NOAA'S AQUACULTURE POLICY

Approved February 1998

I. Introduction

Worldwide fisheries production will be inadequate to meet the needs of the world's population, without supplementation through aquaculture. Constituent and Congressional support for aquaculture dictates that the National Oceanic and Atmospheric Administration (NOAA) bring together its diverse programs to develop a comprehensive aquaculture policy and strategy to provide a context for agency activities for the next ten to twenty years. The impetus for the development of aquaculture extends beyond food production. NOAA involvement in aquaculture can help to foster sustainable economic development and environmentally friendly technologies, create new employment opportunities, reduce the trade deficit in fish products, reduce fishing pressure on living marine resources, and rebuild depleted stocks.

The 1980 Memorandum of Understanding (MOU) between the Departments of Agriculture (USDA), Commerce (DOC) and Interior (DOI), defined aquaculture as "the propagation and rearing of aquatic species in controlled or selected environments". Pursuant to this MOU, DOC, through NOAA's National Marine Fisheries Service (NMFS), and the National Sea Grant College Program, carried out aquaculture research and development on marine, estuarine, and anadromous species. Work on anadromous species has been coordinated with DOI and USDA (Forest Service). The National Sea Grant College Program has conducted research, education, training and advisory services in aquaculture; its advisory services programs have been carried out in collaboration with USDA's Extension Service. Subsequent to the establishment of this MOU, the Fisheries Finance Program, administered by NMFS, and the Coastal Zone Management Act (CZMA), administered by NOAA's National Ocean Service (NOS), were amended to include comprehensive planning, conservation and management of aquaculture facilities within the coastal zone.

Furthermore, the National Aquaculture Development Act of 1980, amended in 1985, established a coordinating group, the Joint Subcommittee on Aquaculture (JSA), chaired by USDA. The JSA has been responsible for developing the National Aquaculture Development Plan, which identifies the relative roles of USDA, DOI and DOC, and establishes a strategy for the development of an aquaculture industry in the United States.

NOAA, the Federal Oceans agency, has a strong statutory basis for the promotion and regulation of marine aquaculture. A listing of the legislative authorities is attached (Attachment 1). NOAA, having the greatest responsibility for the sustainable use and conservation of marine resources and the environment, is best suited to oversee aquaculture activities that affect marine ecosystems and occur in public waters. NOAA has a variety of established responsibilities for marine, estuarine, and anadromous species aquaculture; including research, development, and outreach, for stock enhancement and private sector development, as well as the adoption of appropriate environmental safeguards and technology.

If the current estimates for world per capita consumption of seafood are accurate, the projected demand for seafood will not be met without growth and technological advancement in aquaculture

to supplement the harvest of wild stocks. Aquaculture is one method to meet the projected demand, and should be conducted in concert with a variety of fisheries management techniques, including better product utilization, improved processing technology, improved habitat conditions to support natural fisheries, and consumption of species currently not utilized.

The development of a robust aquaculture industry has the most potential to fill the seafood needs of the domestic market by reducing imports of fishery products and benefitting the nation's balance of trade. Aquaculture for the purposes of marine stock enhancement also has associated economic benefits, such as increased employment associated with the enhancement effort, and the continued health of the commercial fishing and recreational fisheries industries. In addition, aquaculture technologies and consulting services for private industry and enhancement efforts, as well as superior, disease-free strains of broodstock are valuable exports that contribute to the U.S. economy.

II. Current Status of Aquaculture in NOAA

NOAA's primary focus for aquaculture has historically been through NMFS programs, and the National Sea Grant College Program in the Office of Oceanic and Atmospheric Research (OAR). Many aquaculture-based enterprises have benefitted from NOAA research and extension activities. In 1996, Congress, in amending the CZMA, administered by NOS, encouraged States to work with NOAA in aquaculture, siting, management and planning activities. The types of activities undertaken to support aquaculture in each of the three line organizations are described below.

