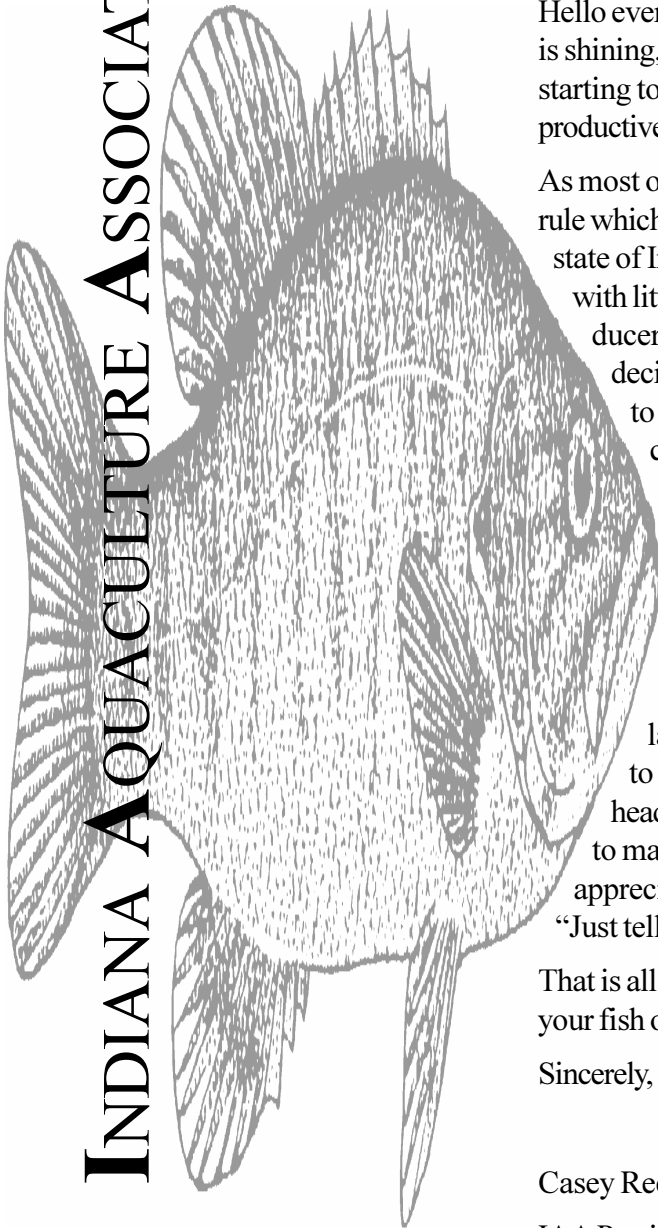


Newsletter

Volume 12 Number 3 1998

INDIANA AQUACULTURE ASSOCIATION



PRESIDENT'S MESSAGE

Hello everyone! It looks like spring is finally here. The sun is shining, water temps are on the rise, and the fish are starting to spawn. I hope everyone has a profitable and productive summer.

As most of you know, the DNR has enacted an emergency rule which restricts the sale of amphibians and reptiles in the state of Indiana. It appears this rule was put into place with little or no thought given to the aquaculture producers in the state. The Board got together and decided to take our (the IAA) opinion on this ruling to the State. LaDon drafted a letter stating our concerns for presentation at public hearings in April. He, and other board members, attended these hearings to discuss the situation with the DNR. Hopefully the current ruling will be revised.

Preparations have begun on the legislative luncheon the IAA plans to provide for your state lawmakers. This should be good way for the IAA to make its presence known. Michael Miller is heading up planning efforts but will need a lot of help to make the luncheon a success. I am sure he would appreciate a call from each and every one of you saying "Just tell me what I can do to help".

That is all I have for now. Shouldn't you be out feeding your fish or checking DO's anyway?

