Final Report

of the

Small Business Advocacy Review Panel

on EPA's Planned Proposed Rule

Effluent Limitations Guidelines and Standards for the Aquatic Animal Production Industry

June 19, 2002

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Appendix B: Written Comments the SBAR Panel Received from SERs

SBAR Panel Report from the Small Business Advocacy Review Panel on EPA's Planned Proposal of Aquatic Animal Production Industry

1. INTRODUCTION

This report is presented by the Small Business Advocacy Review Panel (SBAR Panel or Panel), for the proposed effluent limitation guidelines and standards for the Aquatic Animal Production Industry (Aquaculture), which was convened on January 22, 2002. Section 609(b) of the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), requires a Panel to be convened prior to publication of the initial regulatory flexibility analysis (IRFA) that an agency may be required to prepare under the RFA. In addition to EPA's Small Business Advocacy Chairperson, the Panel consisted of the Director of EPA's Engineering and Analysis Division (Office of Water, Office of Science and Technology) and the Director of EPA's Water Permits Division (Office of Water, Office of Wastewater Management), the Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget (OMB), and the Chief Counsel for Advocacy of the Small Business Administration (SBA).

This report includes the following:

- background information on the proposed rule being developed;
- information on the types of small entities that would be subject to the proposed rule;
- a summary of the Panel's outreach activities;
- a summary of the comments and recommendations of the Small Entity Representatives (SERs); and
- the SBAR Panel's findings and recommendations with respect to the issues raised in the SER comments, and the statutory elements of an IRFA.

Section 609(b) of the RFA directs the Panel to report on the comments of small entity representatives and make findings on issues related to identified elements of an IRFA under section 603 of the RFA. Those elements of an IRFA are:

- a description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;
- a description of projected reporting, record keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be

subject to the requirements and the type of professional skills necessary for preparation of the report or record;

- an identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule; and

- a description of any significant alternative to the proposed rule which accomplishes the stated objectives of applicable statutes and which minimizes any significant economic impact of the proposed rule on small entities.

Once completed, the Panel report is provided to EPA and included in the rulemaking record. In light of the Panel report, and where appropriate, EPA may make changes to the draft proposed rule, the IRFA for the proposed rule, or the decision on whether an IRFA is required.

It is important to note that the Panel's findings and discussion will be based on the information available at the time the final Panel report is drafted. EPA will continue to conduct analyses relevant to the proposed rule, and additional information may be developed or obtained during the remainder of the rule development process. Because the Panel's report is written at a preliminary stage of rule development, it should be considered in that light. At the same time, the report provides the Panel with an opportunity to identify and explore potential ways of shaping the proposed rule to minimize the burden of the rule on small entities while achieving the rule's purposes. Any options identified by the Panel to reduce the rule's regulatory impact on small entities may require further analysis and/or data collection to ensure that the options are practicable, enforceable, environmentally sound, and consistent with the Clean Water Act.

2. BACKGROUND AND REGULATORY HISTORY

2.1 Discussion of Effluent Guidelines

EPA develops national effluent limitations guidelines and standards on an industry-by-industry basis, which are intended to represent the levels of pollutant reductions corresponding to various levels of control. To develop these technology-based regulations, EPA first gathers information on the industry practices; characteristics of discharges (e.g., stormwater flows and pollutants); technologies or practices used to prevent or treat the discharge; and economic and financial characteristics. Using this information, EPA identifies the best technologies that are economically achievable for the industry and sets regulatory requirements based on the performance of technologies. States and EPA regional offices issue National Pollutant Discharge Elimination System (NPDES) permits that implement these technology-based requirements. The permits may be more stringent due to water quality considerations, but may not be less stringent than the national effluent guidelines.

EPA has issued national technology-based effluent guidelines for over 50 industry categories. The effluent guidelines for the Aquatic Animal Production (AAP) Industry if finalized will be a new category, which would be published at 40 C.F.R. Part 451.

2.2 Description of the Aquatic Animal Production Rule and its Scope

The AAP effluent guidelines would apply to facilities engaged in the production of aquatic animal species which are commonly referred to as aquaculture. Aquaculture facilities in the United States span a wide range of operations that vary in size, animal production methods, species, ambient conditions, habitat, and economic considerations. In some aquaculture operations, the process of concentrating animals in large numbers may have implications for the environment. Inputs such as feed, oxygen, clean water, chemicals, hormones, and antibiotics are necessary to maintain a healthy environment for the aquatic organisms being farmed. Similarly, the outputs of materials from concentrated aquatic animal production also need to be properly handled and disposed of in order to prevent the contamination of nearby waterways. These materials may include, depending on the site-specific characteristics of the facility, nutrients, suspended solids, materials from feedstock, exotic organisms, pathogens, chemicals, hormones, and antibiotics. The introduction of these materials into natural waterways may contribute to water quality impairments of the receiving streams.

Through the effort to develop this effluent guideline, EPA will assess the quality of wastewater generated and discharged at different types of aquaculture facilities. EPA will identify the types of treatment technologies and/or "best management practices" applicable to treating this wastewater. EPA also considers the environmental and water quality impacts caused by aquaculture discharges; the costs and cost effectiveness of treatment and/or practices

to address adverse environmental impacts; and the ability of aquaculture facilities to afford treatment and/or adopt best management practices.

In developing the Aquatic Animal Production (AAP) effluent guidelines EPA is considering facilities engaged in AAP in the following categories: commercial and non-profit operations, academic/research institutions, Tribal and government facilities. The facilities under consideration by EPA include both land-based and open-water operations. The regulations may address discharges from these types of facilities that produce finfish, shellfish or other aquatic animals using various production systems, most notably ponds, raceways, recirculating systems, floating and bottom culture systems and netpens.

The schedule for the AAP rulemaking is included in a consent decree between EPA and the Natural Resources Defense Council *(Natural Resources Defense Council, Inc., et al v. Whitman,* D.D.C. 89-2980; January 31, 1992, as modified). The court-ordered deadline for proposing the AAP rule is August 14, 2002 with final action by June 2004.

3. OVERVIEW OF TECHNOLOGY OPTIONS

Under each of the production types, EPA describes the baseline practices and other technology options under consideration for regulation at the time of the Panel. The baseline option represents EPA's best estimate of the current conditions of the typical facility, which in this case may include various combinations of practices or technologies that are described in the baseline discussion. Option 1 considers additional controls to reduce pollutant loads. Option 2 would be more stringent than Option 1, therefore costing more, but also further reducing the amount of pollutants discharged. The options generally increase in stringency, costs and pollutant reductions from one option to another.

3.1 Pond Systems

The effluent guideline requirements may apply to AAP facilities which use ponds to raise aquatic animals. For the purposes of this rulemaking pond systems refer to the practice of raising aquatic animals in a pond, from which there is not a continuous discharge. Discharges from pond systems result from either an overflow due to excess precipitation or runoff entering the pond, or from intentional draining or partial draining of the pond to harvest the animals or repair the structure. This is a common production system used to produce many different species of fish including catfish, tilapia, baitfish, hybrid striped bass, shrimp, ornamentals, crawfish and others. This description of practices and technologies below applies to all pond systems, i.e., watershed and levee ponds, and are assumed to apply to all species which are raised in pond systems.

Baseline:

A. Feed Management

EPA assumes that the following good feed management practices are used at many facilities:

(1) Use of high quality feeds – using feeds specifically formulated for the aquatic animals being cultured and made with high quality ingredients.
(2) Not overfeeding – feeding only as much feed as the animals can consume in a reasonable period.
(3) Proper storage and handling of feed – storing feed to maintain quality and minimize the production of fines (small feed particles, or dust, that will not be eaten by most animals).
(4) Uniform feed applications – feeding as much of the pond surface as possible to ensure that all of the animals have feed available to consume.
(5) Routine observation of feeding behavior – observing the feeding habits of the animals to ensure that they are consuming food, e.g., watching fish feeding on the surface or using feeding trays for shrimp.
(6) Routine monitoring (for management purposes) of water quality, especially dissolved oxygen, ammonia, nitrite, alkalinity, pH, and other key parameters for the species being cultured.

B. In-pond Treatment

Most organic matter added to and produced within ponds is ultimately decomposed through natural biological processes (i.e., microbial oxidation). Ponds can remove over 90% of solids, phosphorus, and BOD, and over 70% nitrogen through such processes.

C. Water Management

EPA assumes that the following practices that can reduce overflow events and draining frequency are commonly used when appropriate:

(1) Reducing effluent volume through the storage of rainfall, which can be done by reducing the volume of water pumped into ponds to make up for evaporation and seepage. In most areas, water in ponds evaporates and seeps at a rate that requires some periodic 'topping off' to maintain water volumes. Operators using this practice do not fully fill ponds when topping off; instead, they leave a 3 to 6 inch reserve below the top of the overflow pipe in anticipation of collecting rainfall. By not completely filling the pond during pumping operations, some or all rainfall is captured, instead of overflowing.
(2) Infrequent draining of ponds, for example only when ponds need to be renovated.
(3) Seine ponds to harvest when possible, instead of draining.
(4) Not using water exchange (i.e., ground water or surface water that is used to displace water of reduced quality in the pond).
(5) Minimizing erosion in ponds with riprap, grass, or other vegetation.
(6) Placement of aerators to minimize the erosion to the pond banks and bottom during operation.
(7) Prompt repair of accidental damage to pond banks from emergency aeration equipment, feeding operations, etc. to reduce additional erosion and damage.

(8) Closing drains in drained ponds, when possible, to keep eroded sediment from washing from the pond.
(9) Aerating ponds to maintain oxygen levels and other water quality parameters.

D. Discharge Management

EPA assumes a variety of practices are used to reduce TSS and other pollutants from reaching receiving waters during draining and overflow events.

(1) Placement of riprap around discharge points that are prone to erosion to reduce scouring from the flowing water.
(2) Properly sized drainage ditches which convey water efficiently and minimize erosion.
(3) Vegetate all outside slopes of ponds, drainage ditches (when possible) and any other bare soil areas.

Option 1:

This option includes baseline practices as appropriate to the particular facility, plus the establishment of a best management plan, which may include requirements to consider some or all of the following: aquatic animal pathogens, nonnative species, and the use of drugs and chemicals.

The goal of this option is to control conventional and nutrient pollutants in the discharge and minimize the discharge of drugs and chemicals through the development and implementation of a best management plan. The AAP facility would be expected to provide written documentation of a best management plan and keep necessary records to establish and implement the plan.

EPA is tentatively referring to this plan as the Pollutant Analysis at Critical Control Points (PACCP), with the idea that it would be patterned after the Hazard Analysis and Critical Control Points (HACCP) methodology that the U.S. Department of Agriculture and the Food and Drug Administration developed for ensuring safe processing and importation of fish and shellfish products.

Components of the PACCP plan would include:

(1) Identifying the specific practices including those described above under the baseline practices, which are or would be implemented to control the discharge of conventional pollutants and nutrients. These practices would be described in the PAACP and specific maintenance, inspection and record keeping practices associated with the proper operation of these practices would be identified and implemented.
(2) A health management portion which includes 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 health management plan outlines the necessary corrective actions to be taken for minimizing the impacts of disease outbreaks.

- It would also outline procedures for routine observation of the relative health of the aquatic animals (e.g., observing feeding behavior, noting flashing, or increasing surveillance after periods of low dissolved oxygen), and a list of practices that prevent stress. Some examples of practices include:
  - Feeding high quality feeds
  - Not overfeeding
  - Maintaining water quality

(3) A drug and chemical plan which would list all drugs and chemicals that will be used, the conditions for use, the practices for safe handling and storage, and actions to be taken to minimize their use (e.g., maintaining water quality to minimize stress).

(4) A nonnative species escapement plan that includes an assessment of the potential problems associated with escaped animals. For cultured species that are generally considered to be native to an area (as defined by state agencies), this plan would provide documentation of this. For nonnative species the plan would include the identification of possible ways that escapement might occur, how the facility would minimize if not prevent escapement, and what actions are necessary by the facility operators if escapement occurs.

Option 2:

The goal of option 2 is to further reduce conventional and nutrient pollutants discharged from pond facilities by establishing a numeric limit for TSS based on expected removal of pollutants using Option 2 technologies.

