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## **Testimony on Senate Bill 493 Senate Committee on Sporting Heritage, Mining, and Forestry January 5<sup>th</sup>, 2016**

Thank you members for allowing me to testify on Senate Bill 493 (SB 493) related to aquaculture and fish farms.

Fishing is an important part of our state's economy and heritage. Every year almost one million Wisconsinites enjoy fishing in our lakes, rivers, and streams. Without private aquaculture, our state would not be able to meet the demands of sport fishermen, tourist, or commercial fishing operators. Private aquaculture supplies live bait to tackle shops, stocks our lakes and rivers, and supplies grocery stores with locally grown fish.

Aquaculture is a \$5.3 million dollar industry in Wisconsin and supports almost 500 jobs. Unfortunately, the industry has declined in recent years due to burdensome and inconsistent regulation. Representative Czaja and I are proposing to regulate aquaculture similar to agriculture as they each grow a product for human consumption. This bill will lead to more consistent and predictable regulation of an important industry. Doing so will allow the aquaculture industry to thrive as the industry has done nationally.

It is important to remember that we are not removing any environmental protections in SB 493. We are proposing to adopt many Federal water quality standards for aquaculture which will provide the industry certainty and allow current farms to continue to operate as they have done for decades.

I want to thank the committee for allowing me to testify and would ask for your support of Senate Bill 493.

Thank you.

Tom Tiffany  
Wisconsin State Senate  
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**SB 493 – Regulation of Aquaculture and Fish Farms**  
**Senate Committee on Sporting Heritage, Mining, and Forestry**  
**January 5<sup>th</sup>, 2016**

Thank you for the opportunity to testify today on Senate Bill 493. As Senator Tiffany mentioned, this bill is the result of our collaborating with fish farmers and other stakeholders to identify the statutory updates that are needed for the aquaculture industry to grow in Wisconsin.

Growing up in northern Wisconsin, I've been exposed to aquaculture all my life. These farmers have the same dedication and work ethic as those who plow our fields and raise our cattle; it just happens that they have a different crop – and that is, fish.

Aquaculture is agriculture – that is the key element to SB 493. The clarification of current laws related to aquaculture will provide the consistency that our private fish farmers need to plan for the future and grow their operations in a sustainable way. Furthermore, by aligning state water quality standards with federal law and guidelines we will ensure that Wisconsin fish farmers are not at a competitive disadvantage to neighboring states.

I ask for your support of SB 493 and we are happy to answer any questions.



Wisconsin Department of Natural Resources Testimony for SB 493  
Senate Committee on Sporting Heritage, Mining, and Forestry  
January 5, 2016

Good afternoon Senator Tiffany and Committee members. I am Pam Biersach, Director of the Bureau of Watershed Management, for the Department of Natural Resources. Thank you for hearing the agency's testimony, which we present for informational purposes.

**Natural bodies of water used as a fish farm**

Chapter 29.733 regulates the use of natural water bodies for fish farming. Sections 1-8 of the bill expand the category of natural waterbodies that may be used as part of a fish farm to also include springs that provide water to an artificially constructed pond. Under current law waters of the state may be used for fish farming only if the water body is a freeze-out pond, a pre-existing fish rearing facility, or a waterbody for which the DNR has issued a construction permit. The legislation also creates an exemption from state law from needing a permit for someone who previously had a permit to raise fish in a natural waterbody, provided they have not modified or expanded their facility.

Department staff have mapped over 10,800 springs across the state. Expansion of aquaculture use of headwater spring habitats could impact state trout fisheries and stream water temperature, quality and habitat.

**Navigable water permits**

Section 9 of the bill exempts aquacultural uses from the requirement to obtain a permit to construct or dredge an artificial enlargement of a navigable waterway or to grade on the bank of a navigable waterway including trout streams and "outstanding and exceptional resource waters." Construction of aquaculture ponds in these areas have significant potential to create difficulty meeting physical and chemical water quality standards for the waterway, habitat fragmentation, and impacts spawning and fish rearing areas. Unregulated construction of aquaculture ponds on navigable waterways could create conflict between aquaculture business owners and members of the public exercising their right to navigate on navigable waterways.

Section 10 adds aquaculture to the definition in chapter 30 for "agricultural use." This adds aquaculture to any activities in chapter 30 permits such as exemptions and permits that use this definition.

**Dams on navigable streams**

The bill provides an exemption from the requirement in sec. 31.34, Wis. Stats. that mandates all dams on navigable streams must release a minimum of 25% low flow at all times. The exemption would be for any dam in an aquaculture facility where the water is returned to the navigable stream.

This change could have impacts on stretches of streams that could become de-watered when the outfall (return flow point) is a distance downstream of the intake (diversion point). If the intent is for the exemption to be unlimited on how much of the navigable stream could potentially be impacted by the lack of flow, it could potentially leave some watercourses short of the water needed to remain viable. Without an adequate minimum flow, adequate mixing may not occur which could lead to water quality impacts and degradation of the water resource downstream.