Sincerely,

Casey Reed

IAA President

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Message from the Editor

Great news! After Casey sent me his letter for the newsletter the Indiana Department of Natural Resources Division of Fisheries informed the IAA that modifications to the Fish Haulers and Suppliers Permit will be made to allow the sale of tadpoles. This change was a direct result of the comments made by the IAA and from the Commissioner of Agriculture's office during the public hearing process. This wonderful news would not have been possible without the input from the IAA, so you now have proof of value of your \$40 membership fee you pay each year.

In a similar vein, now might be a good time to work toward adding crayfish control to the common garden pesticide Sevin. Sevin's active ingredient is Carbaryl which is a very effective control of crayfish that build their chimneys in wet areas around ponds, golf courses and lawns. Judy Loven with ADC explained that a letter from a group such as the IAA to the Indiana State Chemist might get the ball rolling. Sevin is already labelled for the control of crayfish in Louisiana.

Finally, our pond research with rainbow trout ended successfully in early May. On a per acre basis, we stocked 3,000, 4,000, and 5,000 trout fingerlings (6 fish/lb) in late November. In May we harvested the trout and sold them pond side the first two Saturdays in May. The early results indicated no differences in stocking densities with fish averaging 3/4 pound per fish in less than 180 days. Our experiments with double cropping are continuing this summer. In mid-May we stocked yellow perch at 4,000 per 1/4 acre (6 fish/lb) and hope to grow them to 3 fish/lb by late October.

Calendar

July

1998 Recirculating Aquaculture Conference. July 16-19, 1998 at the Hotel Roanoke and Convention Center in Roanoke Virginia. Virginia Tech and the Aquacultural Engineering Society are the primary sponsors.

August

Indiana State Fair. August 12-23.

September, 1998

Indiana Aquaculture Association Fall Meeting, Location, date, and time to be announced in special mailing.

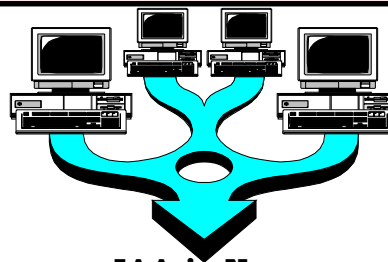
Farm Progress Show, September 29 through October 1, Tipton County, Indiana.

January, 1999

Aquaculture America, sponsored by the World Aquaculture Society, January 27-30, Tampa, FL.
Contact: John Cooksey, 206-485-6682.

April, 1999

World Aquaculture '99.
April 27-May 1, 1999, Sidney, Australia.
Contact: John Cooksey, 206-485-6682.



**IAA is Now
on the World Wide Web**
ag.ansc.purdue.edu/aquanic/iaa.htm

Send events for the Newsletter to: **LaDon Swann, Illinois-Indiana Sea Grant College Program, 1026 Poultry Building, Purdue University, West Lafayette, IN 47907-1026.**

Zebra HAACP

Fish farmers must learn zebra mussel prevention from A-Z

Chris Sigurson

Purdue University

Looking forward to the 10th anniversary of the American debut of the zebra mussel and looking back at the tens of millions of dollars of damage the miniature mollusk has inflicted on industrial and municipal water users, it's no wonder aquaculture managers are wondering when it's their turn. Illinois-Indiana Sea Grant aquaculture specialist LaDon Swann says "Anytime now."

The fingernail-sized mussel's ability to thrive in U.S. waters, its remarkable proclivity for proliferation, and its gift for hitchhiking in bilge water or on boat bottoms makes fish farm contamination a foregone conclusion, says Swann, who works out of Purdue University's animal sciences department. In response, Sea Grant has published a series of fact sheets to help aquaculturists prevent or control a zebra mussel infestation.

Commercial aquaculture operations, several of which operate in Illinois and Indiana, may be at risk, he says, because of the large amount of water that accompanies wild-caught fish, brood fish or fry stock that may be introduced to the operation. Undetected Zebra mussel larvae could be suspended in the water, Swann says, or the spat could be introduced through surface water supplies.

