

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 451

[FRL—7263–2]

RIN 2040–AD55

Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: This action presents the U.S. Environmental Protection Agency's (EPA's) proposed effluent limitations guidelines and standards for wastewater discharges from the concentrated aquatic animal production (CAAP) industrial point source category. The proposed regulation proposes new technology-based effluent limitations guidelines and standards for wastewater discharges associated with the operation of new and existing concentrated aquatic animal production facilities.

EPA estimates that compliance with this regulation, as proposed, would reduce the discharge of total suspended solids (TSS) by at least 4.1 million pounds per year and would cost industry an estimated \$1.5 million and Federal and State permitting authorities an estimated \$3,337 on an annual basis. EPA expects that the control of TSS would reduce the discharge of biochemical oxygen demand (BOD) and nutrients by at least 8.7 million pounds per year. EPA also believes that by implementing the best management practices (BMP) plans any toxic and non-conventional pollutants that may be discharged will be controlled. EPA estimates that the annual quantifiable benefits of the proposal would be approximately \$22,000–\$113,000.

DATES: Comments on the proposal must be postmarked by December 11, 2002. EPA will conduct two or three public meetings to discuss the proposed rule. The information on dates, times and locations of the public meetings will be published in a subsequent **Federal Register** notice.

ADDRESSES: Submit written comments to Ms. Marta Jordan, Office of Water, Engineering and Analysis Division (4303T), U.S. EPA, 1200 Pennsylvania Avenue, NW., Washington, DC 20460. For hand-deliveries or Federal Express, please send comments to Ms. Marta Jordan, Office of Water, Engineering and Analysis Division, Room 6233M, 1201 Constitution Avenue, NW., 6th Floor, Connecting Wing, Washington, DC

20004. Comments may be sent by e-mail to the following e-mail address: aquaticanimals@epa.gov. For additional information on how to submit comments, see “**SUPPLEMENTARY INFORMATION**, How to Submit Comments.”

The public record for this proposed rulemaking has been established under docket number W–02–01 and is located in the Water Docket, EPA West Room B135, 1301 Constitution Ave. NW., Washington DC, 20004. The record is available for inspection from 9 a.m. to 4 p.m., Monday through Friday, excluding legal holidays. For access to the docket materials, call (202) 566–2426 to schedule an appointment. You may have to pay a reasonable fee for copying.

FOR FURTHER INFORMATION CONTACT: For technical information concerning today's proposed rule, contact Ms. Marta Jordan at (202) 566–1049. For economic information, contact Mr. Nicolaas Bouwes at (202) 566–1002.

SUPPLEMENTARY INFORMATION:

Regulated Entities

Entities potentially regulated by this action include:

Category	Examples of regulated entities	Primary NAICS codes
Industry	Facilities engaged in concentrated aquatic animal production, which may include the following sectors: Finfish Farming and Fish Hatcheries. Other Animal Aquaculture.	112511 112519

The preceding table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your facility would be regulated by this action, you should carefully examine the applicability criteria in 40 CFR part 451.1, 451.10, 451.20, and 451.30. You should also examine the description of the proposed scope of each subpart in Section VI.B of this document. If you have questions regarding the applicability of this proposed action to a particular entity, contact the person listed for technical information in the

preceding **FOR FURTHER INFORMATION CONTACT** section.

How To Submit Comments

EPA requests an original and three copies of your comments and enclosures (including references). Commenters who want EPA to acknowledge receipt of their comments should enclose a self-addressed, stamped envelope. No facsimiles (faxes) will be accepted. Please submit any copies of references cited in your comments.

Comments may also be sent via e-mail, see **ADDRESSES**. Electronic comments must specify docket number W–02–01 and must be submitted as an ASCII, Word, or WordPerfect file avoiding the use of special characters and any form of encryption. Electronic comments on this proposal may be filed online at many Federal Depository Libraries. No confidential business information (CBI) should be sent via e-mail.

Protection of Confidential Business Information (CBI)

EPA notes that certain information and data in the record supporting the proposed rule have been claimed as CBI and, therefore, are not included in the record that is available to the public in the Water Docket. Pursuant to EPA regulations at 40 CFR 2.203 and 2.211, EPA treats all information for which a claim of confidentiality is made as confidential unless and until it makes a determination to the contrary under 40 CFR 2.205. Further, the Agency has not included in the docket some data not claimed as CBI because release of this information would indirectly reveal information claimed to be confidential. To provide the public with as much information as possible in support of the proposed rulemaking, EPA is presenting in the public record certain information in aggregated form or, alternatively, is masking facility identities or employing other strategies in order to preserve confidentiality claims. This approach ensures that the information in the public record both explains the basis for today's proposal and allows for a meaningful opportunity for public comment, without compromising CBI claims.

Some tabulations and analyses of facility-specific data claimed as CBI are available to the company that submitted the information. To ensure that all data or information claimed as CBI is protected in accordance with EPA regulations, any requests for release of such company-specific data should be submitted to EPA on company letterhead and signed by a responsible official authorized to receive such data.

The request must list the specific data requested and include the following statement, "I certify that EPA is authorized to transfer confidential business information submitted by my company, and that I am authorized to receive it."

Supporting Documentation

The rules proposed today are supported by several documents:

1. "Economic and Environmental Impact Analysis of Proposed Effluent Limitations Guidelines and Standards for the Concentrated Aquatic Animal Production Industry Point Source Category" (EPA-821-R-02-015). Hereafter referred to as the CAAP Economic Analysis, this document presents the analysis of compliance costs; facility, firm, small business and market impacts; and water quality impacts and potential benefits. In addition, this document presents an analysis of cost-effectiveness. (DCN 20141)
2. "Development Document for Proposed Effluent Limitations Guidelines and Standards for the Concentrated Aquatic Animal Production Industry Point Source Category" (EPA-821-R-02-016). Hereafter referred to as the CAAP Development Document, the document presents EPA's technical conclusions concerning the CAAP proposal. This document describes, among other things, the data collection activities, the wastewater treatment technology options, effluent characterization, effluent reduction of the wastewater treatment technology options, estimate of costs to the industry, and estimate of effects on non-water quality environmental impacts. (DCN 61552)
3. "Draft Guidance for Aquatic Animal Production Facilities to Assist in Reducing the Discharge of Pollutants" (EPA-821-B-02-002). Hereafter referred to as the AAP Technical Guidance Manual, the document presents best management practices (BMPs) in use at concentrated aquatic animal facilities. The guidance manual presents general BMPs that can be applied throughout the industry and BMPs that apply to specific sectors of the industry. (DCN 61553)

How To Obtain Supporting Documents

All documents are available from the National Service Center for Environmental Publications, P.O. Box 42419, Cincinnati, OH 45242-2419, (800) 490-9198 and the EPA Water Resource Center. The supporting technical documentation (e.g., CAAP Development Document, Economic Analysis and AAP Technical Guidance

Manual) can be obtained on the Internet, located at <http://www.epa.gov/ost/guide/aquaculture/>. This website is also linked to an electronic version of today's proposed rule.

Overview

The preamble describes the legal authority for the proposal, background information, the technical and economic methodologies used by the Agency to develop these proposed regulations and, in an appendix, the definitions, acronyms, and abbreviations used in this document. This preamble also solicits comment and data generally, and on specific areas of interest.

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I. Legal Authority

These regulations are proposed under the authority of sections 301, 304, 306, 308, 402, and 501 of the Clean Water Act, 33 U.S.C. 1311, 1314, 1316, 1318, 1342, and 1361.

II. Background

A. Clean Water Act

Congress passed the Federal Water Pollution Control Act (1972), also known as the Clean Water Act (CWA), to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." (33 U.S.C. 1251(a)).

The CWA establishes a comprehensive program for protecting our nation's waters. Among its core provisions, the CWA prohibits the discharge of pollutants from a point source to waters of the U.S. except as authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The CWA also requires EPA to establish national technology based effluent limitation guidelines and standards (effluent guidelines or ELG) for discharges from different categories of point sources, such as industrial, commercial and public sources.

Congress recognized that regulating only those sources that discharge effluent directly into the nation's waters would not be sufficient to achieve the CWA's goals. Consequently, the CWA requires EPA to promulgate nationally applicable pretreatment standards that restrict pollutant discharges from facilities that discharge wastewater indirectly through sewers flowing to publicly-owned treatment works (POTWs). See section 307(b) and (c), 33 U.S.C. 1317(b) & (c). National pretreatment standards are established for those pollutants in wastewater from indirect dischargers that may pass through, interfere with or are otherwise incompatible with POTW operations. Generally, pretreatment standards are designed to ensure that wastewaters from direct and indirect industrial dischargers are subject to similar levels of treatment. In addition, POTWs are required to implement local treatment limits applicable to their industrial indirect dischargers to satisfy any local requirements. See 40 CFR 403.5.

Direct dischargers must comply with effluent limitations in National Pollutant Discharge Elimination System (NPDES) permits. Indirect dischargers, who discharge through POTWs, must comply with pretreatment standards. Effluent limitations in NPDES permits are derived from effluent limitations guidelines and new source performance standards promulgated by EPA, as well as from water quality standards. The effluent limitations guidelines and standards are established by regulation for categories of industrial dischargers and are based on the degree of control that can be achieved using various levels of pollution control technology.

EPA promulgates national effluent limitations guidelines and standards of performance for major industrial categories for three classes of pollutants: (1) Conventional pollutants (*i.e.*, total suspended solids, oil and grease, biochemical oxygen demand, fecal coliform, and pH); (2) toxic pollutants (*e.g.*, toxic metals such as chromium, lead, nickel, and zinc; toxic organic

pollutants such as benzene, benzo-a-pyrene, phenol, and naphthalene); and (3) non-conventional pollutants (*e.g.*, ammonia-N, formaldehyde, and phosphorus). EPA considers development of six types of effluent limitations guidelines and standards for each major industrial category, as appropriate.

1. Best Practicable Control Technology Currently Available (BPT)—Section 304(b)(1) of the CWA

EPA may promulgate BPT effluent limits for conventional, toxic, and non-conventional pollutants. For toxic pollutants, EPA typically regulates priority pollutants which consist of a specified list of toxic pollutants. In specifying BPT, EPA looks at a number of factors. EPA first considers the cost of achieving effluent reductions in relation to the effluent reduction benefits. The Agency also considers the age of the equipment and facilities, the processes employed, engineering aspects of the control technologies, any required process changes, non-water quality environmental impacts (including energy requirements), and such other factors as the Administrator deems appropriate. See CWA 304(b)(1)(B). Traditionally, EPA establishes BPT effluent limitations based on the average of the best performances of facilities within the industry, grouped to reflect various ages, sizes, processes, or other common characteristics. If, however, existing performance is uniformly inadequate, EPA may establish limitations based on higher levels of control than currently in place in an industrial category when based on an Agency determination that the technology is available in another category or subcategory, and can be practically applied.

2. Best Control Technology for Conventional Pollutants (BCT)—Section 304(b)(4) of the CWA

The 1977 amendments to the CWA required EPA to identify additional levels of effluent reduction for conventional pollutants associated with BCT technology for discharges from existing industrial point sources. In addition to other factors specified in section 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two part "cost-reasonableness" test. EPA explained its methodology for the development of BCT limitations in July 1986 (51 FR 24974).

Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demand measured over five days (BOD₅), total suspended

solids (TSS), fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (44 FR 44501).

3. Best Available Technology Economically Achievable (BAT)—Section 304(b)(2) of the CWA

In general, BAT effluent limitations guidelines represent the best economically achievable performance of facilities in the industrial subcategory or category. The CWA establishes BAT as a principal national means of controlling the direct discharge of toxic and nonconventional pollutants. The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, and non-water quality environmental impacts including energy requirements, and such other factors as the Administrator deems appropriate. The Agency retains considerable discretion in assigning the weight to be accorded these factors. An additional statutory factor considered in setting BAT is economic achievability. Generally, EPA determines economic achievability on the basis of total costs to the industry and the effect of compliance with BAT limitations on overall industry and subcategory financial conditions. As with BPT, where existing performance is uniformly inadequate, BAT may reflect a higher level of performance than is currently being achieved based on technology transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

4. New Source Performance Standards (NSPS)—Section 306 of the CWA

New Source Performance Standards reflect effluent reductions that are achievable based on the best available demonstrated control technology. New facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the best available demonstrated control technology for all pollutants (that is, conventional, nonconventional, and priority pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements.

5. Pretreatment Standards for Existing Sources (PSES)—Section 307(b) of the CWA

Pretreatment Standards for Existing Sources are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of publicly owned treatment works (POTW). Categorical pretreatment standards are technology-based and are analogous to BAT effluent limitations guidelines.

The General Pretreatment Regulations, which set forth the framework for the implementation of categorical pretreatment standards, are found at 40 CFR part 403. These regulations establish pretreatment standards that apply to all non-domestic dischargers. See 52 FR 1586 (Jan. 14, 1987).

6. Pretreatment Standards for New Sources (PSNS)—Section 307(c) of the CWA

Section 307(c) of the Act requires EPA to promulgate pretreatment standards for new sources at the same time it promulgates new source performance standards. Such pretreatment standards must prevent the discharge of any pollutant into a POTW that may interfere with, pass through, or may otherwise be incompatible with the POTW. EPA promulgates categorical pretreatment standards for existing sources based principally on BAT technology for existing sources. EPA promulgates pretreatment standards for new sources based on best available demonstrated technology for new sources. New indirect dischargers have the opportunity to incorporate into their facilities the best available demonstrated technologies. The Agency considers the same factors in promulgating PSNS as it considers in promulgating NSPS.

B. Section 304(m) Consent Decree

Section 304(m) requires EPA to publish a plan every two years that consists of three elements. First, under section 304(m)(1)(A), EPA is required to establish a schedule for the annual review and revision of existing effluent guidelines in accordance with section 304(b). Section 304(b) applies to effluent limitations guidelines for direct dischargers and requires EPA to revise such regulations as appropriate. Second, under section 304(m)(1)(B), EPA must identify categories of sources discharging toxic or nonconventional pollutants for which EPA has not published BAT effluent limitations guidelines under 304(b)(2) or new

source performance standards under section 306. Finally, under 304(m)(1)(C), EPA must establish a schedule for the promulgation of BAT and NSPS for the categories identified under subparagraph (B) not later than three years after being identified in the 304(m) plan. Section 304(m) does not apply to pretreatment standards for indirect dischargers, which EPA promulgates pursuant to sections 307(b) and 307(c) of the Clean Water Act.

On October 30, 1989, Natural Resources Defense Council, Inc., and Public Citizen, Inc., filed an action against EPA in which they alleged, among other things, that EPA had failed to comply with CWA Section 304(m). Plaintiffs and EPA agreed to a settlement of that action in a consent decree entered on January 31, 1992. The consent decree, which has been modified several times, established a schedule by which EPA is to propose and take final action for four point source categories identified by name in the decree and for eight other point source categories identified only as new or revised rules, numbered 5 through 12. EPA selected the aquatic animal production industry as the subject for New or Revised Rule #12. Under the decree, as modified, the Administrator is required to sign a proposed rule for the aquatic animal production industry no later than August 14, 2002, and to take final action on that proposal no later than June 30, 2004.

III. Rulemaking History and Industry Profile

A. Concentrated Aquatic Animal Production Effluent Guideline Rulemaking History

EPA actions to regulate aquatic animal production facilities under the National Pollutant Discharge Elimination System (NPDES) permitting program date back to 1973, when EPA proposed and promulgated NPDES permit application rules for concentrated aquatic animal production facilities. 38 FR 10960 (May 3, 1973)(proposed), 38 FR 18000 (July 5, 1973). After some litigation over the NPDES regulations, EPA proposed and took final action to re-establish the concentrated aquatic animal production facility requirements. *NRDC v. Costle*, 568 F.2d 1369 (D.C. Cir.1977); 43 FR 37078 (Aug. 21, 1978); 44 FR 32854 (June 7, 1979). The 1979 version of the regulations has not substantively changed since then.

The NPDES regulations specify the applicability of the NPDES permit requirement to a concentrated aquatic animal production facility. 40 CFR

122.24 and appendix C to part 122. To be a concentrated aquatic animal production facility, the facility must either meet the criteria in 40 CFR appendix C or be designated on a case-by-case basis. 40 CFR 122.24(b). A hatchery, fish farm, or other facility is a concentrated aquatic animal production facility if it contains, grows, or holds, aquatic animals in either of two categories: cold water or warm water. The cold water species category includes ponds, raceways, or other similar structures which discharge at least 30 days per year but does not include: Facilities which produce less than 9,090 harvest weight kilograms (approximately 20,000 pounds) per year; and facilities which feed less than 2,272 kilograms (approximately 5,000 pounds) during the calendar month of maximum feeding. The warm water category includes ponds, raceways, or other similar structures which discharge at least 30 days per year but does not include: closed ponds which discharge only during periods of excess runoff; or facilities which produce less than 45,454 harvest weight kilograms (approximately 100,000 pounds) per year. 40 CFR part 122, appendix C. EPA does not propose to revise the NPDES regulation by today's action.

Prior to today's proposal, EPA had not proposed effluent limitations guidelines and standards for the aquatic animal production industry. In the early 1970s, however, EPA staff did evaluate fish hatcheries and fish farms to develop recommendations on whether EPA should propose effluent guidelines. Ultimately, EPA did not propose any such regulations because the 1977 Clean Water Act amendments re-focused the Agency's attention on establishing effluent limitations guidelines for industry sectors with effluents containing toxic metals and organics. EPA's evaluation of fish hatcheries and fish farms did not reveal significant contributions of toxic metals or organic chemical compounds in the wastes discharged from those hatcheries and farms. That draft development document, however, did serve to assist NPDES permit writers in the exercise of their "best professional judgment" to develop permits for those fish hatcheries and fish farms that were considered "concentrated aquatic animal production facilities," and thus required to apply for NPDES permits under EPA regulations.

B. Environmental and Human Health Impacts

The operation of CAAP facilities may introduce a variety of pollutants into receiving waters. Under some

conditions, these pollutants can be harmful to the environment. According to the 1998 USDA Census of Aquaculture (USDA, 2000, DCN 60605), there are approximately 4,200 commercial aquatic animal production (AAP) facilities in the United States. Aquaculture has been among the fastest-growing sectors of agriculture until a recent slowdown that began several years ago caused by declining or level growth among producers of several major species. EPA analysis indicates that many CAAP facilities have treatment technologies in place that greatly reduce pollutant loads. However, in the absence of treatment, pollutant loads from individual CAAP facilities such as those covered by today's proposed rule can contribute up to several thousand pounds of nitrogen and phosphorus per year, and tens to hundreds of thousands of pounds of TSS per year (see CAAP Economic Analysis). These pollutants, if discharged, can contribute to eutrophication and other aquatic ecosystem responses to excess nutrient loads and BOD effects. In recent years, Illinois, Louisiana, North Carolina, New Hampshire, New Mexico, Ohio and Virginia have cited the AAP industry as a potential or contributing source of impairment to water bodies (EPA, 2000, DCN 40319). State authorities in Idaho, Michigan, and Maine, for example, have set water quality based permit requirements for CAAP facilities in addition to technology based limits based on BPJ.

Another area of potential concern relates to non-native species introductions from CAAP facilities, which may pose risks to native fishery resources and wild native aquatic species from the establishment of escaped individuals (Carlton, 2001, DCN 61434; Volpe *et al.*, 2000, DCN 60611). Some CAAP facilities may also employ drugs, such as formalin, and chemicals, such as a variety of copper-containing pesticides, that may be released into receiving waters. For some applications of these drugs and chemicals, there is a belief that further information is needed to fully evaluate risks to ecosystems and human health associated with their use in some situations. Finally, CAAP facilities also may inadvertently introduce pathogens into receiving waters, with potential impacts on native biota. Today's proposed rule attempts to address a number of these environmental concerns.

C. Industry Profile

The concentrated aquatic animal production industry includes sites that

fall within the North American Industry Classification System (NAICS) codes 112511 (finfish farming and fish hatcheries), 112512 (shellfish farming), 112519 (other animal aquaculture), and part of 712130 (aquariums, part of zoos and botanical gardens). SBA sets up standards to define whether an entity is small and eligible for Government programs and preferences reserved for "small business" concerns. Size standards have been established for types of economic activity, or industry, generally under the NAICS. See 13 CFR part 121 for more detailed information. The first three groups (NAICS 112511, 112512, and 112519) have Small Business Administration (SBA) annual revenue based size standards of \$0.75 million while the SBA size standard for NAICS 712130 is \$6.0 million. EPA uses these SBA size standards to conduct preliminary analyses to determine the number of small businesses in an industrial category and whether the proposed rule would have a significant impact on a substantial number of small entities.

USDA reports that there were approximately 4,200 commercial aquaculture facilities in the 1998 Census of Aquaculture (DCN 60605). Based on revenues from aquaculture sales alone (not including other farm-related revenues from other agricultural crops at the facility), more than 90 percent of the facilities have revenues less than \$0.75 million annually and thus may be considered small businesses. The Small Business Administration's size standard is based on annual revenue at the company level for all products, so using facility revenue from aquaculture sales reported in the 1998 Census of Aquaculture is likely to over-estimate the proportion of small businesses in the industry. Although aquaculture facilities exist in every State, there tends to be regional specialization by species as a result of local climate and the quality and quantity of water available for aquaculture (for example, catfish in the Southeast, salmon on the Northern coasts, and trout in Idaho).

In 1999, commercial farm level aquatic animal sales totaled nearly \$1 billion (842 million pounds). The range of products includes: Finfish raised for food and recreation (including food fish, sport or game fish, baitfish, or ornamental fish); crustaceans and molluscs raised for food; and other aquatic animals such as alligators, frogs, and turtles. Catfish and trout sales account for nearly fifty percent of the commercial market (>\$400 million and \$64 million in production, respectively).

The industry includes several types of ownership structures: (1) Commercial;

(2) Federal and State; (3) Tribal; (4) academic and research; and (5) nonprofit. Within the private or commercial sector, ownership structures range from small family farms to large multinational firms. The non-commercial sector is also diverse. The U.S. Fish and Wildlife Service (FWS) operates 66 Federal hatcheries, six Fish Technology Centers, and nine Fish Health Centers. Its goals are to conserve, restore, enhance, and manage the Nation's fishery resources and ecosystems for the benefit of future generations. FWS distributes more than 50 aquatic species primarily to Federal, Tribal, State, and local governments. Many States operate fish hatcheries for stocking recreational fisheries, and EPA identified approximately 500 State hatchery facilities.

As an approximate measure of the size of the governmental aquatic animal production, fish distributions from the FWS in 1999 totaled 5.5 million pounds. *Fisheries* magazine published an overview of State coldwater fishery programs that listed 23.7 million pounds of trout and salmon distributed from State hatcheries in 1996 (Epifanio, 2000, DCN 60851). EPA estimate that production from 17 Tribal programs is more than 1.3 million fish.

EPA identified approximately 30 academic and research institutions that maintain facilities ranging from small research projects to full-scale systems for training the next generation of aquatic animal producers. Information on the magnitude of these operations nationwide is currently being sought by EPA through a detailed industry survey.

Nonprofit organizations in the CAAP industry that were identified by EPA include Alaskan salmon hatcheries and non-taxable aquariums. Alaskan salmon hatcheries are different from salmon and finfish production facilities in the continental United States. Certain types of production activities related to the farming of salmon and other finfish in Alaska were outlawed in 1990 (ADFG, 2002, DCN 61556). Instead, Alaska permits nonprofit "ocean ranching", where native salmon species are reared from egg to fingerling (chum and pink salmon) or smolt (coho, chinook, or sockeye salmon) stage in hatcheries. The chum and pink salmon produced in the hatchery are then placed in pens in the ocean waters, and after a short additional growing period (approximately two months), are released into public waters to be available as adults for harvest by fishermen. Two types of nonprofit organizations exist—four regional aquaculture associations and eight private nonprofit corporations—with a

total permitted production of approximately 2 billion smolts for ocean release. EPA identified approximately 50 aquariums, some of which are non-taxable establishments.

Aquatic animals raised for commercial purposes are very diverse, ranging from species produced for human consumption as food to species raised for their hides. As mentioned above, governments also produce aquatic animals, usually for recreational purposes. The animals may be raised in a variety of different production systems. The choice of a production system is influenced by a variety of factors including species, economics of production, markets, local water resources, land availability, and operator preference. Some production systems, especially those needed to produce species intended for release into the wild or other natural environments, are intended to provide a suitable environment that imitates the natural environment of the species. CAAP systems include ponds, flow-through systems, recirculating systems and open water systems. Each of these production systems is described below.

1. Pond Systems

Pond systems are distinguished from other systems used to produce aquatic animals by the frequency of discharge. Typically, ponds do not have a continuous discharge. They will discharge water either as a result of a storm event or when the pond is drained for harvest or to make repairs. Aquatic animals produced in ponds include: catfish, shrimp, hybrid striped bass, tilapia, crawfish, baitfish and many ornamental and sport fish species. The largest species sector produced in ponds is catfish.

Many pond producers must pump well water to fill their ponds and are constantly balancing the need to conserve water and reduce pumping costs with keeping ponds full. Most aquatic animal producers minimize the frequency or degree to which the ponds are drained because the water is a valuable asset. Some species require operators to drain the pond to allow for harvesting, while others can be harvested without draining by using seines (large nets) to capture the fish. Aquatic animals that are more difficult to capture in the seines, may require partial draining of the pond to harvest.

Pond system operators must maintain a level of water quality that will support the aquatic animal population. In most cases, water quality maintenance requires that the pond be mechanically aerated to maintain sufficient oxygen levels. The growth of algae is promoted

by the presence of nutrients made available either through excess feed or animal excretions. Planktonic algae (the desired form of algae) process these nutrients and improve water quality. Too much, or the wrong kinds of, algae can degrade water quality in ponds by contributing to excess turbidity and reduced oxygen levels. Producers monitor the dissolved oxygen and turbidity levels to evaluate pond water quality and protect their animal crops from rapid shifts in oxygen or other important water quality parameters. This monitoring also ensures that the pond is serving as an efficient waste treatment system. The pond system itself has the ability to decompose biological material and settle out solids such as fecal materials, sediment, and uneaten feed. Drugs, such as oxytetracycline (added in feed to treat certain diseases) and chemicals, such as copper sulfate and other aquatic herbicides (used to treat excessive aquatic vegetation or algae), readily bind to sediment and other particles in the pond system. Thus, pond systems are capable of treating and reducing the pollutants in the system. When the ponds are drained, the pollutant loads are likely to have been significantly reduced or contained within the sediment at the bottom of the pond. Draining practices that minimize disturbance of the sediments at the bottom of the pond will ensure that the water quality discharged is relatively high in quality.

While most producers use drainage practices that minimize disturbance of the pond bottom (e.g., catfish, hybrid striped bass, and many sportfish), several species require specific drainage practices that have the potential to discharge higher levels of sediments in order to harvest. For example, shrimp require rapid draining. The shrimp are carried along with the drainage water and captured in external harvest structures. These harvest/draining practices are likely to result in the disturbance of the sediment on the bottom of the pond. To reduce pollutant loads and minimize escapement of the valuable animal crop, the water drained from shrimp ponds is typically routed through some type of sediment control structure (e.g., sedimentation basins, harvest boxes or vegetated ditches) prior to discharge.

Most of the historical research on pond water quality and the various management practices to improve pond effluent quality was conducted in the catfish sector. Catfish production is the largest aquatic animal production sector in the United States, and the dominant species produced in ponds. Over the

past few decades there has been considerable research leading to the improvement of management practices and the reduction of pollutants discharged from catfish ponds. One of the most significant changes has been the reduced drainage frequency in producing food sized catfish. Today, the predominant practice is to drain only to repair or rework the pond banks. Industry representatives indicate that ponds used to grow fish to food size are drained, on average, once every 5 to 7 years. Other practices that are being actively encouraged and promoted include water level management to maximize the capture of rainwater. Water level management minimizes the need for operators to pump well water to refill ponds, especially during the drier summer months, and also minimizes the occurrence of overflows (from precipitation). There are a number of other best management practices (BMPs) that have been or are being developed by various States to reduce pollutant discharges from pond systems. For example, BMPs to reduce the impacts from erosion in and around ponds include erosion control on pond banks through establishment of vegetative cover on all pond banks and rip rap where wave action is especially strong. Pond operators can also reduce erosion by the proper positioning of stationary and emergency aerators to prevent erosion during their operation, closing pond drains as soon as possible after draining, and quickly repairing any damaged areas of berms. Other BMPs include practices to reduce overflow and draining effluent volumes, feed management, proper use and storage of chemicals and therapeutic agents, and planning for emergencies.

Pollutants discharged in overflow from catfish production ponds have been well studied in Mississippi and Alabama. The research shows variation in pollutant concentration by season, with the summer months having the highest levels of pollutants in effluent overflows and discharges. The measured pollutants and seasonal average ranges included settleable solids (0.01–0.2 mg/L), total suspended solids (29–135 mg/L), total nitrogen (1.9–7.0 mg N/L), total ammonia (0.27–2.76 mg N/L), total phosphorus (0.09–0.54 mg P/L) and biochemical oxygen demand (5.3–26.1 mg O₂/L) (Tucker *et al.*, 2002, DCN 61555).

Hybrid striped bass is another species that is often produced in pond systems. The body of knowledge needed for the culture of hybrid striped bass for foodfish production grew from the expanded efforts throughout the southeastern United States to provide

striped bass and hybrid *Morone* species for stocking public reservoirs for recreational fishing and fisheries management. Responses to EPA's screener survey indicates that 77% of striped bass/hybrid striped bass producers use earthen ponds, 17% use recirculating systems, and 6% use flow-through systems.

Ponds used to raise food sized hybrid striped bass must be completely harvested before the pond can be restocked, otherwise the larger fish will feed on the smaller fish. Ponds are drained for harvest either annually or biennially, depending on stocking size. The ponds must be completely drained to ensure that all fish are captured. Some producers use an EPA registered pesticide to kill any remaining fish after harvest. If a pesticide is used, water conservation is the goal and the pond does not need to be drained. The most commonly used pesticide is rotenone, which degrades fairly quickly allowing the pond to be restocked within a short period of time.

Other species that are raised in ponds that must be drained either partially or completely to be harvested include tilapia, baitfish, and sport fish. Tilapia can escape seines or nets by jumping over or swimming under them. Therefore, ponds are partially drained to make it more difficult for the tilapia to escape the nets. Most baitfish are harvested with seines, but ponds must be drained and all fish removed prior to starting a new crop. However, most baitfish producers conserve the water that is drained from a pond by moving it to another pond.

2. Flow-Through Systems

The predominant form of flow-through systems, raceways, are constructed to mimic a stream, with fresh water continuously entering at the top of the system and discharging from the bottom (or downstream end) of the system. Between the top and the bottom of the raceway system are a series of production units, which can be either small ponds or raceways of earthen or concrete material. Smaller, younger fish are typically placed in the units at the top of the system near the water source, which is the highest quality water. As the fish grow they can tolerate lesser quality water and they are moved to downstream units.

Flow-through systems are used to produce species that must have very high quality water. Trout and salmon are two examples of fish that require very high quality water with high dissolved oxygen levels and consistent cold temperatures. The predominant species raised in flow-through systems

is trout. Salmon fry are also raised in flow-through systems until they are moved to a marine environment.

The most significant pollutant discharged from flow-through systems is solids from uneaten feed and feces that settle to the bottom of the raceways. These solids are primarily composed of organic matter including BOD, organic nitrogen and organic phosphorus. Many flow-through systems have barriers in the lower portion of each raceway to create a quiescent zone. The quiescent zone allows the solids to settle and be collected. Restricting the fish from entering the quiescent zone keeps the solids from becoming resuspended. The captured solids are periodically transferred to an off-line settling basin for additional settling. Water is then typically decanted off and recombined with the rest of the water being discharged from the facility. Some facilities have installed additional solids polishing treatment, such as filtration or an additional settling basin. Facilities that do not use quiescent zones may treat the total flow-through a settling basin to remove solids. Older and smaller facilities that have earthen raceways or ponds generally use lower flow rates to prevent scouring and erosion of the production unit, allowing solids to accumulate and decompose by natural processes.

Flow-through facilities typically are fed by wells, springs, or by diverting a portion of a stream. Springs and wells are preferred because they usually provide water that is of consistent temperature, high quality, and free from disease organisms. Free flowing springs also have the advantage of little or no pumping costs. Some flow-through system facilities require source waters to be pretreated to remove substances such as sediment or iron and to add oxygen.

Fish in flow-through systems are fed on a scheduled basis, allowed to self feed by activating a feeding mechanism, or a combination of the two. Dead fish are removed from the raceways on a regular basis to prevent accumulation at the end of the raceway that impedes the flow of water from the facility.

3. Recirculating Systems

Recirculating systems are used to raise fish in a controlled environment. The fish are raised in tanks with continuously flowing water that is recirculated through a water treatment system and returned to the production tanks. The treatment may include mechanical filters to remove solids and biological filters to degrade the BOD and nitrify the ammonia, and oxygenation. Most recirculating systems replace about 10% of the system water volume

daily to make up for evaporation and water supply loss associated with solids filter backwash, and to compensate for inefficiencies in the filtration process. Several facilities reported treating their effluent with primary solids settling and solids polishing filtration.

Because construction requires considerable capital investment, the fish produced in these systems are generally high valued species. Species produced include tilapia, hybrid striped bass, and ornamental fish species. Recirculating systems are well suited to maintaining water temperature and can be built almost anywhere.

4. Net Pen and Open Water Systems

Net pens and open water systems take advantage of an existing water body's circulation to wash away wastes and bring fresh water to the animals. Presently, the most common species raised in open water systems are molluscan shellfish (oysters, clams, and mussels) that are primarily grown on floating rafts or prepared bottoms, and salmon that are grown to market size in net pens. Lobster pounds, found only in Maine, are placed in coves along the shoreline to hold lobsters for favorable markets. There is considerable interest and research being conducted to raise additional species of fish in net pen systems.

In the case of molluscs, producers may plant the animals on the bottom of an intertidal area or suspend them above the bottom in racks or trays or on lines. The molluscs, which are filter feeders, reduce concentrations of nutrients through feeding. Molluscs do excrete wastes, but generally, this has a minimal impact on the environment.

Net pen structures are mostly used to grow finfish to food size and are constructed in rectangular, octagonal or round shapes. Nets are suspended from a floating structure to contain the crop of fish. The mesh size of this net is usually increased as the fish grows to provide more water circulating inside the net. The net pen structures are designed to float at the surface and are constructed with "jump nets" that extend above the water line to prevent the fish from jumping out. There is another net, which surrounds the primary net in the pen to keep predators from reaching the confined fish. The pens are anchored to the sea floor, but are designed to have some movement with the tidal and wave action. These structures are often placed in bays and are sited to benefit from tidal and current action to move wastes away from the pens and bring oxygenated, high quality water to the net pen. Because these systems are placed in

open waters, anything that is added to the system may contribute to pollution. Feed and fish metabolic excretions will contribute solids, BOD and nutrients to the water column. Other potential pollutants include zinc, that is added in trace amounts to the feed as a mineral supplement and copper from an antifouling compound that is used on some of the nets. Pollutant discharges from some net pen operations have been found to cause impacts to the benthic community. Net pen facilities have also been linked to water circulation impacts and changes in the natural flushing around the facility that occurs from decreased tidal action when nets become fouled.