#### **Cost-sharing exemption from nonpoint performance standards**

Under s. 281.16(2)(a), stats., the department is required to prescribe the performance standards for nonpoint sources that are not agricultural facilities or agricultural practices. The rule that prescribes these performance standards, subch. III of ch. NR 151, Wis. Adm. Code, exempts agricultural facilities and practices from the non-agricultural performance standards. Currently, since aquaculture is not explicitly listed as an agricultural practice, aquaculture activities are not exempt from the non-agricultural performance standards in subch. III of ch. 151. This change will exempt aquaculture from the non-agricultural performance standards the same as other types of agricultural practices by adding aquaculture to the list of activities that make up "agricultural practice" and that are associated with an "agricultural facility."

By adding aquaculture to the list of activities that make up "agricultural practice," the agricultural performance standards and associated cost-sharing requirements under the current statute would also apply to aquaculture facilities. Any BMPs to meet performance standards would need to be promulgated in rule by both DNR and DATCP in order to provide cost-sharing funds through grant programs.

#### **Water withdrawals under the Great Lakes Compact**

Section 15 of the proposed legislation creates a new definition of "withdrawal" relative to certain aquacultural ponds. The bill would remove recirculating water (pumping) from pond to pond, or discharge from an aquaculture pond from being a "withdrawal" under the compact. Under the bill, only the water initially pumped into an aquaculture pond, registered with Department of Agriculture, Trade and Consumer Protection (DATCP), from a well or diverted from a surface water source into the pond would be considered a "withdrawal." The pumping of water from the initial pond to a second pond or discharged out of the pond, to another basin, would not be considered a "withdrawal" under the compact. Individuals would no longer be required to register the withdrawal when the aquaculture facility fills a pond (or ponds) with a low-capacity well and circulates that water to other ponds or facilities with pumps greater than 70 gpm.

Currently, there are no *registered* properties that the proposed, "Subsequent withdrawals for aquacultural purposes," changes would affect.

**Wetland permits, Wetland exemptions, and WPDES Permits**

Various provisions in this bill would provide exemptions or changes to state implementation of the federal Clean Water Act (CWA). It should be noted that in most cases Army Corp of Engineers and Environmental Protection Agency laws would still have to be followed by both the State and aquaculture facilities including:

- Alternatives analysis required by federal law for permits for a discharge to federally regulated wetlands
- Federal factors used in review for wetland individual permits
- Federal approval of any changes to the department's in lieu fee program
- Federal mitigation requirements
- NPDES condition limitations
- Federal numeric standard Water Quality Based Effluent Limits

Thank you, Chairman Tiffany and Committee members, for hearing this testimony. We would be happy to try answering any questions you may have.

Good Morning,

Thank you Senator Tiffany and Committee members for scheduling this hearing today and for the opportunity to speak. I am testifying in favor of Senate Bill 493.

My name is Ron Johnson. For the past nine years, I was employed by the University of Wisconsin working for the Extension as an Aquaculture Outreach Specialist. I retired in August due to budget cuts. Prior to working for the University, I worked for the Department of Agriculture, Trade, and Consumer Protection (DATCP) as a Senior Aquaculture Program Analyst, and owned and operated the Iron River Trout Haus trout farm for over 11 years. I served 8 years on the Governor's Northern Natural Resource Council. In full disclosure, I am a past Wisconsin Aquaculture Association (WAA) Board Director and Past President, and my wife is currently the Secretary of WAA and Editor of their Newsletter, The CREEL. I have been a fish farmer and worked supporting the industry for over 20 years.

This bill is an accumulation of work and requests that the Wisconsin Aquaculture Industry has been making since 1997 for comprehensive regulatory change in order to become viable and competitive, help strengthen Wisconsin's recreational fisheries, and provide safe locally-grown products for consumers. This bill will help the industry survive, while doing so in an environmentally responsible manner, using sustainable and nationally-accepted Best Management Practices (BMPs). These requests have been outlined in the 1997 Poff Report, 1997 Legislative Audit Summary, 1999 Blue Ribbon Task Force, 2000 Sturgeon Report, 2001 Legislative Council Information Memorandum, and in the Wisconsin Walleye Initiative Regulatory Review and Recommendations Study, a report for the Wisconsin Legislature as required by 2013 Act 20.

