



**Testimony of John R. MacMillan, Ph.D., President,
National Aquaculture Association**

Concerning Open Ocean Aquaculture

**Presented to the Senate Committee on Science, Commerce and Transportation
National Ocean Policy Subcommittee
Senate Bill 1195**

June 8, 2006

Introduction

I am honored to testify today about the opportunities Senate Bill 1195 could create to improve availability of wholesome, competitively priced seafood for U.S. consumers while creating jobs for people living in coastal fishing communities. My name is John R. MacMillan. I am the President of the National Aquaculture Association, the NAA. The NAA is a U.S. trade association primarily representing producers of domestic fish and shellfish aquaculture. Our members produce a variety of food fish, recreational fishing stock and baitfish, aquarium ornamental fish and shellfish. The NAA mission is to foster development of environmentally sustainable aquaculture in the United States. To do this, we strive to partner with various Federal agencies to develop policies and regulations that are protective of the environment and public health, practical and cost-effective, and based on credible scientific information. The focus of my testimony is environmental issues. Several issues regarding offshore aquaculture were also presented in written comments previously submitted to the Subcommittee by the NAA. The NAA supports S.B. 1195 because it creates opportunity for further, environmentally sustainable US aquaculture development.

In addition to serving as President of the NAA, I am the Vice President of Research and Environmental Affairs for Clear Springs Foods in south-central Idaho. In this capacity, I serve as an officer of the company addressing various research, natural resource and quality assurance issues. I also serve as the chairman of the Idaho Board of Environmental Quality. Prior to my current position, I was an Associate Professor of Veterinary and Aquatic Animal Medicine at the Mississippi State University College of Veterinary Medicine. I have authored or co-authored over 75 scientific publications dealing with cellular senescence, aquatic animal diseases and their treatments, environmental stewardship and aquatic animal production practices. I have a Ph.D. in

111 W Washington Street Suite 1, Charles Town, WV 25414
T: 304.728.2167 F: 304.728.2196 E: naa@frontiernet.net
W: www.nationalaquaculture.org

Testimony of John R. MacMillan, Ph.D.
National Aquaculture Association

fishery biology and was a Senior Research Fellow in the School of Medicine at the University of Washington in Seattle. In 2005, I received the U.S. Food and Drug Administration (FDA) Commissioner's Special Citation and recently (2006) was selected by the United Nations FAO/WHO/OIE as a world expert on antibiotics and antimicrobial resistance issues to participate in an expert consultation.

My testimony will focus on the importance of ensuring that federal legislation strikes a reasonable environmental protection balance if the goal of Congress is to successfully create an open ocean aquaculture program. My conclusion will be to encourage Congress to support offshore aquaculture development in the Exclusive Economic Zone (EEZ) by ensuring S.B. 1195 is not overly burdensome or prescriptive.

I will make three primary points as follows:

1. For any aquaculture program to succeed, whether in the EEZ or anywhere else, it must be profitable for businesses.
2. Current U.S. environmental protection, fishery management and public safety programs provide the means to ensure domestic aquaculture practices are ecologically sustainable.
3. S.B. 1195 should resolve the fundamental legal issues of authority of the states in federal waters, and limits on the lease periods. Development of specific operating standards should be left to the transparency of rulemaking which should be based on objective scientific research findings.

Globalization, Domestic Aquaculture and Economics

Consumer demand for seafood in the United States continues to rise at an increasing rate. In 2005, U.S. per capita consumption of seafood had increased to 16.6 lbs, an increase of 11 % from 5 years ago. This increased consumption is due to widespread consumer recognition of the health benefits of seafood consumption and because seafood represents good value to US consumers. At this time, foreign imports overwhelmingly dominate the U.S. seafood market. In 2005, our seafood deficit reached \$8.3 billion.

Increasingly, this seafood is coming from aquaculture. The United Nations Food and Agriculture Organization (FAO) estimates that in 2002, 35.2 % of the world's 145.9 million metric tons of fisheries landings came from aquaculture. Imports of various farm raised fishes such as salmon, shrimp and tilapia have increased 20 to 200 % over the past five years. Worldwide, the aquaculture sector has grown an average of 9 % per year since 1970 compared with only a 1.2 % growth of capture fisheries and 2.8 % for terrestrial farmed meat production over the same period. Besides well documented health benefits of seafood consumption, including consumption of farm raised species, consumers purchase seafood because of taste and because of price competitiveness. The significant increase in consumption of imported seafood over time is attributed to their

competitive consumer prices. Imported products are often of lower cost because of significant production advantages due to reduced labor costs and reduced environmental stringency, and other reduced regulatory obligations compared to those in the U.S.

In the U.S., seafood aquaculture production of freshwater finfish is currently dominated by channel catfish, rainbow trout, salmon, hybrid striped bass and tilapia. However, cost competitive domestic production of these products is being severely challenged by international competition. In fact, there is already a significant reduction of production in some domestic freshwater species sectors because of the tremendous volume of imported seafood. Marine products captured in U.S. waters, even when combined with domestic farm raised freshwater species, cannot be expected to satisfy the U.S. seafood market demand. Marine aquaculture production could be an important component of domestic efforts to meet consumer demand, but only if the offshore legislation creates a commercially viable legal framework.