"Zebra mussels also can enter an operation through equipment such as nets, baskets and boots that have been used in infested areas," Swann says.

The problems start when the juvenile mollusks begin attaching to virtually any hard surface, including aerators, water supply valves and filtration systems. Because zebra mussels are filter feeders, they prefer settling in high-current areas which will bring a lot of food their way — such as an intake pump.

Swann says the mussels pose two other potential problems: Some of their European ancestors harbor organisms that can cause diseases in fish, and their American offspring may, too. Also, a fish farm contaminated with zebra mussels could conceivably face quarantine measures or restrictions on where live fish could be shipped.

Because chemical controls can be expensive

and could hurt other aquatic life forms including the farm fish, Swann recommends creating a prevention plan to head off zebra mussel infestation along with a monitoring program if an operator suspects that a pond may be affected.

"It's called a Zebra Mussel Critical Control Point Program, where operators identify the points of their operation that may be susceptible to zebra mussel introduction and put measures in place to avoid infestation," Swann says. "The fish farmers would also establish a scouting program for the pest and decide in advance what to do if they find any."

For example, operators may decide to thoroughly filter surface water supplies, steam-clean or ban outside nets, traps and other equipment, and insist on fry and fingerlings from zebra-mussel-free suppliers. They may also use a 1 percent salt solution during fish transport, which has been shown to control juvenile zebra mussels.

Zebra mussel control at the farm, though, is more difficult. Disinfectants such as iodine and calcium hypochlorite aren't completely effective, and stronger ones are toxic to fish. Some aquaculture operations may be able to drain entire ponds to kill off zebra mussels, and for them, Sea Grant researchers recommend a two-week drying out period in either very cold or very hot weather.

Many molluscicides haven't been approved for aquaculture use and may require special permission from state environmental agencies, Swann says.

In any case, zebra mussel control for aquaculturists promises to be more difficult and costly than prevention.

A comprehensive guide to zebra mussel monitoring, Biological Notes 138, by Sea Grant researcher J. Ellen Marsden is available for \$3 from the Illinois Natural History Survey at (217) 333-6880. The free publication "What Every Fish Farmer Should Know About the Zebra Mussel" is available from Mississippi Sea Grant at (601) 388-4710.

CONTACT: Swann, (765) 494-6264; e-mail, lswann@ansc.purdue.edu

FISH GOING TO PRISON

Fish processing center in new state prison will spark Illinois fish farming

Doug Wojcieszak, Policy Analyst

Illinois is poised to become a leader in the aquaculture/fish farming industry with the construction of a fish processing center at the new Pinckneyville state prison. The processing center received \$1.25 million in the recently passed Illinois State budget; Sen. David Luechtefeld (R-Okawville) and Rep. Mike Bost (R-Murphysboro) spear-headed the efforts to have the processing center included in this year's budget.

Aquaculture is a fast growing, multi-million dollar industry that is quickly being established around the United States. According to surveys the average person eats 15 pounds of fish each year, and with Chicago being the largest inland seafood market in the United States, there stands to be vast market potential for fish raised in Illinois.

The development of aquaculture in Illinois will:

- Create jobs and have a large economic impact on the state economy
- Lower fish prices for Illinois consumers
- Diversify and strengthen the Illinois agriculture industry

Currently, the potential of Illinois fish farming is not being realized. Because the industry is small and under developed, the cost of raising fish is so high that private processing centers cannot afford to buy Illinois fish. For example, farmers in the Southern United States only need to charge \$.70-.75 per pound for catfish, whereas Illinois farmers need \$.80-.90 per pound for catfish. Food and equipment cost less in the south because their fish farming industry is bigger and more developed. There are very few fish farmers in Illinois, and no private processing centers to handle farm raised fish.

The fish processing center in the new state prison at Pinckneyville will give Illinois fish farming a "shot in the fin." We'll be able to pay Illinois farmers more for catfish because our

processing costs will be lower with the prison labor used to process the fish. Processed fish will be used for prison consumption and sold on the open market.

