HB

432

HOUSE COMMITTEE REPORT

(7)
Date Referred: March 16, 1990 FURTHER REFERRALS:

Date of Committee Action: 4/4/90

The JUDICIARY Committee considered: HB 432

HOUSE BILL NO. 432 PROHIBITION OF FINFISH FARMING

"An Act prohibiting finfish farming; and providing for an effective date."

RECOMMENDATIONS:
[X] be replaced with CS HB 432 (RES) [X] the same title
[ ] a new title
[ ] have attached amendment(s)
[ ] do pass
[ ] do not pass
[ ] no recommendation
[X] individual recommendations
[ ] additional referral to the _____ Committee

ADOPTS: _____ letter of intent

ATTACHES NEW FISCAL NOTE(s): (Dept)
[ ] fiscal impact _____
[ ] zero fiscal note _____
[ ] zero with analysis _____

APPROVES PREVIOUS: (Date/Dept)
[ ] fiscal note(s) _____
[X] zero fiscal note(s) F+G
[ ] zero fn/analysis _____

SIGNING DO PASS:

Rita Jones
M.F. Greenberg
Cliff Davidson

SIGNING: (Check approp. column)

	Do Not Pass	No Rec	Amend
Mike Miller		—	
Terry Martin		✓	
Jim Ellis		✓	

Rita Jones M.F. Greenberg
Chairman's Signature

Offered: 3/16/90 6-1973H
Referred: Judiciary

3e10/A-7+6

Original sponsor(s): REP. GRUSSENDORF, Ulmer, Goll, Davidson, Navarre, Gillis, Hudson, Taylor, C.Davis, Jacko, Kubina, MacLean, Swackhammer

IN THE HOUSE BY THE RESOURCES COMMITTEE

CS FOR HOUSE BILL NO. 432 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

SIXTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act prohibiting finfish farming; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. FINDINGS. Based on a legislative examination of the potential effects of allowing finfish farming in the state on the common property resources and on the overall economic well-being of the state; the number of serious concerns associated with finfish farming and the need for study of finfish farming that has caused the legislature to enact two moratoriums on finfish farming and establish a nonlegislative task force to study the issue and to report its findings and recommendations to the legislature; a review of the final report of the Alaska Finfish Farming Task Force which notes several possible benefits and some serious risks of finfish farming; the need for the legislature to take action before the current moratorium on finfish farming expires on July 1, 1990; the recommendation of the task force that the legislature not extend the moratorium, but make a final determination to either allow or prohibit finfish farming; and the testimony and evidence received; the legislature finds that

(1) the state has the healthiest stocks of wild salmon and other wild finfish in the world and benefits from thriving commercial, sport, and subsistence fisheries for these fish and a growing tourism industry related to sport fishing;

(2) the people, economy, and environment of the state are dependent in large measure upon the continued health of the state's wild finfish resources;

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(3) serious risks are posed by commercial finfish farming, including the spread of disease among wild fish by farmed fish, genetic intermingling of wild fish stocks with genetically manipulated farmed fish, degradation of water quality near finfish farms, and land use conflicts over the siting of commercial finfish farms;

(4) the state has invested significantly in marketing efforts to promote Alaskan finfish as wild and natural fish products, and this investment in developing the reputation of Alaskan finfish would be lost by allowing commercially farmed finfish to be produced and marketed from Alaska;

(5) the cost to the state to regulate the commercial finfish farming industry would be high;

(6) few jobs would be generated by a commercial finfish farming industry in the state;

(7) the state is responsible for ensuring the protection and wise use of the renewable natural resources of Alaska and providing a framework for a sound economy;

(8) a long-term decision must be made regarding the future of commercial finfish farming in the state;

(9) avoiding harm to the state's wild finfish, land, and water resources must take precedence over the development of a new speculative and potentially harmful commercial finfish farming industry;

(10) the best interests of the state are served by prohibiting commercial finfish farming.

* Sec. 2. AS 16.40 is amended by adding a new section to read:

Sec. 16.40.210. FINFISH FARMING PROHIBITED. (a) A person may not grow or cultivate finfish in captivity or under positive control for commercial purposes.

(b) This section does not restrict

(1) the fishery rehabilitation, enhancement, or development activities of the department;

(2) the ability of a nonprofit corporation that holds a salmon hatchery permit under AS 16.10.400 to sell salmon returning from the natural water of the state, as authorized under AS 16.10.450, or surplus salmon eggs, as authorized under AS 16.10.420 and 16.10.-450;

(3) rearing and sale of ornamental finfish for aquariums or ornamental ponds provided that the fish are not reared in or released into water of the state.

(c) In this section "ornamental finfish" means fish commonly known as "tropical fish," "aquarium fish," or "goldfish," that are imported, cultured, or sold in the state customarily for viewing in aquaria or for raising in artificial systems, and not customarily used for sport fishing or human consumption purposes.

* Sec. 3. This Act takes effect July 1, 1990.

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No. 1

STATE OF ALASKA
90 LEGISLATIVE SESSION

BILL VERSION: CSHB 432(Res)
PUBLISH DATE: HOUSE 3/16/90

cc

FISCAL NOTE

REQUEST:

Revision Date: _____
Title: Prohibition of finfish farming

Agency Affected: Fish and Game
BRU: FRED

Sponsor: Ellason et. al.; Grussendorf, et. al
Requestor: Steve Cowper

Components: _____

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

ANALYSIS: (Attach a separate page if necessary)

FY 90
See attachments.

Prepared by: _____
Phone: 465-4160
Division: ADF&G, FRED Division
Date: 1/30/90

Approved by Commissioner: _____
Date: Feb 8 1990
Agency: ADF&G

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

Bill Analysis --

Background/Legislative Intent

In 1987, the Alaska State Legislature passed SB 297 placing a one year moratorium on finfish farming. The following year HCS SSSB 514 was passed, authorizing the farming of shellfish and aquatic plants, extending the moratorium on finfish farming until July 1, 1990, and establishing the five-member Alaska Finfish Farming Task Force. The shellfish farming program is currently being implemented. HCSSSSB 514 also contained a provision for inland farms in closed waters. The Board of Fisheries however, denied a proposal to make surplus coho eggs available to an interior-based applicant proposing to operate a recycle hatchery. In doing so, the Board of Fisheries asserted that public policy questions pertaining to brood stock acquisition and the privatization of a public resource were questions that should be addressed by the legislature, rather than set by precedent by the Board.