Worldwide, aquaculture is the fastest-growing segment of agriculture, at a rate of over 8% per year, producing \$60 billion in sales. In 2013, captive fish production overtook beef in number of tons produced, and 50% of all seafood consumed is now farm-raised. As the oceans are overfished and depleted (85% of marine stocks are over exploited), we are looking more to captive production of this important food protein. Sadly, however, the United States which produces about \$1.3 billion, and in particular Wisconsin which produces about \$ 5.7 million, has fallen far short in their ability as producers. So we import over 90% of the seafood consumed in the United States and the trade deficit for seafood has reached over \$11 billion per year – the highest for any food commodity. Wisconsin’s inconsistent regulations have put our aquaculture industry at a disadvantage. States like North Carolina, Ohio, and Indiana have all grown their industry in the past eight years, but Wisconsin has lost 2.5% and we have dropped from 22nd to 26th in total market share.

Wisconsinites place a high value on natural resources, as they should, and we all want to ensure that our environment is protected. Fish farmers are stewards of the watersheds they are part of – because, in order to be sustainable, the water needs to be of high quality for the fish and, in many cases, fish farms improve stream conditions. With today’s technologies, by utilizing improvements in fish farm management and feeds that are formulated not only for growth, but discharge considerations, fish farmers have been proactive in reducing discharge effluents. Since the mid-1990s, researchers have developed low phosphorus diets that have reduced aquaculture phosphorus discharge by up to 38%. What the State of Wisconsin needs is regulations that safeguard our natural resources while allowing the aquaculture industry the same protections as other agriculture entities and changes that are science-based and align with the federal Clean Water Act.

Senate Bill 493 is good for Wisconsin's environment and good for Wisconsin Aquaculture Industry. Senate Bill 384 will align the WPDES permits for those fish farms in Wisconsin that are required to have discharge permits with the federal Clean Water Act as outlined in the USEPA's rulemaking in June of 2004. The revision of the CWA for aquaculture started in 1992 with a court-ordered consent decree, included a Federal Joint Subcommittee on Aquaculture Task Force, years of study, review, public input, site visits, and discussions with state and federal agencies, technical groups, industry stakeholders, and plaintiffs. One of the goals of the process was to: "Integrate the best available and appropriate science, technology, data and information into the decision-making processes that best serve the nation." The result was the development of effluent limitations guidelines (ELGs) for aquaculture proposed in June of 2002 and was finalized by rulemaking in June of 2004. The EPA looked at a variety of options including numeric standards but choose BMPs. These BMP guidelines were reviewed by the United States Circuit Court of Appeals and the federal Office of Management and Budget (OMB) before the rule was final. BMPs provide flexibility for producers to incorporate evolving science and innovation based on site-specific factors to achieve a desired environmental outcome. Senate Bill 493 directs the WDNR to comply with the USEPA's 2004 court-accepted rule for aquaculture.

I encourage you to pass Senate Bill 493 that clarifies that aquaculture is agriculture, simplifies procedures, and complies with the federal CWA for aquaculture.

## Chapter 4

# Best Management Practice Programs and Initiatives in the United States

*Gary L. Jensen and Paul W. Zajicek*

### Introduction

Best management practices (BMPs) are specific—and often detailed—protocols, practices, or procedures to manage specific operations in a socially and environmentally responsible manner, and they are typically based on risk analysis and the best available scientific information (Nash 2001). Usually they are a component of a larger regulatory or voluntary effort to assist farmers in achieving environmental stewardship goals of government or a producer organization. These environment-oriented BMPs may or may not contribute to the economic success of the facility.

In this chapter we summarize regulatory and other initiatives related to aquaculture BMPs in the United States. We address 1) background and progression of events for developing federal effluent limitation guidelines (regulations) with significant supporting actions and lessons learned, 2) general description of a nationally coordinated stakeholder process that helped formulate these regulations, 3) experiences of state governments and industry initiatives with BMPs, and 4) participatory processes in regulatory development. To gather current information from the different states on the status and implementation of programs employing BMPs, we prepared and distributed an electronic questionnaire to state agencies, universities, and industry organizations during November and December 2005. Follow-up interviews and published literature filled information gaps.

### Background

The quality and safety of water sources for aquaculture operations and potential external sources of contamination are major concerns reinforcing the need to manage and protect natural aquatic resources. Management is required to maintain desired water quality within production systems and to control discharges of substances defined as pollutants in government regulations. The Federal Water Pollution Control Act of 1948 (33 USC §1251 *et seq.*), also known as the *Clean Water Act (CWA)*, is the primary federal legislation

concerning water quality. The CWA was amended significantly in 1972 (Public Law 92-500), 1977 (Public Law 95-217), and 1987 (Public Law 100-4). The first amendment required a technology-based approach to discharge limits. The last amendment emphasized water quality-based effluent limits as a basis for National Pollutant Discharge Elimination System (NPDES) permits outlined in the 1977 amendment for point source discharges into navigable waters.