The processing center will be a consistent market for our fish farmers, which means the Illinois fish farming industry will grow. As the industry grows, the cost of doing business will decrease and the price of Illinois fish will decrease. At this point, it will be profitable for private processing centers to be developed in Illinois. Considerable interest has been expressed in starting Illinois fish farming operations in lieu of this processing center.

The fish processing centers in the Pinckneyville prison will be monitored by the Illinois Dept. of Public Health.

Several species of fish can be farmed in Illinois, including catfish, trout, striped bass, walleye, perch, and tilapia. Farming can be done three different ways: 1) floating cages in strip mine ponds and other existing lakes/ponds; 2) building ponds; 3) constructing indoor facilities that use waste heat from factories and/or power plants.

The Pickneyville prison fish processing center enjoys wide ranging support from 22 different associations, companies, and agencies:

IL Chamber of Commerce, IL Corn Growers Assoc., IL Soybean Assoc., Archer Daniels Midland (ADM), IL Coal Assoc., Peabody Coal Co., Freeman Coal Company, Arch Coal Company, IL Energy Assoc., Farm Resource Center City of Pinckneyville, IL Aquaculture Assoc. IL Farmers Union, IL consumer Fishery Council IL State Univ., SIU Fisheries/Aquaculture, Perry Co. economic Development, IL DCCA, USDA North Central Region Aquaculture Center, Illinois-Indiana Sea Grant College Program, National Aquaculture Council, and the Southwestern IL Resource Conservation & Development, Inc.

Decapsulation of Brine Shrimp

Craig Watson
University of Florida

Brine shrimp eggs are used throughout the world as a food for small fish in hatcheries. These eggs are really cysts which can remain dormant for years before hatching if they are kept dry.

As soon as the eggs are exposed to water, the hatching process begins. When hatching brine shrimp eggs, we not only produce baby brine shrimp, but also the empty shells out of which they came, along with unhatched eggs.

These are mixed in the hatching jar. The unhatched eggs and shells from the hatched eggs, must be separated from the baby brine shrimp since they are not digestible if eaten by small fish. If a small fish eats just a few of these shells or unhatched eggs, the fish's intestinal tract may be blocked, causing its death. The process of separating the shells and unhatched eggs from the baby brine shrimp is quite time consuming, and sometimes hard to do effectively.

A process that is used in many hatcheries involves removing the outer layer of eggs with chlorine (household bleach), leaving the unhatched baby brine shrimp protected in a membrane.

Besides making the harvest of the hatched brine shrimp easier, this process also:

- Essentially sterilizes the eggs which may have disease organisms on the outer layer of the egg.
- Can produce a higher percentage of hatching, since the brine shrimp no longer have to break through the hard outer layer of the egg.
- Allows you to feed even the unhatched eggs, since the undigestible outer layer of the egg is no longer present.

Decapsulated eggs can be hatched immediately after treating them with chlorine, or they can be stored in a saturated brine solution for several months before hatching. This allows you to decapsulate large quantities of eggs, store them, and use small portions as needed. The brine

solution dehydrates the eggs, effectively stopping the hatching process, but the eggs hatch normally when placed in hatching solution of lower salinity water at a later date (up to two months).

Procedure

Note: The following is the procedure for decapsulating one pound of eggs. The amounts of water, chlorine and sodium hydroxide can be changed accordingly if you are working with more or less eggs.

You will need the following items:

- A 3-gallon container with clear sides
- 1 pound of brine shrimp eggs
- 1 gallon of household bleach
- Brine shrimp net or filter
- Saturated brine solution
- Sodium hydroxide solution
- In one gallon of water, dissolve salt until no more can be dissolved and salt remains in the bottom of the container.
- In one quart of water, dissolve 1 ½ ounces of sodium hydroxide.

