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

Concerning National Offshore Aquaculture Act of 2007
H.R. 2010

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Introduction

I am honored to testify today about the opportunities House Bill 2010 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. 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 environmental and public health, practical and cost-effective, and based on credible scientific information. The National Aquaculture Association (NAA) appreciates the continuing efforts of the Congress to enhance the nation's food security and food safety interests by your consideration of the National Offshore Aquaculture Act of 2007.

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 on 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 80 scientific publications dealing with cellular senescence, aquatic animal disease and their treatments, environmental stewardship and aquatic animal production practices. I have a Ph.D. in 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 Commissioner's Special Citation and recently participated as an expert in the United Nations FAO/WHO/OIE consultation on antibiotics and antimicrobial resistance issues.

Passage of the proposed legislation is critical to the development of marine aquaculture in U. S. federal waters. Our national experience with marine aquaculture in near shore waters has demonstrated that significant marine finfish aquaculture expansion must occur in the offshore aquaculture zone in order to minimize user conflicts and enhance environmental management capabilities.

Offshore aquaculture production capacity is developing rapidly around the globe but not in the United States. In some instances, the rapid expansion of marine aquaculture occurs with the advanced U.S. technologies that ensure production of high quality food and proper management of environmental impacts. As an importer of eighty percent of our seafood, the majority of that farmed seafood, the U.S. market drives foreign expansion that is supported with U.S. technology.

Our heavy reliance on foreign sources also means that trade disputes, foreign food shortages, political turmoil and food safety could jeopardize continuing future supplies. Recent concern about the safety of Chinese seafood exports highlights the issue before us. The preferred alternative to such reliance in terms of better oversight of food quality, environmental quality, food security and impacts to our balance of trade deficit is to foster development of a domestic marine aquaculture industry. This alternative would also allow our domestic industry to capture the benefit of the millions of federal tax dollars spent to support research and development of advanced aquaculture technologies in fish propagation and production system designs.

The proposed legislation allows for the rational development of aquaculture in federal waters, assurance of proper application of existing environmental standards and authority to develop other requirements without unnecessary duplication of existing laws. Notwithstanding protests of potential adverse environmental impacts from fish farms, the reality is that good water quality is the goal of every aquaculturist regardless of the water's salinity. Good water quality is important to fish farmers because this equates to good aquatic animal or plant survival, good growth, wholesomeness and superior quality products for the consumer, as well as economic returns to the operator. In this respect, the US aquaculture industry is an important ally of the environmental community's efforts to ensure environmental stewardship from all user groups. The proposed National Offshore Aquaculture Act will ensure that proper environmental monitoring and oversight of the marine farms occurs, and that the advantageous environmental characteristics that attract businesses to prospective sites in the first place are maintained.

Relative to the area encompassed by the U.S. exclusive economic zone, the likely footprint of federal waters used by aquaculture will be virtually microscopic, while the benefit to the nation could be substantial. All users of the federal marine waters have an equal right to access such waters in compliance with federal law. Cooperation rather than preclusion should be the benchmark for developing a system for siting aquaculture facilities, and while efforts to pre-designate potential sites are welcomed, there should also be flexibility to allow facility proponents to propose sites based on their own evaluations.

The NAA would be pleased to provide additional comments as the National Offshore Aquaculture Act is given further consideration and revisions may arise. In the meantime, we offer the following focused comments.

- **Environmental stewardship and aquaculture**

  US aquaculture is distinctly different from aquaculture occurring in other parts of the world. The US has a well defined Clean Water Act (CWA) permitting system (NPDES) that requires permittees comply with state and federal discharge standards. The new Clean Water Act rules for aquaculture were established through a transparent public review process and are based on credible scientific information. Once standards are established, permittees must not violate those requirements which are enforced through various federal (EPA) and/or state authorities. The CWA and its regulations also include ocean discharge standards that could be used to supplement the recently adopted aquaculture effluent regulations and provide an adaptive process to ensure protection of ocean water quality. The ocean discharge standards require an assessment of discharge impacts to biological community resources. The US EPA's review of a proposed ocean discharge project considers the effects on the receiving water ecosystem, 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 unreasonable alternative to the discharge exist; and, c) the applicant complies with other permit conditions. Opponents of aquaculture often associate poor environmental stewardship requirements occurring in other countries with what happens or could happen in US waters. In fact, the United States has one of the strongest environmental regulatory programs in the world. Domestic aquaculture must comply with stringent state and federal discharge requirements. Opponent's erroneous statements create unjustified uncertainty and distracts from other important issues.