Although the task force was authorized in 1988, it was not funded until last spring. The members were appointed by Governor Cowper and began work last July. The task force recently issued its report and recommended that prior to the end of the moratorium on July 1, 1990, the legislature take statutory action to expressly allow or prohibit finfish farming. SB 397 would prohibit finfish farming by not allowing a person "to grow or cultivate finfish in captivity or under positive control for commercial purposes." As drafted, the state and PNP hatcheries would remain unaffected.

Amendments Proposed

On Page 2, lines 1-5, the third finding asserts that serious disease and genetic risks are posed to wild stocks. As the FRED Division has stated on the record, in legislative hearings and to the task force, if a properly managed, regulated, and funded pathology and genetics program were in place, similar to that run by the FRED division for current public and private non profit hatcheries, then commercial farming of finfish would not pose a serious risk to the health and genetic integrity of wild stocks.

Sale of finfish under a scientific or educational permit is not allowed currently. Accordingly on Page 3, Section 2, the department recommends deleting item 3.

With regard to Section 2, item 4, the department recommends extending the sentence. After the word "ponds", insert: "provided these fish are not reared or released into waters of the state."

Alaska State Legislature

Senate Resources Committee

Senator Bettye Fahrenkamp, Chairman

Senator Jay Kerttula, Vice Chairman
Senator Dick Eliason
Senator Steve Frank
Senator Rick Halford
Senator Arliss Sturgulewski
Senator Fred Zharoff

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M E M O R A N D U M

RECEIVED 1990

TO: All Legislators

FROM: Senator Bettye Fahrenkamp

DATE: March 30, 1990

RE: Finfish farming

If your mail is like my mail, many of you may have been the recipient of a letter writing campaign from commercial fishermen in opposition to finfish farming. I am convinced that their comments do not reflect the opinion of most Alaskans.

In a survey of voters in my district on a variety of issues, the respondents told a markedly different story on finfish farming.

133 respondents

100 favorable
12 unfavorable
61 no opinion

I have attached typical comments in favor. The responses are in my office if you would like to review them.

Typical Comments in Favor of Fish Farming

"Most governments go to great lengths to foster an 'infant industry', rather than try to strangle it in the crib! We need jobs!"

"Too long delayed. We are way behind in one of best potentials the state has. Both finfish and seaweed (nori) culture. Please break this loose and let development begin and don't let agencies set up constrictive controls. There's a big difference between regulation and strangulation."

"The fish farming moratorium should end. When Alaska's economy is so bad and fish farming a viable option for improving that economy, restricting the activity because of the greed of a select group of fishermen is a travesty. On fish farming, Alaska is way behind the times and again will miss out on a great opportunity."

"Let it develop with good environmental safeguards."

"Allow the farming with inspection of stocks/fry by Fish & Game to check for contamination/disease."

"I favor fish farming with adequate safeguards and controls to ensure safety and product quality."

"With proper precautionary measures and controls there should be few of the dangers to natural stock. It appears to be another effort by fishermen to keep out market competition."

"Finfish farming must be permitted. Why deny Alaska a valuable industry? If we don't develop this industry others will, leaving us cut out of the world salmon market."

"I'm all for mariculture. Politically, commercial fishing in this state has become a nightmare."

"Commercial fishing interests have had their way too long---Let's get on with it!"

"Worth investigation. Should not be outrightly banned simply to protect fishermen, but if there is a possibility of disease then it's questionable. Someone in FBX is doing it and I understand his system is completely closed. No chance of escape to contaminate wild stocks. He should not be restricted in any manner regarding how (or if) he can produce fish."

Distributed by Senator Bettye Fahrenkamp

Alaska Mariculture Association

TO: All Legislators

FROM: Rodger Painter

DATE: March 19, 1990

RE: How not to Diversify the Alaska Economy

There's been a great deal of discussion about how to diversify Alaska's economy over the past several years. While Alaskans seem as divided as ever over just how to accomplish this goal, there's at least one clear example of how to stifle entrepreneurial initiatives and ignore real opportunities.

A proposal to ban finfish farming has gained a good head of political steam and threatens to roll over sound public policy. A decision to even prohibit freshwater tank farming of char and trout simply can't be supported by fact, logic or common sense. While the legislature is supposed to make political decisions, Alaska's inevitable economic future under declining North Slope revenues should give you pause to think about snuffing out opportunities to diversify our economy.

The debate over aquatic farming is a sad commentary on the legislature's commitment to economic diversification. The emotional debate over the pros and cons of the net pen rearing of salmon makes the entire issue of aquatic farming too hot to handle. So, no one is willing to listen to the facts about upland finfish farming.

Land-based finfish farming is the oldest form of aquaculture, and a tremendous body of research and knowledge exists about its biological and environmental effects. All that's really required to weigh the issues involved in uplands farming, though, is a good dose of common sense.

Take, for example, the biological impacts of upland farms on wild stocks. Fish raised in tanks simply cannot escape into the wild, eliminating the threat of genetic alteration. The record of our salmon hatchery program in preventing disease transmission to wild stocks also testifies to our ability to control the spread of pathogens from land-based systems.

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Or, how about pollution? The Environmental Protection Agency regards upland finfish farms as point source pollution discharges and as such requires the screening of effluent. Antibiotics? Our present hatchery program safely utilizes antibiotics, and the Food and Drug Administration imposes quarantine periods to prevent fish with residual antibiotics from reaching the marketplace.