5. Feed, Diseases, and Non-Native Species

Some concerns about certain aspects of producing aquatic animals have arisen. Among these are the feed (because of the nutrient content), diseases and possible ways of treating diseases when they occur through the use of drugs and chemicals, and escapement of non-native species. Each of these is summarized below.

a. **Feed.** Most aquatic animal production requires active feeding of the animals being raised. A few species, such as molluscs, feed from naturally occurring sources. For some species, conditions are created to promote the growth of natural sources of feed (such as fertilizing ponds to stimulate the algae growth as the source of food). This is common practice in the production of baitfish, ornamental, and finfish fingerlings of many species. Commercial feed for the major species produced has undergone substantial improvements in recent years. The feed has been improved both in terms of its nutritional content (allowing for the reduction in some ingredients that are not processed by the fish, such as phosphorus), and its physical properties (a lower density and moisture rate allows the feed to float longer, increasing fish consumption and decreasing the amount of uneaten feed). Open water facilities offer little, if any, opportunity for treatment and removal of pollutants, such as excess feed, prior to discharge, thus feed management is a very important component of pollution control at net pen facilities. Pond facilities represent the other end of the spectrum. Ponds, as described above, act as a waste treatment system and have capacity to absorb pollutants resulting from uneaten feed and feces. Recirculating systems and flow-through systems perform better (i.e., discharge less waste) with the practice of proper feed management. These systems can remove some of the pollutants

associated with uneaten feed, but most flow-through systems do not have the technology to treat excess feed as it breaks down and releases dissolved pollutants. The decomposition of uneaten feed will put a greater demand on the filtration system used by recirculating systems to clean the water as it is being recirculated. Feed is the most expensive production input for most CAAP facilities, so operators have a financial incentive to minimize excess feed, independent of concerns about water quality.

b. **Diseases.** By providing food and oxygen, aquatic animal production facilities can produce fish and other aquatic animals in greater numbers than natural conditions would allow. This means that system management is important to ensure that the animals do not become overly stressed, making them more vulnerable to disease outbreaks. When diseases do occur, facilities may be able to treat diseased aquatic animals with drugs. Operators producing aquatic animals that are being produced for human consumption must comply with requirements established by the Food and Drug Administration (FDA) with respect to the drugs that can be used legally to treat their animals, the dose that can be used, and the withdrawal period that must be achieved before the animals can be processed for consumption. Drugs can be divided into four categories: approved drugs, investigational drugs, extra-label use drugs, and unapproved drugs. Approved drugs have already been screened by the FDA to determine whether they cause significant adverse public health or environmental impacts when used in accordance with label instructions. Currently, there are six approved drugs for selected CAAP species and disease conditions. The currently approved drugs are: (1) Chorionic gonadotropin (Chorulon®) used for spawning, (2) oxytetracycline (Terramycin®) which is an antibiotic, (3) Sulfadimethoxine, ormetoprim (Romet-30®) which is an antibiotic, (4) tricaine methanesulfonate (Finquel® and Tricaine-S) which is an anesthetic, (5) formalin (Formalin-F®, Paracide-F® and PARASITE-S®) used for fungus and parasite treatment, and (6) sulfamerazine which is an antibiotic.

The FDA authorizes use of investigational drugs on a case-by-case basis to allow a way of gathering data for the approval process. 21 U.S.C. 360b(j). Study protocols establish quantities and conditions of use. NPDES permits sometimes have required reporting of the use of drugs and chemicals. To EPA's knowledge, very few permits have established limitations

on the use of drugs and chemicals, probably due to their intermittent use and the lack of analytical methods to measure such drugs and chemicals in wastewater matrices. Extra-label drug use is restricted to use of approved animal and human drugs only by the order of a licensed veterinarian, and must be within the context of a valid veterinarian-client-patient relationship. New unapproved animal drugs are sometimes used in discrete cases where the FDA exercises its regulatory discretion.

c. **Non-Native Species.** Many of the aquatic animal species in commercial production are "non-native" to the geographic area of production. These are species that have been brought into the United States from abroad or into a region of the United States where they would not occur naturally. When non-native species are introduced to an area, there may be a potential for these species to become invasive, out-competing and threatening the survival of the native species. There may also be the potential that the introduction of non-native species will introduce diseases against which native populations have no natural defenses. The Department of Interior's Fish and Wildlife Service along with the Department of Commerce's National Marine Fisheries Service oversee the introduction of non-native species into the United States. In addition, many State Departments of Fish and Wildlife have established programs to control the introduction and release of non-native species within their States. The United States, however, has banned the importation of very few non-native species. There are several examples of species becoming established in the wild, in part through aquatic animal production, that some States have defined as non-native to specific areas of the United States (e.g., Atlantic salmon—non-native to the Pacific Northwest, bighead and grass carp, and some ornamental species). It should be noted that aquatic animal production is one of several causes of non-native or invasive species introductions; ballast water, for example, has been associated with non-native or invasive species introductions.

IV. Summary of Data Collection

A. Primary and Secondary Sources of Data and Information

The Agency evaluated the following databases to locate data and information to support regulatory development: the Agency's PCS database, the Aquatic Sciences and Fisheries Abstracts database, the USDA's AGRICOLA

database, the 1998 USDA Census of Aquaculture, the SEC's EDGAR Database, the Dun & Bradstreet Million Dollar Directory, and the Hoover's database. In addition, the Agency conducted a thorough collection and review of secondary sources, which include data, reports, and analyses published by government agencies; reports and analyses published by the aquatic animal production industry and its associated organizations; and publicly available financial information compiled by both government and private organizations.

EPA used all of the documents cited above in developing the industry profile, a survey sampling frame, and for stratifying the survey sampling frame. In addition to these publications, EPA examined many other documents that provided useful overviews and analysis of the aquatic animal production industry. EPA also conducted general Internet searches by company name.

B. Industry Surveys

EPA developed a survey questionnaire because the existing primary and secondary sources of information available to EPA did not contain the information necessary to fully evaluate regulatory options. In particular, EPA evaluates facility/site specific technical and economic information to evaluate the costs and benefits of regulation. EPA made every reasonable attempt to ensure that the AAP industry Information Collection Request (ICR) did not request data and information currently available through less burdensome mechanisms. Prior to publishing a notice in the Federal Register on September 14, 2000 (65 FR 55522), EPA met with and distributed draft copies of the survey questionnaires to the Joint Subcommittee on Aquaculture's Aquaculture Effluents Task Force (JSA/AETF), which includes representatives from various government agencies, industry and trade associations, academia, and other interested stakeholders.

On September 14, 2000, EPA announced its intent to submit the Aquatic Animal Production Industry Survey Information Collection Request (ICR) to OMB (65 FR 55522). The September 14, 2000 notice requested comment on the draft ICR and the survey questionnaire. EPA received 44 sets of comments during the 60 day public comment period. Commenters on the ICR included: National Oceanic and Atmospheric Administration, U.S. Trout Farmers Association, American Farm Bureau Federation, North Carolina State University, Louisiana Rice Growers Association, Michigan Department of

Natural Resources, Mississippi Farm Bureau Federation, Idaho Farm Bureau Federation, and the Freshwater Institute. EPA made significant revisions to the survey methodology and questionnaires as a result of these public comments. Based on the comments, EPA revised the questionnaire and divided it into two survey versions. The first version is the screener survey (short version) and the second version is the detailed survey (the longer version). The two primary reasons for the Agency splitting the survey were: (1) Comments to the effect that the Agency would not know how much emphasis to place on rarely occurring facility types without a census and (2) the need to target specific types of aquatic animal production facilities that could not be identified using information obtained from the databases available to the Agency at that time. After evaluating the comments received on the September 14, 2000 notice, EPA drafted a revised detailed survey, which was sent to the JSA/AETF for review and comment. EPA worked with the JSA/AETF via conference call and written comments to further refine the detailed survey. EPA also conducted two conference calls with the economic technical subgroup of the JSA/AETF to discuss the economic and financial questions in the survey. To the extent possible, EPA incorporated comments and suggestions from these reviews into the survey.

EPA published a second notice in the **Federal Register** on June 8, 2001 (66 FR 30902), announcing the Agency's intent to submit another, revised aquatic animal production industry Survey Information Collection Request (ICR) to OMB. The June 8, 2001, notice requested comment on the draft ICR supporting statement, the short screener survey and the detailed survey questionnaire. EPA received 9 sets of comments during the 30 day public comment period. Commenters on the ICR included: North Carolina Department of Agriculture and Consumer Services, Ohio Aquaculture Association, Catfish Farmers of America, National Aquaculture Association, National Association of State Aquaculture Coordinators, U.S. Trout Farmers Association, American Farm Bureau Federation, and Florida Department of Agriculture and Consumer Services. EPA obtained approval from OMB for the use and distribution of the short screener survey on August 1, 2001 (66 FR 64817). EPA obtained approval from OMB for the use and distribution of the detailed survey on November 28, 2001 (67 FR 6519).

1. Description of the Surveys

In August 2001, EPA mailed a short screener survey, entitled "Screener Questionnaire for the Aquatic Animal Production Industry" to approximately 6,000 potential Aquatic Animal Production facilities. A copy of the screener is included in the record (USEPA, 2001, DCN 10001). The screener survey consisted of eleven questions to solicit general facility information, including confirmation that the facility was engaged in aquatic animal production, species and size category produced, type of production system, wastewater disposal method, and the total production at the facility in the year 2000. EPA used the information collected from the screener survey to describe industry operations and wastewater disposal practices. EPA also used the responses to the facility production question to classify whether or not each facility is "small" according to the Small Business Administration regulations at 13 CFR part 121.

EPA designed the second survey to collect detailed site-specific technical and financial information. A copy of the detailed survey is included in the record (USEPA, 2002e, DCN 10002). The detailed survey is divided into three parts. The first two parts collect general facility, technical, and cost data. The first set of questions in part A request general facility site information, including facility contact information, facility size, and NPDES permit information. The general facility information questions also ask the facility to identify species and production type and confirm that, in fact, it is engaged in aquatic animal production. The second set of questions in part A focused on system descriptions and wastewater control technologies.

The wastewater control technology section is divided into six parts, one part for each type of production system (pond, flow-through, recirculating, net pens and cages, floating aquaculture and bottom culture, and other systems). The individual system sections have been tailored with specific questions and responses. Each of these sections asks the respondent to describe (1) the system, (2) water use, (3) pollutant control practices, and (4) discharge characteristics.

The second part of the survey asks the respondent for facility cost information. The cost information is intended to provide EPA with a complete description of all cost elements associated with the pollution control practices and technologies used at the facility. Separate tables show the details

of capital and annual operating costs. The cost section also evaluates the current discharge monitoring practices, product losses, and feed information.

The third part of the detailed survey elicits site-specific financial and economic data. EPA intends to use this information to characterize the economic status of the industry and to estimate potential economic impacts of wastewater regulations. The survey requests financial and economic information for the fiscal years ending 1999, 2000 and 2001—the most recent years for which data are available.

The Agency intends to use this information to refine the regulation proposed today. The Agency also would use data that identifies treatment technologies in place to determine the feasibility of regulatory options, and to refine its estimates of compliance costs, pollutant loading and load reductions associated with the technology-based options, and potential environmental impacts associated with the regulatory options EPA considers for final rulemaking. The data gathered through this survey and any revisions to the proposed regulation that may result from this additional data would subsequently be published in a notice in the Federal Register to provide the public an opportunity to comment on this data.

2. Development of Survey Mailing List

The mailing list (sample frame) for EPA's screener survey was developed by synthesizing facility information found in the Dunn and Bradstreet database, EPA's Permit Compliance System (PCS), contacts with EPA regional permit writers, EPA site visits, State aquaculture contacts, assistance from the Bureau of Indian Affairs on tribal facilities, universities, recent issues of *Aquaculture Magazine*, and an extensive collection of Web sites with aquaculture references. The mailing list EPA developed contained approximately 6,000 facilities. This number seemed to compare favorably with the roughly 4,000 commercial facilities found in the 1998 Census of Aquaculture and the additional Federal, State, Tribal, research, and non-profit facilities not found in the 1998 Census of Aquaculture (USDA, 2000, DCN 60605). EPA believes that this mailing population was as current as possible and reasonably complete.

3. Response to the Screener Survey

EPA sent the screener survey to all 6,000 facilities on its mailing list. EPA received responses from 4,900 facilities, with about 2,300 facilities reporting that they do produce aquatic animals. The

discrepancy between the number of surveys sent and the number of facilities reporting that they are aquatic animal producers is largely attributed to the fact that the list was compiled from general industry sources and included aquatic animal processors, retailers, etc.

As described in Section V, EPA is proposing to establish effluent limitations guideline regulations for various segments of the concentrated aquatic animal production sector, thus, the Agency sent the detailed survey to a sample of 263 facilities. EPA used the results of the screener survey to ensure that the facilities that received the detailed questionnaire, in fact, produce aquatic animals and that a high percentage are conducting operations that would be included in the scope of today's proposal.

4. Sample Selection for the Detailed Survey

Respondents to the detailed questionnaire were selected at random from within groups (stratified random selection) that were identified using results of the screener survey. The sample and the questionnaires described above are expected to provide EPA with the additional information that will be used to re-estimate the costs and benefits associated with the proposed regulatory options. These results along with results from any additional evaluations based on comments on the proposal will be published in the Notice of Data Availability (NODA) prior to final action.

C. Site Visits and Wastewater Sampling

During 2000 and 2001, EPA conducted site visits at more than 70 AAP facilities. EPA conducted some of these site visits as part of AAP conferences that EPA attended to better understand the industry. The purposes of these site visits were: (1) To collect information on aquatic animal operations; (2) to collect information on the generation of wastewater and waste management practices used by the AAP facilities; and (3) to evaluate each such facility as a candidate for multi-day sampling.

In selecting candidates for site visits, EPA attempted to identify facilities that were representative of various CAAP operations, as well as both direct and indirect dischargers. EPA specifically considered the type of aquatic animal production operation (production method and species produced), geographical region, age of the facility, size of facility (in terms of production), wastewater treatment processes employed, and best management

practices/pollution prevention techniques used. EPA also solicited recommendations for good-performing facilities (e.g., facilities with advanced wastewater treatment practices) from EPA Regional offices, State agencies, and members of the JSA/AETF. The site-specific selection criteria are discussed in site visit reports prepared for each site visited by EPA (DCN 30987–30998 and 61615–61652) and summarized in the CAAP Development Document. The sites visited reflect a cross section of the industry that is fairly complete and proportionally representative of the industry.

During each site visit, EPA collected information on the facility and its operations, including: (1) General production data and information; (2) the types of aquatic animal production wastewaters generated and treated on-site; (3) water source and use; (4) wastewater treatment and disposal operations. EPA used the site visit reports to prepare multi-day sampling and analysis plans (SAPs) for each facility that would undergo multi-day sampling. For those facilities selected for sampling episodes, EPA also collected information on potential sampling locations for wastewater (raw influent, within the treatment system, and final effluent); and other information necessary for developing a sampling plan for possible multi-day sampling episodes.

Based on data collected from the site visits, EPA selected three facilities for multi-day sampling (two flow-through systems and one recirculating system). The purpose of the multi-day sampling was to characterize pollutants in raw wastewaters prior to treatment as well as document wastewater treatment performance (including selected unit processes). Selection of facilities for multi-day sampling was based on an analysis of information collected during the site visits as well as the following criteria: (1) The facility activities and operations were representative of CAAP facilities and (2) the facility utilized in-process treatment and/or end-of-pipe treatment practices that EPA was considering for technology option selection.

The Agency collected the following types of information during each sampling episode: (1) Dates and times of sample collection; (2) flow data corresponding to each sample; (3) production data corresponding to each sample; (4) design and operating parameters for source reduction, recycling, and treatment; technologies characterized during sampling; (5) information about site operations that had changed since the site visit or that

were not included in the site visit report; and (6) temperature, pH, and dissolved oxygen (DO) of the sampled waste streams.

During each multi-day sampling episode, EPA sampled facility influent and effluent wastestreams over a 5-day period. Samples also were collected at intermediate points throughout the wastewater treatment system to assess the performance of individual treatment units. Samples were obtained using a combination of composite and grab samples, depending upon the pollutant parameter to be analyzed. EPA selected the duration for sampling the composites to reflect feeding and non-feeding conditions at the facilities and to minimize risk to sampling personnel. The composite time frames ranged from 12 hours to 24 hours. EPA had the samples analyzed for a variety of conventional (BOD, TSS, oil and grease, and pH), nonconventional (nutrients, microbiological, drugs and chemicals), and toxic (metals and organic compounds) pollutants. When possible for a given parameter, EPA collected 24-hour composite samples in order to capture the variability in the waste streams generated throughout the day (e.g., production wastewater during feeding and non-feeding periods.)

Data collected from the sampling episodes contributed to characterization of the industry, development of the list of pollutants of concern, and development of raw wastewater characteristics. EPA used the data collected from the influent, intermediate, and effluent points to analyze the efficacy of treatment at the facilities, and to develop current discharge concentrations, loadings, and the treatment technology options for the Concentrated Aquatic Animal Production industry. EPA used effluent data to calculate the long-term averages (LTAs) and limitations for each of the proposed regulatory options. EPA intends to use industry-provided data from the CAAP detailed survey and other sources to complement the sampling data for these calculations in final rulemaking. During each sampling episode, EPA collected flow rate data corresponding to each sample collected and production information from each associated production system for use in calculating pollutant loadings. EPA has included in the public record all information collected for which a facility has not asserted a claim of Confidential Business Information (CBI) or which would indirectly reveal information claimed to be CBI.

After conducting the sampling episodes, EPA prepared sampling episode reports for each facility and

included descriptions of the wastewater treatment processes, sampling procedures, and analytical results. EPA documented all data collected during sampling episodes in the sampling episode report for each sampled site. Non-confidential business information from these reports is available in the public record for this proposal. For detailed information on sampling and preservation procedures, analytical methods, and quality assurance/quality control procedures see the Quality Assurance Project Plan (QAPP) (DCN 61558) and SAPs (DCN 61557, DCN 61710, and DCN 61711) for today's proposed rule.

D. Pollutants Sampled and Analytical Methods

The Agency collected, preserved, and transported all samples according to EPA protocols as specified in the AAP QAPP.

EPA collected composite samples for most parameters because the Agency expected the wastewater composition to vary over the course of a day. The Agency collected grab samples from unit operations for oil and grease and microbiologicals (e.g., total and fecal coliform, fecal streptococcus, *Aeromonas*, *Mycobacterium marinum*, *E. coli*, and *Enterococcus faecium*). Composite samples were collected either manually or by using an automated sampler. Individual aliquots for the composite samples were collected at a minimum of once every four hours over each 12-hour period. Oil and grease samples were collected two or three times per composite time frame and microbiologicals were collected once a day.

Table IV.D-1 lists the parameters sampled at the majority of the facilities, some of which have not been identified as pollutants of concern.

TABLE IV.D-1: CAAP SAMPLED PARAMETERS

Settleable Solids	Oil and grease
pH	Sulfate
Biochemical oxygen demand (BOD ⁵)	Metals (e.g., arsenic, chromium, copper, mercury, zinc)
Chemical oxygen demand (COD)	Volatile Organics
Total organic carbon (TOC)	Semivolatile Organics
Total suspended solids (TSS)	Total coliform
Total dissolved solids (TDS)	Fecal coliform
Total volatile solids (TVS)	<i>Escherichia coli</i>
Chloride	Fecal streptococci
Total Chlorine	<i>Aeromonas</i>
Ammonia as nitrogen	

TABLE IV.D-1: CAAP SAMPLED PARAMETERS—Continued

Nitrate/nitrite	<i>Mycobacterium marinum</i>
Total Kjeldahl nitrogen (TKN)	<i>Enterococcus faecium</i>
Total phosphorus (TP)	Oxytetracycline
Total dissolved phosphorus (TDP)	Toxicity:
Orthophosphate	Fathead Minnow, <i>Pimephales promelas</i>
Temperature	Cladoceran, <i>Ceriodaphnia dubia</i>
Dissolved Oxygen	Green Alga, <i>Selenastrum capricornatum</i>
Turbidity	
Conductivity	
Salinity	

All wastewater sample analyses, except for the field measurements of temperature, turbidity, conductivity, salinity, total chlorine, dissolved oxygen, settleable solids, and pH were completed by EPA contract laboratories. EPA collected field measurements of temperature, dissolved oxygen, and pH at the sampling site. The analytical chemistry methods used, as well as the sample volume requirements, detection limits, and holding times, were consistent with the laboratory's quality assurance and quality control plan. Laboratories contracted for CAAP sample analysis followed EPA approved analysis methods for all parameters except some microbials and drugs (i.e., oxytetracycline) for which no current EPA approved method has been formally developed. The protocols used to measure those pollutants are available in the docket to today's proposal.

The EPA contract laboratories reported data on their standard report sheet and submitted them to EPA's sample control center (SCC). The SCC reviewed the report sheets for completeness and reasonableness. EPA reviewed all reports from the laboratory to verify that the data were consistent with requirements, reported in the proper units, and complied with the applicable protocol.

E. Other Data Collection

EPA conducted a number of other data collection efforts to supplement information gathered through the survey process, facility sampling activities, site visits, meetings with industry experts, the general public, and government funded studies. The main purpose of these other data collection efforts was to obtain information on documented environmental impacts of aquatic animal production facilities, additional

data on aquatic animal production waste characteristics, pollution prevention practices, wastewater treatment technology innovation, and facility management practices. These other data collection activities included a literature search, a review of current NPDES permits, and a review of NPDES Discharge Monitoring Reports.

1. Literature Search on Environmental Impacts

EPA conducted a literature search to obtain information on various aspects of the aquatic animal production industry, including pollutants causing environmental impacts, water quality and ecological impacts from these pollutants, non-native species impacts, and other potential impacts. EPA performed extensive Internet and library searches for applicable information. EPA has included a summary of the case studies in the public docket (DCN) associated with today's proposal and in Chapter 9 of the CAAP Economic Analysis (DCN 20141). The primary sources for the case studies include technical journal articles, newspaper articles, industry experts, and government contacts for aquaculture.

EPA also conducted a separate literature search for case studies that characterize the AAP industry, or more specifically the typical effluents associated with different production system types and species. The primary sources for the case studies were technical journal articles.

2. Current NPDES Permits

EPA extracted information from the Agency's Permit Compliance System (PCS) to identify concentrated aquatic animal production industry point source dischargers with NPDES permits. This initial extraction was performed by searching the PCS using reported Standard Industrial Classification (SIC) codes used to describe the primary activities occurring at the site.

Specifically, EPA used the following SIC Codes: 0273 Animal Aquaculture and 0921 Fish Hatcheries and Preserves.

EPA identified a total of 1,174 concentrated aquatic animal production facilities in the PCS database which does not include the number identified in the screener. Some of these facilities may have permits, but are not in the PCS database. Based on the NPDES permits found in the PCS database, EPA estimates that 377 facilities have active permits (*i.e.*, facilities that are still in business and are required to be permitted).

EPA selected a sample from this universe of dischargers. The Agency then reviewed NPDES permits and

permit applications to obtain information on facility type, production methods and systems, species produced, and effluent treatment practices for each of the aquatic animal production sectors. EPA used this information as part of its initial screening process to identify the universe of AAP facilities that would be covered under the proposal. In addition, this information was used to better define the scope of the information collection requests and to supplement other information collected on waste management practices in the industry. EPA will continue to refine its estimates of direct dischargers to further incorporate information from the PCS database.

3. Discharge Monitoring Reports

The Agency collected long-term effluent data from facility Discharge Monitoring Reports (DMRs) to supplement the PCS database in an effort to perform a check on the achievability of today's proposed requirements. DMRs summarize the quality and volume of wastewater discharged from a facility under a NPDES permit. DMRs are critical for monitoring compliance with NPDES permit provisions and for generating national trends on Clean Water Act compliance. DMRs may be submitted monthly, quarterly, or annually depending on the requirements of the NPDES permit.

EPA extracted discharge data and permit limits from these DMRs to help identify regulated pollutants and to identify better performing facilities. EPA was able to collect DMR information on a total of 157 facilities. Of those 157 facilities, EPA was able to identify 57 flow-through and 2 recirculating systems for which basic facility characteristics are available. EPA does not have sufficient information on the facility characteristics for the remaining 98 facilities. EPA collected 38,096 data points on 126 separate pollutant parameters (including nitrogen, phosphorus, solids, flow, chemicals such as formalin, diquat, and copper).

Indirect dischargers file compliance monitoring reports with their control authority (*e.g.*, POTW) at least twice per year as required under the General Pretreatment Standards (40 CFR 403) while direct dischargers file discharge monitoring reports with their permitting authority at least once per year. EPA did not collect compliance monitoring reports for CAAP facilities that are indirect dischargers because: (1) A vast majority of CAAP indirect dischargers add only small volumes of wastewater to POTWs and typically do not discharge toxic compounds and (2) this

information is less centralized and much harder to collect.

F. Summary of Public Participation

EPA encouraged the participation of all interested parties throughout the development of the proposed aquatic animal production effluent limitations guidelines and standards. EPA conducted outreach to the major trade associations via the JSA/AETF (participants include producers, trade associations, academics, federal and state agencies and environmental organizations). EPA also participated in several JSA/AETF meetings and gave presentations on the status of the regulation development. EPA also met with environmental groups, including the Natural Resources Defense Council, concerning this proposal.

In the development of the surveys, which were used to gather facility specific information on this industry, EPA consulted with the various JSA/AETF technical subgroups to ensure that the information being requested was asked for in such a way as to be understandable and that it would be available in the form requested.

EPA also met with representatives from USDA, FDA, National Marine Fisheries Service (NMFS) of Department of Commerce and United States Fish and Wildlife Service (USFWS) of Department of Interior to discuss this regulation. EPA met with the Animal and Plant Health Inspection Service (APHIS) of USDA to discuss potential regulations related to aquatic pathogens. EPA met with FDA's Center of Veterinary Medicine to discuss the new drug approval process. EPA met with NMFS and USFWS representatives to discuss non-native species and the regulatory authority various agencies have over non-native species. EPA met with representatives from State and local governments to discuss their concerns with concentrated aquatic animal production facilities and how EPA should evaluate options to regulate discharges from these facilities.

EPA learned about the regulatory framework that some of these agencies operate under. Specifically, EPA's discussion with USFWS focused on intentional and unintentional introductions and what authority USFWS has to control unintentional releases of non-native species. In discussions with FDA, the major concern raised was the use of investigational new animal drugs and extra label use of drugs.

V. Scope/Applicability of Proposed Regulation

EPA solicits comments on various issues regarding applicability of today's proposed national effluent limitations guidelines and standards. The following discussion describes the applicability for three subcategories of concentrated aquatic animal production facilities that would be subject to the regulations proposed today.

A. Facilities To Be Subject to 40 CFR Part 451

EPA is proposing new effluent limitations guidelines and standards for three subcategories of the concentrated aquatic animal production industry: Flow-through systems, recirculating systems, and net pens. EPA does not propose to establish effluent limitations for CAAP facilities in any subcategory that produce cold water species with annual production between 20,000 pounds and 100,000 pounds annually. EPA also does not propose to establish effluent limitations guidelines for floating and bottom culture systems for molluscan shellfish (e.g., mussel rafts) or for ponds, but EPA does invite comment on whether EPA should regulate rapid drain discharges from such ponds. EPA does not propose categorical pretreatment standards for any production subcategory.

B. Facilities Not Subject to 40 CFR Part 451

EPA developed the production rate thresholds based on 1998 Census of Aquaculture data and the AAP screener survey data, which was available prior to proposal. EPA used six production size categories that correspond with the revenue classifications used in the 1998 Census of Aquaculture (i.e., \$1,000–\$24,999; \$25,000–\$49,999; \$50,000–\$99,999; \$100,000–\$499,999; \$500,000–\$1,000,000; and >\$1,000,000) to develop model facilities representing these size ranges for each species evaluated. EPA also used these size ranges to group facility production data reported in the AAP screener surveys. EPA used national average product prices taken from the 1998 Census of Aquaculture to estimate the production (in pounds) for the dominant species that were reported grown in flow-through (e.g., trout, salmon, tilapia) recirculating (e.g., tilapia, hybrid striped bass) and net pen (e.g., salmon) systems. For alligator systems reported in the AAP screener survey, data from industry reports was used to estimate production value and create groupings of the facilities. EPA used these size classification groupings to more accurately estimate costs,

loadings, non-water quality impacts (NWQIs), and economic impacts of the proposed limitations and standards for each of the size classifications within the various species (or aquatic animal types) cultured in this industry. That is, rather than assume one model facility for each of the three regulatory subcategories, EPA used a minimum of 6 model facilities for each facility type (e.g., commercial, government, research) and species size combinations (e.g., fingerlings, stockers, food size) for better accuracy in its analyses (see also CAAP Development Document for further details on how these production based thresholds were developed). EPA applied these size classifications to the AAP screener survey data to derive the model facility characteristics that have been used to support this proposed regulation.

In evaluating the AAP screener survey data related to facility annual production, EPA identified several variables distinguishing various types of facilities. Aquatic animal production facilities varied by type of facility operation (i.e., species and production method) and type of wastewater management (e.g., direct discharger, indirect discharger, no discharge/wastes applied to land on site). EPA identified annual production levels (by mass) at facilities and then identified the corresponding model facility. For the purposes of estimating costs, loads, economic impacts and Non Water Quality Impacts (NWQIs), EPA only considered the data for the model facilities that would meet the definition of a CAAP facility as defined in 40 CFR 122.24 and appendix C to part 122. EPA invites comments on the appropriateness of using this method of estimating production thresholds to characterize concentrated aquatic animal production facilities and to determine applicability of the proposed regulations.

The production-based threshold in today's proposal were based on a determination that the facilities below this threshold would likely experience adverse economic impacts if they were subject to the proposed requirements. EPA made this determination based on the results of the model facility analysis and thus would likely find the regulations not economically achievable. As described above, the model facilities represent specific size ranges (in pounds) derived from annual revenue ranges from the 1998 Census of Aquaculture, using price data. Most of the impacts that EPA identified would adversely affect trout producers below the 94,000 pounds annual threshold. Therefore, the Agency proposes to

establish the applicability threshold for this effluent guideline at 100,000 pounds annually based on the trout model facility. EPA believes it would needlessly complicate the regulation, with little corresponding environmental benefit, to try to establish different applicability thresholds for different species. EPA believes this applicability threshold is reasonable and will minimize the adverse economic impacts that would be imposed by this proposed regulation. See Section IX of this notice for a more detailed discussion of the economic impact analysis. EPA intends to conduct more detailed evaluations of potential thresholds using responses to the detailed survey. Further evaluation may warrant a change in the proposed production-based applicability threshold.

Most smaller CAAP facilities (i.e., those producing below the applicability threshold) are not included within the scope of today's proposal for a number of reasons: (1) Small CAAP facilities, as a group, discharge less than 18% of the total suspended solids (or 1.1 million lbs/year) and less than 18% of the nutrients and BOD (or 1.1 million lbs/year) when compared to all discharges from the entire CAAP industry; (2) EPA determined that only a limited amount of loadings removal would be accomplished by improved treatment at the BPT/BAT level of control; and (3) EPA estimated that the small facilities would experience compliance costs that exceeded 5% of their revenues which is higher than for large facilities. Therefore, EPA is not proposing limitations and standards for discharges from the smallest facilities. Instead, an NPDES permit for such a smaller facility that is defined as a CAAP facility under the NPDES regulations would include limits based on the "best professional judgment" of the permit writer.

As explained above, EPA's proposed applicability is based on the screener data available for this proposal. EPA invites comment on these estimates and conclusions based on modeled data, especially because EPA is aware that many permitted flow-through facilities producing less than 100,000 pounds of cold water species in Idaho, in fact, can achieve similar requirements that EPA is proposing for large facilities. EPA invites comment on the cost-reasonableness of lower cost BMP plans for smaller facilities (e.g., BMP option without numeric limits on TSS). EPA will re-evaluate this size threshold based on new data (i.e., the detailed survey responses) and intends to invite comment on that data in a notice in the **Federal Register**. EPA is also soliciting comment on alternative size thresholds

at different production levels. A supplemental analysis in the record (CAAP Economic Analysis) compares the proposed size categories in terms of costs, pollutant removals, and economic impacts on the affected facilities. EPA specifically is requesting comment on how alternative thresholds might be justified using the factors discussed above (e.g. economic impact, small pollutant loadings, etc.) and/or other relevant factors.

By today's action, EPA also does not propose effluent limitations guidelines and standards for certain species/production system combinations for reasons unrelated to economics, specifically, either because EPA does not believe the species/production system adds more than trivial amounts of pollutants or because no feasible pollutant control technologies are available to reduce pollutant loads in more than *de minimis* amounts. EPA is not proposing regulations for discharges from:

—*Ponds*. The culture of aquatic animals in ponds requires high quality water to sustain and grow the aquatic animal crop. For many aquatic animals raised in ponds, the pond itself serves as a natural biological treatment system to reduce wastes generated by animals in the pond (including excess feed, manure, and dead aquatic animals). The NPDES regulations for warm water concentrated aquatic animal production facilities exclude discharges from "closed ponds which discharge only during periods of excess runoff" and does not apply to facilities that discharge less than 30 days per year. Given these circumstances, and given that overflow pipes in ponds tend to drain passively from the top surface of the pond, discharges due to excess runoff should be of comparatively high water quality. As such, EPA does not propose nationally-applicable effluent guidelines regulations for pond system discharges related to sediment, erosion, nutrients, or feeds. See section VIII for additional discussion on pond systems. EPA invites comment on its proposal not to adopt ELGs for ponds. In addition, EPA specifically invites comments on effluent limitations related to the use of drugs and chemicals in ponds should be considered, BMPs related to escapement of non-native aquatic animal species raised in ponds, and limits to control discharges from the technique of rapid pond drainage used in certain pond production

systems, particularly shrimp, should be considered.

—*Lobster pounds*. Intertidal impoundments are used for live storage of marine crustaceans (e.g., lobsters, crabs, etc.) to keep wild caught animals alive pending sale. EPA is not proposing nationally-applicable effluent limitations regulation at this time for lobster pounds because the Agency has not found any applicable pollutant control technologies to reduce discharges, EPA continues to evaluate BMPs that might apply for these types of facilities (see AAP Technical Guidance Manual). EPA invites comment, however, on whether controls and/or reporting of the use of drugs and chemicals that EPA is proposing for other production systems would be appropriate for intertidal pounds.

—*Crawfish*. Crawfish are typically raised in conjunction with plant crops, as part of a rice, soybean, crawfish crop rotation because crawfish maintain aeration of the growing media. EPA is not proposing nationally-applicable effluent limitations guidelines regulation for discharges associated with crawfish operations because crawfish producers do not add feed, drugs, or chemicals to manage the crawfish operations and because any associated pollutants tend to be assimilated with the soils used to grow plant crops. EPA invites comment on not proposing regulations for discharges associated with production of crawfish.

—*Molluscan shellfish production in open waters*. For large-scale production of molluscs for food, operators typically use bottom culture, bottom anchored racks, or floating (but tethered to the bottom) rafts in open waters. Because such operations do not typically add materials to waters of the United States, and because EPA has not found any generally-applicable pollutant control technologies to reduce any discharge, the Agency is not proposing effluent limitations guidelines and standards for discharges from open water mollusc culture. EPA notes that molluscs are filter feeders and, in some cases, are recommended not only as a food source, but also a pollution control technology in and of themselves. Molluscs remove pollutants from ambient waters via filtration. EPA also is aware that molluscs have been incorporated into polyculture aquatic animal production operations to minimize discharges of pollutants.

EPA invites comment on not proposing regulations for open water molluscan production.

—*Aquariums*. Public aquariums are AAP facilities that display a variety of aquatic animals to the general public and conduct research on many different threatened and endangered aquatic species. EPA has determined, through the AAP screener survey and site visits, that most aquariums are indirect dischargers and if these facilities discharge directly into waters of the U.S., it is only done in emergency situations requiring rapid dewatering of tanks. These systems maintain low stocking densities and very clean, clear water to enhance the visual display of the animals. Discharges from aquariums are likely to be low in TSS and nutrients because of the low stocking densities. Because most of the drugs used to treat stressed or ill animals are injected directly into the animal, EPA believes that discharges of drugs would be minimal. Few chemicals are used and include pH buffers and chemicals used to make artificial sea salt. Based on these preliminary evaluations, EPA proposes no regulation for discharges from these types of operations. EPA is exploring the potential releases of drugs and chemicals and technologies that can and are being used to remove drugs and chemicals through the detailed survey. Pending results from the detailed survey, EPA solicits comments on whether this regulatory approach is appropriate and also requests any data on the use of drugs and chemicals in public aquariums.