EPA has evaluated several technologies and believes that the following technologies would enable pond operators to meet a numeric limitation on TSS:

(1) Ponds that are seined and then drained may benefit from holding of the water one or more days prior to draining to allow solids to settle in the pond.
(2) Vegetated ditches at least 700 feet in length, designed according to NRCS standards.
(3) Settling basins for portions of pond drainage discharges.

This option would include requirements for pond facility operators to monitor the TSS discharge of drainage water at the point of discharge from the facility.

Option 3 **:**

The goal of this option is to further reduce BOD_5 and nutrients in effluents using biological treatment of effluents or constructed wetlands.

3.2 Flow-Through Systems

The effluent limitations guidelines may apply to culturing systems used to raise aquatic animals where water "flows through" the system. Several species are produced using this type of system the primary species raised in this type of system include trout and salmon. A flow through system mimics the action of a flowing stream, wherein water flows continuously through raceways which house the fish. The intake water used to operate these systems is often diverted from an existing stream or is fed by a spring.

Baseline :

Feed Management

EPA assumes the following good feed management practices are widely used:

(1) Use of high quality feeds – using feeds formulated for the aquatic animals being cultured and made with high quality ingredients.
(2) Not overfeeding – feeding only as much feed as the animals can consume in a reasonable period.
(3) Proper storage and handling of feed – storing feed to maintain quality and minimize the production of fines (small feed particles, or dust, that will not be eaten by most animals).
(4) Uniform feed applications – feeding as much of the flow-through systems surface as possible to ensure that all of the animals have feed available to consume.
(5) Routine observation of feeding behavior – observing the feeding habits of the animals to ensure that they are consuming food, e.g., watching fish feeding on the surface or using portholes or other observation techniques.
(6) Routine monitoring (for management purposes) of water quality, especially dissolved oxygen, ammonia, nitrite, alkalinity, pH, and other key parameters for the species being cultured.

Quiescent Zones.

EPA assumes that quiescent zones are used in raceway flow through systems and use approximately the last 10% of the length (linear) of the raceway to serve as a settling area for solids. The goal of quiescent zones (QZ) practices is to reduce the TSS (and associated pollutants) in the effluent.

Sedimentation Basins and primary settling of collected solids.

The goal of sedimentation basins and primary settling is to collect and store the solids captured in quiescent zones or other in-system practices. Some facilities use sedimentation basins for treating all of the flow, which is called full flow settling. Other facilities collect solids in a system (e.g., by QZ or other in-system removal practices) which are conveyed to a sedimentation basin for solids holding and dewatering, (called off-line settling). EPA assumes that

sedimentation basins are sized according to the estimated settling time for the physical properties of particle sizes in the effluent and the desired final effluent quality.

Option 1:

This option includes baseline practices plus the establishment of a best management plan, which may include components designed to minimize potential problems associated with the introduction and/or discharge of aquatic animal pathogens, as well as nonnative species, and the use of drugs and chemicals. The details outlines for the development of a PACCP plant for this options would be similar to the one described for PACCP plans at pond systems.

***Option 2*:**

The goal of option 2 is to further reduce solids discharged from flow-through facilities by establishing a numeric limit for TSS from settling basins or other primary settling systems. EPA has identified several technologies that it believes would enable facility operators to meet this requirement including microscreen filters, polishing ponds, and chemical additions.

***Option 3*:**

This option would address the control of pathogen indicator organism discharges. The goal of disinfection is to reduce human health pathogens and overall bacterial levels that are generated in and discharged from solids treatment systems that store fish manure. According to EPA, sampling data shows elevated levels of pathogen indicator organisms and bacteria may discharge from manure storage facilities, such as sedimentation basins, to waters of the United States. EPA believes that several treatment technologies can be used to disinfect effluent discharges from solids treatment processes including chlorine, ozone, and UV.

3.3 Recirculating Systems

EPA also may apply the effluent limitations guidelines to discharges from recirculating systems that are used to raise aquatic animals. This type of system initially requires substantially more capital investment and expertise to operate compared to pond or flow through systems. Thus, the species grown in this system tend to be high value (cost) species. A recirculating system mimics a stream, but maintains the fish in tanks and recirculates the water through the tanks with water treatment to refresh the water prior to returning it to the tank. Species raised in this type of system for commercial production typically include tilapia and hybrid striped bass and ornamental species.

Baseline :

Feed Management

EPA believes that the following good feed management practices are widely used in this category:

(1) Use of high quality feeds – using feeds formulated for the aquatic animals being cultured and made with high quality ingredients.
(2) Not overfeeding – feeding only as much feed as the animals can consume in a reasonable period.
(3) Proper storage and handling of feed – storing feed to maintain quality and minimize the production of fines (small feed particles, or dust, that will not be eaten by most animals).
(4) Uniform feed applications – feeding as much of the flow-through systems surface as possible to ensure that all of the animals have feed available to consume.
(5) Routine observation of feeding behavior – observing the feeding habits of the animals to ensure that they are consuming food, e.g., watching fish feeding on the surface or using portholes or other observation techniques.

Sedimentation Basins and primary settling of collected solids:

The goal of sedimentation basins and primary settling is to collect and store the solids captured in solids filters internal to the recirculating system or through other in-system practices. EPA assumes that recirculating systems generate a maximum of about 10% of the system volume per day and believes that sedimentation basins are sized and maintained according to the estimated settling time for the physical properties of particle sizes in the effluent and the desired final effluent quality.

Option 1:

This option includes baseline practices plus the establishment of a best management plan, which may include components designed to minimize potential problems associated with the introduction and/or discharge of aquatic animal pathogens, as well as nonnative species, and the use of drugs and chemicals. The details outlined for the development of the PACCP plan for this option would be similar to the PACCP plan described for pond and flow through systems.

***Option 2*:**

The goal of option 2 is to further reduce solids discharged from recirculating facilities by establishing a numeric limit for TSS from settling basins or other primary settling systems. EPA has identified several technologies that it believes would enable facility operators to meet a numeric limit for TSS including microscreen filters, polishing ponds, and chemical additions.

Option 3:

This option would address the control of pathogen indicator organism discharges. The goal of disinfection is to reduce pathogens known to adversely affect human health and overall bacterial levels that may be generated in and discharged from solids treatment systems that store fish manure. According to EPA, sampling data shows elevated levels of pathogen indicator organisms and bacteria may discharge from manure storage facilities, such as sedimentation

basins, to waters of the United States. EPA has identified several treatment technologies to disinfect effluent discharged from solids treatment processes including chlorine, ozone, and UV.

3.4 Net Pen Systems

The net pen system confines aquatic animals in open water through the use of nets or other similar restraints that prevent the animals from escaping but allow the ambient water to flow through the confinement area. These systems usually require the addition of feed to achieve the growth of the animals expected by the operation. Because the animals are confined directly in waters of the U.S. it is difficult to control discharges (whether from excess feed, fish wastes, medications, or escapement) from these systems.

***Baseline*:**

Feed management.

EPA believes that the following good feed management practices are widely used in this category:

(1) Use of high quality feeds – using feeds formulated for the aquatic animals being cultured and made with high quality ingredients.
(2) Not overfeeding – feeding only as much feed as the animals can consume in a reasonable period.
(3) Proper storage and handling of feed – storing feed to maintain quality and minimize the production of fines (small feed particles, or dust, that will not be eaten by most animals).
(4) Uniform feed applications – feeding as much of the flow-through systems surface as possible to ensure that all of the animals have feed available to consume.
(5) Routine observation of feeding behavior – observing the feeding habits of the animals to ensure that they are consuming food, e.g., watching fish feeding on the surface or using portholes or other observation techniques.

Option 1:

This option includes baseline practices plus the establishment of a best management plan, which may include components designed to minimize potential problems associated with the introduction and/or discharge of aquatic animal pathogens, as well as nonnative species, and the use of drugs and chemicals. The details outlined for the development of the PACCP plan for this options would be similar to PACCP plan described for pond, flow through and recirculating systems.

***Option 2*:**

The goal of this option is to further reduce pollutant discharges associated with feeding. This option considers the use of an active feed monitoring system to avoid the waste (discharge) of uneaten feed. One such approach is to actively monitor feeding in the net pen by using a video

monitor near the bottom to observe the passage of uneaten feed through the bottom of the pen. When feed is observed, feeding is stopped.

4. APPLICABLE SMALL ENTITY DEFINITIONS

EPA typically uses the Small Business Administration's (SBA) size standards that define small businesses by number of employees or, as in this case, revenues generated from all sources to define the facilities that may be covered. EPA estimates that there may be approximately 4,200[1] AAP establishments that meet the SBA definition of "small business." This is derived from the total industry population–establishments that EPA believes could potentially be in the scope of the proposed rule. However, not all of these establishments may be directly affected by the proposed rule. Some establishments, either by sector or size may be excluded from the scope of the proposed rule. In addition, some establishments within the scope may already be using the controls and practices used as a basis for the proposal. EPA would use the SBA definitions of small business in the various AAP sectors to evaluate the effect of the proposal on small entities. The following table lists the SBA small business definitions for the AAP sectors (and activities):

SBA Small Business Definitions for AAP Sectors		
Sector Name	***NAICS Code***	***SBA Size Standard ($)***
Finfish Farming and Fish Hatcheries	112511	annual revenues under $750,000
Shellfish Farming	112512	
Other Animal Aquaculture	112519	
Aquariums	712130	annual revenues under $500,000

5. SMALL ENTITIES THAT MAY BE SUBJECT TO THE PROPOSED REGULATION

Aquatic animal production facilities potentially affected by the rule can be subcategorized by production method and further segmented by species, corporation type, geographic location, wastewater characteristics, production levels, etc. EPA estimates that approximately 3,700 to 4,200 small commercial facilities, aquariums, and small not for profit hatcheries, for example in Alaska are potentially included in the aquatic animal production industry. These facilities are located in every state within the United States, but are mainly found in the Southern/Southeastern region. The number of facilities (about 3,700 facilities) reflects the fact that about 92 percent of the commercial facilities identified in the 1998 Census

[1] EPA is continuing to revise these estimates as new data become available.

of Aquaculture would be considered small entities using SBA definitions. The Census of Aquaculture did not survey aquariums or some non-profit organizations. As a part of EPA's efforts in identifying the potentially regulated population (i.e., screener survey "census"), EPA continues to refine its estimate of small businesses affected by the aquatic animal production industry.

6. SUMMARY OF SMALL ENTITY OUTREACH

As part of the effluent limitations guidelines rulemaking process, EPA has actively involved interested parties and provided many opportunities for input since the start of the regulatory process (January 2000). In addition, EPA has conducted numerous site visits to aquatic animal production facilities and has personally spoken with some of the members of the affected community. EPA has also met with and given presentations to several stakeholder groups during their annual or, in some cases, quarterly meetings including the Joint Subcommittee on Aquaculture/Aquaculture Effluents Task Force, Regional Aquaculture Centers and State and national aquaculture associations.

6.1 EPA's Stakeholder Outreach

Prior to convening the Panel, EPA had several discussions, meetings, and conference calls with small entities that will potentially be affected by this regulation. Between August and October 2001, EPA had discussions with members of the Aquaculture Effluents Task Force (AETF) to identify potential Small Entity Representatives (SERs). EPA invited 16 aquatic animal producers and two university professors to serve as potential SERs for the pre-panel outreach process. On November 29, 2001, EPA mailed a packet of background materials about the rulemaking to the potential SERs.

6.2 EPA's Outreach Meeting With Potential Small Entity Representatives

On December 12, 2001 EPA held a meeting/conference call in Washington, DC with small entities potentially impacted by this rulemaking. EPA presented an overview of the SBREFA process, an explanation of effluent guidelines rulemakings, and background of the AAP rule. In addition, EPA explained the contents of the outreach mailing.

6.3 Panel's Outreach Meetings With Small Entity Representatives

EPA officially convened the SBAR Panel for the aquatic animal production industry on January 22, 2002. The SBAR Panel met and discussed the materials to be provided to SERs prior to the scheduled outreach meetings. 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. The materials were sent in two separate mailings. The materials in the first mailing included: a description of the options under consideration, frequency factors indicating the technologies/practices estimated to be in place, and questions on aquariums. The materials in the second mailing

included: a description of the model facilities, pollutants of concern, possible exclusions for certain subcategories, costs and loadings estimates by subsector and regulatory option, summary of screener responses, groundwater discharges and land application of manure solids, general questions for SERs and scope and potential impacts of the proposed rule. The SERs were to review the materials and provide comments during a follow-up series of meetings/conference calls and in writing after the meetings/calls. The meetings/conference calls were held on February 12 & 13, 2002.