Steps in process

1. Soak 1 pound of eggs in 1 gallon of fresh water for 1 hour. Gently aerate the eggs. Periodically check to make sure that the eggs are not sticking to the sides of the container, above the water line
2. After the eggs have soaked in fresh water for 1 hour, add 1/3 cup of sodium hydroxide solution.
3. Add 1 gallon of liquid household bleach. Decrease the aeration to avoid foaming, while still mixing the eggs in solution.

(Continued next page)

4. The eggs will turn white, and then orange, and start to settle on the bottom. As soon as all of the eggs are orange, pour the contents through a brine shrimp net (or filter), and rinse in fresh water. Continue to rinse until all traces of bleach odor are gone. The time it takes for all the eggs to be decapsulated will vary with the type of eggs being used, so it is more important to observe the color change than to watch a clock

5. Decapsulated eggs can be fed directly to fish that will eat them, or they can be hatched before feeding them to fish. Any eggs that you wish to store should be covered with the saturated brine solution, and stored in a refrigerator until needed.

Hatching decapsulated eggs

By removing the outer layer of the eggs, you will reduce their buoyance, causing them to sink in water. This is important since a hatching system that works well for eggs with their capsules on, may not work for decapsulated eggs. Hatching containers should have steep sides to avoid the eggs settling on the sides, and aeration should come from the extreme bottom of the container. Cylindrical tanks with a steep cone in the bottom are ideal.

Salinity for hatching should be around 20 parts per thousand which is equal to 1 pound of salt for each 6 gallons of water. Using a strong light over the top of the tank also helps the hatching process.

Decapsulated eggs hatch in 24 to 48 hours. The entire contents can then be drained through a brine shrimp net or filter and fed to your fish.

Special Note: Brine shrimp eggs come from many different sources and will react differently to this treatment with some eggs taking longer than others to turn orange in the chlorine solution. However, the basics described above will work for any type of eggs.

Craig Watson is an IFAS Extension Agent specializing in Aquaculture, University of Florida, Seffner, FL.

EPA Federal Register Notice on Proposed Effluent Guidelines Plan

**Gary Jensen
USDA/CSREES
Washington, DC**

On May 28, 1998, EPA published an anticipated Federal Register Notice of its PROPOSED effluent guidelines plan which in Section B - Process for Selection of New Effluent Guideline Regulations, includes Fish Hatcheries and Farms listed under Other Rules for potential New Rulemaking Activities. This notice has potential implications for all aquaculture facilities and operations that discharge effluents into surface waters of the United States and publicly owned treatment works. The following information is an attempt to 1) assess important driving factors for the inclusion of Fish Hatcheries and Farms, 2) understand the issue in the context of this notice, 3) assess potential implications for the aquaculture industry, and finally 4) offer some considerations for anyone wishing to submit a written response to EPA.

This notice is published by the United States Environmental Protection Agency (Headquarters Office) and is unrelated to the currently proposed general National Pollutant Discharge Elimination System (NPDES) permit for aquaculture facilities in Idaho under the administration of the EPA Region 10 Office (Federal Register Notice: Draft General NPDES Permit for Aquaculture Facilities and On-site Fish Processing Facilities in Idaho, April 4, 1998).

Driving Forces

EPA is mandated by both Congress through language in the Clean Water Act, which requires the Agency to publish a biennial Effluent Guidelines Plan, and a 1992 court ordered consent decree in Natural Resources Defense Council et al. versus Browner (EPA), which commit EPA to schedules for proposing and taking final action on effluent guidelines and also for conducting preliminary studies. EPA still retains the discretion to select new industries for development of effluent standards based on Agency priorities. In addition to these mandates, a recent White House Initiative on Water Quality has raised the awareness of federal agencies on this issue because of budget implications for increased funding for research, education and regulatory programs. Today numerous agricultural and manufacturing sectors linked to a dependence and major impact on natural resources are facing increasing public policy scrutiny which has in some cases resulted in stricter operational regulations. Environmental "costs" are now being evaluated against some long-standing traditions in the farming and manufacturing sectors as public interests and competition for natural

resources increase in some locations.