Upland finfish farming even eliminates any concern about undermining the markets of the Alaska seafood industry since the freshwater species end up in entirely different markets. Coho salmon can be grown to pan size in freshwater farms, but these products compete with farm-raised trout.

Some commercial fishermen suggest the concept of fish farming would violate the spirit of Alaska's constitutionally guarantee of common property fish and game resources, but the average fish farm will require only a small number of fish in the initial phases. The farmer will pay for the initial broodstock, and all future generations of those fish will be subject to the Fisheries Business Tax. Consequently, the farmer might pay the state for 200 fish, then pay taxes on the many thousands that will come in future generations. This seems like adequate compensation when the same fish caught by a commercial fisherman would net the state taxes only on 200 fish.

The arguments could go on and on, but there's little utility in belaboring the point. The real reason commercial fishermen want to ban finfish farming is that it represents the proverbial camel's nose under the tent. They argue that upland farmers are likely to fail and will come running back to the legislature to say the ban on net pen rearing must be lifted to make the industry economical, but they also fear the farmers may succeed and a success story will convince the legislature to undo a ban on net pen rearing.

Even if either of these scenarios are played out, they do not justify prohibiting Alaskans from taking advantage of the few opportunities available for creating sustainable, environmentally sound businesses. Does this mean we favor central planning of the Alaska economy where the state makes marketplace decisions? Even the Soviet Union has decided that doesn't work.

The attached article from the ***National Fisherman*** illustrates the paths Alaska now faces. The article shows how the fishing community on Vinalhaven reacted to the emotional arguments over salmon farming and flatly rejected a proposed salmon farm, while neighboring Swans Island (also a fishing community) calmly gathered the facts, debated the issue, and decided to work with the farmer. Swans Island gained 10 fulltime jobs for a population of 350.

Alaska has those same kind of choices. Unfortunately, we may lack the levelheadedness of the residents of Swans Island.

A tale of two islands

One Maine island community decided to try salmon farming to supplement its traditional income from fishing; the other said, "No way."

By Nancy Griffin
Field Editor

The craggy, convoluted coast of Maine is studded with many islands where shrinking communities of rugged individuals stubbornly cling to a year-round way of life that grows increasingly more difficult to maintain.

Two such communities are Swans Island and Vinalhaven, somewhat different in size but with many common features. Most of the year-round families on both islands have lived there for generations. Most of those families now depend solely on lobstering for their livelihood, which means they saw their incomes drop during the past year along with the price of lobster.

There's another common thing: each community was approached during the past two years by companies from off-island wishing to establish salmon farms. Here the differences begin. Vinalhaven residents resoundingly and unequivocally rejected the aquaculture idea, while Swans Island people wrestled with, studied, argued about and finally accepted the notion.

"We have to use the sea," says Bruce Colbeth of the Swans Island Fishermen's Co-op. "Not everyone wants to be a lobster fisherman, and we don't have the option of commuting 20 miles to work, or bringing raw materials to the island, putting them together and shipping them out. We either work on the island or move out."

Swans Island is 7,500 acres with 350 year-round residents. Summer residents swell the population to 800. Vinalhaven, reached by ferry from Rockland, has 1,200 year-round residents and a summer population that reaches nearly 6,000.

Town officials in Vinalhaven were approached in September 1987 by a Norwegian representing a company called Atlantic Salmon (Maine) Inc. Frank Gjerset sought a 10-year lease for 25 acres of bottom off Vinalhaven, a specific site adjacent to the White Islands area.

"The first most townspeople heard of the proposal was a sheet of paper posted around town announcing the public hearing," says Victoria Dyer, who was then Vinalhaven's town manager. "It would have been nice if a representative of the firm came in first and explained to people what they wanted to do."

Observers say this failure to approach people and win them over to the idea probably did more harm to Atlantic Salmon's cause than anything else. The proposed lease area was prime lobster and scallop bottom, heavily used by the island's fishermen. Not only did lobstermen fear loss of access to the 25-acre spot, but they worried about contamination to nearby bottom from salmon droppings, antibiotics used in the pens, chemicals used in the fish food and diseases such as those that plagued Norwegian fjord-based pens and Swedish pens more than a year ago.

Islanders also expressed concern that the Norwegian company would bring workers from off-island, and, while local fishermen would lose some of their traditional fishing territory, little of the revenue generated by Atlantic Salmon would stay on Vinalhaven.

Five hundred Vinalhaven residents flocked to the public hearing in February 1988 ready to show their opposition to the proposal. They never had the chance. The meeting ended at 2 a.m. with the company still presenting its case and townspeople asking questions.

Officials decided to continue the public hearing in April, when townspeople who had signed up as interveners could present their side. In the interim, the town held a non-binding referendum on the proposal, and voters rejected the idea, 5 to 1. Shortly before the scheduled reconvening, Atlantic Salmon withdrew its proposal.

In a letter to the Commissioner of Marine Resources, the company said its reasons for withdrawing included the emotionalism and misinformation raised by some opponents.

"There was a lot of emotionalism, but also people who attended the meeting had legitimate concerns that were not addressed," says Emily Lane, the current Vinalhaven town manager, then a selectman.

"I did a lot of research, and I still think it's a terrible idea," says Maudeann Warren of Vinalhaven. Her husband, Roger, is a sixth-generation lobsterman. "They talk about jobs, but the average is only about three to five jobs per farm. I think it's tragic to see big corporations taking the life blood of small communities," she says.

A Different Approach

Swans Island residents watched this process with fascination. Just as the Vinalhaven saga was ending, they were approached about a salmon farming operation. The approach, however, was different.

"One man from Ellsworth came and talked first to me," says Colbeth, himself a former lobsterman who plans to return to his traps in a few years. "We were interested. But we'd just read in the papers all the bad things about aquaculture, so we did a lot of research. We kept an open mind."

Fishermen were invited to discuss the proposal presented by Mariculture Products Ltd. and decide if they wanted to investigate it further. "After all," says Colbeth, "They were the ones with the most to lose."