7. SMALL ENTITY REPRESENTATIVES

EPA, in consultation with SBA, invited 22 Small Entity Representatives (SERs) to participate in outreach meetings on the AAP proposal and the SBREFA process. The following lists those 22 SERs selected to advise the Small Business Advocacy Review Panel convened for this rule.

ALLIGATOR

Scott Anderson
Cyprus Creek Farms
Starke, FL

AQUARIUM

Bob Jenkins
Steinhart Aquarium
San Francisco, CA

CATFISH

Dan Butterfield
Butterfield Catfish Farm
Tuscaloosa, AL

Jerry Williamson
Lake Village, AR

Tom Foshee
Natchitoches, LA

CRAWFISH

Norma Jean Miller
Eunice, LA

HYBRID STRIPED BASS

Tony Vaught
Chico, CA

ORNAMENTAL

Christopher Watts
Lithia, FL

George Hood
Lower Salem, OH

SALMON FARMING

Sebastian Belle
Maine Aquaculture Association
Hallowell, ME

Steve Reifenstuhl
Northern Southeast Regional Aquaculture
Sitka, AK

SHELLFISH

Robert Rheault
Moonstone Oysters
Wakefield, RI

SHRIMP

Bill Cox
Island Fresh Seafood
Meggett, SC

Carolyn Orr
Straw Ridge Farm
Harrodsburg, KY

TILAPIA

Ken G. Hale
Ken G. Hale, Inc.
Henderson, TX

Rick Eager
Swimming Rockfish and Shrimp Farm
Meggett, SC

TROUT

Bryan Plemmons
Casta Line Trout Farms
Goshen, VA

Sonny Pierce
Pierce Associates Inc.
Hollis, ME

GENERAL

Betsy Hart
National Aquaculture Association
Charles Towne, WV

Dr. Carole Engle
Fisheries Center University of Arkansas at Pine Bluff
Pine Bluff, AR

Dr. Michael Rice
Department of Fisheries, Animal & Veterinary Science University of Rhode Island
Kingston, RI

Jack Waggener
URS Corporation
National Aquaculture Association
Franklin, TN

8. SUMMARY OF INPUT FROM SMALL ENTITY REPRESENTATIVES

8.1 Number and Types of Entities Affected

Several SERs indicated that the majority of aquatic animal production facilities are small businesses.

The Shrimp SER indicated that among the two highest production states for shrimp there are 9 small businesses and one large business in SC, and 16 small businesses and 7 large businesses in TX.

One of the Catfish SERs indicates that most catfish production is located in areas that are already economically depressed and many of the small facilities are owned by minorities or use minority labor.

One SER points out that virtually all aquatic animal producers started out at small businesses, and if EPA imposed regulations on these small producers many would be discouraged from entering the business and those already in the business would lose any incentive or financial ability to expand their business.

One SER pointed out the Aquatic Animal Producers cannot pass their costs onto the consumer and when this is combined with increasing foreign imports, small producers are put under a significant financial strain. The added pressure of costs associated with this regulation would force many producers to leave the business. This SER also indicated that the aquatic animal producers in Ohio are primarily small family owned businesses. This SER also requested that if EPA continues to consider effluent guidelines, it should exclude facilities that have revenues that don't exceed $750,000 annually.

One SER that represented molluscan operations indicated that the Census of Aquaculture count of shellfish operations and revenues appeared to be low. This SER questioned whether the Connecticut oyster industry had been left out of the Northeast data, likewise the reported numbers for Louisiana appear to be low.

A trout SER indicated that trout production in the Northeast consists of small facilities which are relatively old. Their age contributes to their construction, primarily earthen raceways. Most trout facilities in the Northeast would be represented by the National 1 model facility developed by EPA from Census of Aquaculture data. The National 1 model reflects an average revenue of $8,027. Another trout SER indicates that approximately 96% of US trout farms are small businesses, based on Census of Aquaculture information. He also points out that the trout industry is very diverse in size, geographic location, size of fish produced, water supply quality and temperature, and market outlets. He expressed concern that EPA's models oversimplify these differences.

Every SER argued strongly against national effluent guidelines for the aquatic animal production category. However, two SERs indicated that if, after considering all of the SER concerns (along with other factors EPA will consider), EPA still believes there is a strong basis for regulation, EPA should consider regulating just those businesses which meet the NPDES definition of a point source.

8.2 Potential Reporting, Record Keeping and Compliance

Several SERs indicated that EPA's options do not adequately account for the time and expense associated with the preliminary options. EPA's option 1 is based on the implementation of Best Management Practices (BMPs) which assume a cost for implementation including where necessary construction of structures, but primarily rely on labor to perform the practice and keep records. SERs point out that many small operations are family owned and do not hire out any labor. Owner/operators at these facilities are already working very long days and the added burden associated with keeping records on these practices would be unduly burdensome. One SER said that the added burden associated with implementing the BMPs and especially the record keeping associate with them would require him to hire additional labor, which he could not afford to do.

One SER indicated in verbal comments made during the Panel Outreach meeting that the mortality removal requirement is an example of requiring an action to be performed and records kept just for the sake of testing.

EPA's suggestion that manure be analyzed each time a shipment is hauled away is too excessive. One trout SER suggested that EPA should provide some flexibility in the frequency of monitoring. Another SER suggested that EPA allow for the discontinuation of the testing and reporting requirements, if the facility can establish a record of meeting or exceeding the performance standard over a period of a couple of years.

One trout SER suggested that EPA's estimated frequency for cleaning out quiescent zones is excessive. This SER referred EPA to Idaho's guidance which establishes a frequency depending on where in the overall facility a given raceway is located but in any event the most frequent cleaning is less frequent than EPA has assumed.

8.3 Related Federal Rules

Many SERs indicated that State Departments of Fish and Wildlife already control escapes of non-native species and the Federal Food and Drug Administration (FDA) is controlling the application of drugs to aquatic species, therefore EPA should not be attempting to regulate them under the effluent guidelines. Pathogens are controlled by the Department of Agriculture's (USDA), Animal, Plant Health Inspection Service (APHIS).

Some SERs questioned EPA's attempt to develop a BMP approach modeled after the Hazard Assessment Critical Control Points Plans or HACCP Plans, that were developed for fish processors by FDA. One SER pointed out that HACCP is based on scientifically determined hazards and that the costs for training under HACCP amounted to millions. This SER questioned whether EPA has identified hazards that the scientific community can even agree on and that EPA's estimate of costs are understated.

8.4 Regulatory Flexibility Alternatives

8.4.1 Regulatory Exemptions

Most SERs addressed EPA's suggestion that some sectors be exempt in their entirety and all supported this conclusion and some further suggested that other sectors be exempted.

Catfish and other pond producers argued that their production practices do not have an adverse impact on the environment and may actually improve water quality by capturing

surface runoff in watershed ponds allowing for the settling out of solids that would otherwise flow directly into streams and rivers. SERs maintained that ponds as a whole serve as an effective wastewater treatment system and that they need to maintain a high water quality in order to keep the aquatic animals alive.

8.4.2 Baseline Practices

Several SERs pointed out that EPA has overestimated the degree to which practices are currently in place at aquatic animal production facilities. These are discussed by species below.

8.4.2.1 Trout

Trout SERs questioned EPA's assumption of the frequency factors for quiescent zones and settling basins. One SER stated that virtually all trout facilities in the northeast are earthen constructed and do not have quiescent zones, furthermore this SER thought it would be very difficult to retrofit these systems with quiescent zones. The SERs said that many of the older facilities will have land constraints which could make it very difficult to retrofit settling basins. These facilities will have to take raceways out of production and convert them into a settling basins.

The SERs also questioned EPA's assumption of the baseline feed conversion ratio (FCR). Smaller facilities are unable to achieve the targets cited by EPA. SERs indicated that an FCR of 1.6 is the best that can be expected from smaller facilities, while large producers are already at the targets established by EPA. SERs also thought that some facilities would be unable to rely on gravity flow and would need to pump solids and water from the quiescent zones to the settling basins. This would require electricity which would be an additional cost.

SERs also disagree with EPA's loading density, they said that a more realistic loading density is between 2 and 3 lb/cu.ft. of volume. In addition the dimensions of the raceway are too large.

8.4.2.2 Alaskan Salmon

Salmon production in Alaska is conducted by small non-profit businesses for the purpose of returning the animals to the wild to increase the wild populations. Most of these facilities use flow through systems to raise native species. The Salmon SER indicated that these salmon facilities are located in remote locations and tend to be constructed in such a way that they have no land on which to expand. None of the Alaska facilities have quiescent zones or settling basins. To put these structures into their facilities it would require taking part of their raceways out of production. The SER contends that they would need to reduce their production by 16% to retrofit quiescent zones into their systems. This SER indicated that flow through facilities do use baffles to aid in removing solids from their raceways, although the SER said that these baffles serve to collect the solids that are discharged.

This SER also said that the pollutants discharged from these salmon producers is discharged into nutrient poor waters and is useful in supporting aquatic life. Furthermore, these facilities contribute far fewer nutrients than the wild population of salmon returning to their spawning grounds add to the water.

The SER indicated that salmon producers are practicing feed management with a goal of 1:1 feed conversion. The producers also conduct health screening of their stock before releasing them into the wild.

Some salmon are placed into net pens prior to release. These operations hold salmon for only a couple of months prior to release. Although the SER indicated that there are some benthic affects these disappear rapidly after the pens are emptied.

8.4.2.3 Catfish

SERs representing the catfish production sector expressed concern about EPA's erosion controls including rip rap as impractical. SERs said that the cost for rip rap is excessive. Furthermore, these SERs said that EPA's assumption that half of the catfish ponds have installed rip rap is not realistic. One catfish producer that has levee ponds in the Mississippi delta said that the rip rap would be difficult to obtain, since rocks are rare in this region. He did not believe that erosion on the inside berms of ponds is a serious concern for facilities in his region. SERs also questioned EPA's assumptions of being able to divert a portion of the pond drainage into a settling basin. SERs said the topography of the site will often prevent all ponds from draining in the same direction thus it would be very difficult to construct a single settling basin for an entire facility without requiring pumping and the associated electrical requirements. Otherwise EPA would need to assume that more than one settling basin would need to be constructed, which could also have an impact on the land available at the facility. Other erosion control practices that were considered are assumed by EPA to be in place at a much higher frequency than they actually occur. Furthermore far fewer facilities than EPA assumes actually have vegetated ditches. It is common for producers to keep their drainage ditches free from vegetation to avoid creating a habitat for snakes and other animals.

Several SERs strongly disagreed with EPA's recommendaton that mortality be removed from ponds. SERs said that it would require the scheduling of a seining crew to come to the facility which can be logistically difficult and a significant expense. The SERs said that dead fish decompose so quickly that by the time the seining crew arrived it would be very hard to remove the carcasses.

8.4.2.4 Shrimp

The Shrimp SER reported that shrimp producers do not routinely implement many of the erosion control practices that EPA considered for ponds. Shrimp ponds must be drained rapidly to harvest the animals, therefore many of the practices EPA recommends to minimize the discharge of sediment cannot be achieved. Furthermore many shrimp farms in South Carolina do not have the land available to construct settling basins. The SER did say that shrimp producers have implemented practices which reduce the discharge of sediments or pollutants.

8.4.2.5 Striped Bass

The Striped Bass SER said that producers already spend a great deal of attention on feed management, since it is the single largest expense producers incur and they have every incentive to minimize the amount of feed dispensed. This SER indicated that producers already keep records and adjust feed rates and formulations to achieve optimum feed conversion ratios. However, this SER says that were EPA to set a FCR as part of its regulation it would be impossible for all facilities to achieve it.

The SER also said that EPA's practice of installing rip rap on pond bank interiors would be cost prohibitive and would provide a host for vermin and make harvest more difficult. Other solids removal practices use up valuable land that could be used for production. The SER argued that aquatic animal ponds actually improve water quality by capturing solids that would

otherwise runoff the land into lakes and streams. The SER also said that the frequency factors included in the cost model do not accurately reflect the practices in use at striped bass facilities.