—*Alligators*. EPA evaluated screener survey data to determine the scope of the alligator industry and the range of treatment technologies that are currently used. Alligator production facilities range in size from producers with less than 100 animals to some with many thousands of animals. As described through contacts with industry experts (Hochheimer 2002d DCN 61794), alligator production facilities do not discharge effluents from their alligator production systems. Instead, effluents are treated in one or two-stage lagoons and then land applied to crop or forested land. EPA intends to verify this through the collection of detailed survey information. Based on this information EPA believes alligator producers would not meet the definition of a CAAP because they would not exceed minimum threshold of discharging 30 days annually.

—*Alaskan Net Pen Systems*. In Alaska, salmon fry are raised for stocking under an arrangement that does not exist elsewhere in the United States. Non-profit, non-governmental salmon producers raise only native species for the purpose of supplementing natural populations and maintaining Alaska's fishing industry. Producers raise salmon in flow-through systems, which are transferred to net pen systems as they mature. Net pen rearing of salmon in Alaska occurs primarily for pink and chum salmon for two months of the year (mid-March to mid-May). Fish are placed in the pens weighing about 0.4 grams and reared until they reach about 2.0 grams. The industry reports achieving about a 1:1 feed conversion ratio since added feed is supplemented by naturally occurring zooplankton. Once the fish are released into the ocean the nets and pens are fallow until the following year. The Agency is not aware of any drug or chemical use in these non-profit Alaska net pen system operations. For these reasons the Agency proposes to exclude from today's proposed regulation discharges from the net pen phase of operations at non-profit Alaska salmon production based on the current provisions of Alaska law. The Agency solicits comments on any environmental impacts caused by these net pen facilities, in particular the use of drugs or chemicals such as anti-foulants. EPA may consider requiring these facilities to develop and implement BMP plans similar to the plans included in today's proposal for other net pen discharges in order to minimize the potential discharge of solids and other pollutants associated with net pen systems generally. EPA would consider the costs and economic impacts associated with the development and implementation of BMPs and would provide prior notice and opportunity for public comment on any such costs and impacts in a subsequent notice. The Agency solicits comments on this possible approach.

VI. Subcategorization

A. Factors Considered in Developing Proposed Subcategories

The CWA requires EPA, when developing effluent limitations guidelines and pretreatment standards, to consider a number of different factors. For example, when developing limitations that represent the best available technology economically achievable for a particular industry category, EPA must consider, among

other factors, the age of the equipment and facilities in the category, location, manufacturing processes employed, types of treatment technology to reduce effluent discharges, the cost of effluent reductions and non-water quality environmental impacts. See Section 304(b)(2)(B) of the CWA, 33 U.S.C. 1314(b)(2)(B). The statute also authorizes EPA to take into account other factors that the Administrator deems appropriate and requires the BAT model technology chosen by EPA to be economically achievable, which generally involves consideration of both compliance costs and the overall financial condition of the industry. EPA took these factors into account in considering whether to establish subcategories and found that dividing the industry into subcategories leads to better tailored regulatory standards, thereby increasing regulatory predictability and diminishing the need to address variations among facilities through a variance process. See *Weyerhaeuser Co. v. Costle*, 590 F. 2d 1011, 1053 (D.C. Cir. 1978).

EPA used published literature, site visit data, industry screener survey data and EPA sampling data for the subcategorization analysis. Various subcategorization criteria were analyzed for trends in discharge flow rates, pollutant concentrations, and treatability to determine where subcategorization was warranted. Equipment and facility age and facility location were not found to impact wastewater generation or wastewater characteristics; therefore, age and location were not used as a basis for subcategorization. An analysis of non-water quality environmental characteristics (e.g., solid waste and air emission effects) showed that these characteristics also did not constitute a basis for subcategorization (see Section XI).

Facility size (e.g., acreage, number of employees, production rates) directly affects the effluent quality, particularly the quantity of pollutants in the effluent and size was used as a basis for subcategorization because more stringent limitations would not be economically achievable for smaller aquatic animal production facilities (see Section V for definition of "small" and "non-small" facilities for each subcategory). See Section V for a description on how and why EPA established production based thresholds for CAAP facilities.

EPA also identified types of production system (e.g., pond, flow-through system, net pen, etc) as a determinative factor for

subcategorization due to variations in operating practices, quality and quantity of effluent type and discharge frequency. Based on the results of an initial evaluation, EPA determined that using the production system employed at each facility most appropriately subcategorizes the CAAP industry. Additional subdivision was evaluated to better characterize the influence of water management strategies on discharge frequency, volume, and quality.

When subcategorized by production system, the AAP industry consists of six major subcategories: Pond systems, flow-through systems, recirculating systems, net pens and cages, floating aquaculture and bottom culture, and alligator systems. AAP facilities can be characterized by the relative amount of water used to produce a unit of product, the general design of the facility, and the processes used to treat production water. Wastewater flow rates, water usage, and water requirements and characteristics are considered similar within each subcategory.

EPA's analyses indicate that, in most cases, species is not a significant factor in determining differences in production system effluent characteristics. The management practices for a particular species dictate stocking densities, feed types, feeding rates and frequencies, and the overall management strategy. Species, however, does not appear to be a major determinant in the quality or quantity of effluent from the particular type of production system.

The following section describes the proposed Concentrated Aquatic Animal Production industry subcategorization.

B. Proposed Subcategories

In today's notice, EPA proposes new limitations and standards for facilities in the following CAAP subcategories: flow-through systems, recirculating systems, and net pens. EPA developed the proposed limits based on the differences in quality and quantity of discharges from these types of facilities. Flow-through systems tend to have high effluent flows. Some facilities may treat two discharge points: a bulk discharge and a discharge from a settling basin referred to as off-line settling. The solids generated from the production process are collected and treated in the basin through settling. The discharge from the off-line settling basin is small in volume and more concentrated in pollutants such as TSS, BOD, or nutrients. Other facilities opt to treat their entire discharge (full flow settling) which includes the solids generated from the production process. Recirculating

systems have relatively small effluent volumes of treated effluents that are high in TSS, BOD and nutrients. Net pen systems discharge TSS, BOD and nutrients directly to receiving waters. See Section III. EPA chose to further segment the subcategories by facility size (*i.e.* by the amount of aquatic animals produced) because of economic considerations (see Section IX).

VII. Control Technology Options, Costs, Wastewater Characteristics, and Pollutant Reductions

A. Description of Wastewater Treatment Technologies and Management Practices in the CAAP Industry

Most of the wastewater treatment technologies and management practices evaluated as options for AAP facilities are potentially applicable to all of the system subcategory types, including (1) feed management; (2) health management; (3) control of non-native species escapes; (4) drug and chemical use management; (5) water quality monitoring; (6) primary solids settling; (7) disinfection; and (8) additional solids removal. The following is a description of each of these treatment technologies and management practices as they apply to all systems followed by a description of any system-specific practices evaluated. The descriptions of the practices below, however, do not necessarily reflect what EPA proposes to require.

1. Treatment Technologies and Management Practices Considered for All Systems

a. Feed Management. Feed management recognizes the importance of effective, environmentally sound use of feed. All AAP operators should continually evaluate feeding practices to ensure that feed placed in the production unit is consumed. It is important to eliminate excess feeding to reduce the input of solids and nutrients in the production unit. The goal of good feed management is to increase the ability of fish to efficiently convert food to flesh. By observing feeding behavior and noting the presence of excess feed, operators can adjust feeding rates to ensure minimal excess and waste. Use of high quality feed that meets the nutritional requirements of the species being cultured can also help to minimize excess feed. Proper storage and handling can be important for some types of feed in order to reduce the production of small feed particles (or fines) that most animals will not eat. Uniform feeding applications are another tool for achieving effective feed management. Feeding as much of the

rearing unit (*e.g.*, pond, raceway, or tank) surface as possible to ensure that all of the animals have feed available to consume prevents waste and improves the quality of fish production. Because feed is the most expensive production input for most facilities, operators have a strong financial incentive to minimize excess feed.

b. Health Management. As a practice to promote health management, some operators have developed health management plans that include an assessment of the potential animal health problems that may be encountered at a facility and the environmental problems that may result from disease outbreaks. The plan outlines the actions needed to minimize the impacts of disease outbreaks, including the use of drugs and chemicals.

As part of health management practices, AAP facility operators sometimes conduct health screenings by collecting samples of the cultured species and screening for diseases, parasites, and body weight. Health screening allows for the early detection of certain diseases and parasites, which would otherwise not be detected until the outbreak had spread through the cultured population. Most States have disease diagnostic services available to assist in screening aquatic animals and identifying potential problems. Measuring weight allows producers to evaluate general health, determine how well the crop is performing, and constantly update the feeding regimes so that the most efficient feed rates are used. Health screening can also reduce the need for medicated feeds by detecting the disease problems early. However, health screening can be expensive and its effectiveness is highly site- and species-specific. Operators have a strong financial incentive to conduct health screening to the extent that it is cost-effective at their facility.

Mortality of the cultured species in small numbers is a common occurrence in aquaculture systems. Mortality removal is another health management practice that helps prevent the spread of disease and the introduction of excess pollutants into the system. Many of the mortalities float to the surface of the culture water and can be collected by hand or using nets.

c. Control of Non-Native Species Escapes. When culturing non-native species, it is important to control escapes of the cultured animals if there is a potential for adverse impact on wild populations. Where this potential exists, it can be minimized by the preparation of a non-native species escapement plan to address control of escapes. This plan

would include a mechanism to minimize or prevent the potential for escapement. Some examples in existing plans include screens or other barriers over discharge pipes to prevent escapement of aquatic animals, use of double nets in net pen operations, and training of employees to carefully transfer fish when moving or harvesting animals to prevent escapes.

EPA is considering requiring CAAPs to report escapes of non-native species to the permitting authority. With this information, the permitting authority, in coordination with the state agency responsible for fisheries, the U.S. Fish and Wildlife Service (USFWS), and/or the National Marine Fisheries Service (NMFS) would evaluate the potential for the escaped fish to become established and cause ecological harm. Timely notification of any escapes would allow the State, USFWS, or NMFS to take measures to control the spread of the non-natives.

EPA is also considering banning the intentional release of any non-native species with the potential to cause adverse impacts on wild species from CAAPs. EPA is aware of the possibility that non-native species may be intentionally released, especially from net pens, if they are not growing rapidly enough to justify continued feeding. States or USFWS would determine which species the ban would be applied to.

EPA is soliciting comment on the appropriateness and efficacy of a ban on intentional releases, the appropriate entity to define which species the ban should be applied to, and the practicality of reporting requirements for escaped non-native species. EPA is aware of the concern that national ELGs under the CWA may not be an effective mechanism to address non-native species, since many facilities would be outside the scope of the ELGs.

d. Drug and Chemical Use. Facility operators may develop drug and chemical plans that list all of the drugs and chemicals that will be used, the conditions for use, safe handling and storage practices, and actions being taken to minimize their use (*e.g.*, maintaining water quality to minimize stress).

EPA is evaluating whether to include a whole effluent toxicity (WET) test as a screening step for potential adverse environmental effects when a facility uses investigational new animal drugs or an extra label use drug. EPA solicits comment on: (1) The use of WET tests to determine any toxic effects that the addition of drugs could have on the receiving water body, (2) when such a test might be appropriate (*e.g.*, to reflect

how the investigational drug use might otherwise impair local benthos) and (3) choice of test species.

e. Production Unit Water Quality Monitoring. Water quality monitoring of the production unit water helps ensure that conditions are optimal for the species being cultured. Good water quality minimizes stress, which reduces the number of disease outbreaks. Routine monitoring, especially for dissolved oxygen, ammonia, nitrite, alkalinity, pH, and other key parameters will promote the health of the fish. For flow-through and net pen systems, the volume of water that flows through a system on a daily basis is quite large and the quality of the process water changes slowly, if at all. For these systems, once a baseline of water quality is determined, the operator rarely needs to monitor process water quality. Because pond and recirculating systems can have variable water quality, routine monitoring will also help system operators monitor the quality of potential effluent from the system.

f. Primary Solids Control. Solids, which come from feces and uneaten feed, are the largest mass of pollutants generated in CAAP facilities. There are several technologies that can be used for primary solids removal from process waters, in addition to BMPs to control solids generated at CAAP facilities. The general strategy is to combine BMPs with the removal of solids from the bulk waste stream as efficiently as possible and to treat these solids in an environmentally sound way.

Ponds continually process solids by a combination of physical (settling in pond) and biochemical (microbial decomposition of solids) processes. Since high production AAP pond facilities use additional aeration to keep the ponds well mixed and aerated, the processing of solids in ponds results in low organic content solids that accumulate on the pond bottom that can be periodically used to rebuild pond banks. As a result of the long residence times of water and the accumulating solids in a pond system, EPA believes in-pond solids settling to be an effective form of primary solids control.

In flow-through systems, quiescent zones and other in-system solids collection practices help reduce TSS and associated pollutants in the effluent. The water velocities in most flow-through systems are rarely high enough to keep solids entrained in the water column. The swimming action of the cultured fish or the use of baffles to increase tank bottom water velocities, however, tend to keep most of the solids suspended in the effluent of the flow-through system. Quiescent zones are an

effective way to enhance solids settling in flow-through systems, though they do reduce the production capacity of the system.

Because flow-through system animal production capacity is governed by the flow rate of water into the rearing unit and species type and stage of growth, most raceway flow-through systems utilize excess tank volume for installing quiescent zones, which use approximately 10% of the bottom of the raceway as a settling area for solids (Hochheimer, 2002a, DCN 61791). Quiescent zones usually have a wire mesh screen, which extends from the bottom of the raceway to above the maximum water height to prohibit the cultured species from entering the quiescent zone. When the quiescent zones are cleaned, the solids collected in the system are moved to the sedimentation basin for solids holding and dewatering. This is called off-line settling. The goal of sedimentation basins (referred to as off-line settling basins or OLSBs) is to collect and store the solids captured in the quiescent zone. Some facilities use sedimentation basins which are larger than those designed for offline settling for treating all of the flow from the raceway. This is called full flow settling.

EPA believes most flow-through systems collect solids in quiescent zones and remove this concentrated solids stream to a settling basin for further treatment. The water that is decanted off this settling basin at many facilities is commingled with the full flow discharge from the production system to be discharged through a single outfall. EPA is proposing to establish monthly average and daily maximum limits that would apply to the commingled effluent. EPA is also proposing to allow, at the permitting authority's discretion, facilities to comply with the TSS limits through development of a BMP plan designed to meet the limits without having to monitor discharges to demonstrate compliance. EPA solicits comment on this compliance alternative that would allow compliance with a BMP plan designed to minimize sediment discharges that was not explicitly tied to particular numeric limits.

g. Disinfection. Another water treatment technology option is disinfection, which is used to remove most of the pathogens (both aquatic animal and human health) from the effluent stream. Disinfection is a process by which disease-causing organisms are destroyed or rendered inactive. EPA's sampling events found elevated levels of some indicator pathogens in effluents from sedimentation basins and solids

storage facilities. Disinfection was evaluated as a way to reduce the discharge levels of these indicator organisms.

Disinfection is most often accomplished using bactericidal agents. Three commonly used bactericidal agents are chlorine, ozone (O₃), and ultraviolet (UV) radiation (disinfection with UV light). Chlorination, the use of chlorine, is the most commonly used method of disinfection in the United States. Chlorine and ozone function by being added at a concentration that effectively disinfects the discharge stream. UV radiation disinfects by penetrating the cell wall of pathogens with UV light and completely destroying the cell or rendering it unable to reproduce.

h. Additional Solids Removal (Solids Polishing). Solids polishing is the use of a secondary wastewater treatment technology to further reduce solids discharged from flow-through and recirculating systems. Several technologies are available, including microscreen filters and polishing ponds. Microscreen filters are fine mesh filters with automatic backwash that collect solids. Polishing ponds are secondary sedimentation basins used to settle solids from the discharge of the primary sedimentation basin.

Vegetated ditches are another effective means removing solids from effluent. A vegetated ditch is an excavated ditch that serves as a discharge conveyance, treatment, and storage system. The walls of the ditch are excavated at an angle that supports the growth of a dense vegetation layer. The vegetation layer aids in treating the discharge and reduces the susceptibility of the ditch banks and bottom to erosion. The length and width of the ditch are designed to allow for the slowing and temporary storage of the discharge as it flows toward the receiving water body. The vegetation layer increases the ability of the ditch to remove both coarse and fine particulate matter and the associated pollutants, such as BOD, settleable solids, and suspended solids.

Constructed wetland treatment systems also promote solids removal from pond system discharges. These systems consist of shallow pools constructed on non-wetland sites with water at depths of usually less than 2 feet. Constructed wetlands provide substrate for specific emergent vegetation types such as cattail, bulrush, and reeds. Constructed wetlands are designed to treat discharges through physical, chemical, and biological processes. The vegetation causes the discharge to slow and flow in a more

serpentine manner, increasing the likelihood of solids settling. The vegetation also aids in the adsorption of potential pollutants through plant and bacterial uptake, and it increases the oxygen level in the discharge flowing through it. Constructed wetland treatment systems can be designed to provide several different benefits, including treatment of the discharge through biological and chemical processes, temporary storage of discharges, recharge of aquifers, and reduction in discharge volume to receiving water bodies.

2. Specific System Treatment Technologies and Practices

In addition to the technologies and practices evaluated for all system types described in the previous section, EPA considered system specific technologies and practices that will be discussed in this next section apply to pond and net pen systems only because those practices applying to other systems are covered by the items in the previous section.

a. Pond Systems. 1. In-pond treatment (including aeration). The objective of in-pond treatment is to use the natural carrying capacity of earthen ponds to process the solids, nutrients, and other compounds added to the pond water in the form of feed and chemicals for maintaining water quality or animal health. When operated within the limits of their carrying capacity, ponds can remove over 90% of solids, phosphorous, and BOD, and over 70% nitrogen. Mechanical aeration is used to enhance the natural assimilative processes of the pond by raising dissolved oxygen levels and provides mixing of the pond waters. Improving the quality of the water in the pond improves the quality of any discharge leaving the pond.

2. Water management. Water management practices maintain the pond water quality while minimizing pond overflows and drainage discharges. One water management practice is not completely filling the pond to the top. This allows the pond to store extra water during rainfall events without overflowing. By leaving 3–6 inches in reserve, pond operators can capture some or all rainfall. Another water management practice is the infrequent draining of the ponds. This practice reduces the volume of discharge from the pond and minimizes water use. The use of seine nets (where practicable) to harvest ponds instead of draining the ponds for harvest is another practice that improves water quality in the pond. Pond facilities can also improve water quality by

minimizing erosion to reduce the amount of sediment in the water. To minimize erosion, pond operators can use rip rap for pond banks, although this may cause other problems such as interference with feeding and aeration equipment or providing habitat for pests (e.g., snakes). Use of grass and other vegetation also reduces erosion into the pond. Rapid repair of accidental damage to pond banks from emergency aeration equipment or feeding operations will reduce additional erosion. Finally, when possible, pond operators replace deep water overflows, which discharge excess volume from the bottom of the ponds, with surface overflow structures. Waters discharged from the bottom of the pond have higher levels of dissolved nutrients and sediments than waters discharged from the surface.

3. Discharge management. Discharge management practices reduce TSS, in effluents and erosion, that discharges from ponds to surface waters. Several practices can be used to reduce TSS and other pollutants that reach receiving waters during draining and overflow events. Riprap sometimes is placed around discharge points that are prone to erosion to reduce scouring from the flowing water. Drainage ditches can be constructed to convey water efficiently and minimize erosion, as does the addition of vegetation to outside slopes of ponds, drainage ditches, and other bare soil areas. Pond operators also use vegetated ditches, at least 600 feet or longer when possible, to trap TSS, BOD, and reduce nutrient loads that would otherwise discharge off site.

b. Net pen Systems. 1. Active Feed management. In addition to the above practices, particularly the drug and chemical control practices, net pen facilities can also use underwater cameras or other technologies to monitor feeding rates in the net pens by identifying when excess accumulation of solids occur. Excess feed is the primary source of solids accumulation beneath net pens, which can have an adverse effect on the benthic community. Some net pen facilities are already monitoring feeding activities through the underwater and other mechanisms.

B. Water Use and Wastewater Characteristics

1. Water Use

The quantity of water required for aquaculture is dependent on the type of aquaculture system and facility management practices. For aquaculture facilities, water is required to replace evaporative and seepage losses, to

replenish oxygen, and to flush waste from the system.

Water supplies for ponds are typically wells, located on-site at a facility. However, some pond-based facilities rely on pumped or free-flowing water from surface water bodies such as lakes, streams, or coastal waters. Pond operators relying on surface waters, however, are careful not to introduce undesirable species or organisms into the culture ponds. Water might need to be screened or filtered as it is pumped into the pond. Rainwater falling directly on the pond is also captured and can be a source for maintaining water levels, but most commercial aquaculture ponds cannot be filled with rainfall alone because rainfall events are sporadic.

Pond systems initially require a large supply of water to fill ponds and then small amounts of water to regulate the water levels and compensate for seepage and evaporation. Generally, ponds are drained infrequently. Therefore, after initially filling the ponds, operators do not use large volumes of additional water. For those systems that rely on well water, water conservation and rainwater capture are important management tools to minimize pumping costs.

Flow-through systems rely on a steady water supply to provide a continuous flow of water for production. The water is used to provide dissolved oxygen and to flush wastes from the system, which produces a high volume of continuous discharge. Most flow-through systems use well, spring, or stream water as a source of production water. These sources are chosen to provide a constant flow with relatively little variation in rate, temperature, or quality.

Flow-through systems require high volumes of water. Facilities with this production system are located where a consistent volume of water is available. They are the primary method used to grow salmonid species such as rainbow trout. These species require high-quality cold water with high levels of dissolved oxygen. Flow through systems are located where water is abundant, enabling producers to efficiently produce these types of fish.

Recirculating systems do not require large volumes of water because water in these systems is filtered and reused prior to discharge. The production water treatment process is designed to minimize fresh water requirements, which leads to small-volume, concentrated waste streams, which tend to be discharged daily. Solids removal from the recirculating production water produces some effluent volume that is high in solids, nutrients, and BOD. Facility operators rely on a supply of

pumped groundwater from on-site wells. Most systems add make-up water (about 5 to 10 percent of the system volume each day) to dilute the production water and to account for evaporation and other losses.

Net pen systems rely on the water quality of the site at which the net pens are located. Open systems, like net pen facilities, can implement fewer practices than closed or semi-closed systems to control water quality parameters like temperature, pH, and dissolved oxygen. Net pens and cages rely on tides and currents to provide a continual supply of high-quality water to the cultured animals and to flush wastes out of the system. The systems may be located along a shore or pier or may be anchored and floating offshore or in an embayment. State or Tribal siting requirements typically restrict the number of units at a given site to ensure sufficient flushing to distribute wastes and prevent degradation of the bottom sediments near the net pens.

2. Wastewater Characteristics

CAAP facilities may discharge a variety of pollutants. For example, pollutants commonly found in CAAP effluents are nitrogen, phosphorus, organic matter, and solids, many of which are derived either directly or indirectly from feeds. Other factors, in addition to feed added, affecting the levels or types of pollutants in CAAP facilities may be from the source waters such as pollutants picked up in runoff from a watershed when surface waters are used as sources. The most significant of these pollutants are nutrients (nitrogen and phosphorus), total suspended solids (TSS), and biochemical oxygen demand (BOD). CAAP facilities also may discharge vitamins and minerals added to feeds for proper nutrition, drugs to maintain animal health, and chemicals to enhance water quality conditions. Some toxic and non-conventional pollutants that may be discharged in small quantities from some types of CAAP facilities include: metals (aluminum, barium, boron, copper, iron, manganese, selenium, and zinc), and organic chemicals (hexanoic acid), and microbiologicals (*Aeromonas*, fecal streptococcus, total coliform).

Solids are the largest loading of pollutants generated in aquaculture. However, most pond systems are managed to capture and hold solids within the pond, where the solids naturally degrade. Additionally, certain management practices in use at flow-through and recirculating systems capture most of the generated solids, which must then be properly disposed.

While some solids are applied to land, solids in effluent discharges from ponds have been estimated. Estimates of TSS discharges from catfish farms were 5,170 lbs/acre/year for fry and fingerling ponds and 2,418 lbs/acre/year for food fish production from ponds that are drained frequently. (Boyd, 2000, DCN 30313). Many aquaculture facilities with NPDES permits must control and monitor their discharge levels of solids. In Idaho, NPDES permits for flow-through systems typically specify a maximum average of 0.1 mL/L for settleable solids and 5 mg/L for total suspended solids (TSS).

Nitrogen from CAAP facilities is discharged mainly in the form of nitrate, ammonia, and organic nitrogen. Most of this nitrogen, however, is in the form of ammonia. Some facilities with ponds and recirculating systems also may, at certain times, have high levels of nitrite. Organic nitrogen decomposes in aquatic environments into ammonia and nitrate. This decomposition consumes oxygen, reducing dissolved oxygen levels and can adversely affect aquatic life, particularly when nitrogen levels are high enough for the decomposition to occur. Phosphorus is discharged from CAAP facilities in both the solid and dissolved forms. The dissolved form, however, poses a more immediate risk because it is the form that is available to accelerate the growth of plants. Although the insoluble form of phosphorus is generally unavailable, depending on the environmental conditions, some phosphorus may be released slowly from the insoluble form.

Increased levels of suspended solids and nutrients have very different effects on aquatic plants. High levels of suspended solids may kill off desirable species, while elevated nutrient levels may cause too many plants to grow. In either situation, an ecosystem can be changed by increases in either or both of these pollutants.

Carbon-based organic matter is discharged from CAAP facilities primarily from feces and uneaten feed. Elevated levels of organic compounds contribute to eutrophication and oxygen depletion. This occurs because oxygen is consumed when microorganisms decompose organic matter. Biochemical oxygen demand (BOD) is used to measure the amount of oxygen consumed by microorganisms when they decompose the organic matter in a waterbody. The greater the BOD, the greater the degree of pollution and the less oxygen available.

Some of the other pollutants that may be in CAAP effluents include therapeutic drugs, process water treatment chemicals, escaping non-

native animals, and aquatic animal pathogens. There are a few drugs that are FDA approved for use in aquatic animal production including antibiotics, antifungal agents, and parasiticides. Investigational new animal drugs pose an unknown threat to receiving waters because they are often untested for environmental impacts.

A variety of chemicals are used in aquatic animal production facilities for the treatment of process water and to maintain water quality. Chemicals like salt, agricultural lime, and sodium hydroxide are added to maintain system pH and reduce stress. Chemicals such as aquatic herbicides are sometimes added to system water to reduce aquatic vegetation and algae. When used properly, these chemicals pose little risk to the aquatic environment, but improper treatments or accidental spillage of chemicals can lead to negative environmental impacts. Aquatic animals that are not considered to be native organisms may carry exotic diseases, interbreed with other desirable native species, and/or destroy the habitat used by the native species. Aquatic animal pathogens may also be exported in effluent water from a CAAP facility, particularly when outbreaks occur inside the facility. In addition, pathogens can enter the facility by other means, such as contaminated source water, bird droppings or stormwater runoff. The effects and potential risks from pathogens in effluents are not well understood.

C. Pollutants of Concern

EPA reviewed four sources of data to assess the pollutants of concern: (1) Data from sampling events at two flow-through facilities; (2) data from a sampling event at a recirculating facility; (3) discharge monitoring report (DMR) data submitted to EPA from the EPA Regional Offices; and (4) permit compliance system (PCS) data from EPA's NPDES permit database.

EPA used two criteria to identify the list of pollutants of concern. For the sampling data, the identification criteria were: (1) Raw wastewaters with analytes that had three or more reported values with an average concentration greater than ten times the nominal quantitation limit (NQL); in general, the term "nominal quantitation limit" describes the smallest quantity of an analyte that can be measured reliably with a particular analytical method; and (2) treated effluents with analytes that had at least one reported value with an average concentration greater than five times the NQL.

For the PCS and DMR data sets, the original data were first associated with

a system type as defined by NPDES permit information. Measurements for parameters in the DMR and PCS data without a value or with a value of zero were excluded from the data sets and assumed to be non-detectable. All other data were summarized, by system type and analyte, with an analysis for the average sampling value, the maximum sampling value, the minimum sampling value, and the number of samples taken.

The PCS and DMR data, made up of mostly State and federal facilities and large commercial facilities that have NPDES permits, represent the best available information. One limitation of the data is the lack of information on pond systems. Generally, the pollutants identified in the DMR or PCS database are included in the list of pollutants of concern listed below.

The pollutants of concern that are currently indicated for the CAAP industry, based on the available data, include the following: TSS, BOD, ammonia, biochemical oxygen demand, chemical oxygen demand, chlorides, chlorine, dissolved oxygen, nitrate, nitrite, oil and grease, orthophosphate, ozone, pH, settleable solids, sulfate, temperature, total dissolved solids, total kjeldahl nitrogen, total organic carbon, total phosphorus, total suspended solids, turbidity, and volatile residue, metals including aluminum, arsenic, barium, boron, calcium, copper, chromium, iron, lead, magnesium, manganese, molybdenum, nickel, selenium, sodium, titanium, vanadium, and zinc, and microbiologicals including *Aeromonas*, fecal streptococcus, fecal coliform, and total coliform, organic chemicals including bis(2-ethylhexyl) phthalate, hexanoic acid, P-cresol, and phenol, and pesticides including diquat and formalin.

1. Methodology for Proposed Selection of Regulated Pollutants

EPA selects the pollutants for regulation based on the pollutants of concern (POCs) identified for each subcategory.

EPA selected a subset of pollutants for which to establish numerical effluent limitations from the list of POCs for each regulated subcategory. Generally, a pollutant or pollutant parameter is considered a POC if it was detected in the untreated process wastewater at 5 times the NQL as described in the previous section in more than 10 percent of samples.

Monitoring for all POCs is not necessary to ensure that Aquatic Animal Production wastewater pollution is adequately controlled because many of the pollutants originate from similar

sources and are treated with the same technologies and similar mechanisms. Therefore, it may be sufficient to monitor for one pollutant as a surrogate or indicator of several others.

Total coliform, fecal coliform, *E. coli*, fecal streptococci, *Enterococcus faecium*, *Mycobacterium marinum*, and *Aeromonas* were sampled at two of the sampling event facilities to determine the presence of these indicator organisms in CAAP effluents. Sampling points included influent water, process water, and treated effluents, and solids storage effluents. Most of the data show non-detectable levels of these organisms, including influent water. However, some of the indicators, including *Aeromonas*, total coliform, and fecal streptococcus, had average measured levels greater than 60,000 bacteria/100 mL in effluents from primary settling treatment units. These levels compare to total coliform levels of up to 1 billion bacterial counts/100mL in untreated domestic waste water. EPA evaluated disinfection and found it to be not economically achievable (see section VII). EPA is soliciting comments on the presence of these indicator organisms and whether they can and should be controlled in effluents from CAAP facilities.

Metals may be present in trace amounts in CAAP wastewaters for a variety of reasons. Metals may be used as feed additives, occur in sanitation products, or they may result from deterioration of CAAP machinery and equipment. Although metals may serve useful purposes in CAAP operations, many metals are toxic to algae, aquatic invertebrates and/or fish. EPA observed that treatment systems used within the CAAP industry provide substantial reductions of most metals. Because most of the metals can be adequately controlled by controlling solids, and EPA is proposing control of TSS, EPA is not proposing to regulate metals directly.

Residuals from federally registered pesticides that may be used for controlling animal parasites and aquatic plants, may be present in wastewaters. Most treatment systems within the CAAP industry are not specifically designed and operated to remove pesticides residuals. Many of the pesticide residuals, however rapidly bind to sediment particles. Pollution control technologies or management practices that control TSS are expected also to control most pesticide residuals as well. EPA encourages CAAP facility operators to always follow pesticide label instructions, minimize the use of any aquatic pesticides by preventing aquatic weed problems when possible,

maintaining water quality to keep algal blooms in check, and using other means, when possible, to control aquatic weeds. Therefore, EPA is not proposing to regulate pesticide discharges directly from CAAP facilities in today's action.

2. Selection of Proposed Regulated Pollutants for Existing and New Direct Dischargers

EPA is proposing to establish effluent limitations for CAAP facilities for total suspended solids (TSS) with an alternative to use BMPs to control solids. The specific justifications for the pollutants to be regulated for each subcategory are provided below. In general, EPA selected the pollutant or pollutants based on its representativeness of the characteristics of CAAP wastewaters generated in the industry, and its capacity to measure the performance of treatment processes that serve as the basis for the proposed effluent limitations.

Total suspended solids (TSS) is a measure of the quantity of solids in wastewater. Some CAAP facilities produce wastewaters high in organic solids including uneaten feed and fish feces. These solids can cause a high oxygen demand (both chemical and biochemical) and are high in protein and nitrogen content. Because some nutrients bind to solids, and solids often include oxygen-demanding organic material, limiting the loading of solids will prevent degradation of surface waters. EPA believes that by controlling TSS either through numerical limitations or BMPs, BOD and nutrients will also be effectively controlled. Parameters whose control through treatment processes or BMPs would lead to control of a wide range of pollutants with similar properties are generally good indicators of overall wastewater treatment performance.

EPA is considering including BOD limitations in addition to TSS for recirculating systems although limits for BOD are not included in today's proposal. Control of TSS alone may not provide effective control of BOD in the effluent from recirculating facilities. Recirculating facilities are different from flow-through facilities. While the pollutants present in the wastewater from both systems are largely derived from the solids introduced by the animal feed or feces, at flow-through systems the water is flowing through the facility so rapidly there is little opportunity for the solids to break down. Thus, EPA believes that controlling TSS effectively controls the other pollutants present in the wastewater. Recirculating systems,

however, recirculate 90 to 95 percent of their wastewater and treat the water prior to returning it to the production systems. The recirculating system's internal water treatment is designed to remove solids and ammonia and add oxygen. The water recirculation provides an opportunity for other pollutants to become more concentrated and EPA believes that dissolved BOD may become concentrated in recirculating systems. EPA's sampling data indicate that there are elevated levels of BOD in the raw wastewater. The recirculating facility that EPA sampled is using biological treatment to treat its wastewater prior to discharge and has permit limits to control the BOD in their effluent. EPA has not estimated the cost of installing biological treatment at recirculating facilities and does not currently have sufficient data to determine whether this technology is common at other recirculating facilities. EPA will re-evaluate the need to establish BOD limitations after the detailed surveys have been returned. It is also likely that the Agency will conduct additional sampling at recirculating facilities to obtain additional data on the raw wastewater characteristics and the performance of wastewater treatment. EPA solicits comment on the establishment of BOD limits for the Recirculating Subcategory and data on the raw wastewater characteristics as well as any treated effluent characteristics. The CAAP Development Document includes potential values of such BOD limits.

Based on the methodology described above, EPA proposes to regulate pollutants in each subcategory that will ensure adequate control of a range of pollutants from all types of CAAP production systems. EPA is proposing to regulate TSS for control of other pollutants present in CAAP wastewaters such as metals, nutrients and BOD.

3. Approach to Determining Long Term Averages, Variability Factors, and Effluent Limitations Guidelines and Standards

This subsection describes the statistical methodology used to develop long-term averages, variability factors, and limitations for the BPT, BCT, BAT, and NSPS numerical limitations option. The same basic procedures apply to the calculation of all effluent limitations guidelines and standards for this industry, regardless of whether the technology is BPT, BCT, BAT, or NSPS. For simplicity, the following discussion refers only to effluent limitations; however, the discussion also applies to new source standards.

The proposed limitations for pollutants for each option, as presented in today's notice, are provided as maximum daily discharge limitations and maximum monthly average discharge limitations. Definitions provided in 40 CFR 122.2 state that the "maximum daily discharge limitation" is the "highest allowable 'daily discharge'" and the "average monthly discharge limitation" is the "highest allowable average of 'daily discharges' over a calendar month, calculated as the sum of all 'daily discharges' measured during a calendar month divided by the number of 'daily discharges' measured during that month." Daily discharge is defined as the 'discharge of a pollutant' measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling."