NMFS

NMFS plays a significant role in promoting aquaculture that is environmentally sound, through scientific research and technology development, financial assistance and its regulatory programs. NMFS has carried out aquaculture programs since its inception as the United States Commission of Fish and Fisheries, 125 years ago; since then NMFS/NOAA has been involved in aquaculture research and development for finfish and shellfish in commercial applications and for enhancement. Intensive U.S. marine aquaculture research and development on salmon in the late 1960's provided the basis for the development of industries in the United States, Norway, the United Kingdom and Chile. NMFS basic research on finfish and shellfish biology and reproduction, habitat utilization and restoration, environmental impact assessment, and fish pathology supports private and government aquaculture and marine enhancement activities. Much of the information developed by NMFS has been used both in the commercial sector where it has been instrumental in the development of the farmed salmon industry, as well as shellfish hatcheries and shrimp culture operations throughout the world. NMFS has also played an integral role in the rearing of threatened and protected species for stock recovery.

NMFS presently spends approximately $10 million per year for the operation of 25 major salmon hatcheries in the Columbia River Basin through the 1938 Mitchell Act which was established to mitigate loss of salmon runs because of construction of hydroelectric projects. The Mitchell Act hatchery program is the largest Federally-funded marine fisheries enhancement program in the United States.

NMFS-administered state/Federal and industry grant programs have addressed aquaculture development in response to industry needs and state management priorities. In the last five years, the Saltonstall-Kennedy Grant Program has provided funding for commercial aquaculture projects of between $500,000 and $1.7 million dollars annually. In Alaska, since ratification of the U.S./Canada Pacific Salmon Treaty in 1985, NMFS has provided over $20.0 million for salmon enhancement projects. In FY1994 and FY1995, the Northeast Fishing Industry Grants program supplied $1.2 million and $2.19 million respectively for aquaculture -related projects. These projects were aimed at creating commercial development opportunities for displaced New England fishermen. Additionally, the NMFS Fisheries Finance Assistance Program has been specifically authorized to guarantee aquaculture loans, facilitating financing for qualified applicants.

On the regulatory front, the Fisheries Management Councils are becoming involved in the decision-making process for offshore permitting for aquaculture. Because permit-granting may involve the granting of exclusive use in a designated area to an aquaculture business, the traditional users of the resource must be incorporated into the regulatory process. This process has involved the granting of a lease to an experimental scallop culture project off the coast of Massachusetts, through an amendment to the New England Scallop Fishery Management Plan, and the consideration of an experimental permit for the culture of red snapper in the Gulf of Mexico. NMFS, through the Magnuson-Stevens Fishery Conservation and Management Act of 1996, has regulatory responsibilities that will affect aquaculture development in the EEZ.

OAR

Aquaculture has been a major component of the National Sea Grant College Program's research and outreach activities since the program's establishment in 1968. Sea Grant, administered through OAR, has supported technology development for the existing U.S. industry in many areas including offshore and recirculating marine systems, hormonal control of growth and reproduction, growout technology, feeds and nutrition, disease control, regulation, marketing, food processing, and environmental technologies to meet water quality standards.

Aquaculture related projects account for approximately $10 million direct and matching Sea Grant funds on an annual basis. This figure does not include approximately $1.5 million annually in outreach-related activities provided through the Sea Grant Extension Service, or nationwide programs such as the Oyster Disease Research Program. Sea Grant supports aquaculture activities in research, education, and technology transfer. Sea Grant research on systems development, genetics, physiology and endocrinology, nutrition, disease, policy, and economics has contributed to the creation of several new industries including the Gulf of Mexico and South Atlantic soft shell crab industry, the Pacific Northwest oyster and clam industry, the hybrid striped bass industry, and the Mid-Atlantic hard clam industry. Sea Grant research and outreach has helped to establish scores of new businesses throughout the U.S., and to provide improved technologies to these businesses. The combined impact of Sea Grant-developed technology amounts to at least $100 million annually and supports thousands of jobs in the U.S. economy.

