal Rules of Appellate Procedure, Food & Water Watch and Snake River Waterkeeper hereby disclose that they are non-profit organizations, and as such, have no parent corporations or publicly held corporations owning 10% or more of any of their stock.

Dated: June 4, 2020

Respectfully Submitted,

s/ Tyler Lobdell
Tyler Lobdell (ISB # 10431)
3449 S Norfolk Way
Boise, ID 83706
Tel: (208) 905-3569
Email: tlobdell@fwwatch.org

Counsel for Petitioners Food & Water Watch and Snake River Waterkeeper

CERTIFICATE OF SERVICE

I hereby certify that on this 4th day of June, 2020, I electronically filed the foregoing Petition for Review and Rule 26.1 Disclosure Statement with the Clerk of the Court using the CM/ECF System, and served by certified mail, return receipt requested, a true and correct copy of the foregoing on the following:

Andrew Wheeler, Administrator
U.S. Environmental Protection Agency
Mail Code: 1101A
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Daniel D. Opalski, Director
U.S. Environmental Protection Agency, Region 10 Water Division
1200 Sixth Avenue, Suite 155
Seattle, WA 98101

Correspondence Control Unit
Office of General Counsel (2311)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

William Barr
Attorney General
U.S. Department of Justice
950 Pennsylvania Avenue, N.W.
Washington, DC 20530

s/ Tyler Lobdell
Tyler Lobdell
Food & Water Watch

CERTIFICATE OF SERVICE

I hereby certify that I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the Ninth Circuit by using the appellate CM/ECF system on September 22, 2020. I certify that all participants in the case are registered CM/ECF users and that service will be accomplished by the appellate CM/ECF system.

Date: September 22, 2020

s/ Tyler Lobdell
Tyler Lobdell
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