8.4.2.6 Other Producers

The Crawfish SER said that feed management does not apply to crawfish production because this is frequently done as a crop rotation with rice and sometimes soybeans, the crawfish forage on the remnants of the rice crop. No additional feed is provided. Crawfish ponds tend to operated as constructed wetlands. These ponds are relatively shallow and when drained for harvest must be drained quite slowly, thus minimizing the sediment load.

The Ornamental SER said that drug and chemical usage is minimal because the fish density in the pond is low and thus the fish are not stressed which contributes to lower disease rates. The SER acknowledges that escapes may be found in waters near the facility but these are relatively few in numbers and the likelihood that they will survive or be able to reproduce is extremely small. They are intolerant to the colder winter temperatures and attractive to predators. Further this SER says that the state has a very strict BMP program along with inspections to control non-native species releases.

The Alligator SER suggested that EPA establish monitoring requirements that would be discontinued if the facility could demonstrates that they are not causing any environmental problems. The SER stated that alligator producers in Florida are required to pay an annual license and wild egg permit fee to the State's Fish and Wildlife Conservation Commission.

8.4.3 Option 1

Many of the SERs raised serious concerns regarding the PACCP plan. They questioned EPA's assumption of the time that would be required to develop the plan and the training component of this plan. Several SERs said that the objective is not well defined nor is the expertise and training program currently available. One SER questioned whether there is anyone that could provide the training that might be required for the development of a PACCP. Another SER suggested that the plan requirements would require the help of a consultant.

SERs also said that drug application is under the control of FDA. The escape of non-native species is controlled by State Departments of Fish and Wildlife.

8.4.4 Option 2

The SERs expressed many concerns regarding the solids polishing treatment particularly concerning costs. One SER provided an estimate of cost for micro screens of $320,000 for installation and $15,000 in annual operating costs. Another source estimated that micro screens would cost about $0.36/lb of fish and pointed out that this cost would be nearly half the total cost of trout production.

8.4.5 Option 3

The SERs expressed deep concern over EPA's proposed requirement to disinfect wastewater prior to discharge. SERs pointed out that the microorganisms EPA is targeting do not originate from cold-blooded species and the presence of these microorganisms cannot be from fish production, they are more likely coming from the wildlife which can be around the facility. SERs who commented on this issue generally felt the proposed costs for disinfection were well beyond what any facility could afford.

9. PANEL FINDINGS AND DISCUSSIONS

9.1 Number of Small Entities to Which the Proposed Rule Will Apply

One SER indicated that the projected counts of shellfish farms appeared too low, by perhaps 20% in most regions and perhaps more in the Northeast and Louisiana, unless low input "managed fisheries" were being intentionally excluded. Another SER estimated that 96% of aquatic animal production facilities are small businesses. Another SER, a shrimp farmer, reported that, based on his survey of two states, there are 10 shrimp farms in South Carolina, 9 of which are small by the SBA small business definition, and 23 shrimp farms in Texas, 16 of which are small. He concluded that 80% of US shrimp farmers are small and would be vulnerable to closure as a result of significant regulatory cost increases. Another SER indicated that there are 26 salmon hatcheries in Alaska, three of which are inland and discharge into fresh surface waters and 23 of which are coastal and discharge via deep saltwater pipelines. All are either government operated or non-profit and strictly regulated by the Alaska Department of Fish and Game. The Panel notes that EPA used the US Department of Agriculture (USDA) Census of Aquaculture (1998) as a basis for its initial evaluation of the number, size and distribution of aquatic animal production facilities. The Panel recommends that EPA incorporate the information provided by these SERs, as appropriate, and seek additional data on the number of potentially affected facilities.

9.2 Projected Reporting, Record Keeping and Compliance Requirements

9.2.1 Requirements applicable to all systems

9.2.1.1 Documentation of BMPs ("Pollutant Analysis at Critical Control Points")

One SER predicted that, due to existing State regulations, most farms would have to change very little in their day-to-day operations to comply with new Federal effluent guidelines, but that they would have to spend a lot more time documenting and keeping records of their practices under a PACCP type requirement, with little corresponding environmental benefit. Another SER's comments provided support for this argument by detailing some of the environmentally friendly practices that he currently uses, including harvest boxes set deep enough to promote sediment settling, reduced operation of aerators during harvest draining of ponds to avoid stirring up sediments, long discharge canals to promote settling, and minimization of water exchange. In order to show how vulnerable the industry is to excessive paperwork requirements, this SER also gave an example of additional State paperwork and permitting requirements in response to an earlier disease outbreak leading to a shutdown of 2/3 of then existing shrimp farmers in the state.

Several SERs suggested that EPA's cost estimates for PACCP documentation and record keeping requirements were low, and noted that many farms would have to hire outside consultants to help them develop PACCP plans and train operators. SERs indicated that the estimated training costs were especially low and questioned where the appropriate expertise would come from.

SERs also noted that many small operators already work extremely long hours during certain seasons and that it would be virtually impossible to find time for additional paperwork. Several SERs discussed their experience with the HACCP program (on which the PACCP approach is patterned) and indicated that it entails a great deal of paperwork. One SER questioned whether there is an adequate scientific basis to apply the HACCP principles to pollution prevention at aquatic animal production facilities, and whether operators would have

the appropriate expertise to do so even if there were. SERs also noted that HACCP was generally applied to larger facilities (e.g., seafood processing plants), and received substantial start-up funding from several Federal agencies. They questioned whether this model was applicable to the aquatic animal production industry. SERs also emphasized the variability of aquatic animal production operations and the need for operators to have the flexibility to adopt practices (BMPs) that are appropriate to their farms. BMPs that are appropriate on one farm could be disastrous on another.

The Panel notes these concerns and recommends that EPA not include extensive record keeping and reporting requirements in the rule, especially when they mainly serve to document existing practices. EPA never intended to require specific BMPs, as these are unlikely to be appropriate at all facilities, but provided examples of BMPs which have been used at specific facilities. While the Panel recognizes that any proposed guidelines will likely include some kind of planning and documentation requirements, the Panel does not find HACCP a good model on which to base these requirements. The Panel recommends that such requirements be kept to a minimum, and account for the level of expertise and labor constraints at the affected aquatic animal production facilities.

9.2.1.2 Feed Management

Several SERs noted the high variability in Feed Conversion Ratios (FCRs) across feed types, species types, climates, seasons, and production practices, and warned EPA not to adopt quantitative feed management requirements because it would be impossible to account for this variability in a regulation and attempting to do so would not improve current feed management practices. One SER indicated that EPA's baseline and target FCRs were not realistic, and suggested that for pond systems, the current industry average is about 2.7, with 2.2 being the best that well managed farms could reasonably achieve. Further, accurate calculation of FCRs may be difficult for operators, since they can only determine yield at harvest, and some operators do not harvest the whole crop at a single time. SERs also noted that operators already have a strong financial incentive to minimize feed inputs, and that there have been rapid advances in feed technology in recent years independent of any government regulatory efforts.

Several SERs questioned fines reduction as an appropriate or necessary practice for aquatic animal production facilities. According to one SER, pelletized feed is rapidly being replaced by extruded feed, which is more digestible and does not have fines, thus reducing wasted feed, and costs to the farmer. For pelletized feed, fines are screened out to a large extent by the feed mill, and those that result from transport are a relatively small in volume. Many farmers feed manually from bags and would find fines collection totally impractical. It is unlikely that feed mills would take back collected fines on this scale. According to one SER, even pelletized bulk feed has minimal fines, because farmers use gravity feed bins, not augers.

The Panel is persuaded by these comments. Feeding practices and FCRs vary so much across facilities that it would be impossible to define any standard beyond minimization of excess feed that would be broadly applicable. However, minimization of feed inputs is clearly already a primary concern of all operators, certainly of those at larger commercial facilities. The Panel sees minimal environmental benefit from regulatory requirements related to feed management in pond, flow through and recirculating facilities and recommends that such requirements not be included in the proposed guidelines. The Panel also recommends that EPA consider providing guidance on appropriate feed management practices for these facilities. For net pens, the Panel recognizes that EPA is still exploring technologies that can provide additional pollutant reductions associated with feed (e.g., video monitoring).

9.2.1.3 Animal Health

Several SERs questioned whether requirements related to animal health maintenance were appropriate for effluent guidelines because they would be unlikely to affect effluent quality. While animal health is important to operators for financial reasons, management practices to maintain health vary widely across species and production systems. It is not possible to identify all potential health threats and appropriate responses in advance, so documentation of practices would be of limited value. Costs of specific responses (drugs, vet fees) may be high. SERs also indicated that fish pathogens are unlikely to pose a threat to human health or water quality, and to the extent that they threaten wild species, they already fall under the authority of other State and Federal agencies.

The Panel agrees that effluent guidelines would generally not be the best way to address animal health issues and thus recommends that the proposed guidelines not include requirements related to animal health maintenance. The Panel also recommends that EPA consider providing guidance on appropriate health management practices.

9.2.1.4 Mortality Removal

One SER indicated that mortality removal at pond systems was not only impractical, but also less environmentally friendly than allowing natural processes to work. He gave an example from his own experience of a 6,000 lb fish kill that was eliminated in just five days by a combination of feeding by buzzards, ants and flies, and decay followed by a brief algal bloom that crashed and settled out, resulting in no excess discharge whatsoever from his pond system. He contrasted this with the environmental nightmare of trying to haul off and landfill 3 tons of dead fish. Another SER noted that the only practical method of mortality removal for ponds would be to hire a seining crew, which would be cost prohibitive and likely not effective as it would be difficult to get a crew on site before most fish had decayed. The Panel recognizes that EPA is concerned about the possibility of catastrophic mortality events releasing pathogens that may threaten wild species, but also recognizes that the evidence on this issue is mixed and research is ongoing. At the same time, the Panel finds the SER comments compelling for pond systems that are infrequently drained, and thus recommends that mortality removal requirements for pond systems not be included in the proposed guidelines. For other production systems, mortality removal is generally considered part of good operating practice and it is thus not clear that additional regulatory requirements would enhance environmental protection. A general requirement to address mortality removal in the facility's BMP plan may not change existing practice, while a specific requirement (e.g., daily mortality removal) might not be appropriate for all facilities. The Panel therefore recommends that before proposing specific regulatory requirements related to mortality removal EPA consider whether such requirements would significantly enhance environmental protection.

9.2.2 Requirements applicable to ponds, flow-through, and recirculation systems

9.2.2.1 Settling Basins

One SER noted that most States have regulations governing construction activities near (e.g., within 300 feet of) waters of the US. Since aquatic animal production facilities tend to be located near water, this may make it difficult to site a new settling basin. Several SERs noted that many facilities are located in low-lying areas with little gradient and would thus require substantial pumping to bring water to settling basins. One SER estimated that the necessary 2000 g.p.m. pump and associated piping would cost $38,500, and his facility would need two of these. This would be in addition to $30,000 to $40,000 per year in lost revenue from converting

two production ponds into settling basins. This would more than eat up his entire profit margin over a ten year period. SERs also raised serious concerns about the availability of land for settling basins. Several were worried that the only practical means of adding a settling basin would be to convert one or more production ponds for this purpose, which could significantly erode revenues. 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. If several basins were needed, costs and land requirements would be even more prohibitive. One SER noted that many facilities would not have heavy machinery (tractors, loaders, backhoes) for cleaning out the basin and would find it cost prohibitive or simply not possible to rent such machinery, especially in remote areas. This SER also stated that EPA's engineering design cost estimates were significantly understated based on his experience. Another SER noted that settling basins may be superfluous for some facilities, for example if drainage water is reused for irrigation.

The Panel is persuaded that settling basins would not generally be necessary for pond-based facilities where the pond itself can provide adequate solids settling. Where drainage is slow and controlled, solids transport into the discharge is minimized and further settling basins would not provide significant environmental benefits. The Panel thus recommends 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 some ponds, where drainage occurs rapidly, resuspension and discharge may be a concern. For such facilities, as well as for flow-through and recirculating systems. Site-specific factors, such as availability of land and configuration of an existing facility, can greatly influence the cost of settling basins. The Panel recommends that any requirements related to solids removal thus be flexible enough to accommodate facilities where settling basins are not a viable option.