EPA calculated the proposed limitations based upon percentiles chosen with the intention, on one hand, to accommodate reasonably anticipated variability within the control of the facility and, on the other hand, to reflect a level of performance consistent with the Clean Water Act requirement that these effluent limitations be based on the "best" technologies properly operated and maintained. The daily maximum limitation is an estimate of the 99th percentile of the distribution of the daily measurements. The maximum monthly average limitation is an estimate of the 95th percentile of the distribution of the monthly averages of the daily measurements. The percentiles for both types of limitations are estimated using the products of long-term averages and variability factors.

In the first of two steps in estimating both types of limitations, EPA typically determines an average performance level (the "long-term average" or LTA) that a facility is capable of achieving with well-designed and operated model technologies (which reflect the appropriate level of control). This long-term average is calculated from the data from the facilities using the model technologies for the option. EPA expects that all facilities subject to the limitations will design and operate their treatment systems to achieve the long-term average performance level on a consistent basis because facilities with well-designed and operated model technologies have demonstrated that this can be done. In the second step of developing a limitation, EPA determines an allowance for the variation in pollutant concentrations when processed through well-designed and operated treatment systems. This allowance for variance incorporates all components of variability including

process and wastewater generation, sample collection, shipping, storage, and analytical variability. This allowance is incorporated into the limitations through the use of the variability factors, which are calculated from the data from the facilities using the model technologies. If a facility operates its treatment system to meet the relevant long-term average, EPA expects the facility to be able to meet the limitations. Variability factors assure that normal fluctuations in a facility's treatment are accounted for in the limitations. By accounting for these reasonable excursions above the long-term average, EPA's use of variability factors results in limitations that are generally well above the actual long-term averages.

While the actual monitoring requirements will be determined by the permitting authority, the Agency has assumed four samples per month (*i.e.*, monthly monitoring) in determining the proposed maximum monthly average limitations.

The long-term averages (LTAs), variability factors, and limitations for today's proposal were based upon pollutant concentrations collected from two data sources: EPA sampling episodes and discharge monitoring reports. The proposed limitations are based upon the modified delta-lognormal distribution. For the final rule, EPA intends to evaluate its appropriateness for these data and possibly consider other distributions such as the censored lognormal distribution.

EPA used a combination of the data from sampling episodes and DMR data to calculate the proposed limits. Two sampling episodes provided information on flow-through systems and one sampling episode provided information on recirculating systems. Additional DMR data from four Virginia flow-through CAAP facilities taken over a period of several years supplemented the EPA sampling data. The combination of sampling data, from locations in Idaho and Michigan, and DMR data from Virginia provided EPA with broad geographic and facility size coverage to account for some variability when establishing the proposed limits. EPA found the limited data to be adequate to establish proposed limits for flow through systems. For option 1, flow-through systems, the proposed limits were developed based on two EPA sampling episodes each with five data points and DMR data from three facilities with the number of data points used being 19, 34, and 37. For option 3 for the flow-through systems, the proposed limits were developed from

DMR data from one facility with 16 data points and a sampling episode with five data points from one of the facilities with data from effluents prior to a polishing pond that also was used for the option 1 limits. EPA solicits comment on the amount of the data for calculation of the proposed limits. While the proposed regulation includes limitations for recirculating systems, EPA did not have enough detailed data to adequately calculate numeric limits for recirculating systems. The preliminary limitations for recirculating systems used the permit limits for the one sampling episode facility. EPA intends to collect additional data and solicits available data to further evaluate numeric limits for both the flow-through systems and recirculating systems.

EPA also solicits comment on whether autocorrelation is likely to be present in weekly measurements of wastewater data from the CAAP industry. EPA also solicits data that demonstrate the presence or absence of such autocorrelation (see Section XV for guidelines on submitting data). When data are said to be positively autocorrelated, it means that measurements taken at specific time intervals (such as 1 week or 2 weeks apart) are related. For example, positive autocorrelation would be present in the data if the final effluent concentration of TSS was relatively high one week and was likely to remain at similar high values the next and possibly succeeding weeks. In some industries, measurements in final effluent are likely to be similar from one day (or week) to the next because of the consistency from day-to-day in the production processes and in final effluent discharges due to the hydraulic retention time of wastewater in basins, holding tanks, and other components of wastewater treatment systems. To determine if autocorrelation exists in the data, a statistical evaluation is necessary and will be considered before the final rule. To estimate autocorrelation in the data, many measurements for each pollutant would be required with values for equally spaced intervals over an extended period of time. If such data are available for the final rule, EPA intends to perform a statistical evaluation of autocorrelation and if necessary, provide any adjustments to the limitations. This adjustment would increase the values of the variance and monthly variability factor used in calculating the maximum monthly limitation. However, the estimate of the long-term average and the daily variability factor (and thus the

maximum daily limitation) are generally only slightly affected by autocorrelation.

D. Approach To Estimating Compliance Costs

EPA estimated the costs associated with regulatory compliance for each of the regulatory options under consideration to determine the economic impact of the effluent limitations guidelines and standards on the CAAP industry. The economic burden is a function of the estimated costs of compliance to achieve the proposed requirements, which may include initial fixed and capital costs, as well as annual operating and maintenance (O&M) costs. Estimation of these costs typically begins by identifying the practices and technologies that can be used as a basis to meet particular requirements. EPA estimated compliance costs based on the implementation of the practices or technologies to meet particular requirements.

EPA collected data from published research, meetings with industry organizations, discussions with the Aquaculture Effluents Task Force of the Joint Subcommittee on Aquaculture, a review of USDA's 1998 Census of Aquaculture data, existing concentrated aquatic animal production NPDES permits, site visits and sampling events at AAP facilities, screener surveys, and detailed industry surveys. These data were used to define model CAAP facilities for estimating national compliance costs. The data were also used to determine estimates of pollutant loads, discharge volumes, current best management practices and treatment technologies being used, and the applicability of best management practices and treatment technologies for the model farms.

EPA identified candidate best management practices and appropriate treatment technologies for different industry segments that were incorporated into regulatory options. The regulatory options serve as the basis for compliance cost and pollutant loading calculations.

EPA developed cost equations for estimating capital, one-time fixed, and annual O&M costs for the implementation and use of the different best management practices and treatment technologies targeted under the proposed regulatory options. Cost equations were developed from information collected during the site visits, sampling events, published information, vendor contacts, and engineering judgment.

EPA developed and used computer cost models to estimate compliance

costs and nutrient loads for each regulatory option. EPA used output from the cost model to estimate total annualized costs and the economic impact of each regulatory option on the CAAP industry. The AAP industry was segmented into six subcategories, based on system type, which include ponds, flow-through, recirculating, net pens and cages, floating and bottom culture, and other systems.

For each regulatory option, EPA estimated the costs to install, operate, and maintain specific techniques and practices. EPA traditionally develops either facility-specific or model facility costs. Facility-specific compliance costs require detailed process information about many, if not all, facilities in the industry. These data typically include production, capacity, water use, wastewater generation, waste management operations (including design and cost data), monitoring data, geographic location, financial conditions, and any other industry-specific data that may be required for the analyses. EPA then uses each facility's information to estimate the cost of installing new pollution controls.

When facility-specific data are not available, EPA develops "model" facilities to provide a reasonable representation of the industry. Model facilities were developed to characterize the AAP facilities and reflect the different characteristics found in the industry, such as the size or capacity of an operation, type of operation, geographic location, and mode of operation. These models were based on data gathered during site visits, information provided by industry members and their associations, the 1998 Census of Aquaculture and AAP screener survey data. Cost and financial impacts were estimated for each model facility, and then industry-level costs were calculated by multiplying model facility costs by the estimated number of facilities within each model category. For the AAP industry, EPA has chosen a model-facility approach to estimate compliance costs. For the proposal, the model is based on the use of USDA's Census of Aquaculture and EPA's AAP screener survey. More detailed information concerning facilities in the CAAP industry that will enable EPA to further revise the model facility characteristics is not available until after the responses are received from the detailed survey. EPA plans to revise the current dataset as a result of the detailed survey collection efforts and public comments received on this proposal. The development of the model facilities, and the process for determining

estimates of the number of facilities are described in more detail below.

Model facilities were defined for various groupings of CAAP operations based on system type, species, feed conversion ratio, size, system specific factors, and regional location. EPA evaluated the major species produced in the United States, including catfish, trout, salmon, hybrid striped bass, sport or game fish, other food finfish, shrimp, baitfish, molluscan shellfish, crawfish, and alligator. EPA also evaluated the life stage differences among species in the modeling analyses to determine the potential influence of life stage on model output. EPA assigned an estimated feed conversion ratio for each species and system combination in the definition of the model facilities. The feed conversion ratios were the primary factor affecting loadings in the model facilities. While these FCRs were intended to be representative of the facilities corresponding to each model, EPA recognizes that there is significant variability in FCRs across facilities even within the same model facility type.

For the economic and cost analyses, the facility size groups were based on the facility gross revenue for aquatic animal production. These ranges represent the facility revenue categories used in the USDA's 1998 Aquaculture Census. Model facilities were analyzed for each of these revenue ranges. Data from the 1998 Aquaculture Census and screener survey were used to estimate the number of facilities, by system type, species, and facility size. (See preamble, Section V, CAAP Development Document and Economic Analysis for more details) EPA developed cost equations to estimate compliance costs for each model facility and regulatory option. Costs were calculated for each technology or practice that make up each regulatory option for each model facility; based on model facility characteristics, including system type, species, feed conversion ratio, size, and system specific characteristics. The cost estimates generated contain the following types of costs: (1) Capital costs—costs for facility upgrades (e.g., construction projects), including land costs and other capital costs (equipment, labor, design, etc.); (2) one time non capital costs—one-time costs for items that cannot be amortized (e.g., consulting services or training); (3) Annual operating and maintenance (O&M) costs—annually recurring costs, which may be positive or negative.

These costs provide the basis for evaluating the total annualized costs, cost effectiveness, and economic impact of the regulatory options proposed for the CAAP industry. For each best

management practice and treatment technology identified in the options selection process, EPA developed a cost module to provide input to the model facility calculations.

EPA recognizes that some individual facilities have already implemented some treatment technologies or best management practices that were described in the proposed options. As noted above, when estimating costs for the implementation of the proposed options across the entire subcategory nationwide, EPA did not include costs for best management practices or treatment technologies already in place.

EPA estimated the current frequency of existing best management practices and treatment technologies at CAAP facilities based on screener survey responses, site visits, and sampling visits. This occurrence frequency of practices or technologies was used to estimate the portion of the operations that would not incur costs to comply with the new regulation. For example, based on site visits, EPA believes that all catfish operations using levee ponds to practice water level management to capture rainfall and minimize overflows (the frequency factor is 100 percent); therefore, no costs were included for water level management for these operations. Another example is that EPA estimated that 80 percent of trout facilities have quiescent zones (based on site visits); therefore, only 20 percent of trout facilities would incur a cost for installing quiescent zones to comply with the proposed TSS limits.

Applying the frequency factors to the unit component costs reduces the effective cost of that component for the model facility. Essentially, EPA adjusts the component cost to account for those facilities that already have the component in place, and those facilities would not have to install and operate a new component as a result of the proposed regulation.

While this approach should provide a reasonable estimate of national costs, it has the drawback of underestimating facility level costs for facilities that have not already installed a particular technology. This may lead to an underestimation of impacted facilities. EPA requests comment on this approach.

EPA estimated frequency factors based on the sources such as those listed below (each source was considered along with its limitations):

(1) *EPA site visit information*—This information was used to assess general practices of AAP operations and how they vary between regions and size classes.

(2) *Screener Survey*—This information was used to assess general practices of AAP operations and how they vary between regions and size classes.

(3) *Observations by industry experts*—Experts on AAP operations were contacted to provide insight into operations and practices, especially where data were limited or not publicly available.

(4) *USDA National Agricultural Statistical Service (NASS)*—The data currently available from 1998 Aquaculture Census were used to determine the distribution of AAP operations across the regions by size class.

(5) *USDA APHIS National Animal Health Monitoring System (NAHMS)*—This source provides information on catfish production.

(6) *State Compendium: Programs and Regulatory Activities Related to AAP*—This summary of State regulatory programs were used to estimate frequency factors, based on current requirements for treatment technologies and best management practices that already apply to CAAP facilities in various states.

E. Approach To Estimating Pollutant Reductions

A model facility approach was designed to represent the industry. Using this approach, every facility was classified according to its production system. Additionally, pollutant loads, flow characteristics, geographic, and culture species information were linked in the model, creating an array of facilities by system type, pollutant loading, size, location, and species. Technology options and best management practices (BMPs) that were used to prevent the discharge of pollutants into the environment were also linked in a similar way. In this case, variables account for the applicability of the technologies and BMPs, given the characteristics of the model facility (e.g. system type, size). The user of the model can manipulate these variables to analyze different management options. The model was capable of calculating an estimated cost of the management option based on capital and land costs, adjusted for geographic differences.

A benefit of the model facility approach was the option of using the same model to represent the whole industry, sectors of the industry, and even single facilities. No changes in the theoretical model were needed to cope with this, only a manipulation of the input data. The following information was used in the modeling approach:

- (1) Number of facilities by system type, size, culture species, and location
- (2) Technologies and BMPs by system type and facility size
- (3) National average capital cost, land requirements of technology options, and best management practices
- (4) Average flow (daily) by system type and facility size
- (5) Estimates of annual production
- (6) Data associated with feeding practices: feeding in pounds per day, pollutant concentrations in feed, percentage of feed not consumed, feces to feed ratio, and pollutant concentrations in feces
- (7) Pollutants and flow reductions resulting from technology options and best management practices

Information obtained from a national survey (*i.e.* the detailed survey) and EPA sampling data about the state of the industry will constitute the primary input for establishing a baseline scenario. This data has not yet been collected and analyzed but will be in the future, followed by publication in the **Federal Register** of a Notice of Data Availability for public comment. Specifically, EPA will use information from the detailed survey to revise pollutant loadings and costs estimated in today's proposal. Because EPA did not have the detailed survey data for the proposed rule, EPA used information from a number of published sources and unpublished sources such as comments received from small entity representatives through the SBREFA process and personal communications with industry representatives.

The model was based on several facts. First, feed offered to the AAP species contributes to pollutant discharges in three ways, (1) unmetabolized feed consumed by the cultured species is contained in the feces, (2) urine contributes to dissolved ammonia, and (3) uneaten feed, both dissolved and in particulate forms, increase the pollutant load in the culture water. Second, technology options and BMPs have typical efficiency rates of removing specific pollutants from water. Third, certain technologies are more applicable to certain system types and flows than others. Combining these three components of the effluent discharge, the predicted pollution reduction can be estimated for every system type and size.

VIII. Options Evaluated and Selected for Proposal

A. Introduction

For the proposed rule, EPA developed regulatory options using the technologies and practices discussed

previously (see section VII) based on preliminary evaluations of the USDA Census of Aquaculture, screener survey responses, site visits and sampling episodes. The initial regulatory options included the following technology controls and best management practices specific to each production system: feed management; quiescent zones; settling basins; microscreen filters (solids polishing); a best management practices (BMP) plan (based on a modified Hazard Analysis Critical Control Point (HACCP) approach, described later); water level management; in-pond treatment; active feed monitoring and disinfection.

Initially, EPA evaluated options for the following production systems: ponds, flow-through systems, recirculating systems, and net pens. For ponds, EPA considered feed management, in-pond treatment, water management, discharge management and the BMP plan based on the HACCP approach as Option 1. Option 2 considered removals of conventional and nutrient pollutants through the use of vegetated ditches, in-pond, or settling basins. EPA assumed the following in treating pond volumes: treating the first 5 percent of the volume on all ponds with bottom drains; treating the last 20 percent of volume on all ponds with any drain if harvest requires seining or rapid discharge of pond volume and treating the last 5 percent of the volume on all ponds. Option 3 considered removals of additional BOD and nutrients through the use of constructed wetlands.

For flow-through systems, EPA considered feed management, quiescent zones, sedimentation basins and primary settling of collected solids and the BMP plan based on the HACCP approach as Option 1. Option 2 considered removals of additional solids through the use of mechanical filtration such as microscreen filters, polishing ponds, and chemical addition. Option 3 considered the removals of bacterial levels through the use of disinfection such as chlorine, ozone, and UV.

For recirculating systems, Option 1 considered feed management, sedimentation basins and primary settling of collected solids, and the BMP plan based on the HACCP approach. Options 2 and 3 for recirculating systems are the same as those for flow-through systems.

For net pen systems, Option 1 considered feed management and the BMP plan based on the HACCP approach. Option 2 considered reducing pollutant loads associated with feeding through the use of an active feed monitoring system.

Based on the evaluation of the effluent concentration literature values

and research studies, in addition to the estimated costs of compliance, EPA did not pursue or further modify some of the initial regulatory options. However, EPA did develop a refined list of regulatory options and estimated their costs in preparation for analysis required under the Regulatory Flexibility Act (discussed more fully in Section XIII Administrative Requirements). Several of the technologies that were considered in this analysis were also shown to be impractical or too costly. This is described in greater detail in the CAAP Development Document. For example, one regulatory option EPA considered early on in its analysis, but did not pursue was based on disinfection. The estimated costs for this technology to be applied nationally would be cost prohibitive and would have imposed a severe adverse economic impact on this industry. Also several technologies to reduce pollutant discharges when pond systems are drained are no longer being considered. These technologies were estimated to have a high cost in proportion to revenues, and also were determined to provide limited benefit in reducing wastewater pollutant loadings.

Other regulatory options were modified from those initially considered. Option 1 initially estimated costs for solids removal as well as the implementation of a best management plan based on the HACCP approach. The HACCP like BMP approach was a more structured process for identifying control points to minimize discharges of drugs, chemicals, non-native species and pathogens and developing practices to address them. In addition, it would have included a training component. After evaluating these costs, EPA modified Option 1. Subsequently, Option 1 for flow-through includes primary settling (quiescent zones and settling basins) and BMP plan development for solids control either as an alternative or in lieu of numerical limitations for TSS. Option 1 for recirculating systems is a settling basin and BMP plan development for solids control. Option 1 for net pens is feed management and BMP plan development for solids control. For the BMP component for solids control, EPA estimated costs assuming 40 hours to develop such a plan and one hour of manager time and one hour of worker time per month to implement. EPA solicits comment on the time and associated cost required for BMP plan development as well as on the possibility of EPA or the permitting authority developing a model BMP plan which the operator would adopt or

modify, reducing the time and associated cost required.

Option 2 was the BMP plan addressing drugs, chemicals, pathogens, and non-native species which would have been the same for all facilities regardless of production system. Based on recommendations in the SBREFA Panel Report, EPA further modified Option 2 to include reporting requirements for drug and chemical use only. In the BMP component for control of these toxic and non-conventional pollutants, EPA estimated costs assuming 40 hours to develop and one hour of manager time and one hour of worker time per month to implement. EPA solicits comment on the time and associated cost required for BMP plan development as well as on the possibility of EPA or the permitting authority developing a model BMP plan which the operator would adopt or modify, reducing the time and associated cost required. Option 3 technology for flow-through and recirculating systems is solids polishing (*i.e.*, microscreen filters) and for net pens is active feed monitoring. The options are additive in nature, and represent increasing stringency, thus, Option 2 limitations would be based on and incorporate primary settling (Option 1) in addition to the limitations based on BMP considerations under Option 2. Because some existing flow-through facilities that produce between 20,000 and 100,000 pounds per year are currently meeting NPDES requirements to report and implement a BMP plan for the control of solids, EPA solicits comment on the feasibility of requiring other facilities within this production range, and new facilities, to meet the same requirements.

EPA is not proposing to establish phosphorus limits, but will continue to evaluate the need for separate limitations for phosphorus. The proposed TSS limitations should also ensure effective removal of suspended or particulate phosphorus. EPA notes that a number of NPDES permits issued to CAAP facilities do include phosphorus limits presumably to comply with water quality standards. EPA solicits comment on how the use of low phosphorus feeds or wastewater treatment practices (including the actual practices used) meet current phosphorus limits set by the permitting authority. EPA may consider establishing separate phosphorus limits based on treatment of the wastewater to precipitate dissolved phosphorus to achieve effective reduction of phosphorus in the wastewater discharge from CAAP facilities and solicits comment on the need to establish

separate limits for phosphorus and the costs associated with phosphorus treatment. EPA is particularly interested in data documenting the costs of achieving such limits, any increased sludge production as a result of treating to remove phosphorus from wastewater and monitoring data including the method used to analyze the phosphorus in the collected samples. The Development Document includes potential values of such phosphorus limits.

Discussion of the regulatory options by type of operation (*i.e.*, subcategory) is contained below.

B. Flow-Through Systems

1. BPT

After considering the technology options described in Section VII, and in light of the factors specified in section 304(b)(1)(B) of the CWA, EPA is proposing: (1) No nationally-applicable effluent limitations guidelines for facilities producing less than 100,000 pounds per year, (2) effluent limitations based on Option 1 for facilities producing 100,000 pounds per year up to 475,000 pounds per year, and (3) effluent limitations based on Option 3 for facilities producing 475,000 pounds per year or more.

For small flow-through facilities (facilities that produce between 20,000 and 100,000 pounds of cold water species annually), the proposed rule would not establish any national requirements for existing flow-through facilities for the reasons described in Section V.B.

As described in Section IX, EPA's economic analysis is based on the best existing data available to EPA, but the Agency will be collecting financial data through the detailed survey, which should provide a better basis for determining economic achievability. In addition, EPA is soliciting information concerning the costs for developing and implementing the BMP plan described in today's proposed regulation. EPA will reconsider both the BMP costs and the economic achievability.

For facilities producing 100,000 pounds per year to 475,000 pounds per year, the proposed rule would establish BPT limits based on primary settling including quiescent zones and settling basins and/or BMP development and implementation (Option 1) for existing flow-through facilities. EPA considered the revenue classifications in the Census of Aquaculture (National 1–6) to estimate economic impacts. EPA then converted the revenue classifications into production categories using prices for several different species. As EPA

continued its impact analysis, EPA determined that the 100,000 pounds per year threshold, mainly driven by trout production (because of the number of small facilities producing trout) would be an appropriate threshold because the costs of compliance for the facilities producing above the threshold would be affordable while facilities producing below this threshold would experience disproportionate economic impacts.

For facilities producing 475,000 pounds per year or more, the proposed rule would establish limits based on solids polishing and/or a requirement to develop and implement a BMP plan (Option 3). EPA considered the impacts of such proposal requirements on these larger facilities and, based on the results, determined that the 475,000 pounds per year would be an appropriate threshold for which the costs of compliance would remain economically achievable.

EPA is also proposing to establish limits for TSS at large flow-through facilities discharged from separate off-line treatment systems (*i.e.* physically separate and discharging from an outfall distinct from the main flow of the system) based on Option 3 technology performance. EPA would apply the percent reduction achieved by a microscreen filter used as a solids polishing treatment at the recirculating system that EPA sampled. The microscreen performance measured by EPA's sampling data indicates that 20 percent reduction in the TSS concentration was achieved with this technology by this facility. EPA has applied that percent reduction to the long-term average representing treatment through a separate off-line settling basin and applied the variability factors developed from the off-line settling basin data to obtain the monthly average and daily maximum values. EPA believes this transfer of performance from recirculating system technology to flow-through system discharges would be appropriate because the long term average concentrations measured by EPA at both the separate off-line treatment at a flow-through system and the influent to microscreen filtration at a recirculating system are nearly identical (58.1 mg/L from the flow-through system compared to 58.3 mg/L from the recirculating system).

Based on preliminary analysis, these options appear to be technically available, economically achievable and cost-reasonable for the existing flow-through facilities at these size thresholds. The BPT cost comparison test demonstrates, as described in Section IX, that the cost per pound

removed is \$0.23/lb using only the removal loadings of the pollutant BOD. (Also, see discussion of cost as a percent of revenues in section IX.) EPA did not select more stringent options (Options 2 or 3) for facilities between 100,000 and 475,000 pounds production per year because, EPA determined that the cost impacts would not be reasonable and affordable based on the number of facilities (9 out of 31 commercial facilities) estimated to experience compliance costs greater than 10% of revenues from aquaculture sales. As discussed in more detail in Section XI, the proposed option has acceptable non-water quality environmental impacts. As described earlier in Section VII.C.3, the specific effluent limitations guidelines proposed in this rule were derived based on a statistical analysis of the performance of primary settling and solids polishing at flow-through facilities that are sufficiently similar to all of the flow-through facilities that would be subject to the effluent limitations guidelines. Based on the screener survey data, EPA estimates that primary settling and solids polishing are currently used at 91 out of 102 (89%) and 5 out of 102 (5%), of all flow-through CAAP facilities, respectively.

EPA estimates that the proposed effluent limitations guidelines would cause 8 out of 181 regulated flow-through facilities (4%) to experience compliance costs greater than or equal to 5% of their revenues.

As noted previously, the options selected for flow-through systems include requirements to develop and implement a best management practices (BMP) plan, as well as some reporting requirements. Option 1 includes a requirement for a BMP plan for solids control. As noted previously, control of total suspended solids also controls non-conventional and toxic pollutants that EPA believes bind with such solids. Option 2 includes a requirement for a BMP plan addressing non-conventional and toxic pollutants, specifically, discharges of certain drugs, chemicals, and solids or aquatic animals that carry pathogens, as well as escapes of non-native aquatic animals. Option 2 also includes some reporting requirements on the use of certain drugs and chemicals. For flow-through facilities producing between 100,000 pounds per year and 475,000 pounds per year, EPA is proposing the Option 1 BMP plan requirements (solids control). For flow-through facilities producing more than 475,000 pounds per year, EPA proposes limitations based on Option 3, which includes the Option 2 BMP plan requirements for non-conventional and toxic pollutants. EPA proposes and

solicits comment on the use of the BMP plan, either in lieu of or as an alternative to the numerical limitations in today's proposal. EPA also solicits comments on whether the BMP plan for solids control only would be sufficient to assure the pollutant reductions that EPA demonstrates to be economically achievable. Many facilities already have developed and implemented a BMP plan to control solids through feed management, by removing solids regularly, and by treating solids from waste handling operations. Identification and proper implementation of such a BMP plan may be sufficient in and of itself to achieve the numeric limitations EPA proposes today.

For the most part, the proposed BMP plan requirements would prevent or minimize the discharge of pollutants, but also represent economically sound aquatic animal production practices. For flow-through facilities producing 100,000 pounds per year to 475,000 pounds per year, the proposed BMP plan requirements would ensure supplemental controls to prevent or minimize the discharge of solids. Proposed section 451.15(a) would impose a requirement related to management of removed solids and excess feed. Specifically, operators would need to minimize the re-introduction of solids removed through the treatment of the water supply and prevent excess feed from entering the aquatic animal production system. Solids are removed from the water supply to ensure high quality water supply for aquatic animal production. Given the effort to remove solids from that water, re-introduction of those solids would increase the amount of solids discharges. Similarly, operators should prevent the introduction of excessive feed into the production system; uneaten feed increases the total amount of solids discharged. Operators have an economic incentive to optimize feed rates (*e.g.*, to ensure maximum animal growth at minimum costs), but in some cases optimal feed rates from the operator's perspective may not be optimal for water quality. To optimize water quality (though not necessarily production), operators and laborers should observe feeding when food is applied to the system and stop adding feed when the animals are no longer eating. In cases where water quality and production goals are in conflict, operators must find a reasonable balance between the two. The proposed requirements in section 451.15(a)(1) for management of removed solids and excess feed and 451.15 (b)(1) & (3) for

structural maintenance and disposal of biological wastes, respectively, also prevent or reduce unnecessary and avoidable solids discharges. Section 451.15(d) would assure that personnel who implement the BMP, in fact, understand it.

For flow-through facilities producing more than 475,000 pounds per year, the proposal would require additional BMP implementation to avoid inadvertent spillage or release of drugs and chemicals stored at the facility. Similar to the storage management practices required for solids, proposed section 451.15(b)(2) would require sound management of drugs and chemicals stored on-site in order to avoid accidental spillage or release into the system. EPA proposes this requirement only for the largest flow-through facilities because the Agency anticipates that only the largest facilities have a need to maintain significant volumes of drugs and chemicals on-site. The more important aspect of drugs and chemicals storage would be that personnel working at the site also would need to be familiar with proper storage practices.

EPA also proposes reporting requirements related to uses of certain drugs and chemicals. Proposed section 451.3 (a) through (c) would only apply to facilities producing more than 475,000 pounds per year because drug and chemical discharges from such large facilities are more likely to cause an adverse impact on receiving waters. EPA currently lacks data on the total amount of unapproved drugs and chemicals released to the environment from aquatic animal production facilities. For this reason, EPA proposes reporting to ensure that permitting authorities have the necessary information to impose any controls that may be necessary to reduce or avoid adverse impacts to receiving waters on a case-by-case basis using best professional judgment.

EPA proposes to define "chemical" and "drug" at section 451.2 (c) and (e), respectively, to include only those chemicals and drugs that would be discharged and that have not been "approved" as safe and effective. The proposed definition of drug, for example, would not include injected drugs. As such, the proposal would only apply to residual drugs and chemicals, *e.g.*, after a drug or chemical no longer serves its intended purpose. EPA likewise proposes reporting only for drugs and chemicals about which little is known. Reporting would not be required for EPA registered pesticides and drugs approved by the Food and Drug Administration for aquatic animal

uses or water quality maintenance/restoration chemicals used according to label instructions. Reporting would only be required for unapproved drugs and/or drugs prescribed by a veterinarian for extra-label uses. Reporting would also be required for extra-label uses of chemicals. Because drugs that have not been evaluated by FDA may be discharged in facility effluents, reporting information should enable informed regulatory responses when environmental problems do occur. Under the proposal, reports would be both oral and written, according to the use that EPA anticipates for regulatory monitoring of those reports. Given the intermittent and variable use of drugs and chemicals and given the relative absence of data on such uses, EPA does not propose numeric effluent limits, but rather only reporting requirements, for the drugs and chemicals that would be regulated under today's proposal.

EPA anticipates that the BMP requirements would be implemented through permits and, in many cases, standardized BMP provisions may be applicable to all similarly sized flow-through facilities. EPA does not anticipate that development or implementation of the proposed BMP requirements would significantly interfere with a well-managed operation. The proposed requirements, however, would establish a base level of sound management practices that are not only economically reasonable, but also environmentally protective.

2. BAT

EPA proposes to establish BAT at a level equal to BPT (*i.e.*, Option 1 for existing facilities that produce between 100,000 and 475,000 pounds per year and Option 3 for existing facilities that produce more than 475,000 pounds per year). For this subcategory, there are no available technologies economically achievable that would achieve more stringent effluent limitations than those considered for BPT. Because of the nature of the wastewater and wastes generated from CAAP facilities, advanced treatment technologies or practices to remove additional solids (*e.g.*, smaller particle sizes) in TSS that would be affordable do not exist beyond those already considered.

3. BCT

Since the BCT cost test did not support a more stringent technology basis that was economically achievable for BCT, EPA proposes to regulate total suspended solids (TSS) using the same technology basis as BPT. For more details about the BCT cost test, see Section IX.G.

4. NSPS

After considering all of the technology options described in Section VII, and in light of the factors specified in sections 306 of the CWA, EPA proposes standards of performance for new sources equal to BPT, BCT, and BAT because no more stringent technologies are available for NSPS without causing a barrier to entry for new facilities. Because of the nature of the wastewater and wastes generated from CAAP facilities, advanced treatment technologies or practices to remove additional solids (*e.g.*, smaller particle sizes) in TSS that would be affordable do not exist beyond those already considered.

EPA believes that the proposed NSPS equal to BAT would not present a significant barrier to entry. EPA believes that overall impacts from the proposed effluent limitations guidelines on new sources would not be any more severe than those on existing sources because the costs faced by new sources generally should be the same as or lower than those faced by existing sources. It is generally less expensive to incorporate pollution control equipment into the design at a new plant than it would be to retrofit the same pollution control equipment in an existing plant. At a new plant, no demolition is required and space constraints (which can add to retrofitting costs if specifically designed equipment must be ordered) may be less of an issue.

Although EPA is not proposing performance for new sources for smaller cold water facilities (*i.e.*, those producing between 20,000 and 100,000 pounds per year), EPA invites comment on whether downward adjustments to the proposed thresholds would create a barrier to entry for new sources. As described in the BPT discussion, EPA intends to reevaluate the costs and potential barrier to entry for small new sources and solicits comments on the basis for costs estimated for new sources.

EPA solicits comments on its proposed finding that the proposed thresholds would be appropriate and applicable to this subcategory.

5. No Regulation for Flow-Through Systems

EPA is also considering whether it should establish national requirements for flow-through systems at all. If EPA were to decide not to promulgate national effluent guidelines for flow-through systems, it would likely be based on a combination of several factors. First, EPA may conclude that the baseline pollutant discharges from

flow-through systems are not large enough to warrant national regulations. In addition, EPA may conclude that due to significant regional and facility-specific variations, it is more effective to continue to rely on the BPJ of permit writers to establish appropriate limitations. Finally, EPA may conclude that available technologies are either not affordable or provide little reduction in pollutant discharges relative to existing practice. EPA solicits comments on not regulating flow-through systems and encourages commenters to support such arguments with information and data, particularly data on the loadings, efficiency of existing practices including best management practices and treatment technologies and the costs associated with pollutant removals.

In addition, EPA is soliciting comment specifically on an alternative approach to the reporting and BMP requirements for the control of drugs and chemicals. Under this alternative, EPA would issue BMP guidance and recommendations in lieu of establishing the reporting requirements and BMP requirements for these pollutants (*i.e.*, Option 2). Both permit writers and CAAP facilities could use this guidance as a reference source when evaluating various control practices to minimize the discharge of pollutants. The Agency solicits comments on the effectiveness of BMPs related to the use of drugs and chemicals or practices that would minimize the need to use drugs and chemicals such as health management plans (*i.e.*, routine observations of fish behavior, maintaining water quality) and the extent to which facilities are already implementing BMPs. This approach could also be used to address concerns related to pathogens and non-native species. The Agency also solicits comments on practices used including record keeping and contingency plans (*i.e.*, preventive measures) to minimize escapes and discharges of pathogenic bacteria (*e.g.*, through proper management of aquatic animal mortalities).

C. Recirculating Systems

1. BPT

After considering all of the technology options described above, and in light of the factors specified in section 304(b)(1)(B) of the CWA, EPA is proposing to establish BPT limits on the basis of solids polishing (*i.e.*, additional solids removal) including a settling basin and the development of a BMP plan, and general reporting requirements for drugs and chemical use (Option 3) for existing recirculating facilities that produce more than

100,000 pounds per year. This option is technically available for recirculating systems at this size threshold. Based on analysis to date, the BPT cost comparison test indicates, as described in Section IX, that the cost per pound removed is \$0.07/lb using the removal loadings of the pollutant TSS. Therefore, based on the analysis to date EPA believes this option is economically achievable and cost reasonable. This option, the most stringent of the options considered, was chosen because no facilities experienced compliance costs greater than 5 percent of revenues. Further, this option has acceptable non-water quality environmental impacts.

As described earlier in Section VII.C.3, the specific effluent limitations guidelines proposed in this rule were derived based on a statistical analysis of the performance of solids polishing at existing recirculating facilities that are sufficiently similar to all of the recirculating facilities that would be subject to the effluent limitations guidelines. Solids polishing is currently used at 33 percent of recirculating system production facilities, and these technologies are widely used in other industries such as feedlots, food processing, and POTWs. BPT does not mean that the technology needs to be in routine use, but rather that the technology must be available at a cost and at a time that the Administrator determines to be reasonable, and that the technology has been adequately demonstrated if not routinely applied.

EPA is not proposing to establish effluent limitations guidelines for existing recirculating facilities that produce less than 100,000 pounds of aquatic animals per year because most recirculating systems produce warm water species which would not meet the CAAPF point source definition of 100,000 pounds per year and although EPA identified one facility producing a cold water species between 20,000 pounds per year and 100,000 pounds per year, the facility would experience significant cost impacts even from Option 1. EPA also evaluated an option that would apply to small recirculating facilities based on the development and implementation of a BMP plan to control solids as described in today's proposed regulation. EPA assumed 40 hours would be necessary to develop this plan with an additional requirement to implement the plan of two hours per month split evenly between labor and management time. The cold-water facility described above would experience compliance costs greater than 3% of its revenue for this BMP only option. Small facilities that

meet the definition of a CAAPF are subject to existing NPDES regulations, and would be subject to permit limits based on the permit writer's "best professional judgment" if the facility is a "concentrated aquatic animal production facility" under the regulations. EPA invites comment on application of the proposed applicability threshold and its estimations of cost reasonableness for recirculating systems.