  In many respects, aquaculturists are advocates for good environmental quality because it is to their economic advantage. Maintaining good water quality and ensuring sustainability is a first priority for all successful aquaculturists. Without good water quality, animal husbandry challenges are dramatically increased and these increase fish productions costs. There is no reason to believe this will not be the case in off-shore 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 retention of good water quality.

It is a mistake to equate past aquaculture practices with current practice. As the science of marine aquaculture has evolved so to have siting and management practices. Off-shore aquaculture will be far more expensive than near-shore or land based aquaculture due to transportation and facility costs. Financial risk is much greater in off-shore aquaculture relative to land-based aquaculture. Yet the risk has been lessened by significant and evolving improvements in facility design, materials, siting and management practices. The National Offshore Aquaculture Act requires the Secretary to develop additional environmental requirements if necessary to address any unique environmental risks and impacts associated with offshore aquaculture. The NAA supports this requirement with its associated transparent rule making process.

- **Aquatic animal escapes**

The loss of animals from any aquaculture operation whether off-shore or on-shore is a concern economically for the owner and potentially of concern ecologically. Economic concern arises because of lost product for market. Depending upon how close to harvest the loss occurs, financial loses can be significant. Potential ecologic damage arises because non-indigenous species have potential to displace native species or otherwise change an ecosystem. Development of predictive science to enable wise decisions in this regard is ongoing. Because of escapement concerns producers in near shore operations have successfully sought ways to minimize potential for escape. In addition to changes in cage material to better withstand efforts of piscivors (e.g. sharks, seals and otters), producers utilize predator exclusion devices and double cage the rearing environment. Improved facility siting has also further minimized escapes caused by marine mammal destruction of cages and has concomitantly significantly reduced environmental impacts.

- **Aquatic animal disease**

Claims of more disease in wild species as a consequence of near-shore aquaculture operations is disputed by various federal and fish health management experts. It is a well established principle that fish disease occurs as a consequence of interaction between host, environment and pathogen. Due to careful management by fish farmers, and federal and state regulatory authorities, introduction of new pathogens by aquaculturists is very rare and unintentional. In open water aquaculture, as envisioned in an off-shore aquaculture operation, pathogens are more likely to occur as a consequence of wild fish carrying pathogens and exposing farmed fish. Pathogen amplification on a fish farm can theoretically occur but its impact on wild fish has never been scientifically demonstrated. Much of the rhetoric concerning near shore aquaculture operations and fish disease has focused on sea lice and salmon. NOAA fisheries experts report (NOAA Technical Memorandum NMFS-NWFSC-71) that “contrary to some circumstantial reports, there is no basis for expecting an increase in wild

fish infections in the immediate vicinity of any source of lice larvae, including those hatched from lice at fish farms." Existing federal and state regulatory programs already ensure introduction of exotic fish pathogens is unlikely. A recent publication (R. Raynard, T. Wahli, I. Vetsos and S. Mortensen (eds). 2007. Review of disease interactions and pathogen exchange between farmed and wild finfish and shellfish in Europe. VESO, POBox 8109 Dep., N 0032 Oslo, Norway) provided a review of available information on transmission of fish and shellfish pathogens between wild and farmed population and vice versa. Available evidence indicates that with rare exception transmission of pathogens occurs from wild species to farmed species. The exception occurs if inadequate care is taken to prevent pathogen introduction from animal transfers.