Sea Grant has also collaborated extensively in the international arena, creating opportunities for aquaculture technology exchange between the U.S. and Japan, China, Israel, France, Russia and

Ireland. NOAA, through Sea Grant, and Japan have been working together for more than 20 years to enhance the development of freshwater and marine aquaculture through the Aquaculture Panel of the U.S. Japan Cooperative Program in Natural Resources. Technology exchange between the U.S. and China on scallop culture has been conducted by Sea Grant through a bilateral agreement. The U.S. Israel Science and Technology Foundation has provided funds for aquaculture research with Sea Grant members. Sea Grant's efforts have been important in promoting NOAA as an important global resource in the development of aquaculture.

The Sea Grant program is also a participant in the Sustainable Development Extension Network, which is a collaboration among Federal education and extension services and their public/private partners. DOC has pledged to assist communities in developing eco-industrial parks, stabilize and redevelop brownfield industrial sites, integrate environmental technical assistance into the manufacturing extension network, expand and improve access to environmental information, support research, and restore the Nation's fisheries. The network provides NOAA with an opportunity to facilitate Federal coordination in aquaculture extension.

NOS

Congress, in passing the CZMA of 1972, encouraged states and territories to exercise their responsibilities of wise use of the land and water resources of the coastal zone through the development and implementation of management programs. The national coastal zone management program balances competing demands on the coast and coastal waters. The CZMA created a partnership between the Office of Ocean and Coastal Resource Management (OCRM), state and territorial governments and Federal agencies. Under the CZMA, Federal actions that are reasonably likely to affect any coastal use or resource (including direct Federal agency activities, non-Federal activities requiring a Federal license or permit, and Federal funding to state or local governments) must be conducted in a manner that is consistent with the enforceable policies of state coastal management programs.

Aquaculture is an aspect of coastal management which has received increased attention in the past decade with the passage of amendments to the CZMA in 1990 and 1996. The 1990 amendments encouraged states and territories to support comprehensive planning, conservation and management for living marine resources including aquaculture facilities. The 1996 amendments provided new authorization for states to use CZMA funds for: (1) the adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone; (2) to enable States to formulate, administer, and implement strategic plans for marine aquaculture; and (3) to develop a coordinated process among State agencies to regulate and issue permits for aquaculture facilities in the coastal zone.

Past and on-going projects have ranged from: development of aquaculture net-pen guidelines (Mississippi); impact of aquaculture on the eutrophication of coastal bays (Maine); revision of aquaculture lease rules (Maine); development of a marine aquaculture management plan and geographic information system (Rhode Island); and development and implementation of a marine aquaculture regulatory and leasing program (Virginia).

Additionally, OCRM's system of 14 marine protected areas, the National Marine Sanctuary Program, manages and protects significant natural and historic treasures. The National Estuarine Research Reserve System, currently totaling 21 sites, protects coastal resources and provides a network of laboratories for investigating estuarine processes and offers educational opportunities for coastal managers and the public. Although aquaculture has not been a major focus of the sanctuary and reserve programs, both have ample opportunities to address aquaculture issues.

III. NOAA Policy

For the purposes of this document aquaculture is defined as the propagation and rearing of aquatic organisms in controlled or selected aquatic environments for any commercial, recreational, or public purpose. Potential purposes of aquaculture include bait production, wild stock enhancement, fish culture for zoos and aquaria, rebuilding of populations of threatened and endangered species, and food production for human consumption.

A successful NOAA program to meet public needs for aquaculture development and environmental protection will focus on: 1) Research, Development, and Technology Transfer; 2) Financial Assistance to Businesses; 3) Environmental Safeguards including Regulatory and Permit Procedures; and, 4) Coordination. NMFS, OAR and NOS will incorporate these priorities into their aquaculture-related activities.

Research, Development, and Technology Transfer

Basic research and development through NMFS, NOS, and Sea Grant programs provide the scientific basis for further enhancement and commercial activities with species not currently being cultured as well as support for existing industries. NOAA considers the following topics to be important to the development of U.S. aquaculture:

Environmental impacts and standards - Research on ways to minimize any adverse impacts of aquaculture on the environment and wild stocks. Using scientific information develop criteria for marine aquaculture operations including determination of permissible discharges, optimal treatment of effluents, requirements for siting new operations, assessment of ecological impacts, both deleterious and beneficial, and necessary information for establishing siting protocols and standards to facilitate the permitting process. Deliver this information to Federal, state and local agencies for state planning, regulatory and permitting processes.