A major reason the Fish Hatcheries and Farms industry category is included in the current list of industrial categories being CONSIDERED as POTENTIAL candidates for the next categories for effluent rulemaking projects, is not based on the availability and review of technical data on the industry's discharges, but in this specific case, a recommendation by the Environmental Defense Fund. This recommendation states, "The U.S. Environmental Protection Agency (EPA) should implement the Clean Water Act for aquaculture by developing effluent limitations" (Murky Waters: Environmental Effects of Aquaculture in the United States, EDF, 1997, 195 pp.).

Previous EPA (Headquarters) Rulemaking Considerations and Actions

In 1977, EPA considered developing effluent guidelines for fish hatcheries and farms, also called aquaculture facilities. A draft document recommended issuance of BPT limitations, but regulations were not promulgated. BPT refers to Best Practicable control Technology currently available. Effluent limitations can require application of BPTs. These represent the average of the best treatment technology performance for an industrial category. This regulation applies only to facilities that discharge directly into waters of the United States.

Later in 1987, EPA contracted development of a draft Model Permit Package for the Fish Culture Industry. No regulatory action was taken, however, the information was distributed to state regulators to provide guidance to permit writers.

Current Federal Regulations and Rules

Few of the federal environmental statutes and regulations address aquaculture specifically, although provisions in the Clean Water Act apply to aquaculture operations because EPA defines aquaculture facilities that discharge pollutants into waters of the U.S. as point sources. Concentrated aquatic animal production facilities that are subject to the NPDES permit program for controlling discharges FROM point sources into waters of the U.S. are addressed in 40 CFR part 122 subpart B, section 122.24 and subpart D, Appendix C. Discharges INTO aquaculture projects that are subject to the NPDES permit program through section 318 of the Clean Water Act are addressed in 40 CFR part 122 subpart B, section 122.25. The following is the specific language for each section referencing aquaculture.

Section 122.24 Concentrated aquatic animal production warm or cold water aquatic animal production facility as a concentrated aquatic animal production facility upon

determining that it is a significant contributor of pollution to waters of the United States. In making this designation the Director shall consider the following factors:

- (i) The location and quality of the receiving waters of the United States;
- (ii) The holding, feeding, and production capacities of the facility;
- (iii) The quantity and nature of the pollutants reaching waters of the United States; and
- (iv) Other relevant factors.

(2) A permit application shall not be required from a concentrated aquatic animal production facility designated under this paragraph until the Director has conducted on-site inspection of the facility and has determined that the facility should and could be regulated under the permit program.

Appendix C defines categories for concentrated aquatic animal production facilities designated as point sources subject to National Pollutant Discharge Elimination System (NPDES) permit requirements as hatcheries, fish farms, or other facilities that grow or hold aquatic animals and criteria for determining a concentrated aquatic animal production facility as follows:

Cold water fish species or other aquatic animals (e.g., trout and salmon) in ponds, raceways, or other similar structures that discharge at least 30 days per year but exempts facilities which produce less than 9,090 harvest weight kilograms (about 20,000 pounds) of aquatic animals per year and feed less than 2,272 kilograms (about 5,000 pounds) during the calendar months of maximum feeding;

Warm water aquatic animals (e.g., catfish, sunfish, minnows) that discharge at least 30 days per year but exempts facilities which produce less than 45,454 harvest weight kilograms (about 100,000 pounds) of aquatic animals per year and facilities with closed ponds that discharge only during periods of excess runoff.

Facilities determined on a case-by-case basis by the permitting authority to be significant contributors of pollution to waters of the United States

The only provision in the Clean Water Act which addresses aquaculture specifically is section 318, which is titled aquaculture. The intent of this section is to address the discharge of effluents FROM aquaculture operations or surface waters INTO aquaculture facilities to stimulate production as food inputs.