The CWA prohibits the discharge of pollutants from a point source without a discharge permit. These permits are issued by the United States Environmental Protection Agency (USEPA) or a state program authorized by USEPA to administer the State Pollutant Discharge Elimination System program. Currently 45 of 50 states can issue NPDES permits after optional USEPA review. National Pollutant Discharge Elimination System general permitting regulations in 1983 defined concentrated aquatic animal production (CAAP) facilities subject to the NPDES permit program for controlling discharges from point sources into waters of the United States (40 CFR Sections 122 [§122.24, §122.25, and Subpart D Appendix C] and 123 [§123.25]). The NPDES permit program also applies to discharges from aquaculture projects or surface waters into aquaculture facilities to stimulate production as food inputs (Section 318 of the Clean Water Act and 40 CFR §122.25). National Pollutant Discharge Elimination System permits can be issued for an individual facility (individual permit) or numerous common facilities with similar operating and environmental conditions (general permit). Permits are valid for 5 years and new requirements or modifications can be made at the time the permit is renewed for another 5-year cycle.

Water quality regulations during the 1970s and 1980s focused on controlling point source pollution through NPDES permits. Categories of CAAP facilities are defined as hatcheries, fish farms, or other facilities that grow or hold aquatic animals with the following criteria (40 CFR §122.24, 40 CFR Subpart D Appendix C, and 40 CFR §123.25):

- 1) Coldwater fish or other aquatic animals in structures that discharge at least 30 days/year but exempts facilities that produce less than 9,090 kg/year (20,000 pounds/year) and feed less than about 2,272 kg (5,000 pounds) during the calendar months of maximum feeding
- 2) Warmwater aquatic animals in facilities that discharge at least 30 days/year but exempts facilities that produce less than about 45,454 kg/year (100,000 pounds/year) and facilities with closed ponds that discharge only during periods of excess runoff
- 3) Facilities that are determined on a case-by-case basis by the permitting authority to be significant contributors of pollution to waters of the United States.

When writing a discharge permit, the authorized state or federal authorities apply either USEPA technology-based standards for an industry-specific process, end-of-pipe discharge standards, or effluent criteria; or more stringent water quality standards if the discharge is likely to affect water quality based on the designated uses of receiving waters. States are required to identify waters that do not meet water quality standards and designate them as water quality limited. States are then required to establish a priority rating for such waters, and in accordance with that ranking, establish total maximum daily load (TMDL) limits for specific pollutants (McCoy 2000). States may establish stricter

standards than federal requirements to maintain designated water uses and prevent water quality degradation. Water quality-based standards and requirements take precedence over technology-based effluent limitations. The NPDES permits for aquaculture facilities are issued based on the permit writer's best professional judgment in the absence of an applicable USEPA effluent limitation guideline for CAAP facilities.

### **Historical Milestones**

The need to develop a national effluent limitation guideline for aquaculture facilities evolved over more than 20 years. The National Research Council (NRC 1978, 1979) noted the need for national effluent regulations for aquaculture. The passage of numerous environmental protection and marine fishery conservation laws by Congress in the late 1970s also created new regulatory challenges (Jensen, in press). Early attention by USEPA on aquaculture effluents in 1977 and 1987 resulted in limited technical guidance to NPDES permit writers but no national regulation (Jensen 2000). The USEPA (1980) evaluated the use of aquaculture systems as a technique for municipal and industrial wastewater treatment. The first National Aquaculture Development Plan noted the importance of federal environmental regulations and the need for applied research to reduce pollution impacts from aquaculture facilities (JSA 1983a, b). Renewed emphasis on water quality and the environment resulted in technical guidance provided to public agencies and decision makers (Oceanic Institute 1991).

Diverse stakeholders identified the need to characterize effluents, document and minimize environmental impacts, and improve regulations through proactive dialogue among producers, regulators and public interest groups. Without a national guideline specific to aquaculture discharges, permit requirements varied among states based on the permit writer's best professional judgment. Permits were often developed based on experiences with disparate types of industrial and municipal discharges. This regulatory system and limited scientific information challenged local permitting authorities and aquaculture operations—especially flow-through raceway facilities and emerging net-pen operations in state waters of the Pacific Northwest. In response, concerned stakeholders synthesized technical progress and available data, and developed prioritized recommendations (Blake et al. 1992; Jensen 1992).

To address aquaculture effluents, a federal interagency coordinating body, the Joint Subcommittee on Aquaculture (Public Law 96-362), created a Working Group on Water Quality/Effluents in 1991. The Working Group facilitated national coordination of cooperative research, education and public policy activities with producers and producer associations, state natural resource agencies, relevant federal agencies, academia, and other stakeholders. The Working Group helped assess existing information and identified information gaps to guide research projects in anticipation of a national discharge regulation or proactive voluntary options to strengthen environmental stewardship. The Working Group was discontinued in 1993. Coordinating leadership was then provided by five United States Department of Agriculture (USDA) Regional Aquaculture Centers. The Centers support aquaculture research, development, demonstration, and extension education. They directed federally funded research to characterize effluents, develop BMPs, and improve environmental management through better culture technologies and wastewater

treatment methods (CTSA 1991, 1992; WRAC 1998; Tucker 1998; NCRAC 1997, 2001, 2006; Yeo et al. 2004). The Centers also coordinated research through an interregional aquaculture waste management initiative. Further work improved the understanding of key environmental regulatory issues, analyzed current information, and recommended options for regulatory policy with reference to design and implementation of cost-effective BMPs (Rubino and Wilson 1993).