Systems development - Development of cost-effective, environmentally sound aquaculture and hatchery technology for transfer to the private commercial sector and to governmental agencies operating stock enhancement and habitat restoration programs. Focus on two areas for research and development identified as having high potential for involvement by NOAA: open ocean aquaculture and closed system (or "urban") aquaculture. Conduct research on recirculating technologies for inland facilities, and on environmentally sound systems for offshore development.

Growth and production of marine species - Maintenance of marine aquaculture species in captivity throughout their life cycle; control and synchronization of reproductive and growth cycles;

improvement of technology for production and handling of larvae and all life stages in hatcheries; definition and improvement of nutritional requirements and nutritional value of live feeds; and definition of ecological and pheromonal factors affecting production and develop techniques for spawning and early-stage rearing.

Biotechnology - Development of DNA technology for manipulation, introduction, and expressing genes in aquaculture human food species and species with potential for use either in production of chemical products or in industrial processing to provide strains that grow faster, have higher feed efficiency, produce higher proportions of muscle or desirable compounds, synthesize metabolites at greater rates, or catabolize waste materials or toxic effluents more efficiently; production technology to produce sterile animals for commercial culture to reduce the possibility of genetic contamination from accidental escapements: development of gene probes, compound probes and molecular assays for assessment of endocrine activities and detection and measurement of pathogenic viruses and bacteria; development of vaccines and other measures for controlling disease and parasites.

Technology transfer - Technology transfer to the U.S. aquaculture industry and to Federal, state and local agencies relating to production system management, culture techniques, nutrition, disease diagnosis and control, business management, marketing and environmental technologies to meet water quality standards, will continue to be an important part of NOAA's aquaculture program. Using education and training develop logical and economically viable alternatives for displaced fishermen. Improve extension, outreach and education efforts to support aquaculture planning, regulatory and permitting efforts and to support existing industry and to train fishermen, students and other new industry entrants in aquaculture techniques.

Coastal Management - Coordination with management agencies to identify areas in Federal, state and local waters that are appropriate for aquaculture facilities. Develop more efficient Federal and state regulatory and permitting procedures and innovative management tools for resolving user conflicts. Plan for disaster mitigation and prevention related to aquaculture.

Financial Assistance to Businesses

The aquaculture industry has been slow to develop in the United States in part due to the difficulty in accessing capital for investment purposes. A statutory change to the Fisheries Finance Assistance Program (formerly known as the Fisheries Obligation Guarantee Program in 1992 provided authority to include aquaculture facilities. The Fisheries Finance Assistance Program, closed $6 million in aquaculture guarantees in FY '94 and estimates that the majority of its $25 million FY '95 loan authority will be expended on aquaculture projects. In addition the Capital Construction Fund (CCF) could be authorized to also include aquaculture projects. The Capital Construction Fund currently allows commercial fishermen to save pre-tax fishing income dollars (much like an individual's retirement IRA account) to acquire, construct, or reconstruct fishing vessels. The CCF at present allows withdrawals only for investment in fishing vessels. Taxes on deferred income are recouped by the Federal government as the vessel is used, since no depreciation deduction is allowed for CCF capital invested. Adding aquaculture to the CCF program would provide an alternative use for some of the $240 million in existing CCF accounts.

