PERCEPTION AND RECOGNIZED CHANGES AFFECTING AQUACULTURE DEVELOPMENT

Background of Information used in Preparation of
Statement by
Kenneth K. Chew
at
Aquaculture Panel of Public Hearing of U.S. Commission on Ocean Policy
June 13-14, 2002 in Seattle, Washington

INTRODUCTION

I appreciate the opportunity to express some of my views and perceptions of aquaculture, scanning over forty years of teaching and researching in this area. Although my travels have taken me to see many operations and facilities throughout coastal North America and other continents, it amazes me to see the similarities in thoughts, concerns, constraints, and most of all, in how social/political factors and environmental concerns can prove offsetting to aquaculture endeavors in any given region or territory. Because many of my years of experiences have been in the Pacific Northwest, the majority of my comments will be skewed to reflect my thoughts about this area.

It is no secret that the changing scene on traditional marine capture fisheries and the onset of aquaculture is fueled in part by the demands in the market place for more seafood. During the early part of the past half-century there appeared to be an established and growing commercial fisheries for most of the traditional fishing stocks. They were considered well managed by federal/state fisheries managers. In those early years, efforts were continually made to produce better and more efficient fishing gear. Now, many depressed stocks for harvest are causing shutdowns and/or limited harvest quotas that in turn result in economic depression to the local economy in many townships that depend heavily on these industries. Blame for this downturn has been spread to over fishing, mismanagement, pollution, habitat degradation, disease, foreign fishing fleets, etc. The subject is complex and the synergistic effects of many points of view have led to frustration in coming up with a solution.

With livelihoods at stake, efforts have been made to re-educate or train these displaced fishermen to new occupations, such as farming the sea through state and federal developmental programs; some meeting with success and others developing a wait and see attitude as it is too early to tell if it is going to help. I should mention a most successful program of retraining fishermen to go into hard clam culture at Cedar Keys in Florida. Since net fishing was banned due to depressed stocks of fish, many of the fishermen took on training through area redevelopment funded programs and are now successfully growing the commercial hard clam in their new profession.

Aside from the above concern of which most are aware, where does aquaculture fit into all of this? Although aquaculture is considered a new endeavor for the U.S. when compared to agriculture, it has been conducted in the freshwater arena for centuries mainly as a simple cottage activity in the farmlands. Tagged on to this in the early 20th century are the trout hatcheries that have been managed by states and the U.S. Dept. of Interior in efforts to supplement the recreational fisheries. Later came salmon and other species of fish propagated in North America. The historic oyster fishery on the Pacific coast and especially for the State of Washington extends to one and a half centuries of cultivation. The Atlantic coast oyster fishery goes back even further to several centuries.

In my years, there have been numerous revelations seen and heard of involving the growth, or in some cases setbacks to aquaculture that perhaps we could have had some control over, if proper policy coordination in support of aquaculture from the federal and state sectors were in place. The following are listings and discussions of a few items to offer some personal perspective to assist the Commission on Ocean Policy in its efforts to establish guidelines and policies regarding the use of the oceans, and to become better stewards of the oceans for future generations as the prospects of farming the seas loom larger each year. No doubt some of these issues you will have heard from others. There will be some minimal overlap in the discussions below; it is done to get a point across.

PERSPECTIVES AND IMPRESSION

1. Permit Requirements

There was no consistency in support for the growth of this new industry and whoever wanted to propose an aquatic culture venture had to fight through a maze of permit requirements which could extend beyond a year or more, and might even involve litigation along the way. This depended on the size of the operation proposed, but efforts should be made to bring together all federal, state, county and local governments in different strategic regions to perhaps, streamline a coherent step-by-step permit request process to assist people who want to start or expand an operation.

2. Mistakes Made

Some early ventures in commercial aquaculture development were ill conceived and poorly planned in the 1960's and 1970's. Many marine shrimp farms went that way. Mistakes were made in establishing culture operations with major losses of investments. This affected loaning institutions that shied away from making such loans for many years. Fortunately, this has changed in more recent years as planning for most aquaculture ventures is now more carefully organized with better understanding of markets and management needs, detailed review of permit needs and adequate siting. Complimenting this was the emergence of insurance for cultured aquatic crops and facilities—although expensive.