During this period, the National Research Council (NRC 1992) conducted an assessment of technology and opportunities for marine aquaculture in the United States. This assessment included recommendations to develop environmentally sensitive, sustainable systems; streamline permitting process for marine aquaculture; and address the lack of a formal regulatory framework to govern leasing and development of commercial aquaculture in federal waters. The importance of continued research and technology development to protect national aquatic resources was emphasized in a national aquaculture research and development strategic plan (JSA 1994).

From late in the 1970s until the late 1990s, the USEPA demonstrated little interest in directing limited resources to develop a national effluent limitation guideline for aquaculture because of its relatively small size and minor environmental impact compared with other point source industries. The full responsibility for issuing NPDES permits fell to the authorized states and regional EPA offices assigned to states lacking approved program authority.

Three events converged for USEPA to promulgate a national effluent limitation guideline for CAAP facilities. First, a federal court consent decree settlement obligated USEPA to develop new or revised standards for various industry categories within a specific time frame (*Natural Resources Defense Council, Inc. et al. v. Whitman*, D.D.C. 89-2980; 31 January 1992). Since 1974 USEPA had completed guidelines for more than 50 major manufacturing and chemical industry categories and was now considering smaller industries. Second, a national environmental advocacy organization recommended that USEPA implement the CWA for aquaculture facilities by developing effluent limitations (Goldburg and Triplett 1997; Goldberg et al. 2001). The third event was a public notice by USEPA, under the court consent decree settlement, that solicited comments and information for its next effluent guidelines biennial plan. For the first time, this plan included fish hatcheries and farms as one of several candidate industry categories under consideration for rule-making projects (Federal Register 1998a).

Based on public comments and limited information, USEPA decided more information was needed (Federal Register 1998b). Shortly thereafter USEPA announced a preliminary study of the aquaculture industry to evaluate current wastewater controls and the opportunity for improved environmental protection (USEPA 1999a). Before completing the preliminary study, USEPA and litigants amended the court settlement agreement to develop regulatory options for certain types of aquaculture facilities (*Natural Resources Defense Council, Inc. et al. v. Leavitt*, Civ. No. 89-2980; January 31, 1992, as modified). The USEPA launched an activity to develop pollution controls in the form of a national effluent limitation guideline for commercial and public aquaculture operations (USEPA 2000; Kreeger 2000).

The settlement resulted in a multiyear national dialogue and formal rule-making process to evaluate options for nationally applicable technology-based performance standards for the diversity of aquaculture facilities. The USEPA final rule, promulgated about 30 years

after first recommended in the late 1970s, established a national regulatory framework and baseline compliance criteria specifically for effluent discharges from CAAP facilities similar to other industry categories to meet CWA requirements.

## **Federal Environmental Regulatory Approach and Experience**

The USEPA made a decision to begin rule making before completing the preliminary study. The decision to undertake formal rule making for CAAP facilities ensured that funds were available to support data collection and to complete standard and customary engineering, economic, environmental, and other studies. The USEPA staff had no direct experience with aquaculture. Accordingly, as is customary practice for final rule development, USEPA contracted several private companies to support data-gathering and complete intensive analytical modeling.

Although USEPA could have used a traditional approach to rule development, the agency supported the assistance of the federal interagency Aquaculture Effluents Task Force (AETF). The AETF mobilized diverse expertise nationwide to assist, USEPA in developing the effluent regulation for aquaculture operations. The two groups shared a common goal to use science and innovation as central components of assessing environmental protection regulatory options. The challenge was to identify reasonable options applicable under federal rule-making procedures that recognized the continuous evolution of innovation, scientific knowledge, and discovery.

### ***Interagency Coordinating Task Force Model***

With the decision by USEPA to conduct a preliminary study covering all aquaculture facilities, the federal interagency Joint Subcommittee on Aquaculture (JSA), created the Aquaculture Effluents Study Task Force (AESTF) in 1999 to assist USEPA develop industry sector profiles (Jensen 2000, 2001). The USEPA senior management fully supported this innovative interagency collaboration as a means of gaining expertise about the aquaculture industry and status of pollution prevention practices. A technical consultative process was established among USEPA project managers and their contractors, AESTF leadership, and recruited individuals with specific technical knowledge. The AESTF responded to requests for information and technical reviews of draft USEPA documents. The first collaborative actions were preparation of frequently asked questions and answers to educate the interested public and creation of an open-access website to post USEPA information and new developments.