Clean Water Act Section 318 - Aquaculture states:

- (a) The Administrator [EPA] is authorized, after public

hearings, to permit the discharge of a specific pollutant or pollutants under controlled conditions associated with an approved aquaculture project under Federal or State supervision pursuant to section 402 of this Act.

- (b) The Administrator shall by regulation establish any procedures and guidelines which the Administrator deems necessary to carry out this section. Such regulations shall require the application to such discharge of each criterion, factor, procedure, and requirement applicable to a permit issued under Section 402 of this title, as the Administrator determines necessary to carry out the objective of this Act.
- (c) Each State desiring to administer its own permit program within its jurisdiction for discharge of a specific pollutant or pollutants under controlled conditions associated with an approved aquaculture project may do so if upon submission of such program the Administrator determines such program is adequate to carry out the objective of this Act.

Section 122.25 Aquaculture projects is a separate provision in 40 CFR part 122 subpart B which addresses section 318 in the Clean Water Act above as follows:

- (a) Permit requirement. Discharges into aquaculture projects, as defined in this section, are subject to the NPDES permit program through section 318 of the Clean Water Act, and in accordance with 40 CFR part 125, subpart B.
- (b) Definitions. (1) Aquaculture project means a defined managed water area which uses discharges of pollutants into that designated area for the maintenance or production of harvestable freshwater, estuarine, or marine plants or animals.
- (2) Designated project area means the portions of the waters of the United States within which the permittee or permit applicant plans to confine the cultivated species, using a method or plan of operation (including, but not limited to, physical confinement) which, on the basis of reliable scientific evidence, is expected to ensure that specific individual organisms comprising an aquaculture crop will enjoy increased growth attributable to the discharge of pollutants, and be harvested with a defined geographic area.

Significance of this Notice

The 1992 consent decree requires EPA to begin two rulemaking projects by December 1998, and begin development of two additional effluent guidelines, either new or revised, by December 1999. This notice DOES NOT contain regulatory requirements and does not provide specific definitions for industry categories. The

listing of an industry category under New Rulemaking Activities DOES NOT mean that new effluent limitation guidelines and standards will be developed for Fish Hatcheries and Farms. However, the listing of Fish Hatcheries and Farms will result in a review of any public comments, data and information received from this Federal Register notice pertinent to this industry category and an evaluation by EPA's Office of Water to assess what action, if any, should be taken regarding national effluent guidelines for the aquaculture industry. Therefore, comments received are important.

EPA has flexibility in selecting future categories for regulation and no specific criteria have been developed to direct this process. However, EPA has listed criteria used to select categories in previous Effluent Guidelines Plan - the first published in 1990. To date EPA has focused on regulatory projects which have been identified as substantial contributors to water quality degradation. One issue is - to what extent do aquaculture facilities contribute to water quality problems relative to other industry categories also listed as candidates and others that may be identified through this public comment process for additional rulemaking projects. The development of new national effluent standards costs millions of dollars and therefore industries causing the greatest concern are presumably the highest priority targets for rulemaking actions.

Implications for Industry

Presently Federal Clean Water Act water pollution discharge regulations apply to all aquaculture facilities. NPDES permits may be required based on production outputs or local decisions by EPA or state agencies. As with any Federal Register notice soliciting public comments, anyone can provide information, data, examples of case studies, or recommendations. An important element in this process is the early involvement of key stakeholders with KNOWLEDGE of the industry, control technologies, and environmental impacts. One challenge under Clean Water Act provisions is that individual states designate the uses for water bodies and establish water quality standards and criteria for pollutants to protect those uses, and policies to protect water quality and prevent its degradation. States may establish stricter standards than the federal ones to protect designated water uses (swimming, fishing, drinking water). EPA issues water quality criteria for states to use in developing their standards. The effluent standards for a fish farm discharging into a pristine, small trout stream would be drastically different from those for a fish farm discharging into a drainage ditch or large river. The status of receiving waters will also determine the pollutant parameter(s) to regulate. Also some production systems discharge water continuously, others intermittently and still others rarely. The industry has very diverse production systems and practices including raceways, tanks, ponds and sea cages, unlike other industry categories where the significant factors are often size of operation and volume of effluents. When developing discharge regulations

and writing permits, permitting officials may use technology based standards or more stringent state water quality based standards.