- **Fish meal**

The use of fish meal and fish oil is not inherently detrimental to marine ecosystems and ecologic sustainability as long as the fisheries supplying the fish meal and oil are managed. The species most used for reduction fish meal and oils are the small shoaling pelagic fish (anchovy and menhaden) harvested from surface waters feeding at the lowest trophic level above or near to nutrient-rich oceanic up-welling (NOAA Technical Memorandum NMFS-NWFSC-71). These populations are very volatile and are dependent on ocean productivity which depends on seasonal movement of some deep ocean current. While the fish meal and oils are well-suited for human consumption, they are used globally by animal and poultry industries, including for aquaculture. Because of the economic and social importance of the pelagic industrial fisheries, their population dynamics are routinely monitored and assessed by fisheries managers and scientists worldwide. Fisheries managers predict each year the strength of the target population and manage to ensure sustainability of the population.

While the pelagic fisheries are regarded as sustainable, the resource is nevertheless limited. Global capture has remained stable over the past 20 years but demand for fishmeal and oil has increased. Increasing demand has caused substantial price increase which has encouraged a search for alternative protein and oil sources. Alternative protein sources have always been used in aquafeeds to complement fish meal protein and lower feed cost. Fish processing wastes (trimmings) are increasingly used in fish meal as are direct protein substitutions (e.g. terrestrial animal, poultry, trimmings). Most importantly there is research to substitute grains and oilseed meals for fish meal as sources of protein and energy (NOAA Technical Memorandum NMFS-NWFSC-71). The challenge is to find suitable fish meal substitutes for carnivorous animals such that their physiologic homeostasis is maintained, and cost-effective feeds that maximize growth rate and reduce or eliminate feed wastage occurs.

- **Food safety, chemicals and antibiotics**

The most recent germane scientific analysis regarding farmed fish safety was conducted by scientists and physicians at the Harvard School of Public Health, Harvard University. These researchers (Teutsch SM and Cohen JT. Health trade-offs from polices to alter fish consumption. Am J Prev Med 2005; 29: 324; Cohen JT, Belinger DC, Connor WE., et al. A quantitative risk-benefit analysis of changes in population fish consumption. Am J Prev Med 2005; 29: 325-334; Konig A, Bouzan C, Cohen JT et al. A quantitative analysis of fish consumption and coronary heart disease mortality. Am J Prev Med 2005; 29: 335-346; Bouzan C, Cohen JT, Connor WE, et al. A quantitative analysis of fish consumption and stroke risk. Am J Prev Med 2005; 29: 347-352; Cohne JT, Bellinger DC, Shaywitz BA. A quantitative analysis of prenatal methyl mercury exposure and cognitive development. Am J Prev Med 2005; 29: 353-365; and Cohen JT, Bellinger DC, Connor WE, Shaywitz BA. A quantitative analysis of prenatal intake of n-3 polyunsaturated fatty acids and cognitive development. Am J Prev Med 2005; 29: 366-374) developed a clear, scientifically sound argument that consumption of wild and farm raised fish, including salmon, is essential for good health. In fact Willet (Willet WC. 2005. Fish: Balancing Health Risk and Benefits. Am. J. Preventive Medicine 29 (4): 320-321), in introducing the studies, suggests a Science article (Hites RA., Foran J.A., Carpenter D.O., Hamilton MC, Knuth BA, and Schwager SJ. 2004. Global assessment of organic contaminants in farmed salmon. Science 303: 226-229) was "particularly troublesome, perhaps even irresponsible, because the implied health consequences (sic. of farmed salmon consumption) were based on hypothetical calculations and very small lifetime risks." Willet also states the Hites et al. publication "likely caused substantial numbers of premature deaths" because of the reduction in fish consumption that occurred as a consequence. The conclusion, of course, is that wild and farmed raised seafood consumption are important components of a healthy diet and lifestyle, for all ages.

Controversy regarding the public health and environmental significance of drug and pesticide use in domestic aquaculture arises primarily because of misunderstanding of federal approval and enforcement programs. The use of drugs, including antibiotics (antimicrobials), and pesticides (chemicals) in the US aquaculture industry is strictly regulated by the US FDA and EPA. Drug approvals are species and use specific. Pesticides, while more generally applied, must undergo a scientifically, legally and administratively rigorous registration process overseen by the EPA. Drugs and medicated feeds used in US aquaculture must be scientifically demonstrated to be safe and effective for their intended uses and that food from treated animals is safe for human consumption. The FDA approval process includes, among other things, various laboratory and field studies to demonstrate drug effectiveness, target animal safety, good manufacturing procedures, adequate methods to detect drug residues, drug metabolism and depletion, and specific labeling requirements. Mandatory drug withdrawal times before animal harvest may be required if potential drug residues