When USEPA decided on formal CAAP facility rule making in 2000, the AESTF was renamed the *Aquaculture Effluents Task Force (AETF)*. The potentially broad scope of this national regulation created a rare opportunity that rallied and unified diverse national, regional, and species-oriented producer associations and trade organizations. The AETF provided a coordinated national forum for dialogue among stakeholders and mobilized national expertise. It provided USEPA with scientific knowledge, fundamental environmental effects data, state regulations, technical assistance, and information about facility practices in compliance with existing state effluent regulations. The participation of key federal agencies with regulatory authority for approving drugs (United States Food and

Drug Administration) and aquatic animal health permits (Animal and Plant Health Inspection Service, National Marine Fisheries Service, and United States Fish and Wildlife Service) facilitated resolution of cross-jurisdictional issues and independent interagency legal consultations.

The AETF had as many as 11 technical subgroups composed of members with recognized scientific knowledge or extensive professional experience. Technical subgroups addressed distinct production systems and priority regulatory concerns, i.e., drugs and chemicals, economics, feeds, exotic species, and aquatic and human pathogens. The AETF voluntarily prepared scientific reviews or special studies on drugs and chemicals, human pathogens, and economic impact analyses (Engle et al. 2005). The USEPA and USDA also collaborated through an interagency agreement to cofund a comprehensive aquaculture BMP technical guidance document that is the foundation of this book.

The AETF sought collaboration to gather benchmark information and data on the current status of state regulatory permit and monitoring requirements for aquaculture facilities. This same collaboration verified reporting by some state regulatory authorities that aquaculture facilities were causing impairments to water quality or designated water uses. This follow-up analysis provided a national overview on the scope and relative severity of pollution associated with aquaculture from the perspective of state regulatory agencies. In numerous cases, state reporting included only speculations about pollution from aquaculture facilities.

The credibility of AETF was strengthened by the participation of several professional societies (Aquaculture Engineering Society, United States Aquaculture Society, Fish Culture and Fish Health Sections of American Fisheries Society) that supported the process of integrating scientific information and technical expertise into federal rule making. Significant involvement came in the form of a book published by the United States Aquaculture Society summarizing scientific literature related to aquaculture and the environment as a scientific contribution to the process (Tomasso 2002). The societies carefully avoided lobbying activities or interfering with USEPA's legal policy-making role. Establishing a clear distinction between contributing scientific knowledge and formulating policy created an acceptable detachment that was important to their participation.

The AETF leadership conducted a midpoint evaluation of progress toward fulfillment of its stated objectives and an assessment of overall performance and satisfaction. This internal evaluation, done among diverse stakeholders, identified several areas that needed improvement, including nongovernmental organization participation, outreach projects, communication among technical subgroups, cost of meeting locations, the need for teleconferences, turnaround time on technical reviews, farmer participation, and guidance to develop outputs. This self-evaluation exercise helped improve core AETF activities and assess overall effectiveness.

The incorporation of consensus science, accurate industry profiles, participatory stakeholder opportunities, and current state regulatory requirements helped mitigate USEPA and stakeholder polarization regarding regulatory options under consideration. The establishment of professional conduct and operating standards, technical competency, and transparency of work was essential to keep USEPA actively engaged with AETF. The USEPA solicited public input and received comments from many sources during the public rule-making process. However, AETF was engaged throughout the entire rule-making

process and played a significant role in contributing the collective expertise and knowledge from its technical subgroups and scientific reports. The USEPA acknowledged the AETF as an instrumental group that provided comments, expertise, and information (Federal Register 2004). The AETF continued communications among interested stakeholders to help develop the compliance guide for permit writers and facility operators on the CAAP facility effluent limitation guideline (USEPA 2006).

### *Highlights of the USEPA Rule-Making Process*

The first major milestone by USEPA was publication of the proposed CAAP rule for public review and comment in September 2002 (Federal Register 2002a). To develop the proposed rule, USEPA used information provided by the AETF and its own research. The USEPA conducted a two-phase effort to collect additional data from aquaculture producers. A screener questionnaire was used to collect general facility information from all known aquatic animal producers (Federal Register 2000, 2001; USEPA 2001a). The screener questionnaire data, AETF assistance, and the national census of aquaculture (USDA-NASS 2000) were the primary sources of information for the proposed CAAP rule. The USEPA prepared additional supporting documents and released data relating to guidance and economic and environmental impact analyses (USEPA 2002a, b, c). The proposed rule elicited 300 public comments, including form letters.

