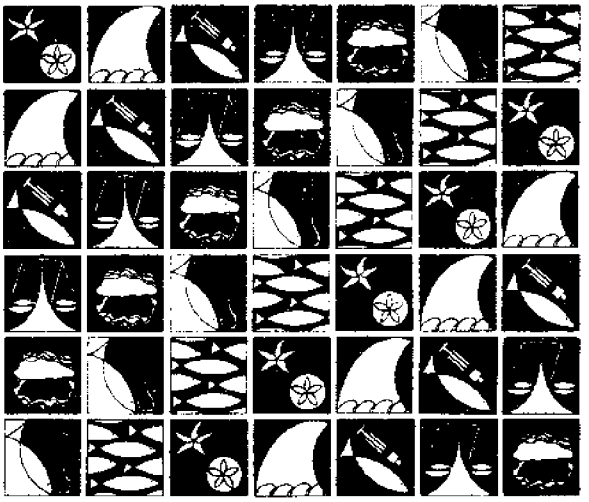
northwest mariculture laws

papers and presentations from a symposium held at THE LAW CENTER UNIVERSITY of OREGON EUGENE June 7, 1974



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OREGON STATE UNIVERSITY
SEA GRANT COLLEGE PROGRAM

Publication no. ORESU-W-74-005

AUGUST 1975 PRICE $2.00

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acknowledgment

The Oregon State University Sea Grant College Program is supported cooperatively by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, by the State of Oregon, and by participating local governments and private industry.

related publications

THE FUTURE MANAGEMENT OF THE OREGON COAST: PROCEEDINGS OF A SYMPOSIUM HELD AT THE LAW CENTER, UNIVERSITY OF OREGON, OCTOBER 27, 1972. Publication no. W-74-001. 167 pp. Price: $3.00.

Explores issues facing the Oregon Coastal Conservation and Development Commission. Sessions covered legal background for coastal zone management, zoning laws and the coastal zone, and the importance of planning for the Oregon coast. Panels discussed environmental considerations of estuary management, balancing the coastal zone interests, what level of government is appropriate for the coastal zone, and the future needs of the Oregon coastal economy.

OYSTER FARMING: CULTURING, HARVESTING, AND PROCESSING A PRODUCT OF THE PACIFIC COAST AREA. Publication no. SG 13. 8 pp.

A brief layman's introduction to oyster farming techniques, terminology and industry problems. Explains how oysters are raised, processed and marketed.

OYSTER HATCHERY MANUAL and CHUM SALMON HATCHERY MANUAL. Two new publications to be available Fall 1975. Write for information and prices.

The oyster hatchery manual will explain the tools and techniques tested and adopted at the Oregon State University Pilot Oyster Hatchery. It will be a "how-to" manual covering all phases of raising oyster seed--from selecting and conditioning adult spawners, to feeding and raising larvae, to culturing algae for oyster food, to preparing tanks for setting.

The chum salmon hatchery manual will describe the construction and operation of the OSU Netarts Pilot Chum Salmon Hatchery. Special attention is given to low-cost, low-maintenance designs for the wier, incubator and water system. The rationale for extensive mariculture (ocean ranching) is discussed.

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contents

introduction

Mariculture, or saltwater "fish farming," has been a part of the Northwest fisheries scene for many years. Recent state legislation has made new Pacific species available to this growing field of commercial enterprise, one that may someday provide us with most of our seafood. This Symposium attempted to examine some of the legal implications of the mariculture trend and focused discussion on the laws, new and old, that affect establishment and operation of mariculture businesses.

We were fortunate in obtaining the participation of many, perhaps most, of the Northwest's principal mariculture pioneers. This was especially true for the brand new business of raising salmon for profit. A number of the legal problems facing a beginning salmon farmer were identified and discussed. Even with the new legislation paving the way, it was discovered that the new sea farmer must pass through a veritable obstacle course of agencies and regulations before he can actually begin his business.

We also heard about some of the legal aspects of running an established business. This time, the contributors included not only the salmon pioneers but also the traditional mariculturalists in our region, the oyster growers.

Along the way, of course, those in attendance picked up a good amount of biology and engineering, as background to the legal considerations.

The Seminar was attended by approximately eighty participants and registrants. As already indicated, the group represented a mixture of disciplines--biology, law, economics, engineering, business, government, to name a few. Together, these people contributed their knowledge and skill to identify, if not to solve, the array of legal and regulatory problems confronting those who are engaged in or considering the exciting enterprise of saltwater farming. We hope that each came away from the Seminar with a greater understanding of these problems. We also hope that we, the Ocean Resources Law Program, will be able in the future to contribute to the solutions.

The following are the main papers and presentations made at the Symposium. Due to difficulties with the taping equipment we were unable to reproduce the panel discussions held at the Symposium. The participants are all listed at the end of this proceedings.

Ocean Resources Law Program
July 1975

on becoming a mariculturist

by JOHN R. DONALDSON

When I was recently re-reading the Proceedings of the Third Sea Grant Conference I went first to a presentation titled "The Economic Challenge" by F. Ward Paine, President of Oceanographic Fund, Inc. of Palo Alto, California. I clearly remembered that Ward Paine had indeed delivered a challenging address. I would like to read a paragraph from his paper as it stated the problems of farming the sea which were present then, and based on my recent experiences, are even more so now.

> What happened to the farming-the-sea concepts, aquiculture using near-shore water bottoms or estuaries? Any promising entrepreneur who hopes to use near shore areas for aquiculture nine chances out of ten will run into a fantastic spectra of problems. His major problems will not be technical ones. Unexpectedly, the aquiculture entrepreneur's major problems have turned out to be what is euphemistically called institutional problems. If the aquiculturist can solve his technical problems, which is no mean task, but is being done today, he finds himself in death grips with the Corps of Engineers, the applicable state lands commission, county government, the municipal government, a town government, the port authority, the water quality people, the FDA, and very likely every one of the conservationist groups.

WHERE TO BEGIN?

To start a fish farm for some is a dream, for others a whim, and for a few sober folks it is a serious challenge. Only the latter will ever come close to making a go at fish farming. But no matter what the motivation, each must settle a few basic questions before beginning. These questions are where to locate, what to begin to rear and how much to grow. These are not mutually exclusive situations, but in the first analysis they can be considered separately. You certainly would not pick Florida to produce a million pounds of pan-sized Pacific salmon for market.

No matter where you are or what you want

to do, the basic ingredients are a piece of land with water flowing over or near it, an indigenous stock of animals or plants, and you are ready to start serious planning. It is not possible here and now to cover all the combinations or potential fish farm situations, and furthermore, if I tried it would only dilute the important issues in developing aquaculture that I hope to convey. I am therefore going to be autobiographical and use our firm, Oregon Aqua-Foods, Inc., in Newport, Oregon, as a case history.

It started way back in my younger years with a need to produce something tangible for a living. For twenty years it lay while I experienced life in agencies and institutions to the point where the only door that really had a bright light on the other side was going out and actually doing it. Enough thinking and talking had gone on.

January 28, 1972, was the actual beginning date for Oregon Aqua-Foods, which is important only as a starting reference for the time required to bring it into being. My wife and I drove to the coast and began looking for estuarine land. We had already designed on paper what I refer to as a completely integrated fish farm. The system would produce fish, molluscs and crustaceans in fresh and saltwater with complete control of broodstock, food supply, production, processing and marketing. I am convinced this independence in all facets is absolutely necessary in order to assure the quantity and quality of your product. Diversification of your products increases efficiency and spreads the risks.

Since it is not feasible to proceed into production on all the possible species simultaneously, it was necessary to choose which one or several would give us the earliest and best cash returns. Thus began the first of many proforma statements. These become your paper fish farm. Great care must be taken in your feasibility studies. Total honesty is the only way to proceed. In the selection of costs always use the highest ones and then when they are summed add at least 20%. When you select market prices, always pick the lowest one. If you do this and the projections are favorable, you have avoided kidding yourself and you even may come out a big winner.

Our early efforts in feasibility analyses told us that salmonids reared in saltwater to pan-size gave by far the best return on dollars invested. Oysters would bring a profit, but not as great as salmon and trout. Crustaceans were not ready for substantial capital investment in production. This order of profitability should be obvious to you as being directly related to technological advances. Considerable agency and institutional money, mostly tax based, has been spent on salmonid research and thus there is a wealth of technology available. Marketability differences also enter into the cost figures. So the site we selected had to meet the life cycle needs of the salmonid.