As described in Section IX, EPA's economic analysis is based on the best existing data available to EPA, but we will be collecting financial data through our detailed survey which should provide a better basis for determining economic achievability. In addition, EPA is soliciting information concerning the costs for developing and implementing the BMP plan described in today's proposed regulation. EPA will reconsider both the BMP costs and the economic achievability. Therefore, EPA solicits comment on a requirement for small recirculating facilities to develop and implement a BMP plan based on the solids control practices included in today's proposal.

As noted previously, the options selected for recirculating systems include requirements to develop and implement a best management practices (BMP) plan, as well as some reporting requirements, for solids control (including control of associated non-conventional and toxic pollutants that EPA believes bind with such solids) and for other non-conventional and toxic pollutants, specifically, discharges of certain drugs and chemicals. For recirculating system facilities above the applicability threshold, EPA is proposing BMPs under both Options 1 and 2. For discussion of EPA's rationale for BMPs and reporting, see the discussion of BMPs in the BPT section regarding flow-through systems. Recirculating systems are expected to have much better opportunities to control such discharges. Likewise, recirculating systems have better opportunities to control the discharge of excess feeds.

2. BAT

EPA proposes to establish BAT equal to BPT for this subcategory. For this subcategory, there are no available technologies economically achievable that can achieve more stringent effluent limitations than those considered for BPT. Because of the nature of the wastewater and wastes generated from CAAP facilities, advanced treatment technologies or practices to remove additional solids (e.g., smaller particle sizes) in TSS that would be affordable

do not exist beyond those already considered.

EPA believes that the selected option for the recirculating system subcategory is cost reasonable and "economically achievable" because EPA estimates that the proposed effluent limitations guidelines would cause no facilities to experience compliance costs greater than or equal to 5% of their annual revenues. Finally, EPA has determined that the selected option has acceptable non-water quality environmental impacts.

3. BCT

EPA proposes to regulate BCT equal to BPT because EPA did not identify any more stringent technologies beyond those considered. For more details about the BCT cost test, see Section IX.G.

4. NSPS

After considering all of the technology options described above, and in light of the factors specified in sections 306 of the CWA, EPA proposes standards of performance for new sources equal to BAT (Option 3). For this subcategory, there are no current technologies that are more stringent than those considered for BPT or BAT other than adding disinfection. Because of the nature of the wastewater and wastes generated from CAAP facilities, advanced treatment technologies or practices to remove additional solids (e.g., smaller particle sizes) in TSS that would be affordable do not exist beyond those already considered.

EPA believes that the proposed NSPS would not present a barrier to entry. EPA believes that overall impacts from the proposed effluent limitations guidelines on new sources would not be any more severe than those on existing sources because the costs faced by new sources generally should be the same as or lower than those faced by existing sources. It is generally less expensive to incorporate pollution control equipment into the design at a new plant than it is to retrofit the same pollution control equipment in an existing plant. At a new source, no demolition is required and space constraints (which can add to retrofitting costs if specifically designed equipment must be ordered) may be less of an issue.

Although EPA is not proposing new source performance standards for smaller facilities (i.e., that produce between 20,000 and 100,000 pounds per year), EPA invites comment on whether downward adjustments to the proposed production thresholds would create a barrier to entry for new sources. As described in the BPT discussion, EPA intends to evaluate the costs and

potential barrier to entry for small new sources and solicits comments on the basis for the costs estimated for new sources.

EPA solicits comments on its proposed finding that the proposed threshold is appropriate and applicable to this subcategory.

5. No Regulation for Recirculating Systems

EPA is also considering whether it should establish national requirements for recirculating systems at all. If EPA were to decide not to promulgate national effluent guidelines for recirculating systems, it would likely be based on several factors. EPA may conclude that due to significant regional and facility-specific variations, it is more effective to continue to rely on the BPJ of permit writers to establish appropriate limitations. In addition, EPA may conclude that available technologies are either not affordable or provide little reduction in pollutant discharges relative to existing practice. EPA solicits comments on not regulating recirculating systems and encourages commenters to support such arguments with information and data, particularly data on the loadings, efficiency of existing practices including best management practices and treatment technologies and the costs associated with pollutant removals.

In addition, EPA is soliciting comment specifically on an alternative approach to the reporting and BMP requirements for the control of drugs and chemicals. Under this alternative, EPA would issue BMP guidance and recommendations in lieu of establishing the reporting requirements and BMP requirements for these pollutants (*i.e.*, Option 2). Both permit writers and CAAP facilities could use this guidance as a reference source when evaluating various control practices to minimize the discharge of pollutants. The Agency solicits comments on the effectiveness of BMPs related to the use of drugs and chemicals or practices that would minimize the need to use drugs and chemicals such as health management plans (*i.e.*, routine observations of fish behavior, maintaining water quality) and the extent to which facilities are already implementing BMPs. This approach could also be used to address concerns related to pathogens and non-native species. The Agency also solicits comments on practices used including record keeping and contingency plans (*i.e.*, preventive measures) to minimize escapes and discharges of pathogenic bacteria (*e.g.*, through proper management of aquatic animal mortalities).

D. Net Pen Systems

1. BPT

After considering all of the technology options described above, and in light of the factors specified in section 304(b)(1)(B) of the CWA, EPA is proposing to establish BPT limits on the basis of active feed monitoring (*i.e.*, additional solids removal) and the development of a BMP plan, and general reporting requirements for use of certain drugs and chemicals (Option 3) for facilities that produce more than 100,000 pounds per year as the technology basis for the effluent limitations guidelines for existing sources in the proposed rule. This option is technically available for net pen systems at this size threshold. The BPT cost comparison test indicates, as described in section IX, that the cost per pound removed is \$0.04/lb using the removal loadings of the pollutant, BOD. Based on currently available data, EPA believes this option is cost reasonable and economically achievable. EPA selected this option, the most stringent of the options considered, because no facilities are estimated to experience compliance costs greater than or equal to 5% of annual revenues.

As discussed in more detail below, EPA believes that this option is cost reasonable and "economically achievable" and represents the best performance that is economically achievable for facilities producing above the 100,000 pound threshold.

As discussed in more detail below, EPA is not proposing to establish effluent limitations guidelines for existing facilities that produce less than 100,000 pounds of aquatic animals per year because EPA has not identified any facilities below the 100,000 pounds per year threshold. If any facilities exist between the 20,000 and 100,000 pounds per year threshold, the facilities would be subject to existing NPDES regulations, and would be subject to permit limits based on the permit writer's "best professional judgment" if the facility is a "concentrated aquatic animal production facility" under the regulations. EPA invites comment on the application of the proposed production threshold and its estimation of cost reasonableness for net pen systems.

Further, this option (including not applying nationally applicable active feed monitoring requirements to smaller facilities) has acceptable non-water quality environmental impacts. Active feed monitoring, may also be a good business practice and it is already used by some facilities to reduce feed costs.

As noted previously, the options selected for net pen systems include requirements to develop and implement a best management practices (BMP) plan for solids control (focused primarily on feed management) and for other non-conventional and toxic pollutants, specifically, discharges of certain drugs and chemicals. For net pen facilities above the applicability threshold, EPA is proposing BMPs under both Options 1 and 2. For discussion of EPA's rationale for BMPs and reporting, see the discussion of BMPs in the BPT section regarding flow-through systems. Net pen systems do not present the same opportunities for solids control as do flow-through systems or recirculating systems. Therefore, EPA proposes active feed monitoring as the most effective and cost reasonable technology for solids control.

2. BAT

EPA proposes to establish BAT equal to BPT. EPA has determined that there are no more stringent options representing BAT that are available.

3. BCT

EPA proposes to regulate BCT equal to BPT because EPA did not identify any more stringent technologies beyond those considered. For more details about the BCT cost test, see Section IX.G.

4. NSPS

After considering all of the technology options described above, and in light of the factors specified in sections 306 of the CWA, EPA proposes standards of performance for new sources equal to BAT.

EPA believes that the proposed NSPS would not present a barrier to entry. EPA believes that overall impacts from the proposed effluent limitations guidelines on new source net pens would not be any more severe than those on existing net pens. The costs faced by new sources generally should be the same as or lower than those faced by existing sources. It would generally be less expensive to incorporate pollution control equipment into the design at a new plant than it would be to retrofit the same pollution control equipment in an existing plant. At a new source, no demolition would be required and space constraints (which can add to retrofitting costs if specifically designed equipment must be ordered) may be less of an issue.

Although EPA is not proposing performance for new sources for smaller cold water facilities (*i.e.*, those producing between 20,000 and 100,000 pounds per year), EPA invites comment on whether downward adjustments to

the proposed thresholds would create a barrier to entry for new sources.

EPA solicits comments on its proposed finding that the proposed threshold is appropriate and applicable to this subcategory.

5. No Regulation for Net Pen Systems

EPA is also considering whether it should establish national requirements for net pen systems at all. If EPA were to decide not to promulgate national effluent guidelines for net pen systems, it would likely be based on a combination of several factors. First, EPA may conclude that the baseline pollutant discharges from net pen systems are not large enough to warrant national regulations. In addition, EPA may conclude that due to significant regional and facility-specific variations, it is more effective to continue to rely on the BPJ of permit writers to establish appropriate limitations. Finally, EPA may conclude that available technologies are either not affordable or provide little reduction in pollutant discharges relative to existing practice. EPA solicits comments on not regulating net pen systems and encourages commenters to support such arguments with information and data, particularly data on the loadings, efficiency of existing practices including best management practices and treatment technologies and the costs associated with pollutant removals.

In addition, EPA is soliciting comment specifically on an alternative approach to the reporting and BMP requirements for the control of drugs and chemicals. Under this alternative, EPA would issue BMP guidance and recommendations in lieu of establishing the reporting requirements and BMP requirements for these pollutants (*i.e.*, Option 2). Both permit writers and CAAP facilities could use this guidance as a reference source when evaluating various control practices to minimize the discharge of pollutants. The Agency solicits comments on the effectiveness of BMPs related to the use of drugs and chemicals or practices that would minimize the need to use drugs and chemicals such as health management plans (*i.e.*, routine observations of fish behavior, maintaining water quality) and the extent to which facilities are already implementing BMPs. This approach could also be used to address concerns related to pathogens and non-native species. The Agency also solicits comments on practices used including record keeping and contingency plans (*i.e.*, preventive measures) to minimize escapes and discharges of pathogenic bacteria (*e.g.*, through proper

management of aquatic animal mortalities).

E. Ponds

As described above, EPA initially developed three technology options for pond facilities to control the discharge of pollutants. Initial Option 1 included practices to minimize the discharge of solids when ponds are drained and to minimize the frequency of overflows due to storm events. Initial Option 1 also included the BMP practices to minimize feed, reduce the need to use drugs and chemicals and prevent the escape of non-native species. Initial Option 2 required more extensive solids control with the establishment of a TSS limit that would be achieved either with the application of a vegetated ditch or a sedimentation pond to capture a portion of the pond drainage. Initial Option 3 would have required more treatment to control BOD and nutrients and was based on the application of constructed wetlands through which the pond drainage would be treated. EPA estimated the costs and pollutant reductions that could be expected to occur with each of these options and presented them to the Small Business Advocacy Review (SBAR) Panel, which is discussed in greater detail in Section XIII. The SBAR Panel sought feedback on these options, their costs and pollutant loading reductions from several Small Entity Representatives (SERs) who were asked to provide comments from their perspective as small businesses engaged in aquatic animal production in ponds.

EPA's preliminary estimates of costs for even Initial Option 1, indicated that it would impose significant financial hardship on many of the facilities. As noted previously, EPA estimated costs, for example, of BMP plans assuming 40 hours for development and 2 hours per month for implementation. The SERs noted that many of the structural best management practices that EPA was considering as part of Initial Option 1 were either inappropriate for their facilities or would be even more costly than EPA estimated. SERs also noted that depending on the configuration of the facility, it might not be possible to route all discharges through a single settling basin as considered under Initial Option 2. If several basins were needed, costs and land requirements could become cost prohibitive. Finally, the industry representatives argued that EPA's estimated baseline pollutant loadings discharged from pond systems grossly overstated the pollutant loads from ponds.

As a result of the feedback received from all of these sources, EPA

reconsidered technologies appropriate for pond systems and the minimal impact these technologies would have in reducing pollutant discharges. Most important, however, EPA anticipates that only a small number of ponds have discharges that meet the NPDES definitions for CAAP facilities. Therefore, EPA revised the options, accounting for the comments received on the preliminary analysis. The revised options assume that all existing pond facilities currently practice good management and therefore minimize the discharge of solids when draining ponds. This assumption regarding the water quality impacts of not regulating ponds is based on information provided from the industry and from representatives in EPA regional offices. Ponds are capable of assimilating the pollutants that are added to the system, thus settling basins generally would not be necessary for pond-based facilities where the pond itself can provide adequate solids settling. EPA estimated that 108 pond facilities met the CAAP facility definition and that these facilities represented 27% of the total regulated CAAP facilities and produce 73% of the production for the regulated CAAP facilities. The pollutant discharges from the pond facilities represent about 4% of the BOD, 12% of the total nitrogen, <1% of the total phosphorus, and 27% of TSS.

Nonetheless, EPA was concerned about potential pollutant discharges from some pond facilities due to the rapid drainage when harvesting the animals, in particular shrimp ponds. Shrimp are harvested through rapid pond drainage and capture of the animals in harvest structures which are external to the pond, to prevent the shrimp from burrowing into the pond bottoms. This drainage practice has the potential to discharge more solids because the pond bottom is disturbed during harvest. EPA has obtained information on shrimp production in Texas where there are many large producers. The State of Texas has issued discharge permits to all shrimp producers, which incorporate requirements on the discharge of wastewater from these facilities. Texas shrimp facilities must comply with numeric limitations for inorganic TSS and typically install sedimentation basins to capture the water that is removed from a pond prior to its discharge to surface waters. In addition, the Texas Department of Parks and Wildlife has concerns over the release of non-native shrimp, thus facilities have a series of structural barriers to prevent shrimp from escaping. There is also

shrimp production in South Carolina. Most of the shrimp in South Carolina are produced at small facilities, but there is one producer that is large enough to be considered a CAAP facility subject to NPDES requirements. This facility does have an NPDES permit and its permit includes a BMP directing it to treat its pond drainage to remove solids prior to discharge. EPA's revised analysis of the regulatory options took these practices into account in the baseline analysis.

Based on the information provided by the industry and permits issued to pond facilities, EPA is not proposing to establish any effluent guidelines requirements for discharges from pond facilities. EPA believes there are very few pond facilities that meet the definition of a CAAP facility and most of the pond discharges that do occur add only a trivial pollutant load because (1) the pond system itself already must have high quality water to produce aquatic animals and (2) surface drainage (due to excess precipitation) also will be of high quality. EPA supports the efforts of the various State agricultural extension services that have developed BMP recommendations for discharges from pond facilities. EPA believes that BMPs are very effective for controlling pollutant discharge from ponds and is also developing BMP guidance for pond producers. EPA's guidance would focus on practices to minimize solids in the discharges and to reduce the need to use drugs and chemicals. EPA will consider comments on the proposed BMP guidance manual that accompanies today's rule.

F. No Regulation Option

EPA solicits comments on the "no regulation" option for discharges from all production facility types and encourages commenters to support such arguments with information and data, particularly data on the loadings, efficiency of existing practices including best management practices and treatment technologies and the costs associated with pollutant removals.

EPA considered an option which would be to establish no national requirements for the entire point source category on a subcategory-by-subcategory basis. EPA is proposing this option for four sectors: pond operations, molluscan shellfish, alligators and aquariums, as described in Section V. EPA is also seeking comment, however, on this option for the other subcategories that today's proposed rulemaking would regulate.

G. CAAP Pretreatment Standards

EPA is proposing to not regulate indirect dischargers under today's effluent guidelines and standards. The indirect dischargers would be discharging mainly TSS and BOD, which the POTWs are designed to treat. In addition, the nutrients discharged from CAAP facilities that are in concentrations similar to nutrient concentrations in human wastes discharged to POTWs. The options EPA considered do not directly treat for nutrients, but nutrients are incidentally removed through the control of TSS. EPA believes that the POTW removals of TSS would get the equivalent nutrient removals obtained by the options considered for this proposed rulemaking and therefore concludes there would be no pass through of pollutant amounts necessitating regulation.

IX. Economic Analysis

A. Introduction

This section describes the capital investment and annualized costs of compliance with the proposed effluent limitations guidelines and standards for the concentrated aquatic animal production industry and the potential magnitude of those costs for the regulated community. EPA's economic assessment is presented in detail in the report titled "Economic and Environmental Impact Analysis of the Proposed Effluent Limitations Guidelines and Standards for the Concentrated Aquatic Animal Production Industry" (hereafter "EA") and in the rulemaking record. EPA conducted cost-reasonableness and nutrient cost effectiveness analyses on all options evaluated and performed an analysis of the economic impacts on small entities for the proposed options.

B. Economic Data Collection Activities

EPA relied on four major sets of data for today's proposal. The first set are the data collected in the screener survey titled "Screener Questionnaire for the Aquatic Animal Production Industry" OMB Control Number 2040-0237 (hereafter "screener survey") which EPA distributed to nearly 6,000 potential aquatic animal production facilities. The screener survey is described in more detail in Section IV.B of this preamble. The screener survey collected facility production data information, but no financial information (such as the facility's annual revenue or operating costs). EPA used the production data, combined with available price data, to estimate revenues for the model facilities for

which the Agency estimated costs. EPA also used the screener survey data to estimate the frequency with which the treatment practices that served as the technology basis for costing the various options occurred in the CAAP industry.

The second and third sets of data are from the United States Department of Agriculture, National Agricultural Statistics Service (USDA/NASS). The second data source is USDA's *Census of Aquaculture (1998)*, (60605), which is the primary source of publicly available data on the Nation's aquaculture industry (hereafter referred to as "the Census"). Specifically, the Census provides information on aquatic animal production, revenues (sales), method of production, species produced, sources of water, point of first sale outlets, cooperative agreements and contracts, and aquaculture distributed for restoration or conservation purposes. The third data source is a special tabulation of the Census data generated by USDA/NASS for EPA. The special tabulation did not collect new information on the industry, nor did it provide information at a level of detail that would disclose confidential information. The special tabulation rather provided data already collected for the Census in a classification scheme more useful for EPA's purposes. Specifically, the data provides facility counts and statistical information (mean, median, standard deviation and coefficient of variation) on a species basis for the six existing Census revenue categories (<\$24,999; \$25,000 to \$49,000; \$50,000 to \$99,999; \$100,000 to \$499,999; \$500,000 to \$999,999, and \$1 million or more). The special tabulation also provides this information for a new revenue category that corresponds to the Small Business Administration's size standard for a small aquatic animal production business (i.e., less than \$750,000 annually). EPA used the special tabulation data to examine the distribution of aquatic animal operations by revenue and species and to estimate the number of "small" entities affected by the proposed rule.

The fourth set of data are enterprise budgets developed by experts in aquacultural economics to depict financial conditions for representative aquaculture facilities. Enterprise budgets are useful tools for examining the potential profitability of an enterprise prior to actually making an investment. To create an enterprise budget, an analyst gathers information on capital investments, variable costs (such as labor and feed), fixed costs (e.g., interest and insurance), and typical yields and combines it with

price information to estimate annual revenues, costs and return for a project. By varying different input parameters, enterprise budgets can be used to examine the relative importance of individual parameters to the financial return of the project or to identify breakeven prices required to provide a positive return. The Economics Subgroup of the JSA/AETF provided EPA with enterprise budgets for trout, shrimp, hard clam, prawns, and alligators. In addition, EPA identified and collected other budgets through literature searches of publications, reports and analyses by regional aquaculture centers, universities and cooperative extensions, the aquatic animal production industry and its associated organizations.

EPA is currently in the process of collecting detailed facility-level technical and economic data on aquatic animal producers. This data collection effort is the "Detailed Questionnaire for the Aquatic Animal Production Industry" OMB Control Number 2040-0240 (hereafter "detailed survey") which EPA distributed in June 2002. The detailed survey is described in Section IV of this preamble. EPA intends to publish a Notice of Data Availability of its findings based on the detailed survey.

C. Economic Impact Methodologies

1. Economic Description of the Aquatic Animal Production Industry

The aquatic animal production industry includes sites that fall within the North American Industry Classification System (NAICS) codes 112511 (finfish farming and fish hatcheries), 112512 (shellfish farming), 112519 (other animal aquaculture), and part of 712130 (aquariums, part of zoos and botanical gardens). The first three groups have Small Business Administration size standards of \$0.75 million in annual revenue while the size standard for NAICS 712130 is \$6.0 million in annual revenue.

USDA reports that there were approximately 4,200 commercial aquaculture facilities in 1998 (DCN 60605). Based on revenues from aquaculture sales alone (not including other farm-related revenues from other agricultural crops at the facility), more than 90 percent of the facilities have revenues less than \$0.75 million annually and thus may be considered small businesses. The Small Business Administration's size standard is based on annual revenue at the company level for all products, so using facility revenue from aquaculture sales is likely to over-estimate the proportion of small

businesses in the industry. EPA intends to use company level revenue from the detailed survey data to identify the number of small businesses impacted by the final rule. Although aquaculture facilities exist in every State, there tends to be regional specialization by species as a result of local climate and the quality/quantity of water available for aquaculture (for example, catfish in the southeast, salmon on the northern coasts, and trout in Idaho).

In 1999, commercial farm-level aquatic animal sales totaled nearly \$1 billion (842 million pounds). The range of products includes: finfish raised for food and recreation (including food fish, sport or game fish, baitfish, or ornamental fish); crustaceans and molluscs raised for food; and other aquatic animals such as alligators, frogs, and turtles. Catfish and trout sales account for nearly fifty percent of the commercial market (>\$400 million annually and \$64 million annually in production, respectively).

The industry includes several types of ownership structures: (1) Commercial; (2) Federal and State; (3) Tribal; (4) academic and research; and (5) nonprofit. Within the private or commercial sector, ownership structures range from small family farms to large multinational firms. The non-commercial sector is also diverse. The U.S. Fish and Wildlife Service (FWS) operates 66 Federal hatcheries, six Fish Technology Centers, and nine Fish Health Centers. Its goals are to conserve, restore, enhance, and manage the Nation's fishery resources and ecosystems for the benefit of future generations. FWS distributes more than 50 species primarily to Federal, Tribal, State, and local governments. Many States operate fish hatcheries for stocking recreational fisheries, and EPA identified approximately 500 State hatchery facilities. In addition, USDA-ARS and DOC-NOAA operate aquaculture research facilities.

As an approximate measure of the size of the governmental aquatic animal production, fish distributions from the FWS in 1999 totaled 5.5 million pounds. *Fisheries* magazine published an overview of state coldwater fishery programs that listed 23.7 million pounds of trout and salmon distributed from State hatcheries in 1996 (DCN 20014). EPA estimates that production from 17 Tribal programs is more than 1.3 million fish annually.

EPA identified approximately 30 academic and research institutions that maintain facilities ranging from small research projects to full-scale systems for training the next generation of aquatic animal producers. Information

on the magnitude of these operations nationwide is currently being sought by EPA through the detailed survey.

Nonprofit organizations in the CAAP industry include 30 Alaskan hatcheries and non-taxable aquariums. Alaskan hatcheries are different from other State hatcheries. The farming of salmon, per se, was outlawed in 1990 (Alaska, 2001a; DCN 20002). Instead, Alaska permits nonprofit "ocean ranching" where salmon are reared from egg to smolt stage and then released into public waters to be available for harvest by fishermen upon their return to Alaskan waters as adults. EPA has identified two types of nonprofit organizations that exist in Alaska—four regional aquaculture associations and eight private nonprofit corporations—with a total annual permitted production of approximately 2 billion smolts for ocean release. EPA identified approximately 50 aquariums in the U.S., some of which are non-taxable establishments.

2. Methodological Overview

This section discusses potential impacts from the estimated compliance costs. The analysis consists of several components: (1) Assessing the number of facilities that could be affected by this rule; (2) estimating the annualized incremental compliance costs for model facilities to comply with the different requirements identified in the rule; (3) calculating model facility impacts using the test measure of the ratio of the estimated annual compliance costs to revenue from aquaculture sales (hereafter referred to as a revenue test); and (4) extrapolating from the individual model facility results to estimate facility impacts at the national level (*i.e.*, in the regulated universe) using the revenue test. EPA also calculated industry-wide costs and pollutant removals and performed cost-reasonableness and nutrient cost-effectiveness tests.

EPA used the screener survey data to characterize the industry by production system, species, ownership structure (commercial and non-commercial, with the latter including Federal, State, Tribal, academic/research, and other operators), and annual production at the facilities. EPA used the information to construct its model facilities. EPA converted the six revenue categories presented in the Census (<\$24,999; \$25,000 to \$49,000; \$50,000 to \$99,999; \$100,000 to \$499,999; \$500,000 to \$999,999, and \$1 million or more) to six production categories (ranges in pounds) for each species using the Census prices and assigned each screener survey facility to the

appropriate category. This conversion allows EPA to use information from both data sources as appropriate. As discussed in Section VII, EPA developed costs for 96 different combinations of production system/species/ownership structure/production category. All costs are reported in 2000 dollars, unless otherwise noted.

Neither the Census nor EPA's screener survey collected data on farm-level operating costs. This absence of matched pairs of operating cost and revenue data limited EPA's efforts in developing the economic analysis for proposal. EPA considered alternative approaches to the revenue test presented in today's preamble to examine economic impacts to the industry, including developing representative model facilities based on enterprise budget data. EPA determined these alternative approaches to be infeasible given the lack of information on the distribution of profits among aquatic animal producers. EPA intends to perform a detailed financial analysis on actual farm-level data collected in the detailed survey prior to final action on today's proposal. In today's proposal, EPA is using the existing technical and economic data to make preliminary evaluations of economic achievability in advance of the detailed survey data. Prior to final action of the rule, EPA

plans to provide the public with an opportunity to review and comment on the data received in response to the detailed survey.

EPA used information from the screener survey to calculate "frequency factors," that is, the portion of facilities represented by a model that already have a particular pollutant control practice in place. For example, if three of every ten facilities already have a particular pollutant control practice in place prior to the regulation, the frequency factor for that practice would be 0.30. EPA estimated costs for each pollutant control practice for each facility.

EPA used the frequency factors and pollutant control practice costs in two ways. First, the Agency calculated national estimates by calculating the weighted average of each pollutant control practice, *i.e.*, the product of the cost and (1 minus the frequency factor). The weighted average cost for each control practice within an option were summed to calculate the weighted average model facility cost for that option. EPA multiplied the weighted average model facility cost times the number of facilities represented by the model facility configuration. EPA performed these calculations for each model facility configuration and summed the results to estimate the

national industry compliance costs attributed to an option.

For the revenue tests, EPA assumed that a facility would incur the full pre-tax annualized compliance cost of any pollution control practices that it needed to implement to meet the proposed rule. For example, suppose an option has three components: control practice A with a cost of \$10 and a frequency factor of 0.9; control practice B with a cost of \$100 and a frequency factor of 0.5; and control practice C with a cost of \$1000 and a frequency factor of 0.1. In this case, a facility could incur any cost from \$0 (all control practices are already in place) to \$1110 (none of the control practices are already in place).

EPA used the frequency factors to calculate the probability of a facility incurring a particular control practice cost combination. Table IX.C.1 summarizes the probabilities of a facility incurring the example costs. The example model facility has a 90 percent probability of incurring a cost of \$1,000 or more (the sum of all probabilities for costs of \$1,000 or more). If the example model facility represents 50 facilities and the \$1,000 cost shows impacts at the 1 percent revenue threshold, EPA estimates that 45 facilities (or 50 x 0.9) would show impacts at the 1 percent revenue threshold.

TABLE IX.C.1—EXAMPLE OF APPLYING FREQUENCY FACTORS FOR REVENUE TESTS

Cost combination	Frequency factor (or inverse)			Facility cost	Probability of facility cost
	A	B	C		
ABC	0.1	0.5	0.9	\$1,110	0.045
AB	0.1	0.5	0.1	110	0.005
AC	0.1	0.5	0.9	1,010	0.045
A	0.1	0.5	0.1	10	0.005
BC	0.9	0.5	0.9	1,100	0.405
B	0.9	0.5	0.1	100	0.045
C	0.9	0.5	0.9	1,000	0.405
No cost	0.9	0.5	0.1	0	0.045
Sum of probabilities					1.000

While some non-commercial facilities—Federal and state hatcheries, academic and research facilities, and tribal facilities—might sell some of their production, most fish and egg distribution from these facilities have no market transaction (that is, the fish are not sold). The industry profile (Section III.C) indicates some of the differences between commercial and non-commercial facilities, but the economic analysis is constrained by the absence of cost and/or funding data for non-commercial facilities until detailed survey data are available. Given the data

available at this time—production level from the screener survey and market value from the Census—the only measure by which to evaluate impacts is to impute a value to their production based on annual harvest and commercial prices.

EPA considers the use of a revenue test for commercial and non-commercial facilities appropriate for this stage of the rulemaking. Government facilities might have the options of increasing user fees and budgets or re-directing budget allocations. Academic and research facilities might have the option of re-directing budget allocations. In other

words, the economic analysis for non-commercial facilities should differ from that performed for commercial facilities. While this is not possible with the information available at this time, EPA designed different versions of the economic and financial portion of the detailed questionnaire for government and academic/research facilities with the intent of collecting the data necessary for the different analyses.

D. Annualized Compliance Cost Estimates

As discussed in Section III, a concentrated aquatic animal production

facility (CAAP) is defined in 40 CFR 122.24 and appendix C. EPA has identified approximately 136 direct discharging CAAPs that would be regulated by this proposal. EPA calculated the economic impact on each model facility based on the cost of compliance using the technology basis for each of the options considered for the proposal. For existing direct dischargers, EPA calculated impacts for compliance with BPT, BCT, and BAT requirements; EPA is not proposing pretreatment standards for indirect

dischargers. As detailed in Section VIII, EPA based the proposed standards for direct discharges on Option 3 for all net pen systems and recirculating systems, as well as for flow-through systems with annual production of 475,000 pounds and greater. EPA based the proposed standards for direct dischargers for flow-through systems with annual production between 100,000 and 475,000 pounds on Option 1. EPA is not proposing standards for any production system with annual aquatic animal production less than 100,000 pounds

although EPA calculated costs and impacts for these smaller facilities.

EPA estimates that the total pre-tax annualized compliance costs attributed to the proposed rule are \$1.10 million (see Table IX.D.1) for facilities identified in the screener survey. More than half of the estimated cost is projected to be borne by non-commercial facilities. Among the commercial facilities, those with flow-through systems will incur the greatest share of the cost (\$0.16 million annually).

TABLE IX.D.1—ESTIMATED PRE-TAX ANNUALIZED COMPLIANCE COSTS BASED ON SCREENER DATA

Production system	Owner	Number of regulated CAAP facilities	Pre-tax annualized cost (Millions, 2000 dollars)
100,000–475,000 Pounds Production			
Flow-Through	Commercial	31	\$0.16
Flow-Through	Non-Commercial	57	0.30
Flow-Through	Alaska Non-Profit	15	0.32
Recirculating	Commercial	5	0.03
Net Pen	Commercial	0	NA
475,000 Pounds Production and Above			
Flow-Through	Commercial	9	0.04
Flow-Through	Non-Commercial	6	0.09
Flow-Through	Alaska Non-Profit	2	0.11
Recirculating	Commercial	3	0.02
Net Pen	Commercial	8	0.03
Total .....	.....	136	1.10

In order to estimate the national pre-tax annualized compliance costs attributed to the proposed rule, EPA multiplied the commercial facilities by a factor of 2.5. EPA believes it was able to identify all public facilities in its screener survey mailing list, so these compliance costs already represent national estimates and do not need to be scaled. The results of scaling up to the

national estimates are presented in Table IX.D.2. This factor was estimated by calculating the ratio of the number of potentially regulated facilities identified in the Census to the number of potentially regulated facilities identified in the screener survey results. EPA evaluated this comparison by system type and found, for those potentially regulated facilities, that the ratio was

fairly consistent (approximately 2.5). A more detailed explanation of this analysis can be found in the EA and rulemaking record (DCN 61793). For the final rule, EPA intends to evaluate other methods of estimating the number of potentially regulated facilities either using the screener or detailed survey data (see approach in TDD Appendix).

TABLE IX.D.2—ESTIMATED NATIONAL PRE-TAX ANNUALIZED COMPLIANCE COSTS

Production system	Owner	Number of regulated CAAP facilities	Pre-tax annualized cost (Millions, 2000 dollars)
100,000–475,000 Pounds Production			
Flow-Through	Commercial	78	\$0.40
Flow-Through	Non-Commercial	57	0.30
Flow-Through	Alaska Non-Profit	15	0.32
Recirculating	Commercial	13	0.06
Net Pen*	Commercial	NA	NA
475,000 Pounds Production and Above			
Flow-Through	Commercial	23	0.09
Flow-Through	Non-Commercial	6	0.09
Flow-Through	Alaska Non-Profit	2	0.11

TABLE IX.D.2—ESTIMATED NATIONAL PRE-TAX ANNUALIZED COMPLIANCE COSTS—Continued

Production system	Owner	Number of regulated CAAP facilities	Pre-tax annualized cost (Millions, 2000 dollars)
Recirculating	Commercial	8	0.05
Net Pen	Commercial	20	0.09
Total .....	.....	222	\$1.51

*EPA did not identify any commercial net pens of this size category in the screener survey.

E. Model Facility Impacts

As mentioned in Section IX.C.2, EPA used the revenue test to make preliminary determinations about economic achievability in advance of the detailed survey data. EPA is not associating any particular threshold of the revenue test with facility failure; such a determination will be made on the basis of facility-specific information collected in the detailed survey. For purposes of today's proposal, EPA believes that a large percentage of facilities experiencing impacts greater than 5% and/or a small percentage

experiencing impacts greater than 10% indicate disproportionate economic burden.

1. Flow-Through Systems

a. BPT. Table IX.E.1 summarizes the results of the revenue test for the three regulatory options at the 3, 5, and 10 percent thresholds. The results are divided into two size categories based on annual production of aquatic animals: facilities with annual production between 100,000 and 475,000 pounds and facilities with annual production greater than 475,000 pounds. The results are presented in

terms of the number of facilities whose test ratio is projected to exceed the threshold level (*i.e.*, the number of facilities that would incur incremental annualized compliance costs that are greater than 3, 5, and 10 percent of their annual revenue from aquaculture sales). EPA is proposing Option 1 for the smaller size category and Option 3 for the larger size category. EPA estimates that under these options, no facilities will incur compliance costs greater than 10 percent of revenues and only a small number of facilities will incur compliance costs greater than 5 percent.

TABLE IX.E.1—REVENUE TESTS FOR FLOW-THROUGH FACILITIES

Size	Facilities regulated	Option 1			Option 2			Option 3			Option selected
		>3%	>5%	>10%	>3%	>5%	>10%	>3%	>5%	>10%	
100,000–475,000 lbs:											
Commercial	78	25	8	0	25	15	0	35	23	23	1
Non-Commercial	57	0	0	0	0	0	0	4	0	0	1
Alaska Non-Profit	15	0	0	0	0	0	0	0	0	0	1
>475,000 lbs:											
Commercial	23	0	0	0	0	0	0	0	0	0	3
Non-Commercial	6	0	0	0	0	0	0	0	0	0	3
Alaska Non-Profit	2	0	0	0	0	0	0	1	0	0	3

*Numbers in the table represent the number of facilities projected to exceed the threshold level.

b. BCT. In July 1986, EPA developed its methodology for setting effluent limitations based on BCT (51 FR 24974). EPA evaluates the reasonableness of BCT candidate technologies—those that remove more conventional pollutants than BPT—by applying a two-part cost test: a POTW test and an industry cost-effectiveness test.