9.2.2.2 Numeric Sediment Limits

Several SERs questioned the achievability of a 30 mg/L TSS limit. SERs also questioned the environmental value of such a requirement, and suggested that the total solids contribution from aquatic animal production facilities is likely to be insignificant on a watershed scale. One SER stated that the specific proportions of pond discharge suggested for treatment were excessive (first 5% for bottom drains, last 20% for all ponds) and suggested that if treatment were required at all, the appropriate volume would depend on hydrology and production practices at the particular facility. The Panel recommends that EPA not include numeric sediment limits for pond-based systems in the proposed guidelines. For other systems, the Panel is concerned about the difficulty of consistently achieving numeric limits, due to site-specific variability, and that numeric limits may thus be economically unachievable at many small facilities. The panel recommends that if EPA includes numeric limits in the proposed guidelines, that it also include alternative approaches, such as BMPs, that facilities can implement to demonstrate compliance in lieu of numeric limitations.

9.2.2.3 Water Quality Monitoring

One SER indicated that monitoring needs would vary substantially across facilities and questioned the basis for EPA's suggested parameters and frequencies. This SER also stated that monitoring and lab analysis costs are significantly higher than EPA estimates. The Panel agrees with this concern and recommends that any monitoring requirements in the proposed guidelines be kept to the minimum necessary to demonstrate compliance with applicable regulatory requirements. Where monitoring will not provide information that is useful to the operator in managing his farm (including regulatory compliance) it should not be required.

9.2.3 Requirements applicable to flow-through and recirculation systems

9.2.3.1 Microfiltration (Solids Polishing)

SERs indicated that filtration is not a common practice (EPA data show 17 % of flow through and recirculating facilities above NPDES production thresholds with such treatment currently in place) and would only be economically feasible for public facilities that do not have to cover costs with sales revenues. Several SERs indicated that mechanical filtration would be physically impossible and/or cost prohibitive for most facilities. One SER provided detailed cost estimates for microscreens based on actual vendor quotes and published literature. For example, one estimate was $0.36 per pound of fish. Another estimate was $320,000 installation plus $15,000 annual operating costs to treat a 350 g.p.m. flow. The SER also noted practical limitations with such screens, for example the need to protect them from freezing weather. Costs for chemical precipitation were even higher. Based on preliminary cost information, the Panel believes it unlikely that limitations based on microfiltration or chemical precipitation would be economically achievable for any sector of the aquatic animal production industry that must cover cost with revenues. The Panel recommends that EPA consider the economic achievability of these technologies before proposing limitations based on them and that any requirements related to solids removal be flexible enough to accommodate facilities where microfiltration is not economically achievable.

9.2.3.2 Groundwater Protection from manure storage

Based on SER comments, it appears that few facilities use fish waste storage ponds. Production ponds would not have pollutants in concentrations high enough to pose a threat to groundwater. One SER suggested that settling basin and waste storage pond bottoms would likely become impervious even if not originally constructed from impervious material because of thick, sticky properties of fish manure. The Panel is not aware of any evidence to suggest that groundwater contamination is a problem at aquatic animal production facilities and thus recommends that EPA not include requirements related to groundwater protection in the proposed guidelines. Any site-specific concerns about groundwater contamination from manure storage could be dealt with on a site-specific basis by the permitting authority.

9.2.3.3 Disinfection of manure storage supernatant

Many SERs noted that, according to EPA's preliminary cost estimates, disinfection would be cost prohibitive. They also questioned whether aquatic animal production facilities are significant sources of human pathogens, and whether UV technology would remove or inactivate any such pathogens even if they were present, given the variety of environmental conditions (e.g., temperature) at aquatic animal production facilities and the fact that the technology is largely untested on wastewater from aquatic animal production facilities except as part of the treatment for water internal to recirculating systems and as a treatment of oysters prior to consumption (depurating). The Panel shares these concerns and recommends that EPA not include disinfection requirements in the proposed guidelines.

9.2.3.4 Land Application of Manure

One SER indicated that only small facilities are likely to include significant row crop agriculture, as these are often traditional farmers that have diversified into aquatic animal production as a subsidiary operation. These facilities produce very small quantities of manure (much smaller than CAFOs) which he does not believe warrant regulation. Another SER stated that testing nutrient content for each shipment of manure would be burdensome and

unnecessary, as nutrient content would be unlikely to change much over time. He suggested using published estimates instead. The Panel notes that in the proposed CAFO guidelines, EPA limited record keeping and testing requirements for off-site land application to facilities producing 12 tons of manure or more per year. Based on available evidence, the Panel believes that few aquatic animal production facilities produce manure in such quantities and those that do would pose less of a threat (if any), because fish manure is generally less concentrated than CAFO manure. The Panel thus questions whether the volume of manure that might be land applied from even the largest facilities would warrant the cost of limitations and/or other requirements related to land application, and recommends that such requirements not be included in the proposed guidelines.

9.2.4 Requirements applicable to flow-through systems only

9.2.4.1 Quiescent Zones

SERs noted that retrofitting raceways with quiescent zones, especially for older, dirt bottom facilities, would be impractical, and even where possible would significantly reduce production area, thus reducing revenues. Labor requirements to vacuum raceways (2 man days per week for the large facilities) would not be affordable for small operations. Operators do not have this much available time, and hired labor would be too expensive. The Panel recommends that EPA re-evaluate the need for and practicability of quiescent zones in existing earthen raceways. The Panel also recommends that any requirements related to solids removal be flexible enough to accommodate facilities where quiescent zones are not a viable option.

9.2.5 Requirements applicable to ponds only

9.2.5.1 Constructed Wetlands

EPA had been considering constructed wetlands among the technologies for pond systems. One SER indicated that the land requirements and costs associated with this option would be burdensome for most producers. Another SER indicated that unlined wetlands cost about $5,000 per acre and lined wetlands as much as 100 times more (not including land costs). Based on currently available information, the Panel believes it unlikely that limitations based on construction and maintenance of constructed wetlands would be necessary for pond systems. The Panel thus recommends that EPA not include any requirements based on constructed wetlands for ponds. However, this technology may be appropriate in circumstances where ponds must be drained rapidly for harvest. The Panel further notes that facilities in other discharging sectors may choose to comply with limitations through the use of constructed wetlands.

9.2.5.2 Vegetated Ditches

Most SERs did not disagree that vegetated ditches are generally an appropriate way to reduce sediment discharge. However, one SER warned against inflexible requirements that may stifle innovation. He used the example of a 700 foot ditch, as discussed under Option 2 for ponds, and noted that while such a requirement might be appropriate for pelletized feed, it might be unnecessary for higher quality, less polluting feed. However, if the better feed is also more expensive, the farmer's only incentive for using it may be the potential cost savings associated with a shorter drainage ditch. It would thus be counterproductive, and could discourage the use of less polluting feed, to specify a minimum ditch length by regulation. Another SER stated that 700 feet was excessive, as most settling occurs within the first 150 feet. Other SERs also noted that appropriate practices are highly site specific. For example, facilities

may have limited land on which to construct ditches. Inflexible requirements for vegetated ditches of a particular length could force facilities to take land out of production and reduce revenues. The Panel finds these comments compelling and thus recommends that any requirements related to solids removal be flexible enough to accommodate existing facilities where vegetated ditches are not a viable option. The Panel also notes that a vegetative ditch is an effective technology to control solids and that facilities may choose this technology to comply with limitations.

9.2.5.3 Bank Stabilization

A number of SERs mentioned that use of riprap on internal pond banks is not common and would be both economically and technically impractical. In addition to the high cost (EPA estimates $1,000 per acre), SERs indicated that riprap placement could interfere with feeding and harvesting machinery, and that riprap could serve as habitat for snakes and other nuisance species. One SER indicated that EPA's cost estimate was low. In his area, the necessary stone costs $9 per square foot, which he estimated would mean a total cost of $26,775 per pond to cover two banks. This would be cost prohibitive, especially for farmers with multiple ponds. Some SERs did not oppose use of vegetation for bank stabilization but indicated that this was common practice anyway, where feasible. However, in marine environments, grass may not grow on pond banks because of salt water. One SER also expressed concern with the cost of adding vegetation to slopes and stated that his operation could not afford it. Another SER noted that constructed ponds may actually serve as a barrier to erosion by catching sediment laden runoff before it reaches waters of the US. The Panel recommends that EPA not promote or require the use of riprap in the proposed guidelines. While a requirement to consider vegetation as a means of bank stabilization for rapidly draining ponds may be appropriate, the Panel notes that where drainage is slow and controlled, solids transport into the discharge is minimized and additional requirements for erosion controls are thus unnecessary. The panel recommends that any requirements related to solids discharge from pond facilities be flexible enough to accommodate facilities where bank stabilization is not a viable option.

9.2.5.4 Frequency and Rate of Pond Draining

One SER commented that infrequent draining of ponds is not possible for shrimp farmers, who must drain their ponds at least once or twice per year for harvest, as well on an emergency basis to prepare for a hurricane. The SER also stated that seining is not a viable alternative for shrimp farms, in that the shrimp can bury in the pond bottom. Another SER noted that fingerling ponds may also need to be drained completely for harvest. Most food finfish ponds are drained infrequently anyway. The Panel believes that operators already have a financial incentive to minimize the frequency of pond drainage and that current practice is dictated largely by production requirements. The Panel thus believes that there is little opportunity to reduce drainage frequency without significant impacts on production and recommends that such requirements not be included in the proposed guidelines.

The rate of pond draining can also have an impact on the pollutant loads discharged when ponds are drained. Some SERs indicated that their ponds are drained slowly minimizing the disturbance of solids on the bottom. The Panel recognizes that drainage rate is to some degree determined by the harvesting practices and species produced at the facility, however, since rate can influence effluent quality, additional measures may be necessary to reduce pollutant loads from rapidly draining ponds.

9.2.5.5 Water Exchange

One SER said that it would not be feasible to prohibit water exchange altogether as a practice. (Water exchange refers to the practice of adding fresh water to a pond system with the goal being to improve the overall water quality in the pond. Water exchange results in water being discharged from the pond for the period during which water exchange takes place.) Although this SER acknowledged that water exchange is being used to a lesser extent than previously it is still sometimes necessary to avoid losing an entire crop when water quality gets bad enough. This SER indicated that shrimp farms already have an incentive to minimize water exchange, to avoid bringing into the pond wild shrimp diseases with the freshwater.

The Panel recognizes that water exchange may be necessary at some facilities and would be determined by production goals, the species produced, and site specific factors (e.g., water availability). The Panel thus recommends that EPA not ban the practice of water exchange entirely. However, since water exchange has the potential to discharge additional pollutants from ponds, particularly those that drain rapidly, additional measures may be necessary for such ponds to reduce pollutant loads from these systems. It is not clear that national effluent guidelines are the best way to address this concern however. Operators already have a strong financial incentive to minimize water exchange, so a general requirement to do so would be unlikely to change existing practice. More specific requirements (e.g., an absolute limit on the amount of exchange allowed in a given year) would not be appropriate for all facilities. The Panel recommends that EPA consider whether specific regulatory requirements imposed through effluent guidelines would significantly enhance environmental protection for rapidly discharging ponds and avoid requirements which would not.

9.2.5.6 Elimination of Deep Water Overflows

One SER commented that EPA's cost estimate for this option, at least in a marine environment, was low. He estimated the cost of aluminum risers at $2600 and piping at $1000, per pond. He indicated that such an expenditure would put him out of business. Another SER noted that appropriate drain configurations are also highly site and species specific and warned against inflexible requirements. Another SER stated that in shallow, levee type ponds, there is not a significant difference in water quality between the pond bottom and pond surface, so reconfiguration of drains would likely have little effect on effluent quality. The Panel agrees that appropriate drain configurations are site specific and recommends against including any specific requirement in the proposed effluent guidelines.

9.2.6 Other requirements

9.2.6.1 Polyculture

Several SERs noted that polyculture is a promising new area with significant potential to reduce pollutant discharges. For example, filter feeders such as tilapia and mollusks may consume nutrient rich residuals from other species. This SER warned against a regulatory structure that would discourage such innovative approaches by layering on additional requirements for each additional species raised. The Panel shares this concern and recommends that EPA evaluate the proposed guidelines to ensure that they not provide a disincentive for environmentally beneficial polyculture.