The next milestone was publication of the Notice of Data Availability (NODA) that summarized the data received and described how USEPA might use the data for the final rule (Federal Register 2003a). The NODA explained an intensive second phase of technical data collection through a detailed questionnaire completed by about 200 facilities (USEPA 2001b). The detailed data from select facilities allowed USEPA to revise methods to estimate costs and economic impacts. Better information helped establish baseline levels of control technologies and operational measures at aquaculture facilities. The USEPA narrowed the regulatory options being considered for the final rule. The NODA also included postproposal data, results from site visits and additional sampling data. After the NODA was published, only about 20 public comments were received, signifying broader support for the direction of rule options under consideration by USEPA. Initially, there was a wide range of treatment options under consideration by USEPA, from stringent end-of-pipe numeric limits for specific pollutants to continuation of the status quo for all aquaculture production systems and facility sizes.

In developing the final rule, USEPA conducted a variety of public outreach activities to solicit input and educate affected and interested stakeholders on the status of the rule-making process (Federal Register 2002b). These activities included site visits and sampling trips, AETF meetings, public meetings during public comment periods, participation in aquaculture conferences, meetings with other federal agencies, and posting materials on the USEPA and AETF websites.

The Small Business Regulatory Enforcement Fairness Act (Public Law 104-121) addresses the concerns and potential impacts of federal regulations on small businesses. Because the aquaculture industry is dominated by small businesses (defined as less than \$750,000 annual gross revenue; USDA-NASS 2006), USEPA convened a small business review panel. Key participants on the panel were aquaculture producers representing diverse systems and species and representatives from several federal agencies, including

USEPA. A report included comments and recommendations from aquaculture producers and the panel's findings and recommendations (USEPA 2002d). Recommendations from this process and analyses influenced the facility size threshold (45,454 kg or more, annual production) established in the final rule.

Federal agencies are stakeholders in federal rule making. The Office of Management and Budget (OMB) oversees an internal federal interagency regulatory review and planning process (Federal Register 1993). This interagency regulatory review step also engaged technical expertise and political management of different federal departments with an interest in the outcome of the final rule. Numerous agencies in the Departments of Agriculture, Commerce, and Interior were actively engaged in consultations with USEPA on technical issues and OMB on policy matters; the Office of Advocacy of the United States Small Business Administration also played a significant role in this process.

Finally, the CWA allows judicial review of the final rule by the United States Circuit Court of Appeals. In the case of the aquaculture final rule, no petition was filed requesting court-mediated dispute resolution. The absence of a court challenge by stakeholder organizations or individuals was a clear indicator of broad acceptance or indifference for the effluent limitation guideline and concomitant regulatory oversight by authorized state governments. In cases of disputes with environmental regulations, arbitration or litigation may be an option for resolution based on the applicability of laws to the facts of a specific case. This course of action can be costly for litigants in reaching a legal outcome from extended delays through the appeals process or out-of-court settlement agreements.

The final rule established a national effluent limitation guideline and new source performance standards for the CAAP point-source category in commercial (for profit) and noncommercial (public) facilities (Federal Register 2004) and marked the end of a nearly 4-year rule-making process.

### *The USEPA Aquaculture Regulation*

The aquaculture effluent limitation guideline was published with a complete description of the applicable legal authorities, environmental requirements, and rationale for the final rule (Federal Register 2004). The technology-based regulation applies to CAAP facilities with annual production of 45,454 kg (100,000 pounds) or more, with exemptions for inland pond systems, alligator farms, and open-water shellfish systems. The definition of a CAAP facility for coldwater structures with annual production of 9,090 kg (20,000 pounds) or more under NPDES permitting regulations was increased to 45,454 kg, based on economic achievability and affordability criteria for this new regulation (40 CFR §122.24 and Subpart D Appendix C). The USEPA estimated that compliance for this regulation will impact about 240 facilities nationwide. The majority of the estimated total annual compliance cost of \$1.4 million falls on public hatcheries. The number of facilities in scope of the regulation is low compared to the estimated total of 4,300 aquaculture farms in the United States (USDA-NASS 2006). There are currently a limited number of recirculation-system farms above the production threshold and affected net-pen operations. Most facilities directly impacted employ flow-through raceways for production of cold-water species (primarily salmonids).

The types of production systems or subcategories were narrowed to include a combined subcategory for flow-through and recirculation systems and a separate subcategory for

net pens and submerged cages. Effluents discharged and confined to private property are exempt. Discharges into sewers flowing into publicly owned treatment works (POTWs) are not covered because of the low mass loading of pollutants. The POTWs must develop local limits for users if the mass loading from a facility causes a violation in the NPDES permit. The effluent limitation guideline did not recognize fish, including nonnative species, as a pollutant for regulation under the CWA and NPDES permit system.