EPA first calculates the cost per pound of conventional pollutant removed by industrial dischargers in upgrading from BPT to a BCT candidate technology, and then compares this cost to the POTW benchmark. The POTW benchmark is the cost per pound for a POTW to upgrade from secondary to advanced secondary treatment. The upgrade cost to industry must be less than the POTW benchmark of \$0.25 per

pound (in 1976 dollars) or \$0.65 per pound (in 2000 dollars). In the industry cost-effectiveness test, the ratio of the cost per pound to go from BPT to BCT divided by the cost per pound to go from raw wastewater to BPT for the industry must be less than 1.29 (that is, the cost increase must be less than 29 percent).

EPA is establishing BPT limitations for flow-through facilities with an annual production of 100,000 pounds and greater. A BCT test can be performed for the category with 100,000 to 475,000 in annual production. (EPA is proposing the most stringent option for facilities with 475,000 and greater in annual production. Hence, there is no more stringent option to be considered for BCT for this group.) For purposes of

this analysis, EPA is assuming that the proposed BPT limits are baseline. Thus, EPA is considering only Options 2 and 3 as BCT candidate options.

Table IX.E–2 presents the calculations for the BCT cost test. The cost per pound to upgrade from secondary to advanced secondary treatment is less than \$0.65 for Option 3, so Option 3 passes the first part of the test. However, the cost per pound to go from raw wastewater to BPT is \$0.20, therefore the ratio of the cost per pound to go from BPT to BCT divided by the cost per pound to go from raw wastewater to BPT for the industry is 2.08 and Option 3 fails the second part of the test. Based on these results, EPA is proposing that BCT be set equal to BPT.

TABLE IX.E.2—POTW COST TEST CALCULATIONS FOR FLOW-THROUGH SYSTEMS (100,000–475,000 POUNDS IN ANNUAL PRODUCTION)

Option	Incremental conventional pollutants removed (lbs.)	Incremental pre-tax total annualized costs (Millions, 2000 \$)	Ratio of costs to removals (POTW test)	Pass POTW test?	BPT-BCT Raw-BPT ratio (Industry test)	Pass industry test?
2	0	\$0.03	Undefined	No	NA	NA
3	874,136	0.37	0.42	Yes	2.08	No

c. BAT. The technology options EPA considered for BAT are identical to those it considered for BPT for existing dischargers. Because EPA projects limited economic impacts associated with the BPT requirements, EPA does not expect significant economic impacts for BAT. EPA did not select the more stringent Option 2 for facilities between 100,000 and 475,000 pounds production per year because EPA was concerned about the number of commercial facilities (15 out of 78) estimated to experience compliance costs greater than 5% of revenues from aquaculture sales. EPA also determined that Option 3 would not be economically achievable for these facilities based on the high number of facilities (23 out of 78) estimated to experience compliance costs greater than the 10% revenue threshold. EPA selected Option 3 for facilities with greater than 475,000 pounds production because no facilities are estimated to experience compliance costs that exceed the 5% revenue threshold.

2. Recirculating Systems

a. BPT. EPA is proposing Option 3 for recirculating systems with annual production greater than 100,000 pounds. EPA estimates that under this option, none of the 21 recirculating facilities will incur compliance costs greater than 3 percent of revenues (which by definition also implies that no facilities will incur compliance costs greater than 5 percent or 10 percent).

b. BCT / BAT. EPA is proposing the most stringent option for facilities with recirculating systems. Hence, there is no more stringent option to be considered for BCT, so BCT is set equal to BPT. The technology options EPA considered for BAT are identical to those it considered for BPT. Because EPA projects limited economic impacts associated with the BPT requirements, EPA expects only limited economic impacts for BCT and BAT.

3. Net Pen Systems

a. BPT. None of the model facilities for net pen systems incur compliance costs greater than 3 percent of revenues

for any of the regulatory options. EPA is proposing the most stringent option, Option 3, as BPT for net pen systems.

b. BCT / BAT. EPA is proposing the most stringent option for facilities with net pen systems. Hence, there is no more stringent option to be considered for BCT, so BCT is set equal to BPT. The technology options EPA considered for BAT are identical to those it considered for BPT for existing dischargers. Because EPA projects limited economic impacts associated with the BPT requirements, EPA expects only limited economic impacts for BAT.

5. New Source Performance Standards for All Production Systems

EPA is proposing new source performance standards that are identical to those proposed for existing dischargers that meet the 100,000 pound production threshold. Engineering analysis indicates that the cost of installing pollution control systems during new construction is no more expensive than the cost of retrofitting existing facilities and is frequently less expensive than the retrofit cost. Because EPA projects the costs for new sources to be equal to or less than those for existing sources and because limited impacts are projected for these existing sources, EPA does not expect significant economic impacts (or barrier to entry) for new sources that meet the 100,000 pound production threshold.

EPA is considering establishing new source performance standards for smaller coldwater CAAP facilities that produce between 20,000 and 100,000 pounds per year. Based on the screener data, EPA initially identified 110 facilities in this group. EPA intends to conduct further analysis pertaining to this issue using detailed survey data. EPA invites comment on whether compliance costs would represent a barrier to entry to these facilities.

F. Other Economic Impacts

1. Firm-Level Impacts

For the final rule, EPA intends to conduct an analysis of firm-level impacts with the detailed survey data.

No firm-level analysis is possible at this time due to data constraints that arise from the predominance of privately-held (*i.e.* firm not required to file financial information with the Securities and Exchange Commission) and foreign-held firms. The salmon industry, for example, is predominantly foreign-held. Due to differences in accounting standards, EPA does not routinely consider foreign firms in its financial analysis. EPA also intends to examine the potential cumulative impacts on non-commercial concentrated aquatic animal production facilities, such as State and Federal hatcheries, using information collected in the detailed survey.

2. Community-Level Impacts

EPA did not identify any data source with detailed employment information for the aquatic animal production industry. Given that the scope of the proposed regulation is focused on a limited number of larger facilities, EPA believes that is not likely to cause severe community impacts. EPA intends to examine community-level impacts based on detailed survey data.

3. Foreign Trade Impacts

EPA believes that proposed regulations will have little, if any, impact on foreign trade. Several species, including striped bass, tilapia, trout, and salmon, face significant foreign competition. However, no facilities in the striped bass sector are expected to incur compliance costs that exceed the 1 percent revenue threshold, and no tilapia or salmon facilities are expected to incur compliance costs that exceed the 3 percent revenue threshold. EPA used its regulatory flexibility and proposed different options for different levels of production for the system most commonly used to raise trout (*i.e.*, flow-through) to mitigate potential adverse impacts. EPA solicits comments on the potential impacts of the proposed rule on foreign trade.

G. BPT Cost Comparison Test and Cost-Effectiveness Analysis

EPA is evaluating technology options for the control of only conventional pollutants at BPT. CWA Section 304(b)(1)(B) requires a cost-reasonableness assessment for BPT limitations. In determining BPT limitations, EPA must consider the total cost of treatment technologies in relation to the effluent reduction benefits gained by such technology. This inquiry does not limit EPA's broad discretion to adopt BPT limitations that

are achievable with available technology unless the required additional reductions are wholly out of proportion to the costs of achieving such marginal reduction.

The BPT cost comparison test is based on the average cost per pound of pollutants removed by a BPT regulatory option. The cost component is measured as total pre-tax annualized costs in 2000 dollars. In this case, the pollutants removed are conventional pollutants although, in some cases, removals may include priority and nonconventional pollutants. Historically, the cost

comparison values have ranged from \$0.21 to \$33.72 (2000 dollars).

For the CAAP industry, EPA has chosen to evaluate cost reasonableness on the basis of the higher of TSS or BOD removals (not the sum of these removals) to avoid possible double-counting of removals. The costs and removals for the proposed options for the flow-through, recirculating, and net pen subcategories are summarized in Table IX.G.1. The cost comparison values range from \$0.04/lb to \$0.23/lb, values that EPA considers to be acceptable.

TABLE IX.G.1.—BPT COST COMPARISON TEST

Production system	Total pre-tax annualized cost (2000\$)	Conventional pollutant removals (lbs)	Average cost per pound (\$/lb)
Flow-Through	\$1,004,363	4,450,465	\$0.23
Recirculating	45,071	638,365	0.07
Net Pens	34,345	868,899	0.04

a. *Nutrient Cost-Effectiveness.* EPA also has calculated the cost-effectiveness of the removal of nutrients for the options considered in today's proposal. As a benchmark for comparison, EPA has estimated that the average cost-effectiveness of nutrient removal by POTWs with biological nutrient removal is \$4/lb for nitrogen and \$10/lb for phosphorus. Table IX.G.2 summarizes the nutrient cost-

effectiveness by production system for all the options considered. The removals are given for total nitrogen (TN) and total phosphorus (TP) individually and on a combined basis. Option 2 always has a higher nutrient cost-effectiveness value than Option 1 because the additional requirement for a health management plan adds costs but results in no nutrient removals. For recirculating systems and net pen

systems, all options are more cost-effective than these benchmarks. For flow-through systems, nutrient cost-effectiveness significantly exceeds these benchmarks suggesting that the requirements are not very cost effective for removing nutrients at flow-through systems. However, as noted previously all options for all systems were within the BPT cost comparison range that EPA considers to be acceptable.

TABLE IX.G.2—COSTS, NUTRIENT REMOVALS, AND COST-EFFECTIVENESS FOR OPTIONS CONSIDERED

Option	Total annualized cost (2000\$)	Average nutrient cost effectiveness (TN + TP, \$/lb)		Average nutrient cost-effectiveness (TN, \$/lb)		Average nutrient cost-effectiveness (TP, \$/lb)	
		Removals	\$/lb	Removals	\$/lb	Removals	\$/lb
Flow-Through:							
1	\$946,796	5,121	\$184.89	2,110	\$448.72	3,011	\$314.45
2	998,269	5,121	194.94	2,110	473.11	3,011	331.54
3	1,438,226	110,666	13.00	85,469	16.83	25,197	57.08
Recirculating:							
1	30,469	0	NA	0	NA	0	NA
2	33,587	0	NA	0	NA	0	NA
3	45,071	32,453	3.12	25,090	1.80	7,363	6.12
Net Pens:							
1	6,205	66,170	0.09	56,717	0.11	9,453	6.13
2	9,322	66,170	0.14	56,717	0.16	9,453	31.04
3	34,345	86,890	0.40	74,477	2.61	12,413	2.77

EPA is proposing a tiered approach for flow-through systems with Option 1 for systems with production levels between 100,000 and 475,000 pounds, and Option 3 for systems with production

levels 475,000 pounds and higher. Due to the absence of economies of scale, smaller facilities bear a relatively higher cost per pound of pollutant removal. EPA is proposing Option 3 for all

recirculating and net pen systems. Table IX.G.3 summarizes the nutrient cost-effectiveness for the proposed options.

TABLE IX.G.3.—COSTS, NUTRIENT REMOVALS, AND COST-EFFECTIVENESS FOR PROPOSED OPTIONS

Production system	Total annualized cost (2000)	Average nutrient cost-effectiveness (TN +TP, /lb)		Average nutrient cost-effectiveness (TN, /lb)		Average nutrient cost-effectiveness (TP, /lb)	
		Removals	/lb	Removals	/lb	Removals	/lb
Flow-Through	\$1,004,363	66,103	\$15.19	50,273	\$19.98	15,830	\$63.45
Recirculating	45,071	32,453	3.12	25,090	1.80	7,363	6.12
Net Pens	34,345	86,890	0.40	74,477	2.61	12,413	2.77
Total	1,083,779	185,446	5.84	149,840	7.23	35,606	30.44

H. Small Business Analysis

Based on the special tabulation from the Census discussed in Section IX.B, EPA identified approximately 4,200 small commercial aquatic animal producers, which represents over 90 percent of the total AAP producers. Based on screener survey data, EPA identified: a total of 999 small entities (including 26 small Alaskan flow-through facilities that are non-profits); a total of 344 small entities that met the definition of a CAAP facility; and 48 small entities that are within the scope of the proposed rule (31 flow-through, 12 Alaskan, and 5 recirculating). That is, about 35 percent of facilities within the scope of the proposed rule are small. Of the 36 regulated small CAAP facilities that are commercially owned, approximately 17 (which represents 5 percent of the total small CAAP facilities or 47 percent of the regulated small CAAP facilities) incur compliance costs greater than 1 percent of aquaculture revenue and 10 small commercial entities (which represents less than 3 percent of the total small CAAP facilities or 28 percent of the regulated CAAP facilities) incur compliance costs greater than 3 percent.

For commercial facilities, EPA assumed that the facility is equivalent to the business, an assumption that will be re-examined when detailed survey data is available. However, because sufficient data is available to determine the parent nonprofit association (and its revenues) for the small Alaskan nonprofit facilities, EPA analyzed small entity

impacts at the level of the parent association. EPA determined that 12 small Alaskan nonprofit facilities within scope of the proposed rule are owned by 8 small nonprofit associations. Of the 6 small Alaskan nonprofit associations for which EPA had data, 3 associations incur compliance costs greater than 1 percent of revenues and 1 association incurs compliance costs greater than 3 percent.

EPA intends to make its final determination of the impact of the aquatic animal production rulemaking on small businesses based on analyses of the detailed survey data. EPA did convene a Small Business Advocacy Review Panel pursuant to section 609(b) of the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA). For a discussion of the Panel's outreach and findings see Section XIII.B.

I. Cost-Benefit Analysis

Table IX.I.1 summarizes the total social costs and benefits of the proposed rule. The estimated pre-tax annualized compliance cost is \$1.51 million in 2000 dollars for the proposed rule (see Table 6–5). All CAAP facilities within the proposed scope are currently permitted, so incremental administrative costs of the regulation are negligible. However, Federal and State permitting authorities will incur a burden for reviewing the BMP plan and reports on the use of drugs and chemicals. EPA estimates these costs to be approximately \$3,337

per year (EPA ICR No. 2087.01). That is, the recordkeeping and reporting burden to the permitting authorities is less than two-tenths of one percent of the pre-tax compliance cost for the proposed rule. The social costs are shown using both a 7 percent and 3 percent discount rates.

The monetized benefits presented are based on the Mitchell and Carson contingent valuation estimates of annual willingness to pay, so the total willingness to pay derived from these values is an annual amount. The model facility approach did not provide any intuition about the timing of compliance or the dynamics of when benefits would accrue so the benefit analysis is based on the environmental effects achieved when the proposed regulation is fully implemented. There is no variation through time. The annualized value of a level annual flow is equal to the annual flow itself, when the rate for discounting and annualization are the same. Thus, the annualized benefits are the same as the annual benefits no matter what discount rate is applied. The estimated monetized benefits of the rule range from \$0.022 million to \$0.113 million. This is likely to be an underestimate because EPA can fully characterize only a limited set of benefits to the point of monetization. Section 10.6 describes several types of benefits—those that can be both quantified and monetized; those that can be quantified but not monetized; and those that cannot be quantified or monetized.

TABLE IX.I.1.—ESTIMATED SOCIAL COSTS AND MONETIZED BENEFITS

Production system	Number of regulated CAAPFs	Pre-tax annualized cost (Millions, 2000 dollars)		Annualized monetized benefits* (Millions, 2000 dollars)	
		7%	3%	Min	Max
Flow-Through	181	\$1.31	\$1.20	\$0.019	\$0.091
Recirculating	21	0.11	0.11	0.003	0.022
Net Pen	20	0.09	0.08	.....	.....
Industry Total	222	1.51	1.39	0.022	0.113
State and Federal Permitting Authorities .....	.....	0.003	0.003	.....	.....

TABLE IX.I.1.—ESTIMATED SOCIAL COSTS AND MONETIZED BENEFITS—Continued

Production system	Number of regulated CAAPFs	Pre-tax annualized cost (Millions, 2000 dollars)		Annualized monetized benefits * (Millions, 2000 dollars)	
		7%	3%	Min	Max
Estimated cost of the proposed rule	1.513	1.393	0.022	\$0.113

* Monetized benefits are not scaled to the national level.

The monetized benefits are based on the 128 flow-through and recirculating systems from the screener data (*i.e.*, are not scaled to the national level) because EPA was not able to estimate a representative national scaling factor. Hence, Table IX.I.1 compares annualized compliance costs associated with 222 facilities to annualized benefits from 128 facilities.

X. Water Quality Analysis and Environmental Benefits

A. CAAP Environmental Impacts

1. Nutrients, Solids, and Water Quality

As described earlier, some CAAP facilities may contribute significant amounts of nutrient (nitrogen and phosphorus) and solids to receiving waters. These discharges have the potential to contribute to a number of water quality impacts related to eutrophication, defined as an increase in the rate of supply of organic matter in an ecosystem (Nixon, 1995, as cited in NSTC, 2000 (DCN 61562)). The increase in organic matter can be caused

either by increased inputs from sources outside of the ecosystem (*e.g.*, agricultural runoff or industrial effluents) or by enhanced organic matter production within the ecosystem caused by increased nutrient inputs to the system. Adverse environmental consequences of eutrophication include harmful algal blooms, increased water column turbidity, low dissolved oxygen and associated stresses to stream biota, increased water treatment requirements, changes in benthic fauna, and stimulation of harmful microbial activity with possible adverse consequences for human health. These consequences have long been a concern in the protection and development of water resources (*e.g.*, Dunne and Leopold, 1978; DCN 61563).

As noted earlier in the Preamble, actual water quality impacts from CAAP facilities vary greatly and depend on type and size of facility, treatment processes and technologies, and physical, biological, and chemical characteristics of the receiving water body. However, EPA estimates of

untreated (“raw”) model facility loadings shown in Table X.A.1 suggest that large CAAP facilities can, in the absence of treatment, contribute significant total annual pollutant loads. Estimated loadings from large net pen facilities, not shown in Table X.A.1, range from about 132,000 pounds to over four million pounds annually. When multiple CAAP facilities are located on a single receiving water, which occurs in such states as Idaho and Maine, cumulative pollutant loadings to the receiving water may be correspondingly higher and may be of concern from a stream ecology perspective. EPA’s Region 10 identified discharges from CAAP facilities as contributors to phosphorus problems in the middle Snake River, where over 70 CAAP facilities, several municipal treatment plants, and several food processors were identified. The region adopted strict numeric limits on phosphorus from the CAAP facilities that led to an overall reduction in phosphorus over the past five years (Fromm and Hill, 2002; DCN 31005).

TABLE X.A.1.—TYPICAL RAW POLLUTANT LOADINGS FOR INDIVIDUAL FLOW-THROUGH AND RECIRCULATING MODEL FACILITIES

[FT = flow through; SB = striped bass; M = medium; L = large. (For definition of model facility size categories, see Chapter 9 of the CAAP Development Document (DCN 61552))]

	BOD5 (lb/yr)	Total nitrogen (lb/yr)	Total phosphorus (lb/yr)	Total suspended solids (lb/yr)
Salmon FT L	2,019,852	8,678	19,707	1,731,301
SB FT M	62,149	267	606	53,271
Tilapia FT M	155,373	668	1,516	133,177
Tilapia FT L	388,433	1,669	3,790	332,943
Trout FT M	77,687	334	758	66,589
Trout FT L	1,009,926	4,339	9,853	865,651
Trout Stockers FT M	77,687	334	758	66,589
Trout Stockers FT L	466,120	2,003	4,548	399,531
SB Recirc L	383,564	1,650	4,181	328,770
Tilapia Recirc L	127,855	550	1,394	109,590

Source: CAAP Economic Analysis (DCN 20141).

Seven States, reporting recently under CWA section 303(d), identify CAAP facilities as a potential source of impairment for one or more water bodies. These States include Illinois, Louisiana, North Carolina, New Hampshire, New Mexico, Ohio, and

Virginia. None of these states, excluding North Carolina and New Mexico, submitted a 2000 report of impaired waters and their listings from 1998 are considered current. North Carolina and New Mexico did submit a 2000 report, which updates the impaired waters

listed in the 1998 report. Nationwide, CAAP is listed as one of numerous potential sources of impairment for 191 miles of rivers and streams (less than 1% of all rivers and streams nationwide that were reported to be impaired), and for 2,788 acres of lakes, reservoirs, and

ponds (less than 1% of all lake, reservoir and pond acreage nationwide reported to be impaired; EPA, 2002; DCN 40319). It should be noted that other sources frequently also contribute to impairment of water bodies where CAAP is cited as a potential source of impairment.

Several researchers in the United States have measured biological variables downstream of aquaculture facilities. In some cases, researchers observed impacts such as the presence of pollution-tolerant benthic invertebrates and changes in biomass and species richness (e.g., Kendra, 1991 (DCN 60366); Selong and Helfrich, 1998 (DCN 60542)). In other cases (e.g., Huggett *et al.*, 2001 (DCN 61564)), pollutants evaluated in this study were not found to negatively impact the receiving stream. Although limited studies on biological impacts of CAAP effluents have been published, States and other authorities have taken regulatory action to address concerns with water quality impacts from CAAP facilities (e.g., EPA, 2002 (DCN 61728)).

EPA solicits public comment and data regarding potential impacts of nutrient and solids loadings from CAAP facilities on water quality, biological, and other characteristics of the receiving waters.

2. CAAP Drugs and Chemicals and Water Quality

As noted earlier in this Preamble, some CAAP facilities utilize animal drugs that are discharged directly into the receiving waters. The U.S. Food and Drug Administration (FDA)/Center for Veterinarian Medicine (CVM) regulates animal drugs under the Federal Food, Drug, and Cosmetic Act (FFDCA). While extensive toxicity studies are generally required prior to drug approval from FDA, limited data on potential environmental effects may be available for some medications that are currently authorized for investigational use by FDA according to FFDCA section 512(j), 21 U.S.C. section 360b(j). In addition, pesticides such as a variety of copper compounds (used to kill unwanted algae or to prevent the growth of fouling organisms) can impair aquatic organisms in receiving waters depending on the rates being applied and other factors such as the breakdown rate of the product or active ingredient. EPA is not aware of research documenting or characterizing the ecological significance of releases of drugs and chemicals at aquaculture facilities in the United States. However, the presence of, for example, residual antibiotics in the environment and in wild organisms near salmon net pens in the United States has been documented

(Capone *et al.*, 1996, as cited in Boxall *et al.*, 2001 (DCN 61789)). EPA furthermore recognizes that general concerns with residual antibiotics and pesticides in the environment have been raised. Residual antibiotics and pesticides may pollute the water and immunize the organisms they are designed to control. The effects of these actions can be distributed well outside the original area of use (NOAA, 1999 (DCN 31006)).

3. Pathogens

CAAP facilities are not considered to be a significant source of pathogens that adversely affect human health (MacMillan *et al.*, 2002 (DCN 61608)). CAAP facilities culture cold-blooded animals (fish, crustaceans, molluscs, *etc.*) that are unlikely to harbor or foster pathogens that would adversely affect warm-blooded animals (e.g. humans) by causing disease (MacMillan *et al.*, 2002 (DCN 61608)). CAAP facilities could become contaminated with such pathogens, e.g., wastes from warm-blooded animals contaminating CAAP facility waters or the source waters used by CAAP facilities, but this is not considered a substantial risk in the United States (MacMillan *et al.*, 2002 (DCN 61608)).

It has been suggested that CAAP facilities may serve as sources of infectious disease transmission to wild populations of aquatic organisms. Such infectious diseases may include those from pathogens that are exotic to native ecosystems, as well as the much larger group from pathogenic microbes that already exist in wild fish populations. For example, wastes and escapement of infected shrimp from CAAP facilities is considered a potential pathway for wild shrimp exposure to viral diseases (JSA Shrimp Virus Work Group, 1997 (DCN 61561)). Blazer and LaPatra (2002; DCN 40361) cite several studies suggesting that CAAP facilities may have been sources of disease transmission to wild populations. An example they describe is that of the Asian tapeworm (*Bothriocephalus acheilognathi*) which was identified in North America in 1975 and became established in fish farms where golden shiners *Notemigonus crysoleucas*, fathead minnows *Pimephales promelas*, and grass carp were raised. They suggest that the more recent use of poeciliids such as mosquitofish *Gambusia affinis* for mosquito control, and possible releases of exotic fishes from aquaria, may have served as mechanisms for the introduction of this parasite into native fish in areas such as Hawaii. As described in Blazer and LaPatra (2002; DCN 40361), Font and Tate (1994) found

that native Hawaiian fish from streams where no exotic species were found were completely free of adult helminthes, including the Asian tapeworm. Conversely, in two rivers with exotic species, nematodes and Asian tapeworms were found in both the exotic species and the native fish (Blazer and LaPatra, 2002 (DCN 40361)).

Blazer and LaPatra's (2002; DCN 40361) discussion on the potential pathogen risks to wild fish populations from cultured fish also provided a summary of risks from viruses, such as infectious hematopoietic necrosis virus (IHNV), infectious pancreatic necrosis virus (IPNV), and infectious salmon anemia virus (ISAV), and bacteria, such as *Edwardsiella ictaluri* and *Renibacterium salmoninarum*. Although these viruses and bacteria are hazardous to wild fish populations, a causative association between CAAP facilities and disease outbreaks in wild populations was not clearly identified.

4. Non-Native (Exotic) Species

Introductions of non-native, or exotic, aquatic organisms from CAAP facilities into the environment via intentional or accidental releases is another area of concern. The health of wild populations of aquatic animals can be affected by the release of cultured individuals or spawning products into the surrounding environment (NOAA, 1999 (DCN 31006); Goldberg *et al.*, 2001 (DCN 30788); Naylor *et al.*, 2001 (DCN 61335); Carlton, 2001 (DCN 61434); Volpe *et al.*, 1999 (DCN 60611)). Concerns relate to potential impacts on native ecosystems and aquatic biota from disease, parasitism, interbreeding, and competition that may arise from the escaped organisms. Interbreeding among cultured and wild individuals, as well as competitive interactions between released populations and local wild populations can lead to declines in the wild populations (NOAA, 1999 (DCN 31006)).

Escapement of Atlantic salmon from net pens in the Pacific Ocean has been documented. Since a reporting regulation was imposed in 1996, nearly 600,000 Atlantic salmon escaped in the state of Washington between 1996 and 1999 (Nash, 2001 (DCN 40149)). In 1997, 300,000 Atlantic salmon escaped into Puget Sound when net pens were accidentally breached (Weber, 1997 (DCN 40151)). Atlantic salmon have also escaped from net pens in the Atlantic Ocean. In 2000, Atlantic salmon escaped from a net pen off the coast of Maine, when a boat slammed into the pen, causing a breach. Approximately 13,000 farmed salmon were released near one of the rivers where wild

Atlantic salmon are listed as endangered (Clancy, 2000 (DCN 40139)).

Cultured aquatic animals have been released in the United States with adverse ecological impacts. Carp, introduced from Asia for food production and biological control, subsequently became established in rivers in the Mississippi River basin and compete with native fish. Non-native Atlantic salmon (*Salmo salar*) now outnumber wild salmon in some spawning rivers; and non-native salmon that become established in the wild may increase pressure on endangered native salmon populations (Naylor *et al.*, 2001 (DCN 61335)). Adverse impacts to native species may be of particular concern when the native species are endangered (NOAA, 1999 (DCN 31006)). Recently, authorities in New England have prohibited at one facility the use of non-North American strains of Atlantic salmon and genetically modified salmonids to protect a distinct population segment of federally-listed endangered species (EPA, 2002a; DCN 61728)). Thus, while EPA is not aware of studies that quantitatively characterize the overall significance of aquaculture's contribution to non-native species issues, the Agency believes, based upon the literature reviewed, that this is a potential area of concern for this sector.

5. Other Impacts

Maintenance of the physical plant of aquaculture facilities can generate organic materials "which may be retained in the surrounding waterbody. These materials can cause biological and physical alteration of the surrounding environment. This type of waste is not widely recognized, but can be quite severe" (NOAA, 1999 (DCN 31006)). For example, cleaning organisms that foul nets from net pens can contribute solids, BOD, and nutrients although such inputs are generally produced over a short period of time. Cleaning algae from flow-through raceway walls and bottoms similarly generates pollutants in effluent. EPA solicits comments or data relating to these, or other potential areas of environmental impact.

B. Environmental Benefits Analysis

1. Environmental Endpoints Evaluated

EPA anticipates that improvements in water quality will result from today's proposed action, and as a consequence, increases in both the recreational as well as the non-use value of affected water bodies will also result. This may include improvements in ecological and biological endpoints in receiving waters

as a result of the expected water quality benefits of today's proposed action. Finally, today's proposed action provides better information on the use of drugs and other chemicals.

EPA has quantified and monetized a subset of the anticipated benefits of today's proposed action due to lack of assessment modeling tools for some benefits categories. The central basis for the quantitative benefits analysis is a water quality modeling assessment that estimates water quality responses to the pollutant loading reductions under technology options described earlier in this Preamble. Specifically, the benefits that EPA has been able to quantify are (a) water quality improvements in stream reaches downstream of flow-through and recirculating systems, and (b) improvements in the recreational use value of these same reaches. Benefits that were not quantified include water quality and ecological responses to pollutant loading reductions at marine net-pen systems and at other coastal facilities such as Alaskan salmon hatcheries. Ecological and other water resource benefits from reductions in releases of non-native species, aquatic animal pathogens, and drugs and chemicals used at CAAP facilities may be only partially captured in the monetized benefits analysis. Thus, the estimated monetized benefits of today's proposed action may understate the potential benefits of the proposed regulation.

As discussed at the end of the previous economic section, EPA estimates the monetized benefits of today's proposed rule for flow-through and recirculating systems to range from \$22,000 to \$113,000 based on an estimated 128 facilities. The range reflects uncertainty in assumed background water quality and stream flow conditions in receiving streams. Again, this estimated range does not include other potential benefits such as those from net pen systems and other coastal facilities. The following sections briefly describe the benefits analysis.

2. Water Quality Modeling Approach

One approach to estimating water quality benefits of the proposed rule involves simulation of water quality responses at potentially regulated facilities and requires data on facility locations, baseline effluent quality for regulated facilities, and data characterizing the hydrologic and water quality conditions of the specific receiving waters at these facilities. At proposal, data inputs required for a detailed analysis were not available. Alternatively, EPA has developed a representative case study approach to

estimate water quality-related benefits for model flow-through and recirculating facilities on a "prototype" stream reach. Under this approach, ranges of hydrologic and water quality characteristics for a "prototype" stream reach associated with flow-through and recirculating systems were developed. These ranges were developed by (a) identifying a region where a relatively large number of CAAP facilities are located, and where streamflow, water quality, and facility location data are available, and (b) using these data to develop generalized background streamflow and water quality characteristics associated with the streams on which CAAP facilities in this region are located. EPA was able to identify sufficient data for facilities mainly in western North Carolina (Central/Eastern Forested Uplands ecoregion). The development of the "prototype" stream reach characteristics is described in greater detail in the CAAP Economic Analysis (DCN 20141). The results of this case study may be of limited applicability to other ecoregions.

EPA then modeled water quality responses under regulatory Option 1/Option 2 (for the purposes of this analysis, no additional pollutant reductions were assumed for Option 2) and Option 3 for flow-through and recirculating model facilities. The pollutant load reductions associated with these Options were described in Sections VII and VIII of this Preamble. The pollutant concentrations scenarios (Baseline, Option 1/Option 2, and Option 3) were each modeled for different species types and facility production sizes (medium and large). Finally, information from USDA's 1998 Census of Aquaculture (USDA, 2000; DCN 60605) on the total number of facilities for each facility type was used to extrapolate the water quality results for the prototype case study to all flow-through and recirculating systems nationwide that fall under the scope of the proposed regulation.

EPA used the QUAL2E (Enhanced Stream Water Quality) model to quantify water quality responses for 30 km downstream of modeled facilities. QUAL2E is a one-dimensional water quality model that assumes steady state flow but allows simulation of diurnal variations in temperature, algal photosynthesis, and respiration. The basic equation solves the advective-dispersive mass transport equation. Water quality constituents simulated include conservative substances, temperature, bacteria, BOD5, DO, ammonia, nitrate and organic nitrogen, phosphate and organic phosphorus, and

algae. Simulated changes in DO, BOD₅, and TSS calculated for the 30 km downstream reach for pre- and post-regulatory scenarios were subsequently used to estimate monetary benefits from water quality improvements, as described below. Further details on the water quality modeling are provided in the CAAP Economic Analysis (DCN 60605).

3. Monetized Benefits

Economic benefits associated with the CAAP regulatory options are based on incremental changes in water quality use-support (*i.e.*, boatable, fishable, swimmable) and the population benefitting from the changes. A national contingent valuation survey relates changes in water quality uses supported to households' willingness to pay for water quality improvements (Carson and Mitchell, 1991). EPA used a single consolidated water quality index (WQI) to represent water quality. WQI is calculated from the water quality criteria estimated in the case studies discussed above (BOD, DO, TSS) and fecal coliforms which are not affected by today's regulation. Increases in WQI indicate improvements in water quality and the ability of the river to support more demanding uses. The Carson and Mitchell survey requested an overall value so the total willingness to pay based on their survey results encompasses aesthetic and non-use values, as well as recreational and other use values.

The Carson and Mitchell survey found that people value changes in waters closer to home more than more distant waters. Because of data limitations, this evaluation could not distinguish between a local population directly affected by water quality improvements and the national population. Therefore, the analysis treated all of the changes in water quality as if they were occurring far from the households' locality. This simplification will reduce the monetized benefits attributable to today's rule. EPA solicits comment on additional methods for estimating and monetizing benefits.

Different flow regimes in the model CAAP facilities resulted in a range of benefit estimates. As discussed above, data was only available at this time to estimate benefits of flow-through and recirculating systems. For this comparison, the monetized benefits are estimated to range from \$22,000 to \$113,000 (2000 dollars). Regulation of the relatively large number of trout flow-through systems generated the largest benefits by this method.

XI. Non-Water Quality Environmental Impacts

Sections 304(b) and 306(b) of the Clean Water Act require EPA to consider non-water quality environmental impacts (including energy requirements) associated with effluent limitations guidelines and standards. To comply with these requirements, EPA considered the potential impact of the proposed CAAP rule on energy consumption, air emissions, and solid waste generation. Considering energy use and environmental impacts across all media, the Agency has determined that the impacts identified in this section are justified by the benefits associated with compliance with the proposed limitations and standards. In reference to today's proposal, Section XI.A discusses energy requirements, section XI.B discusses air emissions, and section XI.C discusses sludge generation.

A. Energy Requirements

EPA estimates that implementation of today's proposal would result in a net increase in energy consumption for aquaculture facilities. The incremental increase would be based on electricity used to operate wastewater treatment equipment at facilities that are not currently operating wastewater treatment equipment (microscreen filters for flow-through and recirculating systems and video cameras for net pens) comparable to the regulatory options. To calculate incremental energy consumption increases for the aquaculture industry, EPA examined the wastewater treatment in place at the aquaculture facilities that would be covered by this regulation. EPA used the aquaculture industry cost models (described in section VII) to calculate the energy that would be required to operate wastewater treatment equipment that would be installed to comply with regulatory options. EPA used the information obtained in the screener survey to determine if a facility would have to install new equipment.

EPA determined that the incremental increase in energy consumption for flow-through and recirculating systems is estimated at 232,000 kWh and 64,500 kWh for net pen systems.

B. Air Emissions Impacts

Potential sources of air emissions from CAAP facilities include primary settling operations (*e.g.*, settling basins and lagoons) and the land application of manure. EPA assumed that the additional air emissions from primary settling operations would be minimal

because only about 10% of in-scope flow-through and recirculating CAAP facilities (estimated from the AAP screener survey data and the 1998 Census of Aquaculture) would require the addition of primary settling to meet Option 1 requirements. Primary settling treatment technologies collect solids below the surface of the water, reducing their exposure to the atmosphere. Although the proposed options do not require land application of manure, the options do increase the amount of solid waste collected from CAAP facilities. Land application is a common solid waste disposal method in the CAAP industry; therefore, the amount of ammonia released as air emissions would be expected to increase as the quantity of waste applied to cropland increases. EPA estimated the increase in ammonia emissions resulting from the implementation of each proposed regulatory option to be 42,470 lbs of ammonia per year. This is an increase of about 9.4% over the ammonia emissions presently estimated for the industry. For additional details about air emissions from CAAP facilities, see Chapter 11 of the CAAP Development Document (DCN 61552).