If the objective of Congress is to indeed create opportunity to produce food fish and other products in U.S. Federal waters, then your success should not be defined by passage of Senate Bill 1195. Success can only be measured by your success in attracting private investment in the creation of U.S. marine aquaculture facilities and the production of products for domestic and potentially for export markets.

The legal system created must provide a reasonable expectation of commercial viability. In part, such viability will be dependent on the legal standards and operating requirements ultimately established. Legislation that leads to uncertainty, excessive operating costs, litigation over broadly-defined legislative standards, short permit periods or potential revocation by states will not justify investment. Investment risks will have to fall within acceptable ranges if we are to produce marine aquaculture products in U.S. waters.¹

Environmental Sustainability

Protection of Water Quality

In one respect, the development of offshore aquaculture in the United States enjoys what could be a demonstrable benefit over several other potential international development locations. In the US, we have legally enforceable environmental standards that have been developed through transparent, rulemaking procedures under the Federal Clean Water Act. Existing standards offer a measure of predictability in designing offshore operations. To attract investors, we should emphasize this predictability as an advantage. Frankly, this may be the best we can make of this issue because other countries are reportedly attracting investors and facility operators with public financing, less stringent

¹ The NAA submitted written comments to the Subcommittee dated April 19, 2006. In part, we opined that a viable commercial program would require long term renewable leases (25+ years), must avoid unpredictable state veto authorities and extraterritorial application of the CZMA, and should modify the role of the regional fishery management councils.

Testimony of John R. MacMillan, Ph.D.
National Aquaculture Association

regulatory standards and expedited permit application review procedures. We also should guard against efforts to create redundant new requirements, or mandate revision of current standards; as such steps will undermine any existing advantages. Congress should simply confirm that aquaculture in Federal waters must comply with the requirements of the Federal Clean Water Act.

Maintaining good water quality is a first priority for all successful aquaculturists. Without good water quality, animal husbandry challenges are dramatically increased and these increase fish production costs. There is no reason to believe this will not be the case in offshore production facilities as well. Current information indicates that marine locations offer favorable characteristics because of their assimilative capacity (waters beneath prospective sites are up to 500 feet deep) and the retention of good water quality. But offshore aquaculture facilities are unlikely to be built simply to take advantage of these characteristics.

In aquaculture facilities, the effluent constituents represent lost investment dollars and product. This is in contrast to constituents of wastewater effluent discharges in other types of industries where the discharge represents non-usable production waste. The principle wastes of concern from aquaculture operations are excess feed and fish excretions. Excess feed is money wasted by producers; so great care is exercised to ensure over-feeding does not occur. Recent technological advancements provide encouragement that feed wastage can be readily prevented. Fish excretions are necessary elements of biomass production by fish. In the husbandry of many farmed fish species, feed to flesh conversions of nearly 1:1 have been achieved. It is reasonable to anticipate similar feed to fish flesh efficiencies in marine waters. Practices that limit waste discharge from freshwater and marine aquaculture facilities have been the subject of considerable scientific research. This research ultimately resulted in development of cost-effective and environmentally protective fish farming practices. The U.S. Environmental Protection Agency (US EPA) has a great deal of information regarding this topic. As you have heard in other testimony, feed management is a focus of marine aquaculture research, and includes development of technologies for video monitoring, and evaluation of environmental impacts of excess feed use.

We should avoid creating new, potentially conflicting legislative standards for issues already addressed through detailed rulemaking under well-developed programs, such as existing standards created under the Clean Water Act. In 2004, the U.S. EPA completed four years of investigations into the primary methods of aquaculture production (including coastal marine net pen operations), and developed discharge permit regulations. The U.S. EPA regulations created enforceable permit standards for aquaculture operations. Aquaculture facilities are required to meet these standards as elements of permits issued under the Clean Water Act. The U.S. EPA relied heavily upon scientifically credible information collected from throughout the World to craft these standards.

In addition, the Clean Water Act and its regulations include ocean discharge standards that supplement the recently-adopted aquaculture effluent regulations, and provide an adaptive process to ensure protection of ocean water quality. The ocean discharge criteria require an assessment of discharge impacts to biological community resources including human health risks. The U.S. EPA's review of a proposed ocean discharge project considers the effects on the receiving water ecosystems, and specifically ensures that there is no "unreasonable degradation" of the marine environment. The operating conditions necessary to meet this requirement are developed in the permit application process, where the project factors such as location, design, proposed stock species and receiving water characteristics are taken into account in order to establish appropriate safeguards. Existing Federal regulations require an evaluation of ten criteria to determine whether an unreasonable degradation of the marine environment will occur. Permits cannot be issued when there is insufficient information to determine that no unreasonable degradation will occur, unless the applicant can demonstrate that: a) the discharge will not result in irreparable harm; b) no reasonable alternatives to the discharge exist; and, c) the applicant complies with other permit conditions.