pose a health hazard. The effectiveness of US regulatory programs is evident by the absence of any detectable residues in domestically raised fishes sold for human consumption. While these approval programs are present in the US and European Union (M.J. Costello, A. Grant, I.M. Davies, S. Cecchini, S. Papoutsoglou, D. Quigley and M. Saroglia. 2001. The control of chemicals used in aquaculture in Europe. Journal of Ichthyology 17: 173-180), they are absent or meager in many other countries. Reports of contaminated seafood entering the US market from other countries is damaging to domestic producers because it fuels consumer concern about all seafood and confusion amongst the public.

Concerns about antimicrobial resistance prompted the US FDA to establish specific guidance relative to how antimicrobial drugs should be evaluated (Guidance for Industry 152- Evaluation the Safety of Antimicrobial New Animal Drugs with Regard to their Microbiological Effects on Bacteria of Human Health Concern). Additionally FDA requires an environmental assessment of new drugs to help ensure compliance with Section 318, 402, and 405 of the Clean Water Act (40 CFR § 122.44). An environmental assessment involves determination of environmental fate of the drug and its toxicity to various aquatic animals and plants. It is because of the federal government's rigorous drug approval requirements for aquaculture use drugs and a strong enforcement program that we should have confidence the public health and environment will be protected.

- **Research and Development**

The proposed support for research and development efforts is a valuable element of continuing programs to maintain the U.S. lead in technology. While no funding levels are set, this is a key requirement that could fund developments which will allow industry to move deliberately into the offshore areas.

- **Suggested legislation change**

The proposed legislation should be amended to allow use of a vessel (ship) as an offshore production platform. As NOAA representatives have pointed out in public presentations, there are several offshore facility designs being developed around the world that adapt a ship for use as a production facility. The U.S. would be best served by legislation that did not preclude useful concepts, and did not limit or prescribe approvable facility designs as only fixed structures or the seabed. The current definition of approvable facilities does not include a boat or other description of a vessel (See, Section 3(g)). Use of an actual production vessel (or ship) offers several advantages with respect to effluent handling technologies, stock control and minimization of escapements, and the ability to move as needed to avoid unexpected adverse events such as adverse weather, nearby oil spills or other water quality impacts. The draft legislation should be amended to include ships or vessels in the definition of an offshore aquaculture facility.

The draft legislation continues to discuss the need to evaluate economic impacts arising from approval of aquaculture facilities. If such provisions are retained, then they should be clearly specified as requiring an evaluation limited to consideration of direct impacts arising from siting of the proposed facility (e.g. potential shipping lane conflicts, loss of substrate resources). Potential market impacts related to competition with capture fisheries should not be an evaluation requirement for siting aquaculture facilities. Such analyses would be wholly speculative, and in their most likely application will simply be used by those who generally oppose aquaculture production policies as political leverage. It would be extremely difficult to interest private industry and capital markets to pursue U.S. offshore aquaculture farms if they must face the burdens of the U.S. regulatory program, the daily challenges of offshore production, and also must be accountable to ensure that their production creates no free market competition for other suppliers to U.S. seafood consumers.

Large-scale marine aquaculture of the type likely to be considered for development in the U.S. Exclusive Economic Zone is being undertaken in many other countries as we speak. In fact, we must recognize that this type of operation will be a much larger scale with more capital intensive investment than most other forms of aquaculture in the US. As such, many of those who would consider undertaking these projects will readily evaluate foreign development locations as alternative to development in the United States. To the extent that we create obstacles to development in this country, marine aquaculture projects will be or have located in Australia, Bahamas, Belize, Canada, Chile, China, Dominican Republic, Mexico, Norway, New Zealand, Scotland, Spain, Vietnam and other countries. The transportation requirements do not present a significant barrier to U.S. markets from these locations, particularly when we consider the disparity in labor costs and regulatory costs.

Thank you for the opportunity to provide these comments.