C. Solid Waste Generation

EPA considered regulatory options based on primary settling followed by solids polishing (*e.g.*, microscreen filtration, vegetated ditches). EPA estimated the incremental sludge generation from the treatment options in a manner similar to estimating the energy consumption incremental amounts. EPA estimated that sludge generation would not increase at facilities that are currently operating treatment systems comparable to the regulatory options. EPA used the cost models to estimate the incremental sludge generation rates for facilities not currently operating wastewater treatment and for facilities operating wastewater treatment not comparable to the regulatory operations.

EPA calculated the volume of sludge that would be generated by the 183 in-scope flow-through and recirculating facilities after implementation of the regulatory options. The sludge volume estimated, on a wet basis (assuming 5% solids), would be an additional 856,576 pounds at Option 1 and an additional 1,788,194 pounds at Option 3.

XII. Implementation

A. Regulatory Implementation of Part 451 Through the NPDES Permit Program and the National Pretreatment Program

Under sections 301, 304, 306 and 307 of the CWA, EPA promulgates national effluent limitations guidelines and standards of performance for major industrial categories for three classes of pollutants: (1) Conventional pollutants (*i.e.*, total suspended solids, oil and grease, biochemical oxygen demand, fecal coliform, and pH); (2) toxic pollutants (*e.g.*, toxic metals such as chromium, lead, nickel, and zinc; toxic organic pollutants such as benzene, benzo-a-pyrene, phenol, and naphthalene); and (3) non-conventional pollutants (*e.g.*, ammonia-N, formaldehyde, and phosphorus).

As discussed in Section II, EPA considers development of six types of effluent limitations guidelines and standards for each major industrial category, as appropriate:

Abbreviation	Effluent limitation guideline or standard
BPT	Best Practicable Control Technology Currently Available.
BAT	Best Available Technology Economically Achievable.
BCT	Best Control Technology for Conventional Pollutants.
NSPS	New Source Performance Standards.
PSES	Pretreatment Standards for Existing Sources.
PSNS	Pretreatment Standards for New Sources.

Pretreatment standards apply to industrial facilities with wastewater discharges to POTWs. The effluent limitations guidelines and new source performance standards apply to industrial facilities with direct discharges to navigable waters.

1. NPDES Permit Program

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES permit program is designed to limit the discharge of pollutants into navigable waters of the United States through a combination of various requirements including technology-based and water quality-based effluent limitations. This proposed regulation contains the technology-based effluent limitations guidelines and standards applicable to the concentrated aquatic animal production industry to be used by

permit writers to derive NPDES permit technology-based effluent limitations. Water quality-based effluent limitations (WQBELs) are based on receiving water characteristics and ambient water quality standards, including designated water uses. They are derived independently from the technology-based effluent limitations set out in this proposed regulation. The CWA requires that NPDES permits must contain for a given discharge, the more stringent of the applicable technology-based and water quality-based effluent limitations.

Section 402(a)(1) of the CWA provides that in the absence of promulgated effluent limitations guidelines or standards, the Administrator, or her designee, may establish technology-based effluent limitations for specific dischargers on a case-by-case basis. Federal NPDES permit regulations provide that these limits may be established using "best professional judgment" (BPJ) taking into account any proposed effluent limitations guidelines and standards and other relevant scientific, technical and economic information.

Section 301 of the CWA, as amended by the Water Quality Act of 1987, requires that BAT effluent limitations for toxic pollutants are to have been achieved as expeditiously as possible, but not later than three years from date of promulgation of such limitations and in no case later than March 31, 1989. See 301(b)(2). Because the proposed revisions to 40 CFR Part 451 will be promulgated after March 31, 1989, NPDES permit effluent limitations based on the revised effluent limitations guidelines must be included in the next NPDES permit issued after promulgation of the regulation and the permit must require immediate compliance.

2. New Source Performance Standards

New sources must comply with the new source performance standards and limitations of the CAAP rule (once it is finalized) at the time they commence discharging CAAP process wastewater. Because the final rule is not expected within 120 days of the proposed rule, the Agency considers a discharger a new source if construction of the source begins after promulgation of the final rule. EPA expects to take final action on this proposal in June 2004.

3. Pollutants in Intake Water (Net limitations)

The TSS limitations being proposed today are based on the implementation of production management controls and wastewater treatment. Depending upon the quality of the intake water and the

specific needs and tolerance of the species being raised, some facilities may or may not currently employ pre-treatment of intake waters prior to their use in the production systems. EPA does not intend that the limits being established today would force facilities that otherwise would not be pre-treating their intake waters to do so. EPA is proposing to apply the TSS limitations on a net basis, such that the TSS content of the intake waters is subtracted from the TSS content of the effluent in determining compliance with the limitation. This credit for intake water pollutant content is consistent with the provisions of 40 CFR 122.45(g) and more closely reflects the ability of controls and treatment to minimize the addition of TSS by the production systems. EPA solicits comment on whether facilities that pre-treat intake waters in order to sustain growth of the aquatic organisms should base the net calculations upon the content of the intake waters subsequent to that pre-treatment, but prior to use in the production system.

4. National Pretreatment Standards

40 CFR part 403 sets out national pretreatment standards which have three principal objectives: (1) To prevent the introduction of pollutants into publicly owned treatment works (POTWs) that will interfere with POTW operations including use or disposal of municipal sludge; (2) to prevent the introduction of pollutants into POTWs which will pass through the treatment works or will otherwise be incompatible with the treatment works; and (3) to improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludges.

The national pretreatment and categorical standards comprise a series of prohibited discharges to prevent the discharge of "any pollutant(s) which cause Pass Through or Interference." [see 40 CFR 403.5(a)(1)] Local control authorities are required to implement the national pretreatment program including application of the federal categorical pretreatment standards to their industrial users that are subject to such categorical pretreatment standards, as well as any pretreatment standards derived locally (*i.e.*, local limits) that are more restrictive than the federal standards. This proposed regulation does not set federal categorical pretreatment standards (PSES and PSNS) applicable to concentrated aquatic animal production facilities regulated by 40 CFR part 451.

The federal categorical pretreatment standards for existing sources must be achieved not later than three years

following the date of publication of the final standards. If EPA were to promulgate PSNS in the final rule, CAAP new sources would be required to comply with the new source performance standards of the CAAP rule (once it is finalized) at the time they commence discharging CAAP process wastewater. Because the final rule is not expected within 120 days of the proposed rule, the Agency considers an indirect discharger a new source if its construction commences following promulgation of the final rule (40 CFR 122.2; 40 CFR 403.3). EPA expects to take final action on this proposal in June 2004.

In addition, Section 403.7 of the Clean Water Act provides the criteria and procedures to be used by a Control Authority to grant a categorical industrial user (CIU) variance from a pollutant limit specified in a categorical pretreatment standard to reflect removal by the POTW treatment plant of the pollutant. Procedures for granting removal credits are specified in 40 CFR 403.11.

B. Upset and Bypass Provisions

A "bypass" is an intentional diversion of the streams from any portion of a treatment facility. An "upset" is an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. EPA's regulations concerning bypasses and upsets for direct dischargers are set forth at 40 CFR 122.41(m) and (n) and for indirect dischargers at 40 CFR 403.16 and 403.17.

C. Variances and Modifications

The CWA requires application of effluent limitations established pursuant to Section 301 or pretreatment standards of Section 307 to all direct and indirect dischargers. However, the statute provides for the modification of these national requirements in a limited number of circumstances. Moreover, the Agency has established administrative mechanisms to provide an opportunity for relief from the application of the national effluent limitations guidelines and pretreatment standards for categories of existing sources for toxic, conventional, and nonconventional pollutants.

1. Fundamentally Different Factors Variances

EPA, with the concurrence of the State, may develop effluent limitations or standards different from the otherwise applicable requirements if an

individual discharging facility is fundamentally different with respect to factors considered in establishing the limitation of standards applicable to the individual facility. Such a modification is known as a "fundamentally different factors" (FDF) variance. Early on, EPA, by regulation provided for the FDF modifications from the BCT effluent limitations, BAT limitations for toxic and nonconventional pollutants and BPT limitations for conventional pollutants for direct dischargers. For indirect dischargers, EPA provided for FDF modifications from pretreatment standards. FDF variances for toxic pollutants were challenged judicially and ultimately sustained by the Supreme Court. (*Chemical Manufacturers Assn v. NRDC*, 479 U.S. 116 (1985)).

Subsequently, in the Water Quality Act of 1987, Congress added new section 301(n) of the Act explicitly to authorize modifications of the otherwise applicable BAT effluent limitations or categorical pretreatment standards for existing sources if a facility is fundamentally different with respect to the factors specified in section 304 (other than costs) from those considered by EPA in establishing the effluent limitations or pretreatment standard. Section 301(n) also defined the conditions under which EPA may establish alternative requirements. Under section 301(n), an application for approval of a FDF variance must be based solely on (1) information submitted during rulemaking raising the factors that are fundamentally different or (2) information the applicant did not have an opportunity to submit. The alternate limitation or standard must be no less stringent than justified by the difference and must not result in markedly more adverse non-water quality environmental impacts than the national limitation or standard.

EPA regulations at 40 CFR part 125, subpart D, authorizing the Regional Administrators to establish alternative limitations and standards, further detail the substantive criteria used to evaluate FDF variance requests for direct dischargers. Thus, 40 CFR 125.31(d) identifies six factors (e.g., volume of process wastewater, age and size of a discharger's facility) that may be considered in determining if a facility is fundamentally different. The Agency must determine whether, on the basis of one or more of these factors, the facility in question is fundamentally different from the facilities and factors considered by EPA in developing the nationally applicable effluent guidelines. The regulation also lists four other factors (e.g., infeasibility of

installation within the time allowed or a discharger's ability to pay) that may not provide a basis for an FDF variance. In addition, under 40 CFR 125.31(b) (3), a request for limitations less stringent than the national limitation may be approved only if compliance with the national limitations would result in either (a) a removal cost wholly out of proportion to the removal cost considered during development of the national limitations, or (b) a non-water quality environmental impact (including energy requirements) fundamentally more adverse than the impact considered during development of the national limits. EPA regulations provide for an FDF variance for indirect dischargers at 40 CFR 403.13. The conditions for approval of a request to modify applicable pretreatment standards and factors considered are the same as those for direct dischargers.

The legislative history of Section 301(n) underscores the necessity for the FDF variance applicant to establish eligibility for the variance. EPA's regulations at 40 CFR 125.32(b)(1) are explicit in imposing this burden upon the applicant. The applicant must show that the factors relating to the discharge controlled by the applicant's permit which are claimed to be fundamentally different are, in fact, fundamentally different from those factors considered by EPA in establishing the applicable guidelines. The criteria for applying for and evaluating applications for variances from categorical pretreatment standards are included in the pretreatment regulations at 40 CFR 403.13(h)(9). In practice, very few FDF variances have been granted for past ELGs. An FDF variance is not available to a new source subject to NSPS or PSNS.

2. Economic Variances

Section 301(c) of the CWA authorizes a variance from the otherwise applicable BAT effluent guidelines for nonconventional pollutants due to economic factors. The request for a variance from effluent limitations developed from BAT guidelines must normally be filed by the discharger during the public notice period for the draft permit. Other filing time periods may apply, as specified in 40 CFR 122.21(1)(2). Specific guidance for this type of variance is available from EPA's Office of Wastewater Management. For the proposed rule, this variance is not applicable since BAT equals BPT.

3. Water Quality Variances

Section 301(g) of the CWA authorizes a variance from BAT effluent guidelines for certain nonconventional pollutants

due to localized environmental factors. These pollutants include ammonia, chlorine, color, iron, and total phenols. For the proposed rule, this variance is not applicable since BAT equals BPT and none of the above authorized pollutants are being proposed for regulation for this industry.

D. Best Management Practices

Sections 304(e), 308(a), 402(a), and 501(a) of the CWA authorize the Administrator to prescribe BMPs as part of effluent limitations guidelines and standards or as part of a permit. EPA's BMP regulations are found at 40 CFR 122.44(k). Section 304(e) of the CWA authorizes EPA to include BMPs in effluent limitations guidelines for certain toxic or hazardous pollutants for the purpose of controlling "plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage." Section 402(a)(1) and NPDES regulations [40 CFR 122.44(k)] also provide for best management practices to control or abate the discharge of pollutants when numeric limitations and standards are infeasible. In addition, Section 402(a)(2), read in concert with Section 501(a), authorizes EPA to prescribe as wide a range of permit conditions as the Administrator deems appropriate in order to ensure compliance with applicable effluent limitations and standards and such other requirements as the Administrator deems appropriate.

The solids control best management plan includes components that are designed to minimize the discharge of solids from the facility. The goal of this plan is to control conventional and nutrient pollutants in the discharge. The CAAP facility is expected to provide written documentation of a best management plan and keep necessary records to establish and implement the plan. This type of regulatory structure will enable the individual facility operator to develop a plan tailored to the unique conditions at the CAAP facility, which reduces the discharge of pollutants consistent with the goals of the Clean Water Act. See CAAP Development Document for this proposed rule for a detailed discussion of pollution prevention and best management practices used in the CAAP industry.

E. Potential Tools To Assist With the Remediation of Aquaculture Effluents

A potential option to assist land owners with aquaculture effluent quality is the Environmental Quality Incentives Program (EQIP). This is a voluntary USDA conservation program. EQIP was reauthorized in the Farm

Security and Rural Investment Act of 2002 (Farm Bill 2002). The Natural Resources Conservation Service (NRCS) administers EQIP funds.

EQIP applications are accepted throughout the year. NRCS evaluates each application using a state and locally developed evaluation process. Incentive payments may be made to encourage a producer to adopt land management, manure management, integrated pest management, irrigation water management and wildlife habitat management practices or to develop a Comprehensive Nutrient Management Plan (CNMP). These practices would provide beneficial effects on reducing sediment and nutrient loads to those aquaculture operations dependent on surface water flows. In addition, opportunities exist to provide EQIP funds to foster the adoption of innovative cost effective approaches to address a broad base of conservation needs, including aquaculture effluent remediation.

XIII. Administrative Requirements

A. Executive Order 12866: "Regulatory Planning and Review"

Under Executive Order 12866 [58 FR 51735, October 4, 1993], the Agency must determine whether the regulatory action is "significant" and therefore subject to OMB review and the requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may:

- (1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
- (2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- (3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- (4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order."

It has been determined that this proposed rule is a "significant regulatory action" under the terms of Executive Order 12866. As such, this action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations are documented in the public record.

B. Regulatory Flexibility Act (RFA) as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 601 et seq.

The RFA generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) A small business that has no more than \$0.75 million in annual revenues; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impact of today's proposed rule on small entities, including consideration of alternative regulatory approaches being proposed, I certify that this action will not have significant economic impact on a substantial number of small entities. We have determined that 17 small commercial facilities (which represents 5 percent of the total small CAAPs or 47% of small CAAPs within the scope of the rule), would incur compliance costs greater than 1 percent of aquaculture revenue and 10 small commercial facilities (which represents less than 3 percent of the total small CAAPs or 28% of small CAAPs within the scope of the rule) would incur compliance costs greater than 3 percent of aquaculture revenue. Of the 10 small regulated CAAPs incurring costs in excess of 3 percent of revenues, the highest impact is at 7 percent of revenues. EPA estimates that small businesses own 36 facilities out of the 56 commercial facilities identified from the screener survey data as being within the proposed scope EPA based this estimate on information from the screener survey and the 1998 Census of Aquaculture as described in Section IV. EPA assumed that there were no multi-facility small businesses and that aquatic animal production was the only source of revenues for a facility. For this proposal, EPA is using the ratio of pre-tax annualized compliance costs to revenues (hereafter referred to as a revenue test) as its preliminary

determination of economic achievability in advance of detailed survey data (see Section IX for discussion). (More detail on these estimates is provided in the EA).

We have also determined that three of the six non-profit associations for which EPA had reported revenue data would incur compliance costs greater than 1 percent of revenue and one association would incur compliance costs greater than 3 percent of revenue. Non-profit organizations produce salmon for the State of Alaska and are considered to be small non-profit organizations for the purpose of this rulemaking. These non-profit facilities have assumed what is usually a State function, which is to raise fish (in this case salmon) in hatcheries to be released into the wild to supplement wild populations and sustain the Alaska commercial and recreational fishing industries. EPA identified 12 small Alaskan nonprofit facilities, owned by 8 nonprofit associations, within the proposed scope. These facilities raise salmon in flow-through hatcheries and as discussed above we propose to establish requirements for flow-through facilities with annual production greater than 100,000.

Despite the determination that this rule will not have a significant economic impact on a substantial number of small entities, EPA prepared a small business flexibility analysis that examines the impact of the proposed rule on small entities along with regulatory alternatives that could reduce that impact. This small business flexibility analysis would meet the requirements for an initial regulatory flexibility analysis (IRFA) and is available for review in the docket and is summarized below.

The Agency is considering this action because the operation of CAAP facilities may introduce a variety of pollutants into receiving waters. Under some conditions, these pollutants can be harmful to the environment. According to the 1998 USDA Census of Aquaculture (USDA, 2000), there are approximately 4,200 commercial aquatic animal production (AAP) facilities in the United States that qualify as small businesses. Aquaculture has been among the fastest-growing sectors of agriculture until a recent slowdown that began several years ago caused by declining or level growth among producers of several major species. EPA analysis indicates that many CAAP facilities have treatment technologies in place that greatly reduce pollutant loads. However, in the absence of treatment, pollutant loads from individual CAAP facilities such as

those covered by today's proposed rule, can contribute up to several thousand pounds of nitrogen and phosphorus per year, and tens to hundreds of thousands of pounds of TSS per year (see CAAP Economic Analysis). These pollutants, can contribute to eutrophication and other aquatic ecosystem responses to excess nutrient loads and BOD effects. In recent years, Illinois, Louisiana, North Carolina, New Hampshire, New Mexico, Ohio and Virginia have cited the AAP industry as a potential or contributing source of impairment to water bodies (EPA, 2000). Several state authorities have set water quality based permit requirements for CAAP facilities in addition to technology based limits based on BPJ (EPA, 2002b).

Another area of potential concern relates to non-native species introductions from CAAP facilities, which may pose risks to native fishery resources and wild native aquatic species from the establishment of escaped individuals (Hallerman and Kapuscinski, 1992; Carlton, 2001; Volpe *et al.*, 2000). CAAP facilities also employ a range of drugs and chemicals used both therapeutically that may be released into receiving waters. For some investigational drugs, as well as for certain applications of approved drugs, there is a concern that further information is needed to fully evaluate risks to ecosystems and human health associated with their use in some situations (EPA, 2002). Finally, CAAP facilities also may inadvertently introduce pathogens into receiving waters, with potential impacts on native biota. Today's proposed rule attempts to address a number of these environmental concerns. These regulations are proposed under the authority of sections 301, 304, 306, 308, 402, and 501 of the Clean Water Act, 33 U.S.C. 1311, 1314, 1316, 1318, 1342, and 1361.

The small entities that would be directly regulated by this proposed rule are small commercial CAAP facilities and non-profit organizations that produce salmon for the State of Alaska. EPA estimates that small businesses own 36 facilities out of the 56 commercial facilities identified from the screener survey data as within the proposed scope. We have determined that 17 small commercial facilities (which represents 5 percent of the total small CAAPFs) would incur compliance costs greater than 1 percent of aquaculture revenue and 10 small commercial facilities (which represents less than 3 percent of the total small CAAPFs) would incur compliance costs greater than 3 percent of aquaculture revenue. EPA identified 12 small

Alaskan nonprofit facilities, owned by 8 nonprofit associations, within the proposed scope. We have determined that three of the six associations for which EPA had reported revenue data would incur compliance costs greater than 1 percent of revenue and one association would incur compliance costs greater than 3 percent of revenue.

The proposed regulation includes reporting and recordkeeping requirements as discussed in this section under Paperwork Reduction Act.

EPA identified Federal rules that have an impact on the CAAP industry and believe that there are no such rules that would duplicate, overlap or conflict with the proposed rule. EPA has identified two sets of Federal rules, however, the implementation of which would be supplemented by the proposed requirements in today's notice—specifically, the reporting requirements proposed for certain drugs and chemicals. Today's rule would require reporting of investigational new animal drugs and any drug that is not used according to label requirements. Regulations administered by the Food and Drug Administration published at 21 CFR part 511 impose restrictions on such usage, but typically do not require reporting of the usage after discharge to waters of the United States. Similarly, today's rule would require reporting of the usage (and discharge) of chemicals when such usage does not comply with label requirements. Some such chemicals would be pesticides subject to regulatory requirements under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which is administered by EPA. EPA has not published FIFRA requirements to require the reporting proposed today for CAAP facilities.

EPA invites comment on whether there are other Federal rules that may duplicate, overlap or conflict with the proposed rule.

EPA has tried to reduce the impact of this rule on small entities. EPA is proposing production thresholds that would minimize disproportionate economic impacts on small entities. EPA is not proposing any new requirements for 95 percent of the small entities producing aquatic animals (including facilities that are not defined as CAAP facilities) or 86 percent of the small CAAPFs identified in the screener data. Most of these are owned by small businesses and would likely experience serious economic impacts if requirements were imposed. EPA considered regulating all facilities that met the definition of a CAAP facility but concluded that the potential for impacts was great enough that CAAP facilities

which produce cold-water species with an annual production less than 100,000 pounds should not be subject to the proposed effluent guidelines. EPA determined that even proposing the least stringent option (Option 1) standards for these direct dischargers would have had a significant impact on a substantial number of small entities, see Section VIII and IX.

Additionally, we conducted outreach to small entities and convened a Small Business Advocacy Review Panel to obtain the advice and recommendations of representatives of the small entities that potentially would be subject to the rule's requirements. The Agency convened the Small Business Advocacy Review Panel on January 22, 2002. Members of the Panel represented the Office of Management and Budget, the Small Business Administration and EPA. The Panel met with small entity representatives (SERs) to discuss the potential effluent guidelines and, in addition to the oral comments from SERs, the Panel solicited written input. In the months preceding the Panel process, EPA conducted outreach with small entities that would potentially be affected by this regulation. On January 25, 2002, the SBAR Panel sent some initial information for the SERs to review and provide comment. On February 6, 2002 the SBAR Panel distributed additional information to the SERs for their review. On February 12 and 13, the Panel met with SERs to hear their comments on the information distributed in these mailings. The Panel also received written comments from the SERs in response to the discussions at this meeting and the outreach materials. The Panel asked SERs to evaluate how they would be affected and to provide advice and recommendations regarding early ideas to provide flexibility. See Section 8 of the Panel Report for a complete discussion of SER comments.

The Panel evaluated the assembled materials and small-entity comments on issues related to the elements of the IRFA. A copy of the Panel report is included in the docket for this proposed rule [DCN 31019]. The Panel's most significant findings and discussion with respect to each of these issues are summarized below. For a full discussion of the Panel findings and recommendations, see Section 9 of the Panel report.

Scope: Based on the data provided by EPA, the Panel was concerned that small facilities could not afford technology-based discharge limitations. For those facilities that do not meet the NPDES permit applicability thresholds, the Panel strongly recommended that

EPA not lower these thresholds or otherwise change the definition of a point source for this industry. For those that do meet the threshold but are still considered small entities, the Panel recommended that EPA exclude them from the scope of the proposed guidelines.

EPA Response: EPA is not proposing effluent guidelines for facilities that do not meet the definition of a CAAP facility under the NPDES permit program or modifying the definition of a point source. Furthermore, EPA is not proposing effluent guidelines requirements for any small CAAP facilities which produce cold water species between less than 100,000 pounds annually or any CAAP facilities which use pond systems. As described above EPA certifies that this proposal will not impose a significant impact on a substantial number of small entities. EPA is regulating small business above the threshold because further analysis reveals best available technologies that are affordable.

Pond Systems: The Panel agreed that pond systems producing any species as foodfish, stockers, sportfish, or baitfish did not pose any significant risk to water quality or have technologies available that were economically achievable to control their minimal discharges, and thus recommended excluding them from the scope of the proposed guidelines. For large pond systems, except for perhaps those which rapidly drain for harvest, the Panel recommended that EPA not adopt any requirements related to sediment discharge, erosion, nutrients, or feed management, as the measures considered are either impractical, not economically achievable, or would result in minimal pollutant reductions. EPA is still exploring requirements for drugs, chemicals, aquatic pathogens and exotic species, but based on information developed to date, the Panel believed it unlikely that the measures that have been identified so far would be effective in addressing these concerns. The Panel thus recommended that EPA continue its research, but that it carefully evaluate any potential measures to ensure that they are both effective and economically achievable before including them in proposed guidelines. Unless EPA identified such measures, the Panel recommended that EPA exclude all ponds from coverage under the proposed guidelines.

EPA Response: EPA followed this Panel recommendation.

Flow-through and Recirculating Systems: Because of their diversity and/or the preliminary cost information, the Panel recommended that EPA carefully

consider economic achievability and technical feasibility before proposing any regulation for these types of systems. If no feasible and economically achievable technologies are identified, EPA should exclude them from the scope of the proposed guidelines. In particular, the Panel was concerned about Alaska Salmon facilities and recommended that EPA carefully consider not proposing requirements for them.

EPA Response: EPA's analysis of flow-through systems including the salmon non-profit facilities in Alaska support the decision to propose technology based requirements for the medium and large flow-through systems. EPA is proposing to exclude from this regulation salmon net pen production in the State of Alaska for the reasons stated previously in Section V.B. EPA's analysis indicates that the medium sized facilities cannot afford to achieve the same effluent limitations as larger flow-through facilities and therefore, EPA proposes to establish tiered requirements for the flow-through subcategory based on production thresholds. EPA believes that the proposed requirements for recirculating systems are also technically feasible and economically achievable.

Net Pen Systems: SERs identified practical limitations and raised concerns about the cost effectiveness of the measures under consideration, and so the Panel recommended that EPA consider these concerns before including them in proposed national effluent guidelines.

EPA Response: EPA considers the proposed net pen system requirements (BMPs, reporting, and active feed monitoring) to be cost effective and economically achievable.

Other Systems: The Panel recommended that EPA exclude aquaria, baitfish, and molluscan shellfish production from the scope of proposed guidelines, unless new information prompted EPA to reconsider. For ornamentals, the Panel recommended against inclusion unless drug or chemical use or the release of non-native species is found to pose a significant environmental risk and EPA identifies effective economically achievable technologies to address them. As for alligator systems, the Panel was concerned about the survival of the species and thus recommended that EPA analyze the impacts on wild species and consider such effects in its selection of options.

EPA Response: EPA is not proposing to establish effluent guidelines requirements for any pond systems, which are the most common systems

used to produce baitfish and ornamentals. EPA does not believe alligator producers are CAAP facilities and therefore would not be subject to these proposed requirements. EPA is also proposing to exclude aquaria from this regulation as described in Section V.B.

Health Management and Feed Management: The Panel was persuaded by the SER comments and recommended that the proposed guidelines not include any requirements related to animal health maintenance or feed management. The only exception was for net pens, for which EPA is proposing feed management requirements as described previously. The Panel also agreed that EPA should consider providing guidance on appropriate health and feed management practices.

EPA Response: EPA is not proposing to impose any requirement related to health management for any facilities. EPA does not propose feed management for flow-through and recirculating systems, except to identify and implement practices that minimize the addition of excess feed should facilities choose to comply with the alternative compliance provision (40 CFR 451.4). Also for flow-through facilities that have bulk flow discharged separately from the off-line settling, the bulk flow is subject to BMPs to minimize solids including excess feed. Active feed monitoring would be required for net pen systems.

Settling Basins: The Panel recommended, based on SER comments, that limitations based on the use of settling basins not be included in the proposed guidelines at pond-based systems that utilize slow, controlled drainage techniques. For other systems, the Panel recommended that any requirements related to solids removal be flexible enough to accommodate facilities where settling basins are not a viable option. Similarly, the Panel was persuaded that numeric sediment limits were not appropriate for pond systems. For other systems, the Panel recommended that EPA provide alternative requirements, such as BMPs, in lieu of numeric limitations. Finally, the Panel recommended that any monitoring requirements included in the effluent guidelines be kept to a minimum and limited only to where useful to the operator.

EPA Response: EPA is not proposing to establish any requirements for pond systems. EPA is proposing to establish limits for TSS based on sediment control such as settling basins for medium and large flow-through and recirculating systems, however,

facilities are not constrained to construct and use settling basins in order to comply with the requirements. The Agency also proposes to provide an alternative compliance provision which would allow producers to comply with this regulation through the development and implementation of a BMP plan instead of numerical limitations.

Groundwater Protection, Disinfection and Manure Application: The Panel was persuaded by SER comments on groundwater protection, disinfection, and land application of manure and recommended that EPA not include any requirements for these topics.

EPA Response: EPA followed this Panel recommendation.

Microfiltration: The Panel was also concerned about the economic achievability of limitations based either on microfiltration or chemical precipitation and thus recommended that EPA reconsider any such requirement. The Panel also recommended that any requirements related to solids removal be flexible enough to accommodate facilities where these technologies are not economically achievable.

EPA Response: EPA is proposing to establish effluent limits for TSS based on the performance of microfiltration, but only for large flow-through systems and recirculating systems. But these limitations do not preclude the use of other technologies or practices to comply with these limitations. EPA has estimated the cost of applying microfiltration and found limitations to be economically achievable for large flow-through and recirculating systems. EPA is proposing to provide a compliance alternative that would allow facilities to develop and implement a BMP plan in lieu of complying with the numeric limitations.

Quiescent Zones: SERs raised compelling concerns about implementing quiescent zones in existing earthen raceways and thus the Panel recommended that EPA re-evaluate the need for and practicability of such a requirement. The Panel also recommended that any requirements related to solids removal be flexible enough to accommodate facilities where quiescent zones are not a viable option.

EPA Response: EPA is not proposing any requirements for the smallest flow-through facilities which are the facilities most likely to be earthen. The proposed limitations for TSS for the medium and large flow-through facilities are based on the application of quiescent zones and off-line settling, but facilities may use other technologies to achieve the limitations and may comply through the development and implementation of a

BMP plan in lieu of complying with the numeric limitations.

Pathogens: The Panel questioned whether national effluent guidelines would provide any additional environmental protection relative to existing practice. The Panel thus recommended that EPA address pathogen concerns through guidance rather than through effluent guidelines requirements, unless subsequent analysis identifies control strategies that can be effectively implemented through national effluent guidelines that would be economically achievable for affected facilities.

EPA Response: EPA is not proposing any specific requirements for the control of pathogens. Control of diseases is managed by the U.S. Department of Agriculture's, Animal Plant Health Inspection Service. This proposal would require large flow-through and other facilities to establish practices as part of their BMP plan that address removing mortalities from the system and properly disposing of them. This provision should minimize the potential for discharging pathogens.

Drugs and Chemicals: The Panel found that drug and chemical use is in most cases already adequately regulated, and was unable to identify any particular technology or BMP that would be broadly applicable or effective in addressing concerns related to discharge of drugs or chemicals. Thus, unless subsequent analysis identifies control strategies that can be effectively implemented through national effluent guidelines that would be economically achievable for the affected facilities, the Panel recommended that EPA address concerns regarding the discharge of drugs and chemicals through guidance rather than through effluent guidelines requirements.

EPA Response: EPA proposes to require regulated facilities to report to the permitting authority the use of a drug or chemical that is an investigational new animal drug, and any drug or chemical that is not used in accordance with the label requirements. This would include investigational new animal drugs or drugs that are being used under the supervision and at the direction of a licensed veterinarian. EPA believes these reporting requirements are necessary to provide the permitting authority with sufficient information to determine whether additional action is warranted, and to enable action to be taken to control the discharge of these pollutants if so warranted.

Non-Native Species: The Panel found that national effluent guidelines are not the best way to deal with non-native species, and recommended that EPA

defer to the States or to other Federal agencies that have the authority to prohibit or control the importation of exotic species. For those species not prohibited that still have a potential to either become a nuisance or non-native species or that may carry diseases that pose a threat to native aquatic species, the Panel recommended that EPA work with these agencies to develop and implement appropriate protection and controls and provide guidance to States.

EPA Response: EPA proposes to require recirculatory, net pen and large flow-through facilities to develop and implement practices which minimize the potential escape of non-native species. EPA will consider working with these agencies to develop and implement appropriate protection and controls.

New Facilities: The Panel found that it unlikely that compliance costs would be significantly lower for new facilities than for existing facilities. Therefore, the Panel recommended that the New Source Performance Standards not be any more stringent than existing source requirements.

EPA Response: EPA followed this panel recommendation.

Through consultation with the Small Business Advocacy Review Panel and the JSA/AETF, EPA has tried to reduce the impact of this proposed rule on small businesses. For example, as described under Section XI, EPA had considered technology options for pond systems. Based on comments provided by the Small Entity Representatives (SERs), and members of the JSA AETF, EPA has concluded that pond systems do not pose a significant threat to the environment and is not proposing to establish requirements for these facilities.

We invite comments on all aspects of the proposal and its impacts on small entities.

C. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under Section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of \$100 million or more in any one year.

Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally

requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative, if the Administrator publishes with the final rule an explanation why that alternative was not adopted.

Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that this rule would not contain a Federal mandate that may result in expenditures of \$100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. The total annual cost of this rule is estimated to be \$1.5 million. Thus, today's rule is not subject to the requirements of sections 202 and 205 of the UMRA. The facilities which are affected by today's proposal are direct dischargers engaged in concentrated aquatic animal production. These facilities would be subject to today's proposed requirements through the issuance or renewal of an NPDES permit either from the Federal EPA or authorized State governments. These facilities should already have NPDES permits as the Clean Water Act requires a permit be held by any point source discharger before that facility may discharge wastewater pollutants into surface waters. Therefore, today's proposal could require these permits to be revised to comply with revised Federal standards, but should not require a new permit program be implemented.

EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. EPA is not proposing to establish pretreatment standards for this point source category which are applied to indirect dischargers and overseen by Control Authorities. Local governments are

frequently the pretreatment Control Authority but since this regulation proposes no pretreatment standards, there would be no impact imposed on local governments. EPA proposed requirements are not expected to impact any tribal governments, either as producers or because facilities are located on tribal lands. Thus, today's rule is not subject to the requirements of section 203 of UMRA.

D. Executive Order 13045: "Protection of Children From Environmental Health Risks and Safety Risks"

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be "economically significant" as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health and safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This proposed rule is not subject to Executive Order 13045 because it is not economically significant under Executive Order 12866, nor does it concern an environmental health or safety risk that may have a disproportionate effect on children.

E. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled "Consultation and Coordination with Indian Tribal Governments" (65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." "Policies that have tribal implications" is defined in the Executive Order to include regulations that have substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and the Indian tribes, or on this distribution of power and responsibilities between the Federal government and Indian tribes."

This proposed rule does not have tribal implications. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175.

EPA does not believe any CAAP facility that would be subject to these proposed requirements are located on tribal lands. Nor is EPA aware of any tribes engaged in the production of aquatic animals subject to these proposed requirements. Thus, Executive Order 13175 does not apply to this rule.

In the spirit of Executive Order 13175, and consistent with EPA policy to promote communications between EPA and tribal governments, EPA specifically solicits additional comment on this proposed rule from tribal officials.