Legislation that creates new performance standards using non-scientific superlative language such as "maximum extent possible" will only lead to debate, not greater protection. Such mandates also create a greater risk that investors and producers will not undertake projects given this level of new uncertainty, and the costs of protracted debates through the rulemaking or judicial review processes that would have to interpret such legislation.

A valid regulatory permit program is already available to regulate offshore ocean discharges from aquaculture facilities. The proposed legislation need not duplicate this program, and efforts to do so will only create potential conflicts and unnecessary additional regulation.

Restrictions on Fish Feed

The potential for development of U.S. offshore aquaculture would be greatly hampered if American fish farmers must also shoulder the burden of international policy disputes. There is much discussion of the use of fish meal and fish oil in aquaculture circles. The debate centers on whether the harvest of pelagic fishes used to make fish meal and fish oil is ecologically sustainable. Fish meal and fish oil is the most expensive component of feed. Typically, feed is the single greatest operating cost for aquaculture facilities. Farmers go to great lengths to ensure that feed is not wasted.

Legislative mandates regarding the use of such feeds will not address the issue of whether fish meal resources are properly managed on a national or international basis. Domestically, regulations concerning the management of fish stocks used to produce fish meal and oil is where such protective efforts should be directed. Mandates to minimize U.S. farm use of these products are unlikely to have any measurable effects.

Testimony of John R. MacMillan, Ph.D.
National Aquaculture Association

Fish meal and fish oil are used in feeds for fish, cattle, swine and poultry. But the domestic aquaculture use of fish meal and fish oil is only a minor share of the global market. Other countries, notably China, are far greater users, and even now are contracting for future production volumes from the major global producers of fish meal and fish oil. Legislation dictating minimized use of these products will only penalize American farmers. Ironically, American farmers are more likely to efficiently use these products by application of technology. In addition, by burdening the fledgling U.S. offshore industry with feed restrictions, we inhibit the potential for developing alternative feed formulas that may be available with greater operating experience in U.S. waters.

Recent scientific reports present a compelling argument that pelagic fishes harvested for fish meal and fish oil production are ecologically and socioeconomically sustainable. Various national and international government agencies manage pelagic fish stock through total allowable catch limits. These international agencies include the Instituto del Mar del Peru (IMARPE), Institute of Fisheries Research (IFOP) in Chile, and the International Council for the Exploration of the Sea (ICES) in Europe. The fish meal industry itself supports government-led stock management and supports the FAO's Code of Conduct for Responsible Fisheries. Data from the FAO over the past 20 years indicate landings of industrial or feed fish have remained fairly stable at around 20 to 25 million tons per year since 1984. While total catch has remained stable, the portion of total fish meal used in aquaculture feeds has increased. Competition for fish meal and fish oil amongst various consumers has increased fish meal and fish oil costs, thereby making production of carnivorous fishes more expensive. Consequently, research priorities have shifted to discovering alternatives to fish meal and fish oil use while maintaining proper animal nutrition and ensuring the positive nutritional benefits of seafood consumption by people is maintained (e.g. omega 3 fatty acid composition).

I urge you not to submit to calls for "silver bullet" solutions regarding proper management of fish feed stocks. Comprehensive domestic and international fisheries management programs should address this issue. Management of this resource cannot be effectively conducted by simply restricting the potential use of fish feed at offshore U.S. production sites.

The Regulation of Antibiotics and Other Drugs

The pending legislation should not attempt to set new policy for drug and antibiotic use in marine aquaculture. A program of Federal regulation is already well established under authority of the U.S. Food and Drug Administration (FDA). Policy statements that mandate minimized use of such materials are not science-based, and provide no additional measure of protection to human health or the environment.

Opponents of aquaculture often allege rampant misuse of antibiotics by producers. Such opponents speculate that antibiotic misuse will be a standard practice if we create a domestic marine aquaculture system. Aquaculture opponents never discuss the various Federal programs designed to ensure that public health and environmental safety are

Testimony of John R. MacMillan, Ph.D.
National Aquaculture Association

maintained when the few available antibiotics are used. Critics also fail to recognize the scientifically rigorous FDA drug approval process for drugs and antibiotics used in agriculture, including aquaculture.

There are very few drugs approved for use in aquatic animal farming in the United States and the three approved antibiotics are only available for a few specific fish species. Ongoing efforts to develop vaccines will dramatically reduce the need for antibiotics. The use of hormones as growth promoters is of questionable merit and none are approved for such use in aquaculture in the U.S. New drugs are strictly regulated, and must pass rigorous evaluation for their potential environmental impacts under the FDA-Center for Veterinary Medicine Investigational New Animal Drug (INAD) approval process. Existing laws set public health and environmental standards for management of drug use and quality assurance requirements that would apply in marine aquaculture.

Conclusion

Efforts to develop an offshore aquaculture program are not occurring in a vacuum. Several well-established Federal regulatory program standards can be used to protect water quality, animal health and natural resources in this context. The offshore legislation should rely on such established standards, and the integration of the new offshore program details with such existing standards through the rulemaking process. This approach could provide a better coordinated and efficient program that is more likely to lead to actual investment and production in U.S. marine aquaculture.

Thank you again for the opportunity to present my testimony.
I would be pleased to answer any questions regarding these issues.