9.3 Other Regulations that May Duplicate, Overlap, or Conflict with the Proposed Rule

Many SERs stated that existing State regulations are adequate to deal with any water quality concerns stemming from aquatic animal production. They urged EPA not to subject

them to another layer of Federal regulation that would add little environmental benefit. Several SERs questions whether EPA had done an adequate job of identifying and evaluating potentially duplicative State regulations. These SERs indicated that based on their experience, they believed such an effort would reveal that most State programs are already more than adequate.

The Panel notes this concern and recommends that EPA explore options to provide regulatory flexibility to reduce conflicting requirements in states with strong existing programs. One such option would be to establish performance criteria for States to demonstrate that their existing program provides equivalent protection to any proposed effluent guidelines and to consider promulgating requirements that are part of a demonstrated equivalent program as an alternative standard for those States. The Panel recognizes that such an option would have to be structured in a way that is consistent with Clean Water Act requirements.

Under this approach, where a State can demonstrate that its existing program provides equivalent protection, EPA would promulgate the State standards as the effluent guideline applicable in that State. Thereby, operators would have to comply only with the promulgated components of the State program that was shown to be equivalent. However, the Panel could envision a situation where a State may have an equivalent program for only part of the effluent guidelines (e.g., non-native species or pathogens). In such instances, the Panel recommends that EPA provide alternate provisions based on the State program for requirements where the State already has equivalent programs in place. For example, if EPA decided to require BMP plans for non-native species and pathogens but the State had an equivalent program only for non-native species, affected operators would have to comply with state requirements for non-native species and the national requirements for pathogens.

Several SERs noted that pathogens in fish are already regulated by the US Department of Agriculture's (USDA) Animal Plant Health Inspection Service (APHIS), US Fish and Wildlife Service (USFWS) the Food and Drug Administration (FDA) as well as by many State and interstate agencies (ie, the New England Salmonid Fish Health compact). The Panel recommends that EPA investigate the extent to which these agencies already regulate fish pathogens and defer to such regulations where appropriate.

Several SERs questioned the authority of EPA to regulate non-native species under the Clean Water Act and indicated that both USDA's Animal and Plant Health Inspection Service (APHIS) and the USFWS have regulations that address this issue. The Panel recommends that EPA investigate the extent to which these (and other) agencies already have regulations that would address concerns regarding non-native species introductions by aquatic animal production facilities, and defer to such regulations where appropriate.

9.4 Significant Alternatives to the Proposed Rule

9.4.1 Small Facility Exclusion

SERs generally favored retaining, or raising, existing NPDES threshold levels. Under existing regulations, facilities that discharge less than 30 days per year or produce less than specific thresholds (warm water species: 100,000 pounds annually; or cold water species: 20,000 pounds annually or feed less than 5000 pounds of food during the calendar month of maximum feeding) are not considered point sources unless designated. Based on the data provided, the Panel does not believe that facilities below these thresholds, many of which are family farms, are discharging significant quantities of pollutants or could likely afford technology-based

discharge limitations. The Panel strongly recommends that EPA not lower the existing thresholds or otherwise change the definition of a point source for this industry.

In addition, most smaller facilities that exceed existing thresholds and are currently regulated through general permits on a BPJ basis would find any of the regulatory options that EPA has so far considered economically unachievable. Based on EPA's current cost analysis, compliance costs for such facilities in most subcategories would generally exceed 20% of revenues, whereas in the past EPA has generally considered impacts in the range 5 to 10 percent of revenues as raising potential economic achievability concerns. Unless EPA significantly scales back the regulatory options from those currently under consideration, it is clear that only the largest facilities could plausibly find any of these options economically achievable. While the Panel does not have enough data to identify specific threshold levels, which may well differ across sectors, the Panel recommends that EPA establish small facility exclusion thresholds for the proposed guidelines based on economic achievability. Facilities that fall below these thresholds but above the current NPDES thresholds would continue to be regulated on a BPJ basis.

The Panel further recommends that in order to minimize paperwork burden on small entities, EPA not send the detailed industry survey to entities, such as those falling below the NPDES production and feeding thresholds, that are unlikely to be covered by the proposed guidelines. To the extent that EPA can identify likely thresholds for a small facility exclusion prior to sending out the survey, EPA should not send the survey to facilities that fall below these thresholds.

9.4.2 Production System/Sector Specific Comments

It has become clear to the Panel that the "aquatic animal production industry" is actually a collection of highly dissimilar sub-sectors that differ fundamentally in production practices, species raised, and potential environmental concerns. The Panel thus feels it is appropriate to discuss each sector separately before addressing common issues that may be relevant to more than one sector.

9.4.2.1 Ponds

Catfish, Tilapia, Shrimp and Hybrid Striped Bass

Based on available information, the Panel believes that most ponds are not currently point sources because they discharge less than 30 days per year. The Panel has elsewhere recommended that EPA not revise the point source definition for aquatic animal production facilities, in which case most pond facilities would not be covered by the proposed guidelines. However, some larger facilities with many ponds, particularly shrimp ponds which must be drained for harvest, might still be covered. Also, under current NPDES regulations, individual facilities can be designated as point sources by the permitting authority. SERs noted that ponds generally act as natural biological treatment systems. For example, the State of Louisiana, in its BMP guide for aquaculture, estimates that under typical production conditions catfish ponds remove 92% of nitrogen, 97% of phosphorus, and 87% of organic matter prior to discharge. Several SERs indicated that EPA's current loadings estimates for pond discharges are substantially overstated because they do not adequately account for this in-pond treatment. See Section 9.5 (below) for additional explanation. The Panel understands that EPA has had discussions with experts concerning pond dynamics and agrees that ponds which are

intermittently drained can serve as an effective water treatment system. EPA is currently revising its analysis of loadings from ponds.

The Panel has carefully considered the various technologies and BMPs that EPA has so far identified for reducing pollutant discharges from ponds. In general, based on EPA's analysis to date, the Panel believes that most of these measures are either impractical, not economically achievable, or would result in minimal pollutant reductions. In particular, the Panel recommends that EPA not adopt requirements related to sediment discharge, erosion, nutrients, or feed management for pond facilities, except that as noted previously, there may be some concerns related to ponds that are drained rapidly for harvest that may warrant consideration of sediment discharges. The Panel's findings with respect to individual technologies are discussed in Section 9.2.

However, the Panel understands that EPA is still concerned about the potential discharge of drugs, chemicals, and aquatic pathogens from large pond facilities, and about the potential for introduction of exotic species. The Panel agrees that these are important concerns, but questions whether they can be adequately addressed through national effluent guidelines given that they are all highly site-specific. The limitations and challenges of addressing these concerns through national effluent guidelines are discussed in detail in Section 9.4.3 below. One technology option that EPA is considering is mortality removal. However, the Panel believes that there are many situations where it is not only impractical but may result in environmental harm, as predation and natural decay within a pond system may well be environmental superior to collection and off-site disposal. (See Section 9.2.1.4)

The Panel understands that EPA is still exploring options for control of drugs, chemicals, aquatic pathogens and exotic species at large pond facilities. However, based on information developed to date, the Panel believes it unlikely that the measures which have so far been identified would be effective in addressing these concerns through national effluent guidelines. The Panel thus recommends 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 the proposed guidelines. Unless EPA identifies such measures, the Panel recommends that EPA exclude all ponds from coverage under the proposed guidelines

Sportfish

One SER supported EPA's intention to exclude ponds used for recreational sport fishing purposes from the scope of this regulation, because these ponds are stocked for the enjoyment of the public and these activities bring income to many economically depressed rural areas, where the tourist industry is the only source of consistent income to the area. Further, the Panel believes that the fish in these ponds are stocked and fed at such a low rate as not to warrant further consideration, nor is the Panel aware of any environmental or public health concerns associated with these ponds. Therefore, the Panel recommends that EPA exclude from the scope of regulation at least those facilities that have only sport fishing ponds. There may be facilities that have sport fish ponds in addition to other fish production systems, and the Panel does not believe that sport fish ponds at these facilities would pose any greater risk to public health or the environment than those at facilities with only sport fish ponds. If regulation is warranted for any such facilities, EPA should consider excluding the sport fish ponds from regulation.

Walleye

No SER comments were received on this topic, however, EPA's preliminary analysis suggests that these fish are primarily raised as sport fish, and are stocked and fed at such a low rate as not to warrant regulation. Unless subsequent analysis indicates a strong basis for regulation, the Panel recommends that EPA exclude these ponds from the scope of the proposed regulation.

Mollusks

One SER, an oyster farmer, noted that mollusk farmers add no feeds, drugs or chemicals (except EPA-permitted use of Sevin to control ghost crabs in Washington State) and that shellfish cultivation serves to improve several water quality parameters, including TSS, water clarity, and nutrients, and fosters biodiversity by providing improved habitat for other organisms. This SER also stated that, with a few exceptions, States with significant aquatic animal production industries already have appropriate regulations to deal with them. The Panel agrees and recommends that mollusk farms be excluded from the scope of the proposed guidelines.

Lobsters

One SER stated that lobster pounds are not animal production facilities, but simply storage facilities in which lobsters do not multiply or grow. He noted that such storage facilities are used for other species of crabs and shellfish as well. Another SER indicated that some northeastern States are attempting to culture lobsters for fishery enhancement/restoration but that feed and water flows for such operations are minimal. However, the Panel is also aware of concerns about the use of drugs, such as antibiotics, at such facilities. Therefore, the Panel recommends that EPA not include any requirements for lobster pounds, or other live storage only operations, within the scope of the proposed guidelines other than to address potential discharge of drugs if these are found to be significant and EPA identifies an effective, economically achievable technology to control them.

Crawfish

One SER indicated that crawfish are generally raised in a symbiotic relationship with rice crops, and do not require any inputs, nor do they produce any adverse environmental impacts. Therefore, the Panel recommends that EPA not include crawfish farms within the scope of the proposed guidelines.

9.4.2.2 Flow Through and Recirculating Systems

The Panel considered whether and to what extent flow through systems should be regulated under national effluent guidelines. The Panel learned that concerns are site specific and there is a great deal of dissimilarity among flow through systems, even within same-species production. The Panel also notes that EPA's analysis of its least aggressive option showed that the preliminary cost estimates as a percent of revenue would generally exceed 30% at even the largest facilities. While recirculating systems may be less varied, the preliminary cost estimates of the least stringent option currently under consideration for these systems would exceed 50% of revenues. The Panel understands that EPA is continuing to explore options. The Panel recommends 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 national effluent guidelines. Specific issues related to particular species follow.

Alaska Salmon

One SER recommended that Alaska salmon hatcheries be exempt from coverage under the proposed guidelines because they are all either government owned or non-profit and are operated in the public interest to enhance natural salmon populations under strict regulation by the Alaska Department of Fish and Game. Most are primarily flow through facilities, with a few net pens to keep juvenile fish for brief periods (two months) prior to release. All but three are coastal facilities that discharge via deep salt water discharge pipes. Discharges are primarily sediment and nutrients which are quickly dispersed by tidal action. In addition, receiving waters are generally nutrient limited so that discharge of nutrients may actually enhance water quality for aquatic life. Further, these anthropogenic discharges of salmon derived biomass are small relative to natural sources. Only native species are permitted, and fish health is strictly monitored. FCRs are already very low by industry standards (often below 1.0 in net pens) and feeding is done manually from bags; no bulk feed is used and fines are minimized. Feed consumption is carefully monitored and only high quality feeds are used to minimize feed input. For all of these reasons, this SER believes that Alaska salmon hatcheries are not causing environmental damage.

In addition, most of the substantive requirements that EPA is considering would not be economically achievable for Alaska salmon hatcheries. Most are in isolated locations with very high transport costs for all material inputs. Many are severely limited in the availability of flat land. Sedimentation basins would be impractical and quiescent zones would significantly impact production; the SER estimated a 16% reduction. Because water is abundant, most facilities have very high flows, in order to maintain suitable water quality for the fish, so any type of treatment would be prohibitively expensive. Video monitoring of net pens would not be cost effective for the brief periods during which they are used. The SER indicated that preparation of a PACCP type BMP plan would be economically feasible for most facilities, but questioned whether there would be any environmental benefits from this burdensome additional paperwork. He suggested that if such a requirement were adopted it should include an option to reduce or eliminate compliance monitoring once satisfactory performance had been demonstrated.