After three informational discussion meetings, the lobstermen told Colbeth to pursue the project. Together, they chose 465-acre Toothacher Cove, parts of which were heavily lobstered while other parts were not lobstered at all. The ones who fished in those areas were willing to give it up for the good of Swans Island.

Then in March, things went haywire, Colbeth reports. "We found handfuls of papers this thick under windshields and at the co-op — all over the island — full of bad stuff about salmon farming. After I read three or four pages, I felt sick. The president of the co-op read it and suddenly turned against the project," he says.

Colbeth, however, felt the informational packets represented propaganda. "I said, 'I've got to find out the truth.'" He drove to Canada, visited several fish farms, interviewed lobstermen in New Brunswick communities with a video camera, and viewed videos that divers took periodically of the bottom under the pens at 50 different sites.

"The first two questions I asked everyone were: What about salmon pollution? And, what about antibiotics?" says Colbeth. "I don't even know how they can call it pollution. What are they going to do, stop all the fish from going to the bathroom in the water? Fish have to excrete. Pollution is no the right word; it's just a scare tactic word.

"One farm I looked at was beside fish weirs, and it also had lobster and clam flats right next to it," says Colbeth. "Everyone talked to was happy. A lobsterman there who was the biggest opponent of salmon farming now has 25 pens of his own. He said he was wrong."

The sea farming operations Colbeth toured were small, tidal action was strong and no buildup showed under the pens. In addition, Colbeth says the aquaculture ventures were mainly owned by small operators who were often lobstermen.

One of the damning things found in packets distributed on the island was a newspaper picture of a clammer holding a fistful of slime described in the caption as salmon gurry from a pen site. When Colbeth went directly to the office of the *St. Croix Courier* and asked about the picture, a staffer provided him with a copy of the

retraction that had run the following week, explaining that the slime was a form of algae, not salmon gurry.

To quell concerns about antibiotics, Colbeth investigated what was used in Canadian pens. It turned out the two antibiotics used are both U.S. Department of Agriculture approved and are commonly used in lobster pounds to prevent red tail. "No one seems to have a problem with using it in lobster pounds," Colbeth says.

Colbeth also checked out stories about disease-ridden salmon farms in Norway. He found out that the Norwegians moved the pens from the still waters of the fjords to the open ocean to solve the problem.

Opposition

Lee McCarthy summers on Swans Island in a camp situated down the cove from the salmon pens. She opposed the farming operation and still does. She says her opposition arises strictly from environmental concerns.

"They sidestepped every possible environmental protection that was part of the law. Those pens violate Department of Environmental Protection minimums for the depth of water under the pens," says McCarthy.

She says intense political pressure brought to bear by Mariculture Products and the state Department of Marine Resources won a three-year probationary permit from the Army Corps of Engineers for the farming venture despite demands from the Environmental Protection Agency, National Marine Fisheries Service, and Fisheries and Wildlife Service that the project be cut back by 90%.

"I quickly found out the position of state agencies is: This will introduce jobs," says McCarthy. "I understand the state is interested in the economic viability of coastal communities, but we think they've jumped head first into a difficult issue with side effects people are just beginning to understand.

"Those fish are dropping 1,500-2,000 lbs. of waste products into the cove every day. Lobstering and scalloping are threatened," says McCarthy, who's read of the dangers of disease and pollution around fish farms in reports from Japan, Scotland and Norway.

"If scallops are in any danger from salmon farming, it won't be in Toothacher Cove," says Swans Island fisherman Kenneth Lemoine Jr. He's scalloped during the winter for several years. In a 15-minute tow where the pens are now, he says, you might get five scallops if you are lucky. "More likely you'd get three, or maybe one. As far as scallops go, that's waste bottom. It's just mud," he says.

"The species most likely to be affected by any pollution around salmon pens are the salmon themselves," says James Acheson, University of Maine professor of anthropology and marine studies and author of *Lobster Gangs of Maine*. Acheson toured salmon farms in Norway and Sweden last year and has read extensively on farming operations in other countries as well.

"To my knowledge, no damage is likely to occur to shellfish," he says. "If there was any pollution, shellfish would be more likely to thrive than the salmon. I see a more serious conflict between salmon farming and industry. Industry wants the right to add some pollution to the water, and fish farms can't stand any."

Bruce Colbeth (standing) of Swans Island visited salmon farms in New Brunswick and talked to local lobstermen and fishermen about their reactions to the operations before he decided in favor of a farm for his community. James Acheson (sitting), from the University of Maine, supports the idea of salmon farms in the state.

In Sweden, Acheson says he saw lots of empty fish pens. Fish had been wiped out in 1988 by disease due to overstocking and fish pens placed too close together. "They just didn't have the tidal flushing to get rid of it like we [in Maine] do," he says.

Comparing other countries or even other coasts to Maine is like comparing apples and oranges, says Acheson. "We probably have the ideal environment for fish farming, and using data from other places involves an interesting use of mis-scientific information."

Acheson believes the objections most people have to aquaculture revolve around a certain image of the state of Maine. Lobster boats are okay, a few other boats passing by are okay, but looking out at fish pens is not. It ruins the view and makes homeowners worry about property values.

Other Problems

If environmental issues were settled suddenly to everyone's satisfaction, salmon farms in coastal Maine still face economic risks, especially in winter. Superchill, which sometimes lowers coastal water temperatures

dramatically, can kill fish. Predators or storms can rip nets and release the salmon, or allow other predators in to destroy them.

A big difference between the experiences of Swans Island and Vinalhaven is that when Mariculture approached Swans Island, it promised to help set up any residents who wanted to get into salmon farming.

"We're using them for jobs, for expertise, for benefits such as insurance," says Colbeth. "We lose a lot of people from the island because they don't want to go lobstering. It's a hard job, and lobstering means you have to be self-employed. We can't have a year-round community without people.

"This is one of the things that can save our coastline. I think the summer people were the start of all this wild emotional speculation. People who come up for two or three weeks, maybe a month, and they don't want to look at salmon pens.