Developing the early proformas and selecting sites was the fun part of the game. When these were completed it was the putting them into operation that got sticky beyond belief. Ward Paine's words were all too true.

THE PERMIT PARADE

One, who like myself, had been trained and steeped in the agency system, has no comprehension as to how many regulatory hurdles, restrictions and at times almost total impasses are confronted by a new business. Especially if one considers using any portion of the natural environment, no matter how prudently you design. Without a doubt, developing a fish farm on an estuary, especially in Oregon, has to be the most closely viewed, scrutinized, investigated, debated and downright spied upon operation imaginable. The following listing is a generalization of major permit areas with accompanying comments, most of which are appropriate to Oregon, but I'm certain are similar in other areas. As for separate permits of last count we have eighteen, and there are more to go.

Fish Use: Most fish resources in their natural habitat are the property of some unit of government. If it is at all legal to possess them privately, one of several permits are needed. In Oregon, it requires two formal permits and three letters of approval to obtain eggs and rear salmon or trout. Disease free certifications are also involved.

Recent legislation has greatly liberalized the laws regarding the possession of salmon stocks by private enterprise in Oregon. The new permit system is well designed to protect the state's salmon resources, yet give the entrepreneur the opportunity to proceed with broodstock development from which he can obtain his production stock from the excess eggs.

Land and Water Use: Getting permission to use land and water is by far the most difficult part of becoming a fish farmer. Long gone are the days when you could just help yourself--and rightfully so. However,

there needs to be some sanity replaced into the process. Every level of government and several agencies on each level have their say in whether or not you can do business, and on occasions they will be at cross purposes and the applicant is caught in the middle. Have you ever tried to pour a concrete floor in a food processing building? FDA says make it smooth so it can be cleaned. The safety people say make it rough so the workers won't fall down.

My last agency count was two city departments, four county groups, eight state agencies and four federal entities, each with the power to allow or disallow what you had in mind to do. That is sixteen unanimous yes votes. It is very much like being voted into a secret fraternity, one black ball and you are out. Paranoia toward agencies is a common ailment in business today and no where is it greater than for an aspirant or operating fish farmer.

An added frustration to the imposing list of needed permits is the frequent lack of assistance from the regulating agency in helping you with your problems. They set rigid rules, or in some cases sliding rules that you cannot get hold of, and then serve as judge and jury. Frequently there is no place to go for counseling in the system. You are on your own to sink or swim. The newcomer is hopelessly lost.

It has been suggested that I write a book on my permit getting experiences. If I did, which I never will as it would be only an academic exercise and use up time, it most certainly would range from tragedy to comedy.

THE MONEY LENDERS

Here is an area that will curl your hair. Particularly if you are a very recent convert from academia into business. How do you pay for your ideas? First of all, I am firmly convinced, based on innumerable proforma exercises, that there is a critical mass necessary in order to make a go at fish farming. Ma and Pa operations will always be just that, and the corner grocery store is testimony to that approach. There are those who have gone to the other extreme and set up grand stock promotion ventures, and the money game always received more attention than the fish. They were in trouble from the beginning.

My experiences tell me that between $500,000 and $1,000,000 are necessary in the first year to get an operation underway that has a chance for success. At this level of front money you should be able to see some return in the first eighteen to twenty-four months whereby additional funding through lending institutions would be possible.

Believe me, you cannot walk into a bank and ask for $500,000 to $1,000,000 to start a fish farm. They will be genuinely interested in your ideas, as most everyone is, as there is great public interest in fish farming today with some strong exceptions that I will relate later. But unless you have moneyed backers who will sign personal guarantees, you are just having a nice visit. Bankers take zero risks. Even federally supported loans are difficult. I have played that game with the Small Business Administration and was led down the primrose path for months to the bitter end that huge personal guarantees were again necessary. Even as in our case with people on the Board of Directors with very healthy financial statements, personal guarantees are tough to get. It makes you wonder who personally guarantees the foreign aid money our government gives away by the bushel baskets full.

The solution is to interest large corporations in your venture. These people are quick to see your scheme and size up its potential, and they will act unbelievably fast in their decisions. The business mind is an exciting thing to watch. It is a head full of steel springs that makes things happen now, not six to twelve months later. Realize, however, that for their money they want control, which means 51%. So you lose your nice little company that you had such great dreams of personal success and wealth planned for. But your dreams were just that without the financial backing. It is certainly better to have 49% of something than 100% of nothing.

There are a number of large firms that are shopping for fish farms. The Japanese are especially active. You must be most careful, however, in whom you choose. Large firms with the "General Motors syndrome" can be deadening. Oregon Aqua-Foods, Inc., is most fortunate in being associated with Fisher Companies, Inc. of Seattle, Washington, which is a family run operation that has been in flour milling and lumbering for over 100 years. It is important that they understand biological systems. Their people are directly active in our fish farm, and they provide additional services in business management and legal counsel that are invaluable.

MANAGEMENT - NOT THINGS

I am firmly convinced, based on viewing numerous state, federal and private fish cultural operations over a number of years, that success is not based solely on technological advances. The primary control is in the management. People, not gadgets or canned programs make an operation work. This is even more true in the private sector where a profit has to be made or it is all over. Tax supported facilities can have costs get out of hand for some time before anyone notices or cares. The regular profit and loss statement makes considerable difference in how the management functions.

In OreAqua we have a crew of young professionals who have been given the challenge of making a fish farm work. They have been told that when we turn the corner they will have a piece of the profits. Professional pride also motivates each of us as we have had our detractors. Professional doubters and objectors have made themselves known by using the wet blankets of disease, food, genetics, mechanical failures and costs. Sportsmen cry that you will ruin the natural runs and that Californication of Oregon will follow private involvement with salmon runs. Commercial fishermen fear competition.

Summing up the problems of aquaculture development -- it is not technology, but the socio-legal impediments that are of concern. How do you get resource agencies, the planning commission, the sportsmen, environmentalists and commercial fishermen to believe in and possibly support your ideas? How do you get state or federal discharge permits? Add to this the financial worries and you have the problems that really concern a potential or actual fish farmer. And I have found no one to step forward with guidance, let alone answers.

WHERE DOES THE HELP COME FROM?

Technology: Agencies and institutions in the past have provided the basic hard facts of life and death in the husbandry of both land and aquatic species. Sea Grant is a mechanism through which such efforts can continue. We do have unsolved problems. From my vantage point these are disease control, food sources, effluent control. The rest are less important, but none of the completely unsolved technical problems should hold back a serious fish farmer. Many species can now be reared.

Socio-legal: Whether you are allowed to farm or not is the question. Who is talking sense within the environmental concern spectrum? Certainly not the regulating agencies, that is too much to expect. Industry's voice will most always be suspect as self-serving, which is the only way it can be.

Why can't Sea Grant assume the role of peace maker? How many in Sea Grant administration or research know what the rules and regulations of EPA, FDA, SBA, OSEA or what other agencies in the "alphabet soup" might be? It is with these problems that help is needed.

PEOPLE WHO CAN DO THINGS

Another crying need of the fish farmer is for people who can do things. A thinking man or woman who can build or mend a functioning system is rare. If you find one, pay him well so he will not be hired away. Presently the Community College program has by far the best offerings. Our Oregon State Superintendent of Instruction recently expressed his concern over our information-rich but experience-poor society of today that has replaced the information-poor but experience-rich society of fifty years ago. It must be possible to strike a balance.

THE CHALLENGE

Aquaculture must no longer be mauled and pawed over in the laboratories and test facilities of our institutions. Other areas of the world stopped this long ago, if they ever began. The challenge of Sea Grant is to get involved with your local politician, bureaucrat, environmentalist and fish farmer and solve the socio-legal problems that impede progress.

When we can freely and pridefully use the word "farmer" to mean one who produces a crop from water, then we are philosophically and physically on our way to economic reality as our land-based counterparts have been for so long.

FOOTNOTE

1. Proceedings of the Third Sea Grant Conference, sponsored by Oregon State University, March 1970. OSU Sea Grant College Program, Corvallis, OR. p. 23.

setting up a mariculture business: legal considerations

by ALFRED A. HAMPSON

The law deals by and large with contracts, and vast sections of law deal with fish treaties. Foremost among those legal writings is the famous treatise on a treaty by Robert Benchley, written when he graduated from Harvard. He wrote his final thesis on "Cod Fishing in the Grand Banks from the Point of View of the Cod." Perhaps I should make my presentation on aquaculture law from the point of view of the fish.