3. Government Support

I can remember in the early 1970's when the National Sea Grant was put into place that many of my projects were funded from this new program in our state's

Washington Sea Grant program at the University of Washington. Working closely with scientists from the National Marine Fisheries Service (NMFS) and state agencies, much was accomplished in promoting shellfish aquaculture in Washington. Most interesting was that I saw that the Department of Commerce, which tied into NMFS and Sea Grant, was a natural for moving marine aquaculture forward at the time, with even the first National Aquaculture Plan drafted through NOAA. However, by the later part of the 1970's, I inquired to the NMFS administration and asked if they were going to take an active role in this relatively new area of fisheries involving aquatic husbandry. They did not want active involvement as emphasis for them were the management of the wild natural harvestable stocks and ancillary issues related to marketing, national and global trade, and understanding the health and well being of the stocks for sustainable harvest. This has fortunately changed with a supportive 1999 Aquaculture Policy for the Department of Commerce (D.C.) signed by its Secretary. This included efforts to promote offshore aquaculture especially in the Exclusive Economic Zone (EEZ), and to conduct enhancement research with marine fish species to rebuild depressed stocks.

With renewed interest by the D.C. in marine aquaculture, limited funding was provided though NMFS to initiate studies and workshops and formally develop the by-laws and organizational structure for incorporation of the Pacific Aquaculture Caucus (P.A.C.), with principle leadership in the governing body by industry representatives. The P.A.C. has recently supported two workshops: "Shellfish Regulations in Alaska" at S.E. Alaska and "Aquaculture Regulations and Research Goals" at Sequim, Washington.

The U.S. Dept. of Agriculture (U.S.D.A.) was brought into the picture in the early 1980's with the passing of the National Aquaculture Act of 1980 (Public Law 96-362, 16 U.S.C. 2801, et seq.). This Act has been re-authorized several times, most recently on May 13, 2002. This 1980 Act was as amended (16 U.S.C. 2809) and re-authorized through 2007. The key provisions of the Act that were re-authorized included: 1) The establishment of a National Aquaculture Policy "to encourage development of U.S. aquaculture;" 2) Authorization for the development, implementation, and revision of the National Aquaculture Development Plan (NADP); 3) Establishment with the Office of Science and Technology Policy, of the Joint Subcommittee on Aquaculture (JSA) as the primary coordinating body for all Federal activities in aquaculture; 4) Establishing USDA as the lead agency for coordinating Federal aquaculture activities by naming the Secretary of Agriculture as the permanent Chairman of the JSA.

The JSA is a body mandated to offer all federal agencies with direct or ancillary indirect interest to meet regularly for open discussions and exchange of ideas on proposals, and communicate new initiatives being developed at the federal level for aquaculture. Candidly, open dialogue and discussions were perceived as limiting by those outside the membership of the JSA for several years. An air of turf protectionism (which is human nature), is showing through. Attempts have been made to break these barriers, and improvements have been observed. An example is its efforts to get the Federal National Aquaculture Plan completed this year, depicting a

listing of most constraints and what the U.S. federal government will do to promote aquaculture into the future.

Picking up on legislation to assist the development of aquaculture in the U.S., Congress passed the Food Security Act of 1985 (Subtitle L. Sec. 1475 (d) to establish Regional Aquaculture Centers under U.S.D.A. with funding authorized for $7.5 million annually. Although attempts have been made to increase the funding for all centers to the $7.5 million authorized, available funding has been level for the past eight years at $4 million. At the national level, direct responsibility for administration of the Aquaculture Regional Funds has been delegated to the Cooperative State Research, Education, and Extension Service (CSREES) by the Secretary of the U.S.D.A., who is ultimately responsible for administration of the five Regional Aquaculture Centers authorized by Congress. All of the centers' goals are to "Support cooperative regional research, extension and demonstration projects to stimulate and facilitate interstate and inter-institutional research of a national or regional character, and to plan and coordinate research to achieve replication while avoiding duplication of effort." As director of the Western Regional Aquaculture Center (WRAC) since its inception in 1987, I have seen much research conducted and many workshops held for the benefit of the aquaculture industry from all regions of the U.S. Attempts continue to be made to get the full $7.5 million authorized for the centers to cover research needs of the aquaculture industries throughout all regions.