"It's very unfair to the natives who live here," says Colbeth. "I don't mind true facts; I want to hear it. But saying things that are not true is unfair to the people of the coast of Maine. They've made up some nice ones, I'll tell you.

"Fishermen hear it, and it is scary what they're saying. So the fishermen get behind them, like on Vinalhaven. We heard the same stories, but we investigated them and found out they're just not true."

New Brunswick provincial officials and biologists have been compiling a database of information during the past 10 years about the many salmon pens operating in their province.

"Initially, we took the strong position that we wanted to go relatively slow on the numbers of fish in cages; that's one reason the videos show it's clean under the pens. Tidal action is another," says Russell Henry, biologist with New Brunswick's Department of Fisheries and Aquaculture.

"Our whole objective is to carry out environmental studies to establish, from a solid data base, what are good levels. We did it more from a disease perspective," Russell explains. "It all goes together. If there are less fish, there is less stress and less potential for disease. The environmental impact will also be less.

"We can foresee pressure for increasing the numbers over the next three or four years. We want to be able to say, 'Yes, you can,' or 'No, you can't,' based on site-specific data," he says.

Underway

This winter, Swans Island has seven salmon pens on 18 acres, with plans to open another 11 pens in the spring. Unlike other operations — even New Brunswick's, which raft pens together — Swans Island pens each sit alone on an entire acre. No antibiotics are being used, and some of the 204,000 fish are up to 3 lbs.

When the Norwegians started farming, their pens contained between 8,000 and 9,000 fish per cubic foot of water in 3' tides. A Canadian experimental fish farm operator recommends maintaining only 1 lb. of fish per cubic foot of water to insure against disease.

"We actually have only two-thirds of a pound of fish per cubic foot of water and 10' tides," says Colbeth of the Swans Island operation. "We're not taking any chances. There is not a trace of anything under the pens. Divers go down weekly and check it out."

Four people are employed full time now, with several seasonal part-time employees. The plan is that when the operation expands to18 pens, the farm will have 10 full-time employees.

"I don't blame Vinalhaven for what they did. If fishermen didn't favor it, I wouldn't," Colbeth says. "I understand the company that approached them was going to bring their own people in and not leave much behind. If that was the case, I don't blame them a bit. All I can say, from what I've experienced and seen and from people I've talked to, there's no problem with the bottom under pen sites."

"At the time [of the Atlantic Salmon proposal], I was caught up in the island's [Vinalhaven] position," says former town manager Dyer. "In the meantime, I've followed with interest what's happened on Swans Island, and I've eaten farmed salmon.

"Now I think it's going to be valuable to Maine. I hope the errors that have been made in other places can be avoided. Maybe people on the coast can have another resource so they don't have to depend only on lobsters for their income," Dyer says. □

Alaska Mariculture Association

HB 432

TO: House Judiciary Committee

FROM: Rodger Painter

DATE: April 2, 1990

RE: Upland Finfish Farming

The Alaska Mariculture Association (AMA) respectfully requests that you consider amending House Bill 432 to allow upland finfish farms. While there may be room for legitimate disagreements over the impacts of salmon net pen culture in marine waters, there's a great body of research and experience showing that the environmental and biological effects of upland fish farms are negligible. This conclusion was unanimously supported by the Alaska Finfish Farming Task Force.

Opponents of finfish farming have attempted to suggest that land-based farms can harm wild stocks through groundwater contamination. Often cited as an example is a report by the Washington Department of Ecology (DOE) which concluded that a 1989 fish kill in the Black River probably was caused by pollutants discharged from a land-based fish farm. What is not mentioned is that the report was thoroughly discredited by an independent group of state and federal scientists.

Attached is a critique of the DOE study by the Interagency Work Group on Fish Health, which is comprised of recognized experts in fish health issues. The review was prepared at the request of the Washington House Fisheries and Wildlife Committee. The group unanimously determined it was impossible to justify DOE's conclusions and that DOE erred in ruling out ambient river conditions as a cause of the kill.

The Alaska Department of Fish and Game should be provided with the authority to require upland farms to treat discharges to protect wild stocks on a case-by-case basis. ADFG already requires a few state hatcheries to treat wastewater discharges as a safeguard against transmission of pathogens to wild stocks. Indeed, ADFG's success in preventing disease transmission to wild stocks from hatcheries demonstrates the safety of upland fish farms.

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College of Ocean and Fishery Sciences
Office of the Dean, HN-15

February 6, 1990

Representative Richard A. King
Chair, House Fisheries and Wildlife Committee
House of Representatives
State of Washington
Olympia, WA 98504

Dear Mr. King,

In December, 1989, members of the Interagency Work Group on Fish Health received copies of the following documents: (1) the Black River Fish Kill Report, (2) the Appendices to the Black River Fish Kill Report, (3) a document prepared by Washington Department of Fisheries that was mistakenly omitted from the Appendices, and (4) the Department of Ecology news release regarding the kill. Work Group members were asked to review the Report and Appendices in the manner they would normally apply to the peer review process for scientific journals. On January 8, 1990, the committee convened in Seattle to discuss the documents and to prepare a response to the House Fisheries and Wildlife Committee. A list of Work Group members who participated in the review are attached to this letter.

Work Group members concurred that Department of Ecology (DOE) and Department of Fisheries (WDF) personnel expended a considerable amount of energy in attempting to determine the cause of the fish kill; however, the members were unanimous in their opinion that the conclusions drawn from the study (Report Section 6.0) cannot be supported by the data collected (Report Section 4.0).

Conclusion 1--"fish kill event was not caused by ambient river conditions."

Although DOE was notified of the fish kill on August 8, 1989, and had personnel on site within hours, ambient river condition surveys were not conducted until August 17-18 (Report Table 7). This 10-11 day delay in collecting samples makes it impossible to reconstruct the conditions existant at the postulated onset of the kill (August 6-7).