There is an historical background for aquaculture law. For many years English judges and lawyers, who hammered out what we call the Common Law, were confused by the fact that fish and wild animals would not readily come under the thumb of man. It bothered them that there were creatures that did not pay attention to the rules and the laws. So they eventually worked out something they called a "ferae naturae," which means wild animal.

This solution applies also to fish. The "ferae naturae" lives and exists on its own without ownership, and can be owned only when it is reduced to effective possession. Certainly, one of the few pleasant things about going to law school is studying this concept, because all of the cases deal with whether you owned the fox when you caught him, and if he escaped and someone else caught him, was he yours or another hunter's?

Two kinds of laws deal with aquaculture. First, in arrogance, legislatures have declared certain fish to be the property of the State of California or of the State of Oregon. They have not told the fish this, and the fish, I am afraid, is a ferae naturae and anybody who gets him can have him regardless of the laws of the states of California or Oregon--regardless of the fact that they assert ownership. To be sure, there is a difference without a distinction here. The Crown, and therefore the state, has always had the right to control the taking of fish or game, but it still has not necessarily owned them.

The second type of law, of historical interest, was that there were all kinds (at least there were two or three kinds) of fish

owned solely by the Crown. They were such exotic species (or perhaps just tasted so good) that the Crown would not let anyone else catch or eat them. The classical example is the sturgeon, which commoners were prohibited from eating. Similarly, all of the swans in the Thames River in England are owned by the Queen. They are her own personal property and no one else can own the swans. (I do not know that anyone else wants to.)

Three kinds of marine situations pertain to the law of aquaculture: (1) the sedentary marine creatures, such as oysters; (2) the "transitory" ones such as fish; and (3) the situation in between where you put transitory creatures in a pen and raise them in captivity. Needless to say, different laws apply to each situation.

Along the Pacific Coast laws dealing with this subject have been or could be promulgated by four states and one nation--the Quinault Indian Nation. I would not have the temerity to deal with the treaty between the Quinault Indians and the United States, but I can speak generally about fishing treaties with the Indian nations. States cannot regulate the taking of fish by the Indians, except to keep the Indians from exterminating a species of fish. The Indians answer quite reasonably that "when we ran this show, there weren't any fish exterminated." But as far as the details and permits and those types of things are concerned, they are for the most part free and are not in any way related to the problems that face the rest of us on the Pacific Coast.

Alaska changed its constitution to permit aquaculture. There is now a bill before the Alaska legislature which, according to my last information, had not passed. It is a much broader bill than exists in either Oregon or California, but it will be filled in by regulations adopted by the controlling agencies. There are not such regulations yet.

Washington's law deals primarily with pen-rearing of fish. There is a casual reference to ocean rearing, but for the most part it is directed at raising fish in pens in Puget Sound.

California was the first state to pass a law dealing specifically with aquaculture, and did so in 1969. They amended it drastically in 1971, declaring it to be an experimental law that applied only to Waddle Creek in Santa Cruz County and declaring it to exist only for sixty-one days following the 1975 regular session of the legislature. This law, by and large, carries with it its own regulations. There is only one facility operating on Waddle Creek, and it is being watched closely by the California Fish and Game Commission.

One difference between California's law and Oregon's is the fact that the fish have to be marked before they are permitted to go to sea. These fish are raised to the pre-smolt size, then they are clipped and released. There seems to be some difference of opinion as to whether they are operating their facility well and whether they understand either the economics or the biology of what they are doing. But I guess that they are still struggling along. The requirement that they thin, clip and mark the fish, I suppose, must grow from the legal concept of who owns the fish. Since we call it fish farming, the California legislature felt that the operators had to put a brand on the fish just as we put a brand on cattle before we let them out on the range. This presents very serious biological problems.

Oregon's law was patterned after the California law but was made a good deal broader. When it was initially introduced into the legislature, it covered all breeds of anadromous fish. It was subsequently limited to chum salmon by the legislature.

There is apparently a great deal of hostility based on fears that commercial interests would purchase streams and exclude sports fishermen. On the other hand, some enthusiasm has been exhibited by people who feel that releasing chinook and coho salmon into the waters would increase those available to be caught by sportsmen.

Oregon Senate Bill 265, introduced by the Committee on Agricultural and Natural Resources, is an attempt to put back into law those words which were excluded in the 1971 Legislature. The bill, passed by the 1973 Legislature, would permit the raising of chinook and silver salmon.

There was another bill in the Oregon Legislature--Senate Bill 96. It provided for the posting of a $100,000 bond for any person or corporation operating a private fish hatchery. This bill would have effectively destroyed the attempt to develop this type of industry. The capital requirements to get a $100,000 bond are three: $100,000 in cash pledged to the bonding company; or, $100,000 in negotiable securities; or, a net worth of $300,000 of which about $80,000 is in liquid securities. This requirement would limit the bidding considerably. At the hearing before the Senate committee, a number of people spoke against Senate Bill 96, pointing out to the committee what appeared to be the unfairness of it. There did not appear to be anyone who spoke in favor of it. The bill was subsequently killed in committee.

Generally the law of aquaculture, at least as we are concerned with it, falls into the two groups--the sedentary through the oysters, and transitory through the fish.

As to the oyster culture, in 1969 Oregon passed a law which permitted acquiring platted oyster lands for $2.00 an acre. These permits are very similar to the Taylor grazing rights for cattlemen. They almost imply ownership, but if the lands are not used for the production of oysters, they lapse back into the public domain.

On the other hand, wild lands can be sold and transferred just as other land. As a result of this law, there are, I am told, very few oyster lands which have not been spoken for. Washington has a somewhat similar law and so does California. Once you have acquired these lands or have leased them from an owner, you run into the same problems the law has created for all those people who want to go about their business and make a living.

Another topic I think we have to deal with concerns the raising of freshwater fish in trout ponds. The law, needless to say, goes both ways on this subject. In California, you are flatly prohibited from having a freshwater hatchery in a situation where the fish can possibly escape into the natural waters of the state. In Oregon, there is no such provision. But assuming you want to go into fish farming, either raising fish in captivity or committing them to go out to sea, it is necessary to get permits from the Oregon Fish Commission and from the Oregon Game Commission. Then you have to get water rights from the State Engineer. There has to be a drawing of your facilities. There has to be a scientific calculation of the quantity of water you will use. If you have a settling pond upstream from your facility there is a disagreement whether you should or should not have a permit to store water. If you talk to one engineer, he is in favor of it; if you talk to another engineer, he says it is not necessary.

Aquaculturists must deal with the Department of Environmental Quality (DEQ), responsible for the general well-being of the environment. It is something, I think, that somewhat surprised L.B. Day, the former director of the DEQ, when the problem first came up. I think that the department has endeavored to be realistic and fair, although I think from time to time it might be somewhat guilty of over-kill. They have so many problems with so many industries that I think they occasionally get a little feverish and their little spines stick out. I think perhaps there will be more cooperation between those who have licenses and the DEQ, and the tendency towards overprotection will remove itself. I do not think that dealing with the DEQ will present any problem which cannot be worked out.

The last problem you have is that if you go into the public waters, you have to get permits from the Coast Guard and from the Corps of Engineers because you may be a navigation hazard. This is essentially a yes/no situation. It is not hard to get one if you are not a navigation hazard; impossible to get one if you are.

I had hoped when I accepted this assignment to be able to present a learned and detailed discussion of the law in all its pristine beauty. However, there almost isn't any law. In fact, when I discovered the lack of law, I went to the dictionary to look up the word, and I discovered that there is no such word as aquaculture. So here we are really working in a vacuum.

Some people question how we can get the biologist to work with the engineer. It would appear, however, that many of the hazards we are facing are those of the law. The question might better be phrased--how can we get the lawyers and the legislators to work with the biologists? Trying to get lawyers to work with anyone is difficult enough. I think this could be achieved if we could work out a plan or position of what aquaculture is and where everyone would fit into it. Too often the biologist looks at it almost as Frankenstein looking at his monster. They have created something beautiful in itself--a life that did not exist before. The engineer looks at the fantastic problem of recirculation and dealing with the problems of waste which he can solve by his intellect. The lawyer weighs all the risks. Each of them, expert in a limited area, tends to operate in a vacuum, never dealing with the others.