4. Education and Outreach

As a teacher, one looks to provide factual information to share in the classroom. With newfound interest in aquaculture, the literature is being flooded as new journals, books, magazines, newsletters, etc. become available for us to summarize for students. But to the public at large, little is known about the importance of aquaculture worldwide and its impact on the U.S. economy. When information is presented in the newspapers or weekly magazines the public generally reads, quite often it paints a cautionary picture on what potentially could happen if aquaculture was to grow unchecked, raising more questions than helpful answers.

There is a great need to provide unbiased information about aquaculture to the public at large and in particular to the environmental community, regulatory agencies and policy makers. Aquaculture has the potential to increase employment opportunities, diversify local economies, and to increase the availability of fresh fish and shellfish. Perhaps even more importantly, aquaculture can help to take some of the pressure off wild stocks of fish by supplying a large proportion of society's seafood needs. Aquaculture should not be viewed as a competitor with capture fisheries for consumer dollars. The two should be viewed together as necessary tools for supplying aquatic protein to our burgeoning human population. Without aquaculture, we either stop eating seafood or we completely deplete the ocean's resources. Also, the contribution of imported aquaculture products to the U.S. trade deficit needs to be repeatedly emphasized, along with the role of aquaculture in total global seafood production as being most important when the wild harvest of traditional commercial fish stocks

show critical declining levels. Latest estimates are that by the year 2025, 50% of all world seafood produced will be from aquaculture.

The environmental community has generally held the upper hand communicating its theme of thought and relaying the potential negative effects caused by aquaculture. Not to say this is wrong, but we do need a watchdog sometimes to check where things are going. How, for example, do we provide a balance to check against bias and to insure that the information is scientifically correct and not assumed or is hear-say before it is released? Maybe this is difficult to do, so it is most important to pursue regular news releases to the public about the benefits of aquaculture, striving to work with all groups to insure the integrity of the environment with minimal impact if any, and not as a health hazard as some claim.

5. Effluent Standards and Regulations to Environmental Code of Practice

Aquaculture has received increased questioning from special interest groups and is subject to an increasingly complex and unpredictable regulatory environment that threatens its long-term economic survival. Regulations on effluents from aquaculture facilities are critical issues, which are hopefully being addressed by a special Aquaculture Effluents Study Task Force formed by the JSA in September 1999. This Task Force was developed to assist the Environmental Protection Agency (EPA) in developing regulations on aquaculture effluents. The task force was renamed the Aquaculture Effluents Task Force subsequent to EPA's decision, announced January 21, 2000, to promulgate national effluent standards for aquaculture operations.

This Task Force has surely been needed to get clear identification of effluent standards and will be in part, most useful in regional development of an Environmental Policy leading to a general statement and adoption of an Environmental Code of Practices (ECP). This is just one facet of the ECP to consider, but an important one. Another facet is new rulings. A case in point was the reauthorization of the 1996 Magnuson-Stevens Act which deals with the management of near- and off shore fisheries that support efforts to save essential fish habitats for several different types of indigenous fish, especially salmon. Eel grass habitat is thought to be very important to many species of aquatic life, including salmon, as protective habitat during their outward juvenile migration. Therefore, the ruling was created to move oyster cultivation off the bottom of intertidal beds in Humboldt Bay, California. Historically, the oysters were planted on the intertidal zone and in some cases in and around eel grass beds. With this re-authorized Act in place, wholesale change to long line off-bottom bed culture for oysters was no other option for the company in question. The oyster farmers will have to change their practices and still must prove to the state and local regulators that there is no harm done to the eel grass beds when using the off-bottom technique. The approach ignores the demonstrated habitat value of living oyster beds in the Pacific Northwest. It is interesting that, while oyster beds are considered inimical to the health of West Coast estuaries, governments on the East Coast of our country are trying desperately to re-establish living oyster beds in an effort to save their estuaries.