The data collected in the August 17-18 survey included measurements of water temperature, dissolved oxygen (DO), percent saturation, and conductivity, but did not include measurements of river flow. Considering the season of year (summertime; period of elevated productivity), the high daytime temperatures (>19 C) and the low-gradient nature of the Black River, flow rate was a critical factor for evaluation.

DO levels of 6.7-11.8 ppm measured in surface waters contrasted sharply with the life threatening DO levels (<1.1- 2.6 ppm) measured near the bottom of the river (the portion of the water column utilized by many aquatic species, including salmonids). While it is true that fish avoid low dissolved oxygen levels whenever it is possible to do so, it is well known that avoidance may not be possible when DO levels decline over large areas as a result of nighttime aquatic plant respiration.

Given the low oxygen levels, the high water temperatures, and the absence of flow rate data, it is not possible to rule out ambient river conditions as a cause of the kill. In fact, the Report states (p. 29) that the "combination of low river velocity, high nutrient concentrations, high productivity, and stratified pools is one which can put the lower Black River at risk to conditions which induce anoxia."

Conclusion 2--"the fish kill was caused by a pollutant."

The Report states (p. 29) that " no pesticides or herbicides were found in the Black River sediment samples" and that "metals were below toxic levels." The Report further states (p.29) that the finding of a whitefish carcass near river mile 13 provided indication that "a limited summer kill was occurring", an event "which is normal."

The Appendices contain (l) correspondence from Dick Huntamer (DOE) to Steve Hunter (DOE) stating that acid/base neutral organics, volatile organics, pesticides/PCB's, organo-phosphorous pesticides and herbicides were not present in significant levels; (2) correspondence from Margaret Stinson (DOE) to Dave Halleck (DOE) stating that bioassays conducted at Biomed Research Laboratories revealed no evidence of toxicity; (3) data from Analytical Resources Incorporated indicating that while residual formaldehyde (12.74 ppm) was present in the sediment of the settling pond at Global Aqua, none was detected in water samples taken from the river. Not included in the Appendices (but provided to Work Group members) was a report from Patrick F. Chapman (WDF) stating that fish mortality patterns in the river did not support the theory of a toxic pollution spill.

In the absence of any data indicating the presence of chemicals in water, sediments, or flesh, and in the face of a statement that limited summer kills are normal on the Black River, it is impossible to justify the definitive statement made in Conclusion 2.

Conclusion 3--"kill...probably occurred on August 6, 1989, and began in the vicinity of river mile 9.2."

On August 8, 1989, WDF personnel collected fish carcasses at river mile 6.5. Based upon the degree of decomposition noted in the tissues, they speculated that the fish had been dead for 24-48 hours. That observation forms the basis for fixing the onset of the kill. Given the statement (p. 15) that "carcasses were not visible from the shore", it is possible that the kill started earlier but was not detected.

The conclusion that the kill began in the vicinity of river mile 9.2 is based upon stream and shoreline surveys conducted by WDF, DOE, and the Chehalis Indian Nation. The data presented in the report (Table 5) and in the Appendices (Attachment 7) are not sufficiently quantitative to permit evaluation of this conclusion. Therefore, lacking further documentation, the conclusion is unwarranted.

Conclusion 4--"Black River contained elevated levels of ammonia, nitrites, nitrates and phosphorous."

Dr. Gary Wedemeyer, a physiologist specializing in water quality factors that affect fish health, reviewed the data contained in the Report and Appendices and stated, based on his experience, that the nutrient levels in themselves did not appear to be life threatening to salmonids. He cautioned, however, that the data were difficult to interpret because nitrite levels were lumped together with nitrate levels and reported as a single value. The interpretation problem arises from the fact that nitrite is extremely toxic to fish, while nitrate is essentially non-toxic.

Conclusion 5--"investigators were not able to find physical evidence of pollutants being actively discharged into the Black River."

No comment.

Conclusion 6--"Results...indicate discharge permits in this area warrant upgrading."

The evidence presented in the Report is inconclusive. It neither supports nor refutes this statement.

Summary of Comments--The Work Group members who independently and then jointly reviewed the study unanimously concur that the evidence presented in the Report is mixed and that it does not support any particular cause for the fish kill. We recommend, therefore, that the Summary (1.0) and Conclusions (6.0) sections be re-written to reflect this fact, and that the body of the text be edited to remove unsupported and unprofessional innuendo.

Recommendations for future fish kill studies--Fish kills are reported in the State of Washington on a regular basis. Some kills arise through natural causes (e.g. poor ambient conditions, epizootics, toxic phytoplankton blooms, supersaturation), others through the activities of man (e.g. chemical spills, toxic discharges, physical disruption of habitat). In investigating fish kills, it is important (l) that data collections be initiated in a timely fashion, (2) that appropriate data be collected, (3) that studies be approached in a scientific manner, and (4) that studies be conducted in a way that will utilize the strengths of appropriate State agencies and that will draw upon the expertise of qualified professionals whose training and credentials are relevant to the investigation.

Points 1 and 2--In 1972, the Department of Ecology published a manual entitled "Guidelines for Evaluating Fish Kill Damages". Detailed in that publication are the procedures to be used when investigating a kill as well as the types of data to be collected. A number of the Guidelines were not followed in the present study, and their omission contribute to deficiencies in the Report. We recommend that DOE review and update this publication, and implement the guidelines in all future investigations.

Point 3--Members of the Work Group were troubled by the tone of the Report and by the apparent desire of the author(s) to identify a culprit. In investigations of this type it is critical that agency personnel take a dispassionate, open-minded approach to the investigation.

We realize that fish kills can be dramatic, disheartening events to the on-site investigator, and that they can create a storm of public outrage. However, if the investigator allows personal feelings to come into play or if he/she makes a priori assumptions regarding the cause of the kill, important points can be overlooked and critical data can be lost.

Because of the high visibility of fish kills and because of the potential damage that can result from incomplete investigation or incorrect interpretation of data, we also recommend that reports be subjected to peer review by non-agency personnel prior to publication.