Obviously, we who are in favor of aquaculture must talk to one another; but it is important that we talk to the sportsman also, so that we can allay his fears if they are not well founded; or if they are well founded, so we can protect him. You would be surprised how many more sportsmen vote than aquaculturists. In the same vein, it is important to talk to the commercial fishermen. They feel, I think, very much a threatened species. Every two years they have to go to the Legislature

and argue that it is their livelihood that someone is trying to take away. I think very possibly that we could work out a statement of policy, expressing where we stand. If it could be agreed to by the disparate groups involved, a policy statement would go a very long way toward bringing the internecine war to an end.

oregon shellfish as related to mariculture

by DALE SNOW

Dr. Donaldson's address reminds me of the newspaper reporter who was interviewing Mrs. Lincoln after the President's assassination and asked, "Other than that Mrs. Lincoln, how was the show?" I would also add that he is not the first John to run into problems with governmental agencies or administrators; the first that I am aware of was King John who 759 years ago this month was forced to sign the Magna Carta. This document, which detailed many of the rights of the people, also stated that fish and game were the property of the people to be held in trust by the Sovereign. This precept has been followed to the present time and may be considered as the beginning or authorization of fish and game agencies. The relationship between this discussion on shellfish and the Magna Carta will be obvious a little later.

SHELLFISH WITH BIOLOGICAL AQUACULTURE POTENTIAL

In Oregon we have seven indigenous groups of invertebrates or 17 species of invertebrate animals that have a biological potential for being adapted to aquaculture. They are oysters, clams, mussels, abalone, crabs, shrimp, and scallops. I wish to re-emphasize that I am saying biological potential. For some species we do not have the technological capability of culturing them and for others I question whether we have the legal capability of allowing their culture in our estuaries. The species that can and is being cultured is the oyster. It also is the only species I will discuss here today. Oregon has one native species of oyster that contributes very little to the field of mariculture at this time. The mainstay of the oyster industry is the exotic Pacific or Japanese oyster which is imported as "seed" from Japan or the state of Washington. This animal, because of low water temperatures, does not reproduce in our estuaries. Consequently, oyster culture can be compared to a farm crop in that the oystermen plant the seed annually and have to wait for the crop to grow to a harvestable size some 20 to 36 months later.

OYSTER REGULATIONS

Oyster regulations are found in the Oregon

Revised Statutes 509.425 through 509.510 and Oregon Administrative Rules Chapter 625, 10-275 through 10-295. Let me explain to those of you who may not know the difference between O.R.S. regulations and O.A.R. The difference is that the O.R.S. regulations are engraved in stone and the O.A.R.'s are written in sand! O.R.S. regulations are enacted by the legislature and require legislative action to change. O.A.R.'s are primarily biological or management regulations and can be changed by action of our three commissioners after holding a public hearing. Either can control the activities of the serious or not so serious aquaculturist.

I will first direct my comments to the laws in Oregon Revised Statutes and because of the time element will refer only to the more salient points of each.

O.R.S. 509.429 states that the commission shall classify those lands that are suitable for oyster culture. Legislative intent on this regulation has never been clear to me. Wally Hublou, my boss, views it one way, while I see it another. I see it as meaning that we will decide on the suitability of lands upon application for lease and culture rights. Wally sees it as meaning that we will go out and classify all lands in the state as to suitability for oyster culture. Consequently, I have classified all tidelands in Oregon as to their suitability for oyster culture. This was of necessity a very broad classification with numerous qualifying statements such as potentially good, etc. The reason for this is that I can look at a parcel of land, tide levels, salinity pattern, bottom type, etc., and say that looks like good oyster land. You can then plant oysters and they very well may thumb their little molluscan noses at you and die.

O.R.S. 509.431 details how to apply for lands for oyster culture. Briefly it states that the applicant must pay a $25.00 filing fee, and advertise in a paper of general circulation his intent to apply for tidelands for oyster culture. Thirty days after publication the commission will grant or deny the lease based upon findings. If denied, the applicant must be given the reasons in writing.

O.R.S. 509.436 requires each grower to report to the commission the number of gallons of oysters harvested from the lands under lease.

O.R.S. 509.439 establishes the criteria by which the commission may withdraw lands from the leasee. Basically these are: (1) no production from the land for three years provided health restrictions, unavailability of seed, or infestation by pests or disease was not the cause of unproductiveness; (2) failure to pay use taxes; (3) improperly marked; (4) used for purposes other than oyster culture. This in effect says if you want to grow clams or do something else with this land, you can't.

O.R.S. 509.411 establishes cultivation and use fees. These are 5-cents per gallon for all oysters produced and two dollars annually for each acre of land under claim.

O.R.S. 509.451 prescribes how oyster cultivation fees will be distributed. All monies received are paid to the state treasurer. After administrative charges are deducted, the money from the gallonage tax goes into the state general fund and fees from land use go into the common school fund.

O.R.S. 509.455 defines oyster plats as private property but does not allow the restriction of public use of the waters. This law and a subsequent Attorney Generals opinion, I feel, is so important to the mariculturist that I am going to read it in its entirety, and I quote:

> "Any plats of oyster lands held by citizens of this state, if distinctly marked out by means which do not obstruct navigation and not exceeding the extent allowed by regulations, shall be deemed and protected as private property. Such plats, however, shall not restrict the rights of the public to the use of the waters of this state in a normal and customary manner."

This sounds simple enough, however, an Attorney Generals Opinion No. 6861, issued September 17, 1971, implies that this statute is unconstitutional. The gist of this opinion was that though the State of Oregon has and can sell or lease submersed or submersible lands, the rights of the public to hunt and fish by constitutional guarantee were never relinquished. Consequently, an oysterman cannot prevent the public from going upon his lands and harvesting clams, mud and ghost shrimp, and hunt or fish. The rights of the public to hunt and fish in Oregon are inalienable and this principle dates back to the Magna Carta. However, in exercising these rights, the public is restrained from harvesting or unduly disturbing the grower's oysters which are con-

sidered to be domesticated animals.

O.R.S. 509.495 defines how oyster leases may be sold, transferred, or assigned. If a grower complies with all regulations, he can hold these leases in perpetuity.

O.R.S. 509.510 makes it unlawful to willfully disturb shellfish on properly marked and legally held grounds.

This is a hurried summary of Oregon Revised Statutes. I have left out certain ones pertaining to "grandfather rights" that were included in 1969 when the current statutes were revised and are no longer applicable.

Oregon Administrative Rules, as mentioned earlier, are based on biological or management needs. 10-275 through 10-295 may be summarized as follows: (1) 10-275 defines oyster; (2) 10-280 prohibits oyster importation except by permit; (3) 10-285 describes how an importation permit may be obtained and essentially says the permit will be issued once the importer has caused the oysters to be examined by a qualified person or agency and the oysters are certified as pest and disease free; (4) 10-290 declares Netarts Bay a restricted oyster growing area and all other areas unrestricted. It also restricts movement of oyster equipment or oysters from Netarts Bay and requires the processing of Netarts oysters be at Netarts Bay (This is to prevent the spread of the Japanese oyster drill Ocenebra Japonica, a serious pest, to other estuaries); and, (5) 10-295 essentially says oysters are private property and how they may be harvested and by whom.

SUMMARY AND CONCLUSION

This has been a one sided discussion on shellfish laws as related to mariculture. However, as I interpret statutes and regulations, oyster culture is the only invertebrate culture we can permit at this time in relation to our estuaries. I do not foresee any change in this situation in the near future. Oregon has only 42,000 acres of estuarine lands, much of this is not suitable for aquaculture and much of it is used by the general public to harvest clams, crabs, etc. As an example, in a 1971 F.C.O. study it was found that between March and October, 506,000 people spent 1.2 million man hours in Oregon estuaries harvesting 550,000 non-salmonid foodfish, 1.8 million clams, 230,000 crabs, and 170,000 miscellaneous invertebrates. This is a recreational pastime that Oregonians will not give up readily and the Attorney General has said, based on several court cases, they do not have to give up. The direction of invertebrate aquaculture in Oregon, I believe, will have to go the direction that Oregon-Aqua Foods has gone. Land based habitat construction.