Last year, the Pacific Coast Shellfish Growers Association set a good example by putting together, with the assistance of the Pacific Shellfish Institute, an ECP for growing shellfish on the Pacific coast. This was added to an adopted Environmental Policy and together, they form the Environmental Management System (EMS). Input was provided from all regulatory agencies, including environmental and tribal groups. This should be similarly done in other marine aquaculture industries.

6. Competition for Aquatic Resources in Public Waters

Competition for space in marine and freshwater habitats creates conflict between aquaculture and shoreline property owners, traditional fishermen, and aquatic farmers. Government needs to be more proactive in partitioning these resources and defining a place for aquaculture. There is far too much conflict between different elements in regulatory agencies regarding appropriate use of the nearshore environments. In other words, I sense that leadership in federal and state regulatory agencies is lacking the will to address this issue head-on. There is a distinct need to implement a clear government program that will offer marine aquaculture opportunities. These comments apply to both marine and freshwater.

7. Enhancement as a Tool for Replenishing Depleted Wild Stocks.

There is a failure with some people in the scientific field to recognize the potential for aquaculture as a tool for replenishing depleted wild stocks of fish. In addition to producing enormous amounts of food per unit area, aquaculture is a tool that could be used to enhance depleted resources. There appears to be a significant contingent of scientists, environmentalists and regulators who look for flaws in past hatchery practices and ignore this potential. Given proper research funding, those faults can easily be corrected. Aquaculture holds the promise of helping to restore the numerous species of fish and shellfish whose populations have been depleted by poor recreational and commercial management along the way. A policy to support enhancement activities for marine species should be encouraged. Some of this work is taking place at the NMFS/Manchester facilities in Puget Sound, but more emphasis for this type of research needs to be pointed out and supported.

A good example of enhancement is saving a population of sockeye salmon which travels a long distance up the Columbia River with several major dams in the way to the Snake River and into Red Lake in Idaho state to spawn. Only a handful of sockeye salmon (3 males and 1 female) returned in 1991. The eggs of the one female were taken by federal and Idaho biologists and divided for hatching and growing at several hatcheries to insure safe-keeping of progeny of the last female trapped. NMFS in Seattle was part of this enhancement effort and the eventual productions of smolt fingerlings were returned to the Red Lake/Snake River system for release as a means to save this wild strain of fish. Thus, the enhancement efforts were accomplished and field monitoring of returning adult fish showed promise.

8. A Level Playing Field and "*Shared Onus*"

There is need for a return to a level playing field in deciding the appropriateness of marine aquaculture (mariculture) in surface waters of the United States coastal areas.

Aquaculture proponents are frequently confronted with a policy of ***Reverse Onus*** in which they are expected to prove that the perceptions held by opponents are incorrect. Long, detailed, and expensive studies are required to address unsupported assertions and as soon as one study is complete, another assertion is made. This process should be stopped by requiring that both private and governmental opponents to projects support their assertions of unacceptable consequences with reasonable, empirically based science. In other words the onus must be shared.

9. Placing Environmental Costs Associated with Aquaculture into Proper Perspective

Aquaculture can produce more food per unit area at a lower environmental cost than nearly any other form of food production. There are environmental costs associated with aquaculture, just as there are environmental costs associated with a walk on the beach. It is a disservice to future generations to focus only on the potential environmental costs associated with this activity, while ignoring the cost of commercial fishing and/or upland agriculture.

CONCLUDING COMMENTS

I have attempted to reflect back on my forty years of teaching and research in aquaculture and have highlighted a few specific issues to share. These are my own impressions as each is outlined and discussed above. To briefly summarize, issues I brought up were as follows:

1. Permit requirements

   Although improvements by some states in the permitting process for aquaculture facilities and operations have been made, more needs to be done to streamline the system on the federal level in concert with state and local agencies.