Based on the SER's comments, it appears that there is limited, if any, opportunity for additional requirements imposed through national effluent guidelines to provide significant additional environmental protection. The Panel thus recommends that EPA strongly consider excluding Alaska Salmon hatcheries from the scope of the proposed guidelines.

Trout

Trout SERs noted that small trout farms tend to have earthen raceways for which quiescent zones do not exist and would be very difficult to construct. Furthermore, few small facilities can attain feed conversion rations (FCRs) of 1.4, the best small facilities can expect to achieve is about 1.6. However, large facilities are already achieving an FCR of 1.2, thus for large trout facilities, EPA's estimates of pollutant reduction benefits are overstated. Trout SERs also pointed out that the loading density and size of the raceway are incorrect and result in overstated pollutant loading estimates. The panel recommends that EPA re-evaluate the environmental pollutant reductions using loading densities provided by the SERs and consider the effect that smaller sized raceways may have on the assumptions of costs and pollutant loading reductions for small trout facilities.

Trout SERs indicated that many smaller, older facilities have limitations on available land and would be forced to take raceways out of production to construct either quiescent zones

or settling basins. This would have the added negative effect of reducing revenues and would not be feasible for smaller facilities. The panel recommends that EPA carefully consider economic achievability and technical feasibility before proposing limitations based on the use of quiescent zones or settling basins.

9.4.2.3 Net Pens

The Panel recognizes that feed can be a significant component of pollutant loads at net pen facilities. Under Option 2, EPA is considering requiring video feed monitoring below pens linked to automated control equipment that would stop feeding when excess particles were detected. One SER indicated that this would not be practical at near shore/estuarine sites due to low transparencies (less than 3 meters under the best of conditions and less than 1 meter during storms). As noted above under feed management, the Panel believes that operators already have a strong financial incentive to minimize feed inputs and are likely already using video monitoring where it can make a significant difference. This is especially likely to be true at larger commercial facilities. The Panel recommends that EPA consider practical limitations such as turbidity as well as costs when evaluating video monitoring requirements in the proposed guidelines.

9.4.2.4 Alligators

One SER noted that Florida alligator farmers pay annual licensing fees to the Florida Fish and Wildlife Conservation Commissions (averaging $180,000 annually in aggregate) that support the Commission's alligator management and biological research programs. (The Panel notes this works out to about $9,000 per farm on average.) Farmers have adopted sustainable use practices advocated by the Crocodile Specialist Group of CITES and contribute significantly to the viability and health of the species and its habitat. Any regulations that adversely affected the industry would thus also adversely affect the species. The Panel recommends that in developing the proposed guidelines, EPA analyze the impacts of any requirements on wild species and consider such effects in its selection of options.

9.4.1.4 Ornamentals

One SER noted that farm production of ornamentals reduces pressure on wild populations, and may thus provide an environmental benefit. The Panel is not aware of significant environmental problems associated with production of ornamentals however recognizes that there may be a potential for the release of non-native exotic species and increased use of drugs and chemicals to maintain healthy stocks at some facilities (since drug residues do not need to be considered in fish that are not being raised to be consumed). However, one SER stated that drug and chemical use in this sector is especially small, since ornamentals are stocked at lower rates which translates into lower stress rates and hence fewer disease outbreaks. Similarly, he indicated that the release of non-native species is not a problem, because the escapees won't survive for long in the waters of the U.S. because the waters are too cold and they make easy targets for predators. The Panel understands that EPA is continuing to evaluate these potential concerns, but also notes the difficulties in addressing these concerns through national effluent guidelines (see Section 9.4.3). Unless EPA finds that these are significant environmental concerns and identifies effective economically achievable technologies to address them, the Panel recommends that such facilities should be excluded from the scope of the proposed guidelines.

9.4.1.5 Baitfish and Sportfish Fingerlings

One SER stated that the low poundage produced, small volume of feed input, and low impact collection methods all justify exemption of baitfish and sportfish fingerlings from any national effluent guidelines. The Panel agrees and recommends that such operations be excluded from the scope of the proposed guidelines.

9.4.1.6 Aquaria

One SER indicated that aquaria are generally indirect dischargers, and that they discharge low volumes of water and waste relative to commercial aquatic animal production facilities. Also, their use of inputs (feed, chemicals, drugs, etc) is highly site specific and is likely to be directed by qualified professionals (vets, scientists, etc). The Panel notes that EPA has little data on which to base effluent guidelines for this industry sector. Based on this SERs comments, the Panel recommends that aquaria be excluded from the scope of the proposed guidelines. However, the Panel understands that EPA plans to send the detailed survey to aquaria and the results may lead to a reconsideration of this recommendation.

9.4.3 Pollutants of Concern

A number of the issues raise by SERs related to possible requirements aimed at addressing specific pollutants of concern that would potentially affect more than one sector. These issues and the Panel's recommendations are discussed below.

9.4.3.1 Non-Native Species

Many SERs questioned whether it was appropriate (or even legal) to include BMPs related to introduction of non-native species in national effluent guidelines under the Clean Water Act. An operator who raises ornamentals noted that Florida has a strong State program to prevent escapements and that when ornamental species do escape, they are unlikely to survive in the wild both because the climate is generally colder than what they can tolerate and because their bright coloration makes them easy targets for predators.

It is not clear that exotic species can be effectively controlled through effluent guidelines. The US FWS and many States already have lists of prohibited species; no facility, large or small, point source or not, may raise species on these lists. The Panel believes that such a prohibition is likely the only effective way of preventing escapement of exotic species. While there are barrier technologies (e.g., double or triple netting) that can significantly reduce escapements from a particular facility, it is unlikely that even these technologies would reduce escapements to zero. More importantly, since most pond facilities are not considered point sources, and even among those that are, it is likely that effluent guidelines would only be economically achievable for the largest facilities (see Section 9.4.1), any technology based measures to reduce escapements would likely not apply to the majority of facilities. Exotic species are not like other pollutants; their potential for harm is not proportional to the volume discharged. Once a species escapes in sufficient quantities to establish itself in the wild, additional escapements in the same area have little environmental impact. Based on investigation and discussions with the other Federal or State Agencies that have authority to prohibit or control the importation of exotic species the Panel believes that EPA should defer to these agencies where they have taken such actions. For those species not prohibited that still have a potential to either become a nuisance or invasive species or that may carry diseases that pose a threat to native aquatic species, the Panel recommends that EPA work with these agencies to develop and implement appropriate protection and controls and provide guidance to States. In general, the Panel believes that for the Aquatic Animal Production Industry national effluent guidelines are not the best way to deal with non-native species.

9.4.3.2 Drugs and Chemicals

Several SERs indicated that drugs and chemicals were not widely used in most aquatic animal production sectors. They suggested that what drugs were used were generally already regulated (by FDA or other agencies) and generally were not used in quantities that would pose any environmental concern. Most producers do not add drugs or chemicals to their systems on a routine basis, but may do so in response to an unforseen event, such as a disease outbreak or pest infestation. The particular drug or chemical used, however, would depend on the species, disease, climate, hydrology, etc at the particular facility. Aquatic animal production facilities mainly use drugs or chemicals that have been specifically approved for a particular use by some other Federal or State agency (e.g., FDA, EPA/OPPT), and that operators would generally rely on labels, instructions, or the advice of qualified professionals (e.g., vets) in determining quantities and conditions of use.

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 Food and Drug Administration (FDA) to ensure that they do not cause significant adverse public health or environmental impacts when used in accordance with label instructions. Investigational drugs are authorized on a case by case basis by the FDA to allow a way of gathering data for the approval process. Quantities and conditions of use are strictly regulated, however, FDA sometimes relies on the NPDES permitting process to establish limitations on discharges to prevent environmental harm. Extralabel drug use in animals is restricted to use of approved animal and human drugs by or on the order of a licensed veterinarian and must be within the context of a valid veterinarian-client-patient relationship. Use of unapproved new animal drugs would not be legal except in those discrete cases where regulatory discretion has been granted by FDA.

Given the existing regulatory structure, the Panel believes that drug and chemical use by aquatic animal production facilities is already adequately regulated in most cases. Further, the Panel is unaware of any particular technology or BMP that would be broadly applicable in addressing concerns related to discharge of drugs or chemicals. EPA could require a management plan for drugs and chemicals, but given the unforeseen nature of most uses, the Panel believes it would be hard for operators to develop a substantive plan in advance that would result in any better management of drugs and chemicals than is likely already occurring. Unless subsequent analysis identifies control strategies that can be effectively implemented through national effluent guidelines and that would be economically achievable for affected facilities, the Panel recommends that EPA address concerns regarding the discharge of drugs and chemicals through guidance rather than through effluent guidelines requirements.

9.4.3.3 Pathogens

Many SERs expressed concern with the possibility of regulating pathogens in aquatic animal production effluent, for several reasons. First of all, aquatic animal production is not a source of human pathogens, though coliforms and other indicators may be present in source water or may be introduced by birds and other wildlife into farm ponds, particularly off-line settling ponds, which are found at some recirculating and larger flow-through facilities. One SER noted that coliform counts in warm water may be dominated by Klebsiella, which is not a human pathogen indicator. Second, there are not good monitoring technologies to identify or quantify pathogens in effluent discharges. Finally, disinfection, which the outreach materials provided to SERs discuss as a possible requirement for addressing pathogens, would be both technically impractical and prohibitively expensive.

Control of animal pathogens through effluent guidelines presents similar challenges. Prevention is the most effective (and cost effective) approach; once an outbreak occurs, there is often little that can be done. In general, operators already have strong incentives to maintain the health of their crop, and are likely to rely on the advice of qualified professionals in determining appropriate responses to potential outbreaks. The Panel thus questions whether requirements to adopt specific control strategies and/or an additional layer of planning and testing, mandated through effluent guidelines, would provide any additional environmental protection relative to existing practice. Unless subsequent analysis identifies control strategies that can be effectively implemented through national effluent guidelines and that would be economically achievable for affected facilities, the Panel recommends that EPA address concerns regarding human and animal pathogens through guidance rather than through effluent guidelines requirements.

9.4.3.2 Metals

Many SERs also expressed concern about possible requirements, including numeric limitations, related to metals. These SERs questioned whether aquatic animal production facilities were sources of metals and suggested that metals detections in effluent samples may reflect concentrations in the source water rather than incremental discharges from the facilities. One SER noted that small quantities of zinc (from galvanized machinery) and copper (from EPA approved algae control formulations) may be present in discharges, but questioned whether these would ever be found in high enough concentrations to be of concern. Another SER provided an analysis which indicated that EPA could remove at most only 2 PEs (pounds of detected metals and ammonia, each adjusted for toxicity) from an average catfish farm per year and even less per year from the typical trout farm. The Panel did not provide data on the costs and loadings reductions that might be associated with any limitations on metals discharges but is not surprised by this SER's findings. It is hard to imagine that traditional methods of metals removal, such as chemical precipitation, would be cost-effective for aquatic animal production facilities, given their very low baseline metals concentrations. For these reasons, the Panel recommends that EPA not include limitations on metals in the proposed effluent guidelines.

9.4.4 Monitoring

One SER recommended that NPDES monitoring requirements be reduced or eliminated for facilities that have demonstrated little or no environmental impact after two years. States would retain the right to conduct site visits and reinstate monitoring where necessary. This SER suggested that monitoring is a burdensome requirement and that the possibility of such relief would provide a significant incentive for sound environmental management. The Panel recommends that EPA keep monitoring requirements in the proposed guidelines to the minimum necessary to demonstrate compliance with regulatory requirements and include provisions for reduced monitoring for facilities that demonstrate superior environmental performance.

9.4.5 New Facilities

One SER noted that aquatic animal production has provided an important alternative in recent years for failing crop farms in distressed rural areas and expressed concern that the guidelines not establish stringent standards for new farms that prevent small crop farms from diversifying into aquatic animal production. The Panel shares this concern. In addition, ~~the~~ after considering the various technologies that EPA has identified as candidates for BAT in this industry, the Panel believes that in most cases it is unlikely that compliance costs would be

significantly lower for new facilities than for existing facilities. The Panel recommends that EPA propose New Source Performance Standards equivalent to existing source requirements.