At the present time, Oregon law, by lack of authorization, limits invertebrate aquaculture to oystering on public or privately-owned estuarine lands. Detractors of the regulatory hurdles they have to surmount must remember that when most, if not all, of these regulations were considered, aquaculture other than oysters and fish was an unheard of concept. Rome was not built in a day and changes in the regulatory process will not come overnight. I would say to you Jack, you were set up for this by another John at a place called Runnymead, and other than that, "How was the show?"

mariculture and the international law of the sea

by DAYTON L. ALVERSON

When Jon Jacobson called me requesting I give a talk at this particular symposium, as I did not consider myself an expert in the field of mariculture, I was a little reluctant. Considering the audience, I see nobody who doesn't know more about mariculture than I do. In a similar vein, I'm almost illiterate when it comes to interpreting legal jargon. Having been involved in drafting material for the Law of the Sea which was subsequently reviewed by a bank of lawyers, there seemed to be little relationship between biological terminology and legal language. In fact, most of what came back took on the look of a poor Russian translation.

Coming here to a mariculture symposium, I felt a little like the English sparrow that was flying through the woods on a beautiful, sunny day. Being a little carefree, he ran into a fence and he broke one leg and a wing. He laid over on his side, and began to cry. Suddenly, he heard a horrible noise, looked over his shoulder, and saw there was a great big bull looking down at him. The bull, being very communicative, said, "What's the matter, fellow?" The sparrow said, "Well, you know, it was a great day and I wasn't paying attention and I ran into the fence and broke my leg and wing. There's a cat that lives over in the barn. He'll get me before evening. I'm a goner." The bull said, "Maybe not. Something humans seldom realize, and most other animals don't realize either, is that there's curing power in bull manure. I'm going to deposit a little next to you here and you take advantage of it." The sparrow thought it over and came to the conclusion: "What have I got to lose?" He dipped his wing and leg in the manure. About ten minutes later, he tried his leg out and, by gosh, it worked pretty good! He tried his wing and it also was healed. He flew over to the bull and said, "Boy, you're absolutely right. That's terrific." He thanked him profusely and flew off. He went back into the woods and flew up to the highest tree he could find. Once on top of the tree, he started to sing and dance on the limb. A hunter coming through the woods heard the bird, took his shotgun, and killed the sparrow dead. The moral of this is: "If you get to the top on 'bullshit,' don't make a

song and dance about it."

I reiterate, I'm not a mariculture specialist, but have been exposed to people performing mariculture work for a number of years. I am reminded of the fact that I spent time in southern China during the early forties and tromped through a number of carp farms when I didn't even know what fish farming was all about.

What I'm going to try to do is in some way put the Law of the Sea Conference in perspective. You can draw your own conclusions of the legal and technical implications that might be applicable to the future of mariculture. In doing so, I've organized the talk into three phases: a little bit about the history of why we're in the present LOS situation; the progress--or lack of progress--to date; and finally, the likely outcome of the conference and its consequences on maritime activity.

The first question we might ask ourselves is: Why a Law of the Sea Conference? There's been an extremely rapid extension of technology into the ocean, particularly in the last three decades. A very effective extractive process has evolved in terms of exploiting many of the oceans' living resources. Technology has also made major strides as regards to the extraction of inanimate resources--the fluid hydrocarbons and certain mineral resources. Ocean fisheries have grown at a very rapid pace in the past three decades. The "grab" for ocean resources has resulted in contentious issues developing among countries of the world. Part of this reflects "visions of sugarplums." Visions of sugarplums are certainly not exclusive to the people who are looking for natural resources, living resources or wild resources. I think a wave of unreality has reached the people who are looking at mariculture. People read, with a certain amount of jealousy and anticipation, about the riches of the ocean. The first outcome of this was that people who were not a part of this action began to feel that they should be a participant. A number of developing countries watched, with a certain amount of envy, the very rapid growth of fisheries production off their coast, and they were concerned with the possibility that oil might be extracted from continental shelf and slope areas off their part of the world. They had, to some extent, been led down the "primrose path." A concept of "share" the wealth was promoted by a philosopher named Arvid Pardo from Malta who generated the concept of the oceans being a "common heritage." This all meant that somehow the ocean resources belonged to everyone. The international community felt they had to look at the ocean resources and try to change human values and, unlike land resources, share the wealth of the oceans. Many developing countries, as well as some developed countries liked this idea. This, plus the increasing unhappiness of developing countries over the fact that certain nations weren't sharing, or were overexploiting their coasts and destroying their local coastal fisheries, helped to stimulate a conference to establish a new legal order in the oceans.

The formation of the conference began several years ago. Originally its goal was to look at the seabed resources in terms of minerals and oil. This rapidly expanded to include fisheries. Now it encompasses almost every major contentious item in the ocean activities. The conference agenda includes problems such as the seabed resources, the fisheries resources, navigation, pollution, freedom of research, etc.

The conference activities and organizations were structured along political themes. First, there was the formation of the normal political forces: the developed countries versus the developing countries, the African bloc, the Eastern bloc, the Western bloc, the landlocked blocks, etc. Each tried to put together some sort of force which could bring about a two-thirds majority or a blocking third for the ultimate conference on Law of the Sea.

What essentially seems to be coming out now is the development of two polarized groups: developing nations of the world versus the traditional maritime nations of the world; for example, U.S., Japan, U.S.S.R., U.K. This has led to some rather peculiar bedfellows at the Law of the Sea Conference. The Soviets and the Poles are huddled together in the corners with the U.S. You see countries such as Canada and Mexico, which might be considered very close neighbors of ours, huddled together with the South American and African countries.

The strange bedfellows are the result of the very strong polarization of priorities at the conference. The U.S. and the traditional maritime countries put the living resources fairly far down on their list of priorities. They are concerned with freedom of navigation--which translates out to national security. In such countries as the U.S.S.R., U.K. and the U.S., the first priority is freedom of navigation. In the U.S. the oil interests probably garner second place, and fisheries may be third or fourth--somewhere down the line. The same is true in many of the developed countries. By contrast, in

the developing countries of the world, the living resources are very high on their priority list. They are looking at what type of new legal regimes will provide them greater control over the living resources that are adjacent to their coasts and also to the inanimate resources.

The "common heritage" concept that I mentioned to you melted away rapidly. Those who threw rocks at the U.S. because they were developing policies which reflected self-interest, soon found themselves doing the same. The concept that the ocean revenues would go into some sort of world pot to help the many less fortunate people and develop a more equitable distribution of wealth, dwindled during the first two preparatory conferences of the LOS; each nation struggled to establish policy which favored its own self-interests.

There is a thread in the conference, however, that may result in a positive solution. This high degree of polarization and priorities for a peculiar reason provices an avenue for a solution. In seeking their priorities, the U.S. and other strong maritime nations are going to be willing to negotiate regarding certain living resources concepts. The nations which want coastal state management over living resources are going to get it. In order for each nation to achieve its priority goals, they will be willing to negotiate priorities that are important to them. The U.S. and U.S.S.R. will move to adopt the resource policies of the developing nations--that is, some sort of extended coastal jurisdiction over the living resources. There lies a thread for a solution.

The priorities are basically different in the conference. You have to put this conference in perspective. One nation, one vote. It means that places like Tonga and Western Samoa have the same voting privileges as the U.S. and the U.S.S.R. Of more than 150 nations that will participate, almost 50 or 60 were not in existence a decade and a half ago. They did not participate or were not in existence during the 1958-60 conference. To eventually get a decision that is acceptable in terms of the world community will require a two-thirds vote.

If the conference is successful and does reach some conclusions, there will be extended jurisdiction over a zone adjacent to coastal states--an economic zone. I don't even think this is a question any more--we're going to have some extended coastal jurisdiction over both oil and minerals and fish. To some extent, it will exist for for control of pollution. I don't know what that zone will be, but if I had to guess, it will probably end up at the 200-mile limit.

The magic 200-mile limit which was started by the Latin American countries is catching on in many areas of the world (probably because it's easier just to follow suit). It doesn't necessarily have any good, basic criteria in terms of either the living resources or the inanimate resources. The real question is: What legal principles will be embodied in this so-called economic zone? Will the coastal state manage under guidelines of obligating principles established by the U.N.? Will it be a completely exclusive zone in which the coastal states will manifest their own destiny? Will it have some constraints laid down by the international community that relate to navigation? To what degree will coastal states control things other than living resources, such as pollution and freedom of science?