Point 4--The various State agencies differ in the range of expertise that their staff may bring to the investigation of a fish kill. For example, DOE personnel are uniquely well qualified to conduct chemical analyses, but WDF and WDW personnel have the knowledge that is required to evaluate fish pathology, fish habitat requirements, hatchery operations, etc. While there was interagency co-operation in this study, increased effort should be made in the future to utilize the expertise of appropriate State agencies and to address differences of opinion that may arise regarding interpretation of data. When necessary, investigators also should make efforts to capture skills from other organizations (e.g. universities, federal laboratories).

We hope that this letter has provided the assistance you requested. If the Work Group can be of further service to your Committee or if you require additional information, please feel free to contact me.

Sincerely,

Marsha L. Landolt

Marsha L. Landolt, Chairman
Interagency Work Group on
Fish Health Issues

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Southeast Alaska Conservation Council

SEACC • P.O. Box 021692 • Juneau, Alaska 99802 • (907-586-6942)

House Bill 432
Prohibiting Commercial Fish Farming

My name is Nevette Bowen. I am representing the Southeast Alaska Conservation Council which is made up of 13 member groups from Ketchikan to Yakutat plus over 1000 individual members, including a few oyster farmers.

SEACC solidly supports HB 432 which would prohibit commercial fish farming in Alaska. It is clear to us that the ecological risks and budgetary costs associated with fish farming far outweigh any potential benefits.

Water quality degradation, pollution, genetic alteration, broodstock sources and broodstock control, genetic weakening of wild stocks, spread of disease, impacts of antibiotics and other chemicals on health and the environment, predation by bears, sea lions, birds, otters, etc., land and water use conflicts and the reduced initiative to protect natural fish habitat are all environmental problems that would be created by fish farming.

Upland tank farms and trout farming are not the answer to resolving these problems. The average 200 ton tank farm that employees 3 people uses water at the same rate as the city of Eugene, Oregon and produces the same amount of waste as the cities of Petersburg & Wrangell combined. Where is that volume of water going to come from and more importantly where is it going to go?

Fish disease is commonly spread through water. The deaths of 100,000 coho fry in a Washington state river located near a

landlocked trout farm have been linked to contaminated ground water discharged from the farm. How much is it going to cost the state of Alaska to make sure we don't experience water contamination problems.

SEACC cannot support creating a new industry in Alaska that poses such threats to the environment when the state is not adequately funding regulation and monitoring of the existing hatchery and enhancement program. We concur with the recommendation of the Fin Fish Farming Task Force that the state should conduct a thorough review of fish enhancement activities to determine whether the state's disease and genetic policy is being adhered to. We think such a review would have some eye opening outcomes.

In conclusion SEACC supports passage of HB 432 and urges this committee to get the wheels rolling on a review of the state's genetics policy to see whether or not it is being strictly followed. We also support the recommendation of the Task Force and the American Fisheries Society that calls for establishing wild fishery reserves for the purposes of protecting those stocks for future use.

A LIST OF ECOLOGICAL PROBLEMS ASSOCIATED WITH FISH FARMING

1. Degradation of water quality near marine fish farms from feed, fecal matter, chemicals and other waste products.

   Pollutants discharged from a typical fish farm in Washington is equivalent to the discharge of untreated sewage from 5000 people.

2. Groundwater contamination from upland fish farm discharge. Fish diseases are commonly transmitted through water sources, not just contact.

   The deaths of 100,000 cohos in a Washington River located near a landlocked fish farm have been linked to the seepage of water discharge from the farm. Seattle PI, Nov 1, 1989

3. The extensive use of antibiotics and other medication by fish farms to fight disease pose potential threats to human health and give rise to the development of resistant strains of bacteria.

4. Broodstock ownership, genetic mutations and alterations of broodstock by private businesses would threaten common property ownership of fisheries. Sources of broodstock would be a major concern.

5. Genetic intermingling of wild fish stocks with farmed fish unsuited to survival in the wild could weaken and alter wild fish runs.

6. The spread of disease among wild fish by farmed fish.

   Genetics and disease problems at Norwegian fish farms are well known.

   Alaska has the healthiest stocks of wild salmon and other wild fish in the world. Commercial, sport and subsistence fisheries depend on the continued health of the State's wild fish resources.

   The release of diseased fish by a fish farmer located in a remote, isolated bay would be almost impossible to prevent because enforcement would be costly and not effective.

7. The potential for higher rates of disease infections in wild fish in waters near net pens.

8. Fish farms attract seals, sea lions, birds, otters, bears, and other animals in significant numbers.

   There is tremendous pressure for a fish farmer to simply "eliminate" the predators rather than continue to have their profits "eaten" up. Enforcement of the Marine Mammal Protection Act, the Bald Eagle Protection Act and other wildlife conservation measures would be almost impossible due to the isolated location of many fish farms.

9. Land use conflicts over farm siting.

   Fish farms are often in conflict with other land uses including: shellfish farms, residential areas, recreation, boat harbors, safe anchorages, sport fishing, subsistence, and high value fish and wildlife areas.

10. The necessary water supply for upland tank farms is enormous and could potentially cause significant use conflicts.

    A 200 ton upland tank farm uses 50 cubic feet of water per second, a rate equal to the use of Eugene, Oregon.

11. The Fin Fish Farming Task Force acknowledged that these ecological threats can never be eliminated - only minimized.

    Minimizing risks would mean more state regulation which would result in a substantial cost to the state. To allow fish farming would require vast amount of state money, time and personnel.

Fish farms only employ an average of 3 people per farm. Many Alaskans maintain that the risks and costs associated with fish farming do not outweigh the benefits for a few.

MISCELLANEOUS INFORMATION REGARDING THE RISKS ASSOCIATED WITH FISH FARMING

An October, 1989 research report submitted to Pacific Marine Fisheries Commission (PMFC) by Dr. Arthur Whitely and Annamarie Johnstone presented the following observations:

> There is no medical or public health regulation on the use of antibiotics and other medications other than FDA approval of three drugs. There is no monitoring by agencies on these drugs or their persistence in marketed fish.
>
> The amount of drugs used in fish farming is enormous. Norway used 48 metric tons of Oxytetracycline alone in 1989!
>
> No data exists for measuring the length of time antibiotics remain in fish after they have been medicated. Fish in colder temperatures retain residues of antibiotics for longer periods of time.