9.5 Costs and Loadings Estimation Methodology

The Panel received numerous comments on EPA's cost and loadings model. These are summarized below.

Cost Estimates

Several SERs indicated that EPA's current models are not sufficient to capture the variability in the industry and that they generally overestimate pollutant reduction benefits and underestimate costs. One SER noted in particular EPA's assumption of constant loading of BOD, total nitrogen, total phosphorus and TSS per unit of feed, and suggested that this was completely unrealistic. This SER also questioned the assumption of a loading density of 5 lbs/cf for virtually all species, which will significantly overestimate pollutant loadings for facilities with lower densities, such as those that raise recreational species. This SER also believes that EPA has inadequately accounted for treatment in place, for example, at recirculating facilities.

Another SER indicated that the model facility data are not representative of northeastern trout farmers. Specifically, feed conversion ratios are generally higher than 1.4, while loadings densities are lower than 5 lbs/cf. Facilities are generally small, with dirt bottoms, limited flows, and cold water. Feeding during the winter is intermittent and most farmers use bag feed, for which fines have already been dramatically reduced, not bulk feed.

Several SERs suggested that EPA's cost estimates were low. One stated that they were especially low for small farms, which could not benefit from economies of scale. One important factor not considered in EPA cost estimates is lost production time. Practices such as slower draining of ponds or closing drains when ponds are empty may entail significant time costs. SERs generally felt that labor estimates were low for most of the practices discussed. Examples include time for observation of feeding, record keeping, mortality removal, and cleaning of quiescent zones and settling basins. SERs also noted that operators often work long hours and would not be able to provide any extra labor themselves. Hiring part-time or intermittent labor to supplement the labor of the operator is often not feasible in remote rural areas where many fish farms are located.

One SER noted that costs for rock riprap were likely to be much higher in the Mississippi Delta than EPA estimates (by a factor of 3-4) because rock would have to be trucked in from long distances away. This SER also noted that the cost of installing drains was underestimated. This SER also stated that the costs of installing settling basins for a pond-based system would be at least $11,000 per acre, if a single basin could be used. For farms that drain in multiple directions, however, or farms with several distinct production areas, more than one basin would be required and costs would be much higher. This SER estimated costs for unlined constructed wetlands at $5,000 per acre, and for lined wetlands several orders of magnitude greater.

One SER suggested that EPA's cost estimates for construction and maintenance of settling basins and quiescent zones were low. In particular, costs estimates for engineering design were significantly less than his experience suggested. Labor and equipment requirements for cleaning of basins were also underestimated, and disposal costs for hauling and tipping fees would likely be very high in remote areas where many facilities are located.

Land costs (where land was available at all) would likely be higher for aquatic animal production facilities than for average crop land because they tend to be in choice locations with direct access to surface waters.

One SER indicated that EPA's cost estimates did not adequately account for the land required for wetlands based effluent treatment. He also indicated that projected costs for aeration equipment and consultant time were low, and noted that many facilities are located in rural areas where significant travel time costs for consultants would also be incurred. He provided detailed cost estimates for a 1,000 per year alligator farm.

Many SERs questioned the accuracy of EPA's frequency factors for current practices, suggesting that in general they were too high. SERs suggested that this reflected not a lack of appropriate environmental stewardship, but rather that many of the practices identified are only appropriate in limited situations. SERs believed that many respondents to the screener survey may have misunderstood the practices being described. Specific practices mentioned in this context included riprap on pond banks, quiescent zones and settling basins. One SER suggested the following alternate frequency factors for catfish ponds, based on extensive experience with many such facilities: for riprap on interior pond banks, 0.05; for riprap around drains, 0.25; for vegetated stoppers; 0.75; for mortality removal, 0; for sedimentation basins, < 0.01; for in-pond settling, < 0.1; for constructed wetlands, < 0.1. This SER also noted that the practice "feed management" was ambiguous in that all farmers must manage feed to maximize profits, since feed is the most expensive input, but very few if any manage it specifically with the goal of protecting water quality. Similarly, most farmers measure those water quality parameters that are important to their operation, but few if any measure all of the parameters EPA is interested in with the goal of protecting receiving water quality.

Several SERs highlighted the distinction between gross price and net price received by the farmer. Net prices include deductions for transportation and other factors. EPA should base its revenue estimates on net prices, if this data can be obtained.

Loadings Estimates

Several SERs stated that EPA's estimates of solids loadings in pond discharges were seriously flawed because they are based on oversimplified assumptions. First of all, there is no documented relationship between the amount of feed that is introduced into a pond and the amount of pollution that leaves the pond when drained. Most of the solids in ponds are phytoplankton (not fecal solids from feeding) and phytoplankton growth is not proportional to feed additions, except at very low and very high feeding rates not used at most commercial facilities. But even if there were a relationship, most organic matter added to and produced within ponds is ultimately decomposed through microbial oxidation. One SER provided a sample calculation which showed that EPA's input based model overestimated solids discharges for a 70 acre facility by a factor of 20, when compared with a model based on empirical parameters. This SER suggested that a model based on empirical discharge concentrations and draining frequencies while less than perfect, would be more appropriate than one based on modeled inputs. This SER also noted that pollutant concentrations and drainage volume can vary substantially even within a single pond, and even more so across ponds and facilities. An accurate estimate of loadings must account for this variability.

Another SER stated that loadings estimates for flow-through facilities were also significantly overstated. He indicated that they did not account for modern feed formulations, and did not account for the variability in feed, temperature, fish size, etc that would substantially affect effluent loadings. He stated that for large facilities, FCRs were close to 1.2

(lower than EPA estimated) so that feed input was also overestimated. He also suggested that raceway velocities may be lower than estimated with the result that more solids settle out before discharge. Finally, he questioned the data on which the estimates of pollutant loadings per unit of feed were based and suggested that EPA may be relying on outdated sources. He cited a number of recent references.

A trout farmer provided the following comments on EPA's model facility parameters. Fish loadings for trout flow-through facilities are generally between 2 and 3 lbs/cf. Most raceways are smaller than EPA estimated (500-600 cf) but the number of raceways per farm is greater.

The Panel understands that EPA intends to revise its loading model for ponds and supports this intention. The Panel recommends that whatever methodology EPA adopts, the results be ground-truthed against real world empirical data to the extent that such data can be identified. The Panel recommends that EPA carefully evaluate all of the SER comments and adjust its cost and loadings models appropriately.

9.6 Economic Achievability

The Panel notes that based on EPA's preliminary cost estimates, most of the regulatory options evaluated to date would not be economically achievable for any but the largest facilities in any given industry sector. See section 9.4.1 for further discussion.

One SER noted that even in the absence of national effluent guidelines, financing for capital improvements is often difficult to obtain for aquatic animal production facilities because it is perceived by financial institutions as a fairly risky industry, especially in light of intense foreign competition. This SER speculated that financing for compliance related improvements would be particularly difficult to obtain because it would not lead to any increase in revenues, and that lack of financing might thus force many farms out of business. Other SERs noted that due to intense foreign competition in some sectors (e.g. catfish and shrimp), there is little opportunity for producers to pass regulatory costs onto processors or consumers through price increases. The Panel recommends that EPA consider constraints on financing and cost pass-through in its analysis of economic achievability.

9.7 Community Level Impacts

Several SERs noted that forcing a significant number of facilities out of business would have serious spillover effects, especially in small rural communities, on feed mills, processing plants, equipment suppliers, and others, including many minority-owned businesses. A significant share of the industry is located in economically depressed areas, such as the Mississippi delta. The Panel recommends that EPA fully consider such impacts in its economic achievability analysis.

9.8 Environmental Benefits of Aquatic Animal Production

A number of SERs indicated that aquatic animal production provides environmental benefits that must also be factored into any environmental impacts analysis. If facilities are forced to close as a result of new regulatory costs, such benefits would be lost. Examples of such benefits include: restocking of threatened fisheries, fisheries management research, reuse of effluent for agricultural irrigation and fertilization, reduction in runoff from land that would otherwise be used for row crop agriculture, reductions in nutrients and solids loadings in other waters (e.g., by filter feeders), and reduced pressure on stressed wild populations. The Panel

recommends that EPA fully consider all of these benefits, at least qualitatively and quantify them to the extent possible given time and resources available, in its analysis of the proposed guidelines.

9.9 Uncertainty

One SER noted that it is important to account for uncertainty in EPA's estimates of costs and loadings reductions. The Panel agrees with this and recommends that EPA present both point estimates and confidence intervals, to the extent feasible, in its economic analyses. Where there is insufficient data to calculate meaningful confidence intervals, uncertainty should be addressed through sensitivity analyses, qualitative discussions, or other appropriate methods.

Appendix A
List of Materials SBAR Panel Shared With SERs During Panel Outreach

1. **Description of Options** provides a qualitative discussion on the options considered for each method of production. In the options description paper, EPA does not address species specific information, but does include the general assumptions for the production systems under consideration. The species specific information is reflected in the model farm cost calculations and will also be captured when conducting the economic impact analyses. The options discussed for each of the production systems provide what EPA believes to be the baseline (i.e., current conditions of the industry), Option 1 considers the development of a BMP plan, Option 2 considers additional solids removal and would establish a numeric limit for TSS, and Option 3 considers disinfection.

2. **Frequency Factors** presents the technologies/best management practices that are currently in place for each of the species and production systems under the options being considered for this industry. The costs would be applied to the percent of facilities that would have to put the technology or BMP in place.

3. **Questions on Aquariums** provides some questions to better understand the aquarium operations The responses to these questions will help provide some background information necessary to move forward in this area for which EPA is lacking information. The enclosed list of questions is directed for the aquarium SER. However, if other SERs are interested in responding to the questions or may have knowledge/insight into the aquarium arena, the information will be appreciated.

4. **Description of Model Facility** presents the model facility characteristics used to model the costs, pollutant loadings, and removals for the individual options under consideration. The description provides the facility characteristics that remain the same for the various production systems and also provides summary tables that include the variables for the model facility characteristics that are unique to the species, life stage, etc.

5. **Summary Table of Model Facilities** identifies the key variables that were used to develop the model facilities. The variables presented include species, life stages, geographic area, (e.g., national, regional and state) and production levels (pounds or dollars). Data from the USDA Census of Aquaculture was the basis for the development of the model facilities. EPA developed the average model facility using all available data for each case. The Table also presents the costs, pollutant loadings, and removals for each of the technology options being considered. The description of model facility, Section A, also provides additional information to help you better understand how the costs, loadings and removals presented in the Table were calculated.

6. **Pollutants of Concern** presents the pollutants EPA has evaluated and plans to control (but not necessarily regulate) through the technologies and/or best management practices identified in the previous mailing, Description of Options.

7. **Possible Exclusions for Certain Subcategories** presents summary discussions of the species that EPA believes may not be considered in scope of the proposed regulations. Since a lack of data still exists for some of these species, we have included questions and request feedback (data or information) from the SERs.

8. **Summary of Screener Responses** presents the results of the screener survey to date. The entered responses are summarized for each question asked on the survey. Note: EPA also appreciates the time and effort expended in responding to the screener survey.

9. **Ground Water Discharges and Land Application of Manure Solids** presents EPA's evaluation of the water quality impacts associated with aquatic animal production (AAP), including impacts and resulting pollutant discharges associated with the leaching of pollutants to ground water sources, as well as the fate of the manure solids collected at AAP facilities. EPA intends to evaluate the application of requirements to control discharges to ground water and discharges associated with land application of manure solids. EPA is considering a similar approach in the context of the national effluent guidelines for Concentrated Animal Feeding Operations (CAFOs).

10. **General Questions for SERs** identifies specific questions EPA is requesting data and information on concerning prices to supplement existing Census data.

11. **Scope and Potential Impacts of the Proposed Rule** presents EPA's proposed plan for facilities that are not covered by the current NPDES concentrated aquatic animal production facility definition.

12. **Alligator Industry profile, Alligator Data Sources, Identification of Data Gaps, and Additional Questions** provides information on the Alligator industry sector, the sources of the information, the notable gaps in the data, and follow up questions for this sector.

13. **Description of the Trout Model Facility Calculations** presents the model facility characteristics used to model the costs, pollutant loadings, and removals for the individual options under consideration.

Appendix B
Written Comments the SBAR Panel Received from SERs