Let's now try to put the Law of the Sea Conference and mariculture in focus. Will it be a better system? Will it eliminate some of the legal barriers that now confront some of you who would like to go into the mariculture business? Will it provide for better management systems of the living resources of the sea? My answer is yes and no; it all depends. What it will do is basically transfer the legal responsibilities to different legal entities. It really depends upon how each coastal state responds. If they have enlightened government and institutions, and strive to provide an environment where both natural fisheries and mariculture can be pursued in an appropriate manner, you're likely to be better off. That is not necessarily how the national entities will respond. Some will respond that way; some will respond with bureaucracies that will be even worse than the situation that now confronts you. In the U.S. within the territorial sea, the LOS probably will not have a great influence. Those laws are now being established at the state level. The federal government might be involved in control of things that are in the 3- to 200-mile area. Things could improve, but not necessarily.

There are, however, areas of the world that because of the investment security (the capacity to allocate certain rights to certain people) there will be a better environment for investment in the ocean, both in natural resources and those produced from mariculture.

But don't count wild resources out; that is, you should not write this competition

off on the basis of overfishing problems. Quite to the contrary, the basic evidence shows this is not true. These outcries often reflect a misunderstanding of the basic concept of overfishing. If you examine overfishing in terms of definitions commonly used throughout the world, you'll find that there are three categories of overfishing.

One is overfishing that relates in an economic sense to the fishermen. This occurs when stock level drops to a point where the cost of extraction is equal to the value of the product. This definition of overfishing means something different to each individual or group. Indeed, in many of the areas of the world, cries of overfishing relate to economic problems. They are really saying that the stocks have been driven to a point where "they" are out of business. It doesn't make any difference to a fisherman if you say, biologically, the stock isn't overfished--he is still out of business!

The second type of overfishing, which is frequently associated with the biological characteristics of a population(s), is what I call "misuse." It is basically the category you're in when you have an apple tree in your backyard and your kids run out and pick the apples when they're small and green. The apples don't have a chance to mature, so you don't get the weight you might from the crop. In this instance, you haven't really destroyed the tree's productivity. The tree will bloom next year and will have another crop. If you use it wisely next year, you can maximize the potential yield. Most of the overfishings in the international sense are a product of misuse. If we didn't misuse those products, by the way, we would probably increase the world production by about 16-20 million metric tons.

It's rather ironic, however, that the people who make such a fuss about misuse in the oceans and forecast a complete destruction of the ocean resources don't really equate this concept in an economic sense as do the mariculturists. By the conservationist definition, most mariculturists are in the business of overfishing. Salmon mariculture extracts the product at sizes which do not maximize weight--but dollars--in terms of a salable product. The salmon could be held a lot longer until they grow bigger and bigger, and one could thereby get more weight out of them, but less dollars. This is true of a lot of our mariculture businesses. (When you optimize dollars in mariculture you are not necessarily optimizing the yield in weight.) The product must be harvested at the right time to make dollars. In the extraction of wild stocks, we consider this as a category of overfishing.

A final type of overfishing is that where the biological productivity in terms of recruits coming into the population has been destroyed. This is much less frequent in marine fisheries, or at least less demonstrable. Some of the marine fisheries that only yesterday we were told were down the "tube," such as the anchovy, are now showing strong signs of rebuilding.

In addition, other natural resources are now being used successfully. I have just received a report from the Japanese on their recent krill production in the Antarctic. They're now getting about $500 a ton for krill and have overcome some technological problems. The krill resource alone could add some 40 to 50 million metric tons to the existing world production. So the people in natural resources or wild stocks are not out of business.

There are bound to be increasing problems because of the fragmentation of attitudes regarding how the oceans should be used. Some excellent examples were heard today from various people who are in the business of analyzing legal pitfalls. One of the legal pitfalls is the growing group of people who don't want you to tamper with the oceans and the estuaries. They see the mariculturist in the same vein as they see a commercial exploiter or commercial fisherman--someone who is upsetting the ecological balance of nature.

I was looking at a very nice article by Tim Joyner ("Toward Global Aquaculture") that related to aquaculture in the antarctic and establishing a ranging population of salmon in the krill areas of the south polar seas--an interesting concept. But one of the first letters received in the mail on that article was from an individual adamantly against the idea because it may upset the ecosystem balance in the Antarctic area. Perhaps this is a legitimate concern, but it emphasizes the growing disparate views on use of aquatic resources. The idea of no alteration to the ecosystem is a rather interesting view. If we had done that in the terrestial regime, we'd all be starving to death or wouldn't be here. There are people who basically feel the ocean animal communities should not be modified by man. The mariculturist is going to find this an increasingly difficult problem.

The 200-mile concept could offer some very interesting possibilities if we could set up a legal regime that would allow for allocating a certain place for ocean ranging. You have the possibility of stability in investment, that is somebody else doesn't take advantage of your activities. This will largely depend on the character of the national legislation which evolves in response to extended jurisdiction.

I was called by a large food producer in the U.S. several weeks ago. He wanted to ask me about aquaculture and I said, "For crying out loud, we sent you two of our best biologists," (one of whom is here by the way) "to talk about this particular subject; and there's nothing I can add to what they have said." They flew me down to California, bought me a nice dinner, and asked me one question. "What do you think of investment in the salmon business and aquaculture in general?" I said, "From what standpoint?" They said, "From your standpoint." I said, "If I had $100,000 in my pocket, I wouldn't invest a nickel of it in salmon aquaculture. On the other hand, if I were in your shoes, and had a lot of dollars to invest, I just might because I think in the next ten years many of the technical problems in aquaculture will be resolved. Aquaculture will start to make a contribution in terms of highly valued food and may ultimately even produce substantial quantities of protein; but during those ten years, I think nine out of ten businesses are going to go belly-up. I'd invest in one of the nine that went belly-up!" On the other hand, I told them that if they wanted to put seed money into aquaculture and learn something, it was a good time to get in. If you've got the right people, the right location, the right legal environment, and good leadership, you just might make it.

legal aspects of marine farming operations--a game of tournament chess

by ANTHONY J. NOVOTNY

INTRODUCTION

It would be interesting to speculate about what the status of marine aquaculture would be like in this country today if we had started with the same fervor 100 or more years ago that turned this country into an agricultural giant. It is hard to imagine a "sea rush" to stake the most desirable claims for water ownership the way we did in the great Oklahoma "land rush." It is also hard to imagine a "spread" of one million acres--of water--being owned by one conglomerate such as the famous King ranch of Texas. In fact, it is difficult to comprehend the idea of anyone owning a portion of the sea, large or small.

The ownership and use of land for agricultural purposes in the United States is based largely on historical precedents. After all, isn't the right to own land a part of the founding documents of this country? The right to inherit land is established by law. With some exceptions, we can do with land as we please. We can cut trees or plant trees, plow or let land lie fallow, or even rent land out to a tenant farmer. Until recently, you could even get paid by the government if you promised not to make land productive. If you do not know what to do with your land, there is a large government organization that can muster field forces from Key West to Anchorage to help you get the most productive crops from your land. There are soil bank programs, irrigation programs, inspection services, and even storage services. You can lease certain grazing rights on public lands, or bid on harvestable timber. You can even go out and drive a few stakes in the ground and start extracting any minerals that you might find beneath it. Agricultural land is bought and sold by the hundreds of thousands of acres each day (with and without the attached crops) with no more thought than if we were buying a load of bananas. It is sad, but true, that in treating land as a common commodity, we have lost all respect for it.

But water, especially the sea, is a

different story. The historical precedents are few. There are many people who own freshwater ponds, man-made and natural, and even some who own entire lakes. But these are usually self-contained. Woe be to the man who uses moving water and then allows it to run into another body of water or across other land. He suffers restrictions and comes under the new regulations that talk about "point sources" and "receiving bodies."

In the sea, our earliest historical precedents deal with shellfish culture. I distinctly remember seeing a chart of Long Island Sound that was neatly divided into plats for oystering. It predated the American Revolution! On the West Coast, subtidal rights for shellfish farming in Washington were declared prior to statehood. In the eighteenth and nineteenth centuries, shellfish farming in this country was still "semi-fishing." It has only been in this century that shellfish farms have advanced to the point of having complete control of the organisms, from spawning to market. However, setting the early precedents was a definite asset. Shellfish farms are bought and sold, along with the rights to certain tidal zones for culture purposes, and rights of inheritance are legally respected.