2. Mistakes made

   Many of the early aquaculture ventures in the 1960s and 1970s were total failures with major losses in investments. This affected getting loans for aquaculture ventures for many years. Fortunately, this has changed in recent years. Now, loans and aquaculture insurance can be acquired.

3. Government Support

   Since the beginning of the late 1970s and early 1980s, the federal government began to take more notice of activities surrounding aquatic farming leading to activities legislated by Congress for U.S.D.A. in 1980 to take leadership in U.S. aquaculture, and establishing the Joint Subcommittee on Aquaculture. In addition, the U.S.D.A. was authorized to develop the five Regional Aquaculture Centers, which were established in 1987/89. The Department of Commerce came into the picture to support marine Aquaculture with the adoption of a Department Aquaculture Policy signed by the Secretary in l999. A need for more funding in R&D through the federal government was noted.

4. Education and Outreach
There is a need to provide unbiased and factual information about aquaculture to the public at large through the news media, popularized articles, displays and workshops. Little has been done to show the positive contributions of global and regional aquaculture. Further, aquaculture should not be viewed as a competitor with capture fisheries for consumer dollars. The two should be viewed as necessary tools for supplying aquatic protein to our increasing human population.

5. Effluent Standards and Regulations to Environmental Code of Practice
Effluent standards for aquaculture waste are being developed by an Aquaculture Effluent Task Force under the Joint Subcommittee on Aquaculture (JSA). An example was given as to how regulations can alter the farming practice on oysters to accommodate the protection of eel grass as salmon essential habitat. All such information is needed if a coherent approach to Environmental Policies is expected.

6. Competition for Aquatic Resources
Competition for space in marine and freshwater habitats creates conflict between aquaculture and shoreline property owners, fishermen, and aquatic farmers. The government needs to be more proactive in partitioning these resources and defining a place for aquaculture.

7. Enhancement as a Tool for Replenishing Depleted Wild Stocks
Aquaculture holds the promise of helping restore the many species of fish and shellfish whose populations have depleted. A policy to support enhancement activities for marine species should be encouraged.

8. A Level Playing Field and "Shared Onus"
There is need to return to a level playing field in deciding the appropriateness of marine aquaculture in surface waters of the U.S. The onus is on the person proposing an operation to prove a claim of impact does not exist, followed by another claim that needs to be addressed. This is not uncommon and has to stop at some reasonable point.

9. Placing Environmental Costs Associated with Aquaculture into Proper Perspective
There are environmental costs associated with aquaculture, just as there are environmental costs associated with driving a car or taking a walk on the beach. What are the results of thoughts and concerns when considering seafood production versus commercial fishing versus upland agriculture in terms of environmental impact to each of the ecosystems?

Although perception and recognized changes, as they relate to helping to build on the presence of sea farming or aquaculture in the marine environment, have been provided in my comments above, there are several other thoughts which come to mind for re-emphasis and/or not covered earlier for the Commission members to consider. These are specifically listed as follows:

a. Establishing a process to look at environmental impacts that can be addressed in the short term and projected into the long term. In other words, to monitor and manage nutrients, such as N, P, and solids, in terms of what is present now and what can be expected in long term impacts associated with large scale development.

b. What are the realistic, existing pressures on coastal and offshore ecosystems? Could these be gauged in relation to aquaculture going into these systems?

c. What can we expect in terms of lack of interagency cooperation and collaboration in the promotion of marine aquaculture? Some say this is an impediment and some say it is not. My feelings are this is not as critical now as several years ago, especially seeing more open exchange in the JSA and other convened meetings. It might be good to take a closer look at this.

d. There has been talk about establishing a marine aquaculture advisory committee to assist in the development of aquaculture in the marine area. Development of this committee will help in the movement of marine aquaculture into the future. How we structure this committee will be critical, taking into consideration the stakeholders (as federal, state, local, tribal, and industry entities).

e. Investment in R&D through some means is essential. A proposal was made to perhaps invest 1% of the seafood trade deficit per year in aquaculture R&D. This makes sense if it can be done.