F. Paperwork Reduction Act

The information collection requirements in today's proposed rule have been submitted for approval to OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* An Information Collection Request (ICR) document has been prepared by EPA (ICR No.2087.01, OMB No. 2040-NEW) and a copy may be obtained from Susan Auby by mail at Collection Strategies Division; U.S. Environmental Protection Agency (2822T); 1200 Pennsylvania Ave., NW., Washington, DC 20460, by e-mail at auby.susan@epa.gov, or by calling (202) 566-1672. A copy may also be downloaded from the internet at <http://www.epa.gov/icr>. In today's proposed regulation flow-through and recirculating facilities that would be subject to compliance with numeric limitations, however, EPA proposes to provide an alternative compliance provision that would allow facilities to develop and implement a BMP plan to control solids provided the permitting authority determines the plan will achieve the numeric limitations. Also flow-through facilities that segregate the bulk discharge from off-line settling discharge would develop and implement the solids control BMP plan. Larger flow-through facilities and all recirculating and net pen facilities within the scope of this proposed rule would also develop a BMP plan to address mortalities, non-native species, drugs and chemicals storage. These facilities would also be required to report to the permitting authority whenever an investigational new animal drug is used or drug or chemical is used for a purpose that is not in accordance with its label requirements.

EPA estimates that each plan will require 40 hours per facility to develop the plan. The plan will be effective for the term of the permit (5 years). An additional two hours per month (comprised of 1 hour of a manager's time and 1 hour of a laborer's time) or 24 hours per year are assumed to be required for implementation. EPA does

not believe that the development and implementation of these BMPs will require any special skills.

EPA estimates that half of the flow-through and recirculating facilities (92 facilities) would choose to comply with the compliance alternative provision and incur the estimated 40 hours for plan development plus 24 hours per year for implementation. An estimated 10 percent of the flow-through facilities (10 facilities) may have segregated discharges of bulk flow and off-line settling. These facilities would also be required to develop the BMP plan for solids control and incur the estimated 40 hours for plan development and an additional 24 hours per year for implementation. All recirculating, net pen and large flow-through facilities would be required to develop and implement the BMP plan addressing non-native species releases, drug and chemical storage and mortality removal. This BMP plan is estimated to require 40 hours for development and 24 hours per year for implementation.

Facilities that develop a BMP plan would be required to certify that they have developed and are implementing the BMP plan. The burden for CAAP facilities associated with this certification is included in the 40 hours required to develop this plan. The estimated burden for Federal and State permitting authorities to review, approve and file these certifications is estimated to be 20 minutes per certification. The Compliance Alternative Provision requires the permitting authority to determine that the plan will achieve the numeric limits. EPA estimates that permitting authorities will expend 16 hours per permit to make this determination.

Burden means 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. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB

control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR chapter 15.

Comments are requested on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques. Send comments on the ICR to the Director, Collection Strategies Division; U.S. Environmental Protection Agency (2822); 1200 Pennsylvania Ave., NW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th St., NW., Washington, DC 20503, marked "Attention: Desk Officer for EPA." Include the ICR number (No. 2087.01) in any correspondence. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after September 12, 2002, a comment to OMB is best assured of having its full effect if OMB receives it by October 15, 2002. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

G. Executive Order 13132: "Federalism"

Executive Order 13132, entitled "Federalism" (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications." "Policies that have federalism implications" is defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

This proposed rule does not have Federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. EPA estimates that, when promulgated, these revised effluent guidelines and standards will be incorporated into NPDES permits without any additional costs to authorized States.

Further, the revised regulations would not alter the basic State-Federal scheme established in the Clean Water Act under which EPA authorizes States to carry out the NPDES permitting program. EPA expects the revised regulations to have little effect, if any,

on the relationship between, or the distribution of power and responsibilities among, the Federal, State and local governments. Thus, Executive Order 13132 does not apply to this rule.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communication between EPA and State and local governments, EPA specifically solicits comment on this proposed rule from State and local governments.

H. Executive Order 12898: "Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations"

The requirements of the Environmental Justice Executive Order are that EPA will review the environmental effects of major Federal actions significantly affecting the quality of the human environment. For such actions, EPA reviewers will focus on the spatial distribution of human health, social and economic effects to ensure that agency decision makers are aware of the extent to which those impacts fall disproportionately on covered communities." This is not a major action. Further, EPA does not believe this rulemaking will have a disproportionate effect on minority or low income communities because the technology-based effluent limitations guidelines are uniformly applied nationally irrespective of geographic location. The proposed regulation will reduce the negative effects of concentrated aquatic animal production industry waste in our nation's waters to benefit all of society, including minority and low-income communities. The cost impacts of the rule should likewise not disproportionately affect low-income communities given the relatively low economic impacts of the rule.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995 (Pub L. 104-113 Sec. 12(d) 15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standard bodies. The NTTAA directs EPA to provide Congress, through OMB explanations when the Agency decides not to use

available and applicable voluntary consensus standards.

Today's proposed rule does not establish any technical standards, thus NTTAA does not apply to this rule. It should be noted, however, that the proposed rule would require certain facilities that produce aquatic animal products to monitor for TSS. Consensus standards for TSS were previously approved and are specified in the tables at 40 CFR 136.3.

J. Executive Order 13211: "Energy Effects"

This rule is not a "significant energy action" as defined in Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355, May 22, 2001) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. As part of the Agency's consideration of Non-Water Quality Impacts, EPA has estimated the energy consumption associated with today's proposed requirements. EPA estimates that concentrated aquatic animal production facilities would incrementally increase energy consumption for flow-through and recirculating systems at 232,000 kWh and 64,500 kWh for net pen systems. EPA estimated the annual electric energy use at an average individual flow-through system facility to be about 30,000 to 136,000 kWh per year and at average individual recirculating system facilities to be about 1.6 million kWh per year. The per facility annual increase in electricity use ranges from 4.3 to 18.9 % in average flow-through facilities and about 0.4% for average recirculating facilities. (See Chapter 11 of the CAAP Development Document for more details). Comparing the estimated annual increase in electric use associated with these proposed requirements to national annual energy use, EPA estimates the increase in electricity resulting from the proposed regulation to be 6.4×10^{-8} % of national energy use. Therefore, we have concluded that this rule is not likely to have any adverse energy effects.

K. Plain Language

Executive Order 12866 requires each agency to write all rules in plain language. We invite your comments on how to make this proposed rule easier to understand. For example, have we organized the material to suit your needs? Are the requirements in the rule clearly stated? Does the rule contain technical language or jargon that is not clear? Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule

easier to understand? Would more (but shorter) sections be better? Could we improve clarity by adding tables, lists, or diagrams? What else could we do to make the rule easier to understand?

XIV. Solicitation of Data and Comments

A. General and Specific Comment Solicitation

EPA solicits comments on various issues specifically identified in the preamble as well as any other issues that are not specifically addressed in today's notice. Specifically, EPA solicits information, data, and comment on the following topics:

- Additional information and data on the performance and associated costs of all wastewater treatment practices currently or potentially capable of treating CAAP wastewaters;
- The potential of CAAP facilities to reduce water consumption and new technologies or practices that can effectively reuse water;
- Additional methods for estimating and monetizing benefits associated with the proposed rule;
- The economic analysis in this proposal and the methods EPA is considering for subsequent analyses using detailed survey data, particularly the use of cash flow as a measure of resources available to finance environmental compliance and suggestions for alternative methodologies;
- Whether controls for TSS are necessary and which industry subcategories (if any) should be subject to these potential limitations and standards;
- Additional data and information related to instances of CAAP indirect dischargers causing POTW interference or pass through especially of either drugs or chemicals used by the facility;
- Whether it would be appropriate and efficacious to ban the intentional release of non-native species, the appropriate entity to define non-native species, and the practicality of reporting requirements for escaped non-native species.
- How to control non-native species releases, pathogens, antibiotics and other chemicals with technologies or practices that are available and affordable.
- How to characterize and quantify incidental benefits from controlling non-native species, pathogens, antibiotic, chemical releases.
- How to characterize economic and environmental impacts associated with antibiotic releases.
- Feed back on the proposed BMP plan, particularly on how record

keeping should be used and what it should entail.

- The establishment of a phosphorus limit for existing and new concentrated aquatic animal production facilities; how the use of low phosphorus feeds or wastewater treatment practices (including the actual practices used) meet current phosphorus limits set by the permitting authority. EPA is interested in data documenting the costs of achieving such limits, any increased sludge production as a result of treating to remove phosphorus from wastewater and monitoring data including the method used to analyze the phosphorus in the collected samples.

- The establishment of a BOD limit for existing and new recirculating facilities, and how wastewater treatment practices (including the actual practices used) meet current BOD limits set by the permitting authority. EPA is interested in data documenting the costs of achieving such limits, any increased sludge production as a result of treating to remove BOD from wastewater and monitoring data including the method used to analyze the BOD in the collected samples.

- The appropriateness of the scope of the effluent limitations guidelines and standards and the parameters being considered for regulation (TSS, BOD, and phosphorus only) and whether autocorrelation is likely to be present in the wastewater data.

- A decision not establish effluent guidelines for the CAAP point source category. This decision may be made based on the baseline pollutant discharges not being large enough to warrant national regulations. In addition, EPA may conclude that due to significant regional and facility-specific variations, it is more effective to continue to rely on the BPJ of permit writers to establish appropriate limitations. Finally, EPA may conclude that available technologies are either not affordable, or provide little reduction in pollutant discharges relative to existing practice.

XV. Guidelines for Submission of Analytical Data

EPA requests that commenters to today's proposed rule submit analytical, flow, and production data to supplement data collected by the Agency during the regulatory development process. To ensure that commenter data may be effectively evaluated by the Agency, EPA has developed the following guidelines for submission of data.

A. Types of Data Requested

EPA requests paired influent and effluent treatment data for each of the treatment practices identified in the technology options (*see* Section VII.A) as well as any additional technologies applicable to the treatment of CAAP wastewater. EPA prefers paired influent and effluent treatment data, but also solicits unpaired data as well.

For the systems treating CAAP process wastewater, EPA requests paired influent and effluent treatment data from 24-hour composite samples of flowing wastewater streams (except for analyses requiring grab samples, such as oil and grease). This includes end-of-pipe treatment practices and in-process treatment, recycling, or water reuse. Submission of effluent data alone is acceptable, but the commenters should provide evidence that the influent concentrations contain treatable levels of the pollutants. If commenters sample their wastewaters to respond to this proposal, EPA encourages them to sample both the influent and effluent wastestreams.

EPA prefers that the data be submitted in an electronic format. In addition to providing the measurement of the pollutant in each sample, EPA requests that sites provide the detection limit (rather than specifying zero or "ND") if the pollutant is non-detected in the wastestream. Each measurement should be identified with a sample collection date, the sampling point location, and the flow rate at that location. For each sample or pollutant, EPA requests that the chemical analytical method be identified.

In support of the treatment data, commenters should submit the following items if they are available: A process diagram of the treatment system that includes the sampling point locations; treatment chemical addition rates; laboratory reports; influent and effluent flow rates for each treatment unit during the sampling period; production in each subcategory (daily values are preferred, but either production or estimated production during the sampling period are also acceptable); sludge or waste oil generation rates; a brief discussion of the treatment practice sampled; and a list of CAAP operations contributing to the sampled wastestream. If available, information on capital cost, annual (operation and maintenance) cost, and treatment capacity should be included for each treatment unit within the system.

B. Analytes Requested

EPA considered metals, conventional, and other nonconventional pollutant parameters for regulation based on analytical data collected. EPA initially identified 30 pollutants of concern for the industry (*see* Section VII.C and CAAP Development Document). The Agency requests analytical data for any of the pollutants of concern and for any other pollutant parameters that commenters believe are of concern in the CAAP industry. Of particular interest are BOD₅, TSS, total phosphorus, and pH data. Commenters should use the methods listed in Table XV.C-1 or equivalent methods (generally, those approved at 40 CFR 136 for compliance monitoring), and should document the method used for all data submissions. The methods are described in more detail in the CAAP Development Document.

C. Quality Assurance/Quality Control (QA/QC) Requirements

EPA based today's proposed regulations on analytical data collected by EPA using rigorous QA/QC checks specified in the analytical methods listed in Table XV.C-1. These QA/QC checks include procedures specified in each of the analytical methods, as well as procedures used for the CAAP sampling program in accordance with EPA sampling and analysis protocols. These QA/QC procedures include sample preservation and the use of method blanks, matrix spikes, matrix spike duplicates, laboratory duplicate samples, and QC standard checks (*e.g.*, continuing calibration blanks). Because of these rigorous checks, EPA has high confidence in its data. Thus, EPA requests that submissions of analytical data include any available documentation of QA/QC procedures. However, EPA will still consider data submitted without detailed QA/QC information. If commenters sample their wastewaters to respond to this proposal, EPA encourages them to provide detailed documentation of the QA/QC checks for each sample. EPA also requests that sites collect and analyze 10 percent field duplicate samples to assess sampling variability, and sites provide data for equipment blanks for volatile organic pollutants when automatic compositors are used to collect samples.

TABLE XV.C-1.—ANALYTICAL METHODS FOR USE WITH CAAP WASTEWATERS

Parameter	Method used in EPA sampling (alternative methods)
Aeromonas	9260L, EPA draft method 1605
Ammonia as Nitrogen	350.1, 350.2, 350.3
BOD 5-Day	405.1
Chemical Oxygen Demand (COD).	410.1
	410.2
	410.4
	5220B
Chloride	325.2, 325.3
<i>E. coli</i>	9221F
<i>Enterococcus faecium</i>	9230 B or C
Fecal Coliforms	SM 9221 B
Fecal Streptococcus	SM 9230 B
Metals	1620 (200.7, 245.1)
<i>Mycobacterium marinum</i> .	SM 9260
Volatile Organics	1624 Rev. C (624)
Semivolatile Organics	1625 Rev. C (625)
Nitrate/Nitrite	350.1, 350.2, 350.3
Nitrogen, Total Kjeldahl.	351.1, 351.2, 351.3, 351.4
Oil and Grease	413.2
Oil and Grease (as HEM).	1664 A
Oxytetracycline	NA
pH	150.1 (SM 4500 H+ B)
Phosphorus, Total	365.2, 365.3
<i>Salmonella</i>	FDA-BAM
Settleable Solids	160.5, SM 2540 F ??
Sulfate	375.1, 375.3, 375.4
Total Coliforms	SM 9221 B
Total Dissolved Phosphorus.	365.2, 365.3
Total Dissolved Solids (TDS).	160.1
Total Organic Carbon (TOC).	Lloyd Kahn (solids only), 415.1
Total Orthophosphate	365.1, 365.2, 365.3
Total Suspended Solids (TSS).	160.2
Total Volatile Solids ..	160.4

Note: Standard Method (SM).

Appendix A: Definitions, Acronyms, and Abbreviations Used in This Document

Administrator—The Administrator of the U.S. Environmental Protection Agency.

Agency—The U.S. Environmental Protection Agency.

BAT—The best available technology economically achievable, applicable to effluent limitations for industrial discharges to surface waters, as defined by Section 304(b)(2)(B) of the CWA.

BCT—The best control technology for conventional pollutants, applicable to discharges of conventional pollutants from existing industrial point sources, as defined by Section 304(b)(4) of the CWA.

BOD₅—Biochemical Oxygen Demand measured over a five day period.

BPJ—Best Professional Judgment.

BPT—The best practicable control technology currently available, applicable to

effluent limitations, for industrial discharges to surface waters, as defined by Section 304(b)(1) of the CWA.

CAAP—Concentrated Aquatic Animal Production.

CFR—Code of Federal Regulations.

Clean Water Act (CWA)—The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1251 *et seq.*), as amended.

Conventional Pollutants—Constituents of wastewater as determined by Section 304(a)(4) of the CWA (and EPA regulations), *i.e.*, pollutants classified as biochemical oxygen demand, total suspended solids, oil and grease, fecal coliform, and pH.

Daily Discharge—The discharge of a pollutant measured during any calendar day or any 24-hour period that reasonably represents a calendar day.

Direct Discharger—A facility that discharges or may discharge treated or untreated wastewaters into waters of the United States.

DMR—Discharge Monitoring Report.

Existing Source—For this rule, any facility from which there is or may be a discharge of pollutants, the construction of which is commenced before the publication of the final regulations prescribing a standard of performance under Section 306 of the CWA.

Facility—All contiguous property and equipment owned, operated, leased, or under the control of the same person or entity.

FDF—Fundamentally Different Factor.

FTE—Full Time Equivalent Employee.

HEM—A measure of oil and grease in wastewater by mixing the wastewater with hexane and measuring the oils and greases that are removed from the wastewater with n-hexane. Specifically EPA Method 1664, see 40 CFR 136.3, Table IB.

Indirect Discharger—A facility that discharges or may discharge wastewaters into a publicly-owned treatment works.

ISA/AETF—Joint Subcommittee on Aquaculture, Aquaculture Effluents Task Force.

LTA (Long-Term Average)—For purposes of the effluent guidelines, average pollutant levels achieved over a period of time by a facility, subcategory, or technology option. LTAs were used in developing the effluent limitations guidelines and standards in today's proposed regulation.

Maximum Monthly Discharge Limitation—The highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during the calendar month divided by the number of "daily discharges" measured during the month.

Minimum Level—The level at which an analytical system gives recognizable signals and an acceptable calibration point.

NAICS—North American Industry Classification System. NAICS was developed jointly by the U.S., Canada, and Mexico to provide new comparability in statistics about business activity across North America.

National Pollutant Discharge Elimination System (NPDES) Permit—A permit to discharge wastewater into waters of the United States issued under the National Pollutant Discharge Elimination System, authorized by section 402 of the CWA.

Non-Conventional Pollutants—Pollutants that are neither conventional pollutants nor priority pollutants listed at 40 CFR 401.15 and part 423 appendix A.

Non-Water Quality Environmental

Impact—Deleterious aspects of control and treatment technologies applicable to point source category wastes, including, but not limited to air pollution, noise, radiation, sludge and solid waste generation, and energy used.

NRDC—Natural Resources Defense Council.

NSPS—New Sources Performance Standards, applicable to industrial facilities whose construction is begun after the effective date of the final regulations (if those regulations are promulgated after January 10, 2003. EPA is scheduled to take final action on this proposal in June 2004. See 40 CFR 122.2.

NTTA—National Technology Transfer and Advancement Act.

NWPCAM—The National Water Pollution Control Assessment Model (version 1.1) is a computer model to model the instream dissolved oxygen concentration, as influenced by pollutant reductions of BOD₅, Total Kjeldahl Nitrogen, Total Suspended Solids, and Fecal Coliform.

Outfall—The mouth of conduit drains and other conduits from which a facility effluent discharges into receiving waters.

Pass Through—The term "Pass Through" means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Point Source—Any discernable, confined, and discrete conveyance from which pollutants are or may be discharged. See CWA Section 502(14).

Pollutants of Concern (POCs)—Pollutants commonly found in aquatic animal production wastewaters. Generally, a chemical is considered as a POC if it was detected in untreated process wastewater at 5 times a baseline value in more than 10% of the samples.

Priority Pollutant—One hundred twenty-six compounds that are a subset of the 65 toxic pollutants and classes of pollutants outlined pursuant to Section 307 of the CWA.

PSes—Pretreatment standards for existing sources of indirect discharges, under Section 307(b) of the CWA, applicable (for this rule) to indirect dischargers that commenced construction prior to promulgation of the final rule.

PSNS—Pretreatment standards for new sources under Section 307(c) of the CWA.

Publicly Owned Treatment Works (POTW)—A treatment works as defined by Section 212 of the Clean Water Act, which is owned by a State or municipality (as defined by Section 502(4) of the Clean Water Act). This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey

wastewater to a POTW Treatment Plant. The term also means the municipality as defined in Section 502(4) of the Clean Water Act, which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works.

RFA—Regulatory Flexibility Act.

SAP—Sampling and Analysis Plan.

SBREFA—Small Business Regulatory

Enforcement Fairness Act of 1996.

SCC—Sample Control Center.

SER—Small Entity Representative.

SIC—Standard Industrial Classification (SIC)—A numerical categorization system used by the U.S. Department of Commerce to catalogue economic activity. SIC codes refer to the products, or group of products, produced or distributed, or to services rendered by an operating establishment. SIC codes are used to group establishments by the economic activities in which they are engaged. SIC codes often denote a facility's primary, secondary, tertiary, etc. economic activities.

Total Nitrogen—Sum of nitrate/nitrite and TKN.

TKN—Total Kjeldahl Nitrogen.

TSS—Total Suspended Solids.

List of Subjects in 40 CFR Part 451

Environmental protection,
Concentrated aquatic animal
production, Waste treatment and
disposal, Water pollution control.

Dated: August 14, 2002.

Christine Todd Whitman,
Administrator.

For the reasons set forth in the
preamble, 40 CFR part 451 is proposed
to be added as follows:

PART 451—CONCENTRATED AQUATIC ANIMAL PRODUCTION POINT SOURCE CATEGORY

Sec.

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451.22 Effluent limitations attainable by the
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technology economically achievable
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application of the best conventional
technology (BCT).

451.24 New source performance standards
(NSPS).

451.25 Best management practices (BMPs).

Subpart C—Net Pen Systems

451.30 Applicability.

451.31 Effluent limitations attainable by the
application of the best practicable
control technology currently available
(BPT).

451.32 Effluent limitations attainable by the
application of the best available
technology economically achievable
(BAT).

451.33 Effluent limitations attainable by the
application of the best conventional
technology (BCT).

451.34 New source performance standards
(NSPS).

451.35 Best management practices (BMPs).

Authority: 33 U.S.C. 1311, 1314, 1316,
1317, 1318, 1342 and 1361.

§ 451.1 General applicability.

As defined more specifically in each
subpart, this Part applies to discharges
from concentrated aquatic animal
production facilities as that term is
defined at 40 CFR 122.24 and Appendix
C. This Part applies to the discharges of
pollutants from production activities
that occur in the following systems:
flow-through, recirculating and net
pens.

§ 451.2 General definitions.

As used in this part:

(a) The general definitions and
abbreviations in 40 CFR part 401 apply.

(b) *Bulk discharge* means wastewater
from the areas of animal confinement in
a flow-through system that does not
flow to off-line settling. The bulk
discharge is either treated effluent from
full-flow settling or the flow from the
areas of animal confinement other than
the flows routed to offline settling, but
does not include the flows removed
from the areas of animal confinement
for offline settling.

(c) *Chemical* means any substance
that is added to the concentrated aquatic
animal production facility to maintain
or restore water quality for aquatic
animal production and that may be
discharged to waters of the United
States.

(d) *Concentrated aquatic animal
production facility* is defined at 40 CFR
122.24 and Appendix C.

(e) *Drug* means any substance that is
added to the concentrated aquatic
animal production facility to maintain

or restore aquatic animal health or to
affect the structure or any function of an
aquatic animal, and that may be
discharged to waters of the United
States. For the purposes of this Part, the
term does not include substances
injected directly into aquatic animals or
used in immersion baths that are not
discharged to waters of the United
States.

(f) *Excess feed* means feed that is
added to a production system and that
is not consumed or is not expected to
be consumed by the aquatic animals.

(g) *Flow-through system* means a
system designed for a continuous water
flow to waters of the United States
through chambers used to produce
aquatic animals. Flow-through systems
typically use either raceways or tank
systems. Water is supplied to raceways
by nearby rivers or springs and are
typically long, rectangular chambers at
or below grade, constructed of earth,
concrete, plastic, or metal. Tank systems
are similarly supplied with water and
concentrate aquatic animals in circular
or rectangular tanks above grade. The
term does not include net pens.

(h) *Full-flow settling* means the
treatment practice in which all of the
flow from a flow-through system is
treated using solids settling techniques
prior to discharge.

(i) *FWS* means United States Fish and
Wildlife Service, an agency within the
United States Department of the
Interior.

(j) *Net pen system* means a stationary,
suspended or floating system of nets or
screens in open marine or estuarine
waters of the United States. Net pen
systems typically are located along a
shore or pier or may be anchored and
floating offshore. Net pens and cages
rely on tides and currents to provide
continual supply of high-quality water
to the animals in production.

(k) *Non-native aquatic animal species*
mean an individual, group, or
population of a species:

(1) That is introduced into an area or
ecosystem outside its historic or native
geographic range; and

(2) That has been determined and
identified by the appropriate State or
Federal authority to threaten native
aquatic biota. The term excludes species
raised for stocking by public agencies.

(l) *Off-line settling* means the
treatment practice in which a small,
concentrated portion of the flow is
diverted and treated before being
discharged; specifically, the portion of
flow that is vacuumed or removed from
the bottom of a tank or raceway, which
contributes high levels of settled solids.

(m) *Permitting authority* means the
agency authorized to administer the

National Pollutant Discharge Elimination System permitting program for the receiving waters into which a facility subject to this Part discharges.

(n) *Recirculating system* means a system that filters and reuses water in which the aquatic animals are produced prior to discharge. Recirculating systems typically use tanks, biological or mechanical filtration, and mechanical support equipment to maintain high quality water to produce aquatic animals.

(o) *TSS* means total suspended solids that may be discharged to waters of the United States.

§ 451.3 Reporting requirements specific to facility discharges under the scope of this part.

(a) *Drugs and chemicals.* In accordance with the following procedures, the permittee must notify the permitting authority of the addition directly to an aquatic animal production facility subject to this Part of any investigational new animal drug (*i.e.*, a drug for which there is a valid exemption in effect under 512(j) of the Federal Food, Drug, and Cosmetic Act, 21 U.S.C. 360b(j)) and any drug that is not used according to label requirements, as well as any chemical that is not used according to label requirements:

(1) For drugs and chemicals that are not used according to label requirements:

(i) The permittee must provide an oral report to the permitting authority within 7 days after initiating application of the drug or chemical. The oral report must identify the drug and/or chemical added and the reason for adding the drug and/or chemical.

(ii) The permittee must provide a written report to the permitting authority within 30 days after conclusion of the addition of the drug or chemical. The written report must identify the drug and/or chemical added and include: the reason for treatment, date(s) and time(s) of the addition (including duration); the total amount of active ingredient added; the total amount of medicated feed added (only for drugs applied through medicated feed), and the estimated number of aquatic animals medicated by the addition.

(2) For investigational new animal drugs: The permittee must provide a written report to the permitting authority within 30 days after conclusion of the addition of any investigational new drug. The written report must identify the drug added including: the reason for treatment, date(s) and time(s) of the addition

(including duration); the total amount of active ingredient added; the total amount of medicated feed added (only for drugs applied through medicated feed), and the estimated number of aquatic animals medicated by the addition.

(b) *Best Management Practices (BMP) plan certification.* The owner or operator of any facility subject to this Part must certify that a BMP plan has been developed and meets the objectives as defined in the §§ 451.15, 451.25, or 451.35 (as applicable). The plan will be made available to the permitting authority upon request.

§ 451.4 Alternative compliance provision.

Facilities subject to the total suspended solids (TSS) numerical limitations in this section may comply with these requirements through the development and implementation of a BMP plan if the permitting authority determines that the plan will achieve the numeric limitations. For facilities subject to this section, the BMP plan also must satisfy the provisions of § 451.15(a) for flow-through systems and § 451.25(a) for recirculating systems.

Subpart A—Flow-Through Systems

§ 451.10 Applicability.

This subpart applies to the discharge of pollutants from a concentrated aquatic animal production facility that produces aquatic animals in a flow-through system according to the production level thresholds in this subpart.

§ 451.11 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the application of BPT:

(a) Facilities that produce 475,000 pounds or more per year.

(1) For discharges from a full-flow facility, including a facility that has flow from separate offline settling but that recombines such separate flows prior to discharge; The permittee must meet the TSS maximum daily and monthly average numeric limits:

Regulated parameter	Maximum daily	Maximum monthly average
TSS (mg/l)	10	6

Regulated parameter	Maximum daily	Maximum monthly average
Non-conventional and toxic pollutants	(¹)	(¹)

¹ Develop and implement a BMP plan as specified in §§ 451.15(b)–(d) and 451.3(b).

(2) For discharges from a facility that discharges from separate offline settling.

(i) The permittee must meet the TSS maximum daily and monthly average numeric limits for discharges from the separate offline settling:

Regulated parameter	Maximum daily	Maximum monthly average
TSS (mg/l)	69	55
Non-conventional and toxic pollutants	(¹)	(¹)

¹ Develop and implement a BMP plan as specified in §§ 451.15(b)–(d) and 451.3(b).

(ii) For the remaining bulk discharge, the permittee must develop and implement a BMP plan as described in § 451.15 (a) through (d).

(b) Facilities that produce 100,000 pounds per year up to 475,000 pounds per year.

(1) For discharges from a full-flow facility including a facility that has flow from separate offline settling but that recombines such separate flow prior to discharge; The permittee must meet the TSS maximum daily and monthly average numeric limits:

Regulated parameter	Maximum daily	Maximum monthly average
TSS (mg/l)	11	6
Non-conventional and toxic pollutants	(¹)	(¹)

¹ Develop and implement a BMP plan as specified in §§ 451.15 (b) and (d) and 451.3 (b).

(2) For discharges from a facility that discharges from separate offline settling.

(i) The permittee must meet the TSS maximum daily and monthly average numeric limits for discharges from the separate offline settling:

Regulated parameter	Maximum daily	Maximum monthly average
TSS (mg/l)	87	67

Regulated parameter	Maximum daily	Maximum monthly average
Non-conventional and toxic pollutants	(1)	(1)

¹ Develop and implement a BMP plan as specified in §§ 451.15 (b) and (d) and 451.3 (b).

(ii) For the remaining bulk discharge, the permittee must develop and implement a BMP plan as described in § 451.15 (a), (b) and (d).

(c) Compliance with paragraphs (a)(1) or (a)(2)(i) or (b)(1) or (b)(2)(i) of this section should be determined based on the net TSS concentration (measuring the TSS added by the production system.)

(d) The reporting requirements in § 451.3 (a) do not apply to facilities that produce between 100,000 pounds per year up to 475,000 pounds per year.

§ 451.12 Effluent limitations attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a flow-through system subject to this subpart must achieve the following effluent limitations representing the application of BAT: The limitations for Total Suspended Solids (TSS) and non-conventional and toxic pollutants are the same as the corresponding limitation specified in § 451.11.

§ 451.13 Effluent limitations attainable by the application of the best conventional technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a flow-through system subject to this subpart must achieve the following effluent limitations representing the application of BCT: The limitation for Total Suspended Solids (TSS) is the same as the corresponding limitation specified in § 451.11.

§ 451.14 New source performance standards (NSPS).

Any new source flow-through system subject to this subpart must achieve the following performance standards: The standards for Total Suspended Solids (TSS) and non-conventional and toxic pollutants are the same as the corresponding limitations specified in § 451.11.

§ 451.15 Best management practices (BMPs).

Any flow-through system subject to this subpart must develop and implement a Best Management Practices

(BMP) Plan to achieve the objectives and the following specific requirements:

(a) Management of removed solids and excess feed. The following requirements only apply to waste streams that are not subject to numeric limits for TSS. Minimize the re-introduction of solids removed through the treatment of the water supply and minimize excess feed entering the aquatic animal production system. Minimize the discharge of unconsumed food. Minimize discharge of feeds containing high levels of fine particulates and/or high levels of phosphorus. Clean raceways at frequencies that minimize the disturbance and subsequent discharge of accumulated solids during routine activities, such as harvesting and grading of fish.

(b) Proper operation and maintenance of a concentrated aquatic animal production facility:

(1) *Structural maintenance.* Maintain in-system technologies to prevent the overflow of any floating matter and subsequent by-pass of treatment technologies.

(2) *Materials storage.* Ensure the storage of drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility; and

(3) *Disposal of biological wastes.* Collect aquatic animal mortalities on a regular basis. Store and dispose of aquatic animal mortalities to prevent discharge to waters of the United States.

(c) The permittee must develop and implement practices to minimize the potential escape of non-native species.

(d) The permittee must ensure that the facility staff are familiar with the BMP Plan and have been adequately trained in the specific procedures that the BMP plan requires.

Subpart B—Recirculating Systems

§ 451.20 Applicability.

This subpart applies to the discharge of pollutants from a concentrated aquatic animal production facility that produces 100,000 pounds or more per year in a recirculating system.

§ 451.21 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a recirculating system subject to this subpart must achieve the following effluent limitations representing the application of BPT:

Regulated parameter	Maximum daily	Maximum monthly average
TSS (mg/l)	50	30
Non-conventional and toxic pollutants	(1)	(1)

¹ Develop and implement a BMP plan as specified in §§ 451.15(b)–(d) and 451.3(b).

§ 451.22 Effluent Limitations attainable by the application of the Best Available Technology Economically Achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a recirculating system subject to this subpart must achieve the following effluent limitations representing the application of BAT: The limitations for Total Suspended Solids (TSS) and non-conventional and toxic pollutants are the same as the corresponding limitations specified in § 451.21.

§ 451.23 Effluent Limitations attainable by the application of the Best Conventional Technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a recirculating system subject to this subpart must achieve the following effluent limitations representing the application of BCT: The limitation for Total Suspended Solids (TSS) is the same as the corresponding limitation specified in § 451.21.

§ 451.24 New source performance standards (NSPS).

Any new source recirculating system subject to this subpart must achieve the following performance standards: The standard for Total Suspended Solids (TSS) and non-conventional and toxic pollutants are the same as the corresponding limitations specified in § 451.21.

§ 451.25 Best management practices (BMP).

Any recirculating system subject to this subpart must develop and implement a Best Management Practices (BMP) Plan to achieve the objectives and the following specific requirements:

(a) Management of removed solids and excess feed. The following requirements only apply to waste streams that are not subject to numeric limits for TSS. Minimize the re-introduction of solids removed through the treatment of the water supply and minimize excess feed entering the aquatic animal production system.

(b) Proper operation and maintenance of a concentrated aquatic animal production facility:

(1) *Structural Maintenance*. Maintain in-system technologies to prevent the overflow of any floating matter and subsequent by-pass of treatment technologies.

(2) *Materials storage*. Ensure the storage of drugs and chemicals to avoid inadvertent spillage or release into the aquatic animal production facility; and

(3) *Disposal of biological wastes*. Collect aquatic animal mortalities on a regular basis. Store and dispose of aquatic animal mortalities to prevent discharge to waters of the United States.

(c) The permittee must develop and implement practices to minimize the potential escape of non-native species.

(d) The permittee must ensure that the facility staff are familiar with the BMP Plan and have been adequately trained in the specific procedures that the BMP plan requires.

Subpart C—Net Pen Systems

§ 451.30 Applicability.

This subpart applies to the discharge of pollutants from a concentrated aquatic animal production facility that produces 100,000 pounds or more per year in net pen systems, except for net pen facilities located in the State of Alaska producing native species of salmon.

§ 451.31 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a net

pen system subject to this subpart must achieve the following best management practice representing the application of BPT:

(a) The permittee must maintain a real-time monitoring system to monitor the rate of feed consumption. The system must be designed to allow detection or observation of uneaten feed passing through the bottom of the net pens and to prevent accumulation.

(b) [Reserved]

§ 451.32 Effluent limitations attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a net pen system subject to this subpart must achieve the following best management practice representing the application of BAT: Active feed monitoring as specified in § 451.31.

§ 451.33 Effluent limitations attainable by the application of the Best Conventional technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, discharges from a net pen system subject to this subpart must achieve the following best management practice representing the application of BCT: Active feed monitoring as specified in § 451.31.

§ 451.34 New source performance standards (NSPS).

Any new source net pen system subject to this subpart must achieve the following performance standards: Active feed monitoring as specified in § 451.31.

§ 451.35 Best Management Practices (BMPs).

Any net pen system subject to this subpart must develop and implement a Best Management Practices (BMP) plan to achieve the objectives and the following specific requirements:

(a) The permittee must operate the facility so as to minimize the concentration of net-fouling organisms that are discharged, for example, changing and cleaning nets and screens onshore.

(b) The following discharges into waters of the United States should be avoided to the maximum extent feasible:

(1) Blood, viscera, fish carcasses, or transport water containing blood associated with the transport or harvesting of fish;

(2) Substances associated with in-place pressure washing nets. The use of air-drying, mechanical, and other non-chemical procedures to control net-fouling are strongly encouraged.

(c) The permittee must develop and implement practices to minimize the potential escape of non-native species.

(d) The following discharges from a net pen system into waters of the United States are prohibited :

(1) Feed bags and other solid wastes;

(2) Chemicals used to clean nets, boats or gear; and

(3) Materials containing or treated with tributyltin compounds.

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