In some real estate transactions, the surface land can be sold for any use, and the original title holder can retain the rights to the minerals that lie beneath the soil. A parallel exists in shellfish farming, where a person may buy a piece of waterfront property for a summer home or residence, etc., but the transaction may only include that property above the mean high tide level. The rights to the tidelands could very well belong to an oyster farmer. By virtue of legal precedent again, there are areas where the cultivation of intertidal and subtidal shellfish grounds have precedent over any other type of activity. In other words, you cannot interfere with an oyster farmer's work simply because you want to water-ski.

Many of the laws regarding shellfish farming in our estuaries were enacted in the days when everyone was busy trying to eke out a living from the land or the water, one way or another. I am certain that the judicial branches of government would not have believed that someday there would be fierce competition for our water resources. The work ethic then was high, leisure time was spent resting to prepare for more work, and esthetic values were not needed, as there was plenty of wilderness and unexplored water to go around for everyone.

Now we are entering a new era of aquaculture. There is new technology, and previously unfarmed species of marine organisms are being looked at and produced. New precedents will be set (and are being set) for the future. But the rules of the game have changed with time, as there are more divergent uses of our marine waters now than in the time of our forefathers. The competition for water use will become fierce. From now on, the marine farmer will play a game of tournament chess--with a changing rule book.

THE NEW BREED--FARMING THE SEA

I classify marine water use into four categories:

1. Commercial transportation
2. Industry, including fishing and marine aquaculture
3. Recreation
4. Esthetics

Of these four types of use, I consider the last to be the most dangerous to marine aquaculture.

Let us examine, briefly, the future of the marine aquaculture for the next twenty-five years. I will not speculate on anything beyond that. There is no question in my mind that without a massive infusion of federal research funds, farming the open sea is out of the question. Even if the federal government were to infuse $100 million today, it would take ten years to develop anything that could be measured economically. That leaves the protected waters of the coastal zones--the same areas that have the highest competitive use.

One cannot question the use of our coastal zones for transportation. Ample room must be allowed for vessel traffic, which undoubtedly will increase. This is the life blood of our nation, for both intra- and international commerce.

In regards to commercial industry, I would prefer that a new precedent be set. I would like to see a legal course of action that would make it mandatory that a commercial sea farm be established as close as possible to every large seaside industry, especially oil refineries, nuclear power plants and pulp

mills. A marine farm places a dollar value on the water that we never had before. The threat of a possible law suit is the best possible policeman that I can think of. What a distinct advantage we would have with a virtual 365 day bioassay! Commercial fishing is usually restricted to specific historic zones, and these can be avoided when selecting sites for culture purposes.

Recreational use is heavy in most areas, and is primarily oriented toward boating and sport fishing. I have a collection of Japanese books that pictorially demonstrate the use of their inland seas for aquaculture. I doubt if there is sufficient room in any sheltered water in Japan for a dinghy race! Here again precedent dictates. Recreational boating and sport fishing are almost non-existent in Japan, and marine aquaculture is a reasonably long-standing industry. In our inland seas, the precedents are reversed. We could not possibly expand our use of marine coastal areas for aquaculture to the extent that Japan has, without creating a serious conflict with the recreational users. Only a national food crisis could reverse this position.

We place an extremely high esthetic value on our coastal zones. People who own shoreline property regard their unobstructed views as assets, and are a most powerful force. This is especially true in Puget Sound, where we have the recent commercial development of floating salmon farms. Amongst the many permits required to start a salmon farm is one from the U.S. Corps of Engineers. The permit request for a site location, with a complete description of the proposed construction, must be posted for at least 45 days in order to allow area residents to voice objections.[1]

In Kitsap County we had one case, which I will call "the Harper Dock," that was stopped dead on the first move. In this situation, a group of people unfamiliar with the county, obtained a lease on an existing dock and drew up extensive plans for its development into a marine salmon farm. The local residents, frightened by the threat of an extensive activity in their serene atmosphere, voiced their disapproval and the project was killed. If the developers had gone first to the county commissioners with their plan, they would have been advised to make alterations which would be less objectionable to local residents, and they would have been closer to obtaining a permit.

A wise man learns from the mistakes of others. In a second case, a permit was requested to use another existing dock in Kitsap County for a salmon farm. The proposed developers (well informed of the Harper Dock problem) began with an 18 month time schedule in mind. They went first to the county agricultural extension agent. The extension agent helped them through the offices of the various county planners. In this way, all parties were well aware of the needs of the proposed farm and the best way to develop the farm and still satisfy the desires of the county planners. The developers moved in progressive stages, obtaining their permits from the various agencies in sequential steps. However, somewhere in the final stages of this arduous process, the development was in check. The county health authorities discovered an illegal raw sewage disposal within 1000 feet of the proposed farm. The sewage was from a collection of less than a dozen residences. The authorities were not worried about the fish--they were concerned about the possible hazard to workers on the farm. In spite of the fact that the sewer was illegal, the fish farm developers had to prove that the bacteria levels were not above permissible numbers before they could obtain a Department of Ecology permit. This has since been accomplished, all permits have been approved, and construction has begun.

In the Puget Sound area, I believe that it takes at least 17 permits to operate a salmon farm, not including a fresh-water facility. I have heard that in California the number of permits needed is over 50 (including freshwater) facilities). The number of legal routes that must be followed is so great, that any individual or group that wants to start a fish farm, fresh or saltwater, had best look for help and not try to do it alone. In most cases, starting at the county level is probably the best bet. The problem becomes even more complex when you want to develop a fish farm with a "point-source" discharge, either freshwater or salt. There are stringent EPA requirements for any effluents discharged into a "receiving body," and will probably be discussed in detail in your workshop sessions. There are no specific EPA discharge requirements for net-pen culture in marine waters, but they will come as surely as the sun rises in the morning. My point is this: one should not only be aware of the legal restrictions to aquaculture, and where to seek help, but also that the rules can be changed. This applies to established shellfish farms as well as new types of mariculture.

SURVIVAL AFTER SUCCESS

If we can assume that a proposed farm has obtained all of the necessary permits, and is licensed to operate, what are the next legal problems to arise? If you are operating a shellfish or seaweed hatchery and nursery, coupled with a "growing out" farm, there should be no problems except a cautious attitude toward the purity of the crop prior to marketing. The most extreme treatment of molluscs might be freshwater, heavy saline or copper sulfate baths to rid the crop of fouling organisms. The Food and Drug Administration (FDA) is interested in chemical residues, and State Health Authorities are interested in bacterial levels. Since most shellfish or seaweed farmers just "take their lumps" and never treat with anything, any problems of residues or bacterial loads are due to a poor natural environment. Concentrations of microorganisms in shellfish that are pathogenic to man have been a serious problem in the upper reaches of Chesapeake Bay and a large segment of oyster growing area there is closed to harvesting. In this case, the oyster grower is an innocent victim of our own wretched technology in human waste disposal.

The most serious problem comes to the fish farmer. Every fish farm will be hit by disease. Most of the diseases are caused by pathogenic bacteria, and mortalities can be reduced by the oral administration of antibiotics. If one were to be technically legal to the nth degree, we would find that there are no antibiotics approved for use in fish in sea water by the FDA. Furthermore, there are no drugs approved by the FDA to combat vibriosis, which is the major salt disease--anywhere. The FDA has cleared certain sulfa drugs and tetracycline compounds to treat furunculosis in salmon and trout in freshwater, and that is just about the legal bag of antibiotics that a farmer can use, and only for that specific disease. What about the saltwater fish farmer? I cannot be certain of this, but I would venture to say that anyone could obtain a court order to confiscate any harvested crop of fish from saltwater that had been treated with any antibiotic for vibriosis. This is how far behind we are in the legal clearance of drugs for therapy. The law clearly states that each drug must be legally cleared or approved for each pathogen and species of fish. In other words, if we are to obtain approval for the use of terramycin to combat vibriosis in rainbow trout, we had better do it for salmon also.