Many point source dischargers are required to comply with numeric effluent limits established for specific pollutants. However, USEPA recognizes that BMPs can be an important part of the NPDES permitting process to prevent releases of pollutants. Over the years, BMPs for many types of facilities (metal finishing; organic chemicals, plastics and synthetic fibers; textile manufacturing; pulp and paper manufacturing; pharmaceuticals manufacturing; and petroleum refining) have been developed. Case studies have demonstrated the success and flexibility of the BMP approach in controlling releases of pollutants to receiving waters. Pollution prevention practices have become part of the NPDES program, working in conjunction with BMPs, to reduce potential pollutant discharges. Pollution prevention methods reduce costs and pollution risks through source reduction and recycling/reuse techniques (USEPA 1993). The effluent limitation guideline for concentrated animal feeding operations also included guidance for conservation and pollution prevention practices (BMPs) that may improve production efficiency and protect the nation's waters (USEPA 2004).

The core requirement for flow-through and recirculation systems is development of a facility BMP Plan that specifies how the permittee will 1) employ efficient feed management and feeding strategies; 2) minimize discharges of accumulated solids during routine cleaning, inventorying, grading, or harvesting aquatic animals; 3) remove and dispose aquatic animal mortalities on a regular basis; 4) ensure proper storage of drugs, pesticides, and feed to prevent spills; 5) implement procedures for proper containment, cleaning, and disposal of spilled material; 6) maintain the containment structure with inspections to identify and promptly repair damage and conduct regular maintenance to ensure proper system operation and functioning; 7) maintain records to calculate feed conversion ratios and document frequency of cleaning, inspections, maintenance, and repairs; and 8) train all relevant personnel to ensure proper clean-up and disposal of spilled material, spill prevention and emergency response, operation and cleaning of production and wastewater treatment systems, and feeding procedures and equipment use.

For the net-pen or submerged cage system category, the same annual production threshold of 45,454 kilograms or more applies. The exception is native species released after a growing period of no longer than 4 months to enhance commercial or sport fisheries. Facilities in this subcategory must meet the same BMPs for mortality removal, materials storage, maintenance and inspection of the production system, record keeping, and training as the flow-through and recirculation system subcategory. However, feed management strategies must minimize the accumulation of uneaten food beneath pens through active feed monitoring and management practices or good husbandry practices approved by the permitting authority. Waste management and disposal specifically refer to feed bags, packaging material, waste rope, and netting. Special attention is directed to transport or harvest discharge of aquatic animal blood, viscera, and carcasses or transport water containing blood.

The aquaculture effluent guideline applies to CAAP facilities located in the territorial seas (Mean Low Water to 12 nautical miles) and the Exclusive Economic Zone (12 to 200 nautical miles). Net-pen (or cage) facilities operating in the Exclusive Economic Zone are considered to be point sources subject to new source performance standards and NPDES permit requirements. This scope of coverage is important because there are currently no model aquaculture facilities operating within this area. The federal government has proposed a regulatory framework for aquaculture facilities in these federal waters (Bush Administration 2004; NOAA 2006).

The renewed federal interest to develop national effluent limitation guidelines for aquaculture gained nationwide attention. It influenced numerous states to review their CAAP facility discharge regulations and induced several producer organizations to take proactive steps to develop reasonable state regulatory options. The approach preferred by numerous states and producer organizations was a BMP program that was system-, species-, or site-specific to mitigate potential environmental risks. Some states used BMPs as a regulatory model while others used end-of-pipe numeric limitations for some production systems, such as flow-through raceways.

Numeric discharge limits for a specific pollutant of concern and BMPs are two regulatory options that may be used to meet common CWA objectives. BMPs provide flexibility for producers to incorporate evolving science and innovation based on site-specific factors to achieve a desired environmental outcome. Numeric limits define a maximum concentration or discharge of a specific priority pollutant determined by periodic monitoring and testing of end-of-pipe discharges. The limits can be determined based on the performance of best available technologies.

#### *Federal Assistance for Conservation-Related Programs*

Federal agencies administer a variety of financial assistance programs that may assist landowners with voluntary conservation, meeting requirements of government regulatory programs and aiding government-industry partnerships to promote sound environmental management. In the case of USEPA, Section 319 of the CWA directs states to submit assessment reports that demonstrate intergovernmental coordination and public participation in implementing BMPs or other management options for pollution sources. States prepare management programs for controlling pollution from nonpoint and point sources into navigable waters within the state and improving the quality of such waters. To assist states in implementing these programs, USEPA administers a grant program to provide cost-share financial assistance. This can support demonstration of aquaculture BMPs or other eligible activities (training and publications, for example). Funds are available to state agencies, colleges and universities, and nonprofit organizations on programs to prevent, control, and/or abate nonpoint source water pollution. Florida has taken advantage of these funds to hold statewide producer education sessions and install educational signage that illustrates BMPs at some university aquaculture research facilities.

The USDA's Natural Resources Conservation Service (NRCS) administers the Environmental Quality Incentives Program (EQIP) as a voluntary conservation program for farmers and ranchers to promote agricultural production and environmental quality. The EQIP offers limited financial and technical assistance to eligible participants to install or implement structural and/or management practices on agricultural land. Fish or other