EPA listed Fish Hatcheries and Farms primarily because of the report and recommendation by The Environmental Defense Fund. This is only one source of information which may be either verified or refuted by others for its content, accuracy and recommendations. The Federal Register notice provides an opportunity for EPA and other stakeholders to again revisit the need and rationale for national effluent standards. As with any national regulatory initiative, the federal government can set minimum standards and states can develop stricter standards if deemed necessary. The outcome resulting from this EPA notice is uncertain, but it requires strategic, rational approaches based on sound science, adequate protection of our natural aquatic resources and careful considerations for the diversity and sustainability of the important commercial aquaculture sector in this country.

State Actions and Technology Development

The current status of the ability and success of EPA-delegated states (currently about 40 states) to administer NPDES permit programs that regulate fish hatchery and farm effluents should be an important indicator for evaluating any pressing need for national effluent standards or possibly any needed specific technical guidance. Many coalitions of diverse stakeholders have been formed in numerous states to develop reasonable permit structures for regulating effluents at both small and large aquaculture facilities. In several cases general permits for aquaculture effluents have been developed and approved for regulatory purposes. These can serve as models or guidance to other states if needed.

There have been significant investments in research and development from both public and private funds, to address numerous problems and issues associated with aquaculture effluent management. Much work has been done to characterize the effluents from different system types and intensification levels to enable comparisons with other industry categories and assess relative contributions to impacting receiving waters. Additionally, control treatment technologies have been adopted by numerous industries which do reduce pollutant parameters of greatest concern at designated locations and can serve as a basis for best management practices. Improved feeding management practices, feed manufacturing, and diet formulations have contributed to gains in feed conversion efficiencies and reductions of solids and nutrients in discharges. New facility engineering designs and innovations have also refined solids waste reduction and removal for proper disposal.

Possible Considerations for Written Comments

As part of the proposed rulemaking process, individuals and organizations can provide EPA with recommendations, case studies, examples of state permit systems, copies of reports or studies on control technologies, and other information related to aquaculture effluents. Of particular interest to EPA is summary information describing current industry pollution reduction practices and references or citations of existing pertinent reports. EPA is not seeking reams of data.

Examples of other types of information that can assist EPA to assess the need and rationale for proceeding with or deferring any further regulatory actions with the Fish Hatcheries and Farms industry category include:

- the need for national versus state effluent standards in states with and without EPA-delegated authority to administer NPDES program - current or planned research and development projects linked to aquaculture effluents control techniques or impact assessments - copies of studies or citations of scientific research on characterization of aquaculture wastes associated with different types and sizes of systems - copies of studies or citations of scientific research on waste treatment and control technologies employed by industry and their performance efficiency
- responses from state agencies with jurisdiction over NPDES permits on successes/problems with current regulatory systems and rationale for or against national effluent standards (is current system working?)
- describe broad-based coalitions established to reach workable solutions at the state/territory level that include regulatory, academic, industry and natural resource organization interests (much has already been accomplished in many states to develop current regulatory system) and present successful case studies (models)
- address specific statements or content in EDF report based on scientific data or actual experiences
- consider technical guidance information in lieu of standards that can also serve as guidance to states desiring assistance

Access to Federal Register Notice

Interested individuals or organizations should obtain a copy of the complete Federal Register notice to review and study before formulating any written comments. The DEADLINE for receipt of written comments is on or before July 27, 1998.

This notice can be accessed directly via the world wide web (www) at

the following address:

<http://www.epa.gov/fedrgstr/EPA-WATER/1998/May/Day-28/w14156.htm>

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