How is legal clearance obtained on new drugs? Quite frankly, not easily. All drugs must be cleared against specific diseases by the FDA for licensing. The type of investigation that is required to obtain FDA approval for a drug is of a complexity that is beyond the capacities of the fish farmer. The people who stand to gain the most from drug clearance are the drug manufacturers. The U.S. Fish and Wildlife Service spends years of time working with drug manufacturers, other research groups and their own staff to demonstrate drug efficacy for specific diseases. In addition to demonstrating drug efficacy, analyses of drug residues or metabolites in the product tissue must be reported. It would seem obvious then, that the legal clearance of new drugs for therapy is going to be the responsibility of federal agencies and drug manufacturers, for these are the only people who have sufficient staff and technical facilities to do the job. Yet I know of no formal federal programs that are organized (or funded) to systematically screen and test drugs for therapeutic use in cultured fish. I distinctly remember that the federal government screened over 4000 chemicals to find a selective larvacide for eradicating the sea lamprey in the Great Lakes, with excellent success. It would seem to me that the present and future value of cultured fish in this country are sufficient to justify similar efforts to combat diseases.

More recently, many of us in research have been working actively on the development of vaccines to prevent specific diseases. The vaccine for vibriosis is extremely important in preventative medicine in marine aquaculture. In its simplest form, the bacterium that causes the disease is grown in the laboratory, killed with mild heat, and fed to the fish. All that we have done is to render harmless the same "bug" that the fish faces almost every day in sea water culture. Nothing could be simpler, and yet such a vaccine is termed a "biological product" and falls into the legal category of the 1913 Serum-Toxin Act. This bit of federal legislation places all nonhuman vaccines under the control of the USDA. To be very brief and explicit, the law states that the producer of the vaccine who intends to sell it commercially must obtain a USDA license. The procedures that a producer must go through to obtain that license are enough to make the fainthearted go on to other endeavors. Only the anticipation of large volume sales will induce a commercial firm to apply for that license. This means that unless saltwater fish production expands, the people in business now will have to do without, or produce their own vaccines

and request an experimental waiver. Fortunately, in the case of vibrio vaccine, several firms are moving to obtain licenses. Once a vaccine is licensed for sale, the farmer may use it without regulation.

Another case in point is the processed food used to grow the fish to market size. Trout and salmon farmers get a much better price for their product if the flesh is red. "The redder, the better" is an old quotation in the salmon industry. One way to do this is to add canthaxanthin, an artificial carotenoid, to the diet. Canthaxanthin was approved for human consumption some time ago. You can find it in chili sauce and other similar products. But to the best of my knowledge, it was never approved for fish consumption, and to this day I have not seen any FDA material that indicates that it has been approved for cultured fish.

HARVESTING THE CROP--LEGAL PRACTICES AND DESIRED PRACTICES

If we can assume that the marine fish farmer or shellfish farmer has safely (and legally) brought his crop to harvest size--what next? Everyone wants a top quality product. In the case of fish, I would prefer to use an anesthetic (except that a 21-day waiting period after use on live fish is required, and thus makes it illegal), drop the fish into an ice bath, and bleed them on the spot before processing. The latter act is illegal unless you can dispose of the blood in some way other than dumping it in the water. The next best thing is to drop the fish into an ice bath (which cools them down), wait until they die, and then ship to the processing plant. The longer that you wait to process, the greater the chance of bacterial buildup. We have isolated a few bacteria from the kidneys and gut of processed fish that are pathogenic to fish. We have also found kidney diseases in processed fish. Of course, the longer the fish sit before processing, the greater is the chance of finding spoilage bacteria. The former is of interest because of H.R. 6397, a bill that was first introduced to the 93rd session of the U.S. Congress, and the latter because of H.R. 887 which was introduced recently. H.R. 6397 would authorize the Secretary of the Interior to establish regulations for the protection of U.S. fishery resources, including marine culture industries, against the dissemination of serious diseases of fish and shellfish. Article 3 of Section 4a of this bill would give the Secretary the power to issue regulations to prohibit the movement in interstate commerce of fish infected with (or contaminated with) any fish diseases that pose a major threat to the U.S. fish resources. This bill, formerly known as the "Fish Disease Control Act of 1973," and now known as the "Fish Disease Control Act of 1974" would be (in my estimation) the beginning of some type of federal fish inspection program. Exporters of processed, cultured fish going to Canada are familiar with a minimal control act, as they must provide a certificate that has been signed by a qualified pathologist. The processed fish must be certified to be free of fish pathogens.

MARKETING

My most recent knowledge of H.R. 6397 is that it is back in committee. I am leaving at least a dozen copies of this lengthy bill with this workshop. If H.R. 6397 does not become law, I am sure that sooner or later a revised bill will be passed. Anyone who is in the legal profession and interested in fisheries should become familiar with H.R. 6397. I say this because this legislation covers all fish products, alive or dead, wild caught or cultured, including those coming from the high seas. It includes freshwater and marine fish and shellfish, reptiles, amphibians, eggs, offal and even shipping containers. Perhaps I am overreacting to this bill. However, I do not think that I am alone, as virtually all of the trade journals (at least in aquaculture) have published articles or editorials on this bill.

The agricultural meat producers have had inspection programs regulated by the USDA for years. Could we say that consumer protection through inspection in the fish industry is long overdue? Perhaps so, because H.R. 887 is intended to fill this need and H.R. 583 and H.R. 10150 are intended to regulate and license through inspection. The jurisdictional agency would be the USDA. No matter how we may feel about fish product regulation, in my estimation it is inevitable. Thus, we will have regulations to protect both the fish and the consumer of the fish. My question is: can we not streamline this under one agency?

PERSONNEL RELATIONS IN AQUACULTURE

Unless you have a family farm, you will have to hire people to conduct the daily operations. There will be the usual state regulations concerning sanitary facilities, health regulations, and the never-ending forms dealing with labor in general. Fish farming involves a great deal of physical labor, and the natural tendency is to hire

men. However, in this day of women's liberation, I would hesitate to select only men, as the possibility of a sex discrimination suit is always there. I would also be cautious of hiring "token" women and installing them in "token" jobs. The farmer must also be conscious of the fact that his employees may wish to be represented by a union, an option that cannot be denied. I would suggest to any prospective new farmer that some legal advice be obtained on the latest rulings regarding hiring practices and the rights of employees.

Safety is another problem that is probably more serious on the fish farm than the terrestrial farm. The agriculture industry, by the way, has one of the poorest safety records in U.S. industry. Legal advice concerning accident insurance, etc., should be accompanied (or perhaps preceded) by advice from state or private safety experts. This is especially true where diving is involved.

CONCLUSIONS

If I have painted a picture of a fish farm ensnarled in legal webbing, and a farm manager who lives on a mixed diet of aspirin and tranquilizers, I will not apologize. Any aquaculture company that finds itself in this position has probably jumped into business in blind haste, or has not done its homework. Marine aquaculture is a new industry, but deserves the same legal consideration as any other new industry. The question is, how much legal constriction can a new industry such as this absorb? The amount of dollar revenue generated is still small, and lobbies have yet to be organized.

As an example, let's look at the industry that manufactures outboard motors. The EPA estimates of the number of gallons of leaked or dripped fuel from outboard motors is in the millions of gallons per year. And yet, if restrictions were placed on the outboard motor industry that would be severe enough to make it unprofitable to produce them, a large recreational industry would collapse. Boat and trailer manufacturers, resort owners and producers of accessory products, as well as wholesalers and retailers would be wiped out. No one wants this to happen, as the industry supplies an economic need as well as a psychological need. This is one dollar value of our water that cannot be ignored. How then, can the marine aquaculture industry operate legally and survive economically? I believe that it will have to be a slow process of growing up. And, the industry will have to suffer its own "growing pains".

However, I think that the amount of suffering can be reduced if the industry members can join forces through regional and national associations. The typical fisherman who goes out to sea in his crabber or troller will be able to remain independent for a few more years. But, the marine farmer cannot afford it, as his proximity to the shore puts him in plain view. Through associations, the marine farmer can express his pooled needs and problems to the proper agencies that can respond. Associations can provide advice on laws that will restrict or aid the farmer, and advancements in technology. Associations will also provide an outlet for concerted voices where those voices need to be heard.

Therefore, if I could offer one last bit of advice: Join hands! you won't regret it, and you are going to need it.

FOOTNOTE

1. See "Coho Salmon Farming in Puget Sound", U.S.D.A. Extension Bulletin 647 (August, 1973) by Curtis W. Nyegaards. This bulletin provides an excellent summary of a typical legal "scenario for establishing a farm.

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