Environmental Safeguards

Permit Procedures: A primary objective of a Federal aquaculture policy is to develop, in coordination with responsible agencies, more efficient Federal and state permit processes to promote industry development. This will involve establishment of national criteria for environmentally safe aquaculture operations. Federal and state agencies will be encouraged to use the national criteria to make consistent and reasonable Federal and state aquaculture regulations and permitting decisions. One Federal agency should be responsible for coordinating the administrative process for Federal aquaculture permitting decisions: the receipt of permit applications, consultation with all permitting agencies, and the issuance of Federal permits. This will reduce the time required for permit approval or denial, reduce the cost to industry, foster better cooperation between Federal and state agencies, and assure that sound science is used as the basis for decisions. To further facilitate the permit approval process within the Exclusive Economic Zone and promote responsible development of the industry, NOAA will identify areas that reduce conflicts with vessel transit lanes, traditional fishing grounds, and protected species habitat, as well as minimize the potential for negative impacts on the environment. Permit requests for aquaculture activities in these areas would receive rapid responses because the areas would have already been designated as approved for aquaculture. NOAA will work closely with coastal states to ensure that the identification of such areas and permit approvals are consistent with applicable provisions of Federally approved state coastal management programs.

Environmental Research and Planning: Growth of aquaculture has brought attention to its potential environmental effects. Most questions focus on the potential adverse impacts of disease, loss of genetic diversity, introduction of non-indigenous species and potential habitat degradation. Federal and State governments must conduct strategic planning to cope with the expected economic development from aquaculture and to ensure that environmental quality is not compromised. These issues apply to most forms of aquaculture. If the U.S. aquaculture industry is to expand, a healthy aquatic environment must be sustained for all users, including the aquaculture industry. Given the high cost of applied research, every effort will be made to use commercial platforms to obtain environmental data, conduct basic biological research, and determine the environmental effects of aquaculture, particularly in the Exclusive Economic Zone. Other issues that merit consideration are the possible accumulation of marine toxins in cultured organisms; the effects of pollution on aquaculture operations; the effects of major discharges from aquaculture operations on fisheries and other biotic resources; the effects of nutrient enrichment, physical alteration (through dredging, filling or construction), and alteration of freshwater flows, to habitat upon which living resources depend.

Finally, it is important that the feedback derived from research is taken into account in the Federal and State regulatory and planning processes. The best scientific information available will be considered in guiding these processes, and where there is insufficient science a precautionary approach will be taken to adequately safeguard the environment and wild stocks. NOAA will accomplish this mainly through NMFS and the Coastal Zone Management Program administered by NOS' OCRM. NMFS has the ability to set environmental standards for regulation on the Federal level. OCRM can encourage and work with state coastal management programs to do the same on the State level.

Coordination

The responsibility and capability to assist in building an economically and environmentally sustainable aquaculture industry in the U.S. rests with various Federal agencies. By providing a coordinated effort between regulatory agencies, agencies offering economic incentives, the financial sector, and the potential user, NOAA can promote the use of environmentally sound aquaculture technologies and practices, while creating job opportunities in localized areas. NOAA will pursue opportunities to accomplish its policies through joint activities and programs with Federal, State and local agencies, as well as industry, academia and foreign institutions.

Conclusion

A strong NOAA role in aquaculture will create jobs, revitalize communities suffering from the collapse of traditional fisheries stocks, utilize advanced technologies to resolve natural resource conflicts, reduce the fisheries trade deficit, and increase domestic production of finfish and shellfish and recreational opportunities, and ensure that aquaculture is done in an environmentally sound manner. Marine aquaculture can augment restoration efforts of depleted marine stocks and can provide safe, high-quality seafood for consumers.

AUTHORIZING LEGISLATION - Attachment I

Agriculture and Food Act of 1980
Anadromous Fish Conservation Act
Clean Water Act
Coastal Zone Management Act, 1990 and 1996 Amendments
Columbia River Basin Fishery Development Program
Commercial Fisheries Research and Development Act
Endangered Species Act
Fish and Wildlife Act of 1956
Fish and Wildlife Coordination Act
Interjurisdictional Fisheries Act
Magnuson-Stevens Fishery Conservation and Management Act
Marine Mammal Protection Act
Marine Protection, Research and Sanctuaries Act
National Sea Grant College Program Act
National Aquaculture Improvement Act of 1985
National Environmental Policies Act
National Aquaculture Act of 1980
Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
Rivers and Harbors Act of 1899
Saltonstall-Kennedy Act
Title XI, Merchant Marine Act of 1936 as amended.
Water Resources Development Act