Thousands of farmed Atlantic salmon have escaped from net pens in Washington State and British Columbia. Hundreds of thousands of farmed Pacific salmon have escaped from pens, especially in British Columbia. Seattle PI, March 5, 1988

In fall of 1989, an algae bloom hit Washington State fish farms causing massive fish die offs, killing up to 80% of the fish at ScanAm Fish Farms, Tilfin Inc and Olympic Sea Farms.
Seattle PI, September 9, 1989 and wire reports

Fishfarms are killing Pacific salmon smolts & fingerlings because they have proven uneconomical to raise. Only Atlantic salmon have proven economical. Testimony of Tim Kennedy at Finfish Farming Task Force meeting, September 1989.

There is a surplus of 100,000 metric tons of salmon on the world market. Supply exceeds demand by about 14%. Finfish Farming Task Force Report, 1989

HOUSE COMMITTEE REPORT

(9)
Date Referred: January 19, 1990

Date of Committee Action: 3/14/90

FURTHER REFERRALS:
JUDICIARY

The RESOURCES Committee considered: HB 432

HOUSE BILL NO. 432 PROHIBITION OF FINFISH FARMING

"An Act prohibiting finfish farming; and providing for an effective date."

RECOMMENDATIONS:
[X] be replaced with CS HB 432 (RES) [ ] the same title [ ] a new title
[ ] have attached amendment(s)
[X] do pass
[ ] do not pass
[ ] no recommendation
[ ] individual recommendations
[ ] additional referral to the ______ Committee

ADOPTS: ______ letter of intent

ATTACHES NEW FISCAL NOTE(s): (Dept)
[ ] fiscal impact ______
[ ] zero fiscal note ______
[ ] zero with analysis ______

APPROVES PREVIOUS: (Date/Dept)
[ ] fiscal note(s) ______
[ ] zero fiscal note(s) ______
[ ] zero fn/analysis ______

SIGNING DO PASS:

SIGNING: (Check approp. column)

Name	Do Not Pass	No Rec	Amend
	X		
		✓	

Chairman's Signature

STATE OF ALASKA

OFFICE OF THE GOVERNOR

BILL ANALYSIS

DEPARTMENT	DIVISION	BILL NUMBER	SPONSOR
Fish and Game	FRED	SB 397/[redacted]	Eliason, et. al., Grussendorf, et. al

SHORT TITLE OF BILL

Prohibition or finfish farming

DEPARTMENT POSITION

Neutral

PREPARED BY	DATE	COMMISSIONER'S SIGNATURE	DATE
Brian J. Allee, Ph. D.	2/1/90	[signature]	2/8/90

SUMMARY

OTHER AGENCIES AFFECTED BY BILL	CONSTITUENT GROUP(S) AFFECTED BY BILL
Dept. of Environmental Conservation, Dept. of Natural Resources, Dept. of Commerce and Economic Development, OMB, Div. of Governmental Coor.	Commercial fishermen, sport fishermen, PNP hatchery operators, Regional Aquaculture Associations, Recreational Interests, Upland owners and Managers.
ORGANIZATIONAL SUPPORT FOR BILL	**ORGANIZATIONAL OPPOSITION TO BILL**
UFA, various commercial fishing groups and environmental groups	Potential private for profit fish farmers

FISCAL IMPACT ☑ NONE ☐ FISCAL NOTE ATTACHED

BACKGROUND/LEGISLATIVE INTENT

SEE ATTACHED

ANALYSIS OF BILL/PROGRAM EFFECTS

SEE ATTACHED

AMENDMENTS PROPOSED

SEE ATTACHED

PLEASE ATTACH A SEPARATE SHEET FOR ADDITIONAL COMMENTS OR ANALYSIS.

[illegible] 3-[illegible]

STATE OF ALASKA
89 90 LEGISLATIVE SESSION

BILL VERSION : [illegible]
PUBLISH DATE : 1/19/90

FISCAL NOTE

REQUEST:

Revision Date: _____
Title : Prohibition of finfish farming

Agency Affected : Fish and Game
BRU : FRED

Sponsor : Ellason et. al., Coussenger, et. al
Requestor : Steve Cowper

Components : _____

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

ANALYSIS : (Attach a separate page if necessary)

FY 90
See attachments.

Prepared by : _____ Phone : 465-4160
Division : ADF&G, FRED Division Date : 1/30/90

Approved by Commissioner : _____ Date : Feb 5 1990
Agency : ADF&G

Distribution (by preparer) :
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

Bill Analysis SB 397/HB432

Background/Legislative Intent

In 1987, the Alaska State Legislature passed SB 297 placing a one year moratorium on finfish farming. The following year HCS SSSB 514 was passed, authorizing the farming of shellfish and aquatic plants, extending the moratorium on finfish farming until July 1, 1990, and establishing the five-member Alaska Finfish Farming Task Force. The shellfish farming program is currently being implemented. HCSSSB 514 also contained a provision for inland farms in closed waters. The Board of Fisheries however, denied a proposal to make surplus coho eggs available to an interior-based applicant proposing to operate a recycle hatchery. In doing so, the Board of Fisheries asserted that public policy questions pertaining to brood stock acquisition and the privatization of a public resource were questions that should be addressed by the legislature, rather than set by precedent by the Board.

Although the task force was authorized in 1988, it was not funded until last spring. The members were appointed by Governor Cowper and began work last July. The task force recently issued its report and recommended that prior to the end of the moratorium on July 1, 1990, the legislature take statutory action to expressly allow or prohibit finfish farming. SB 397 would prohibit finfish farming by not allowing a person "to grow or cultivate finfish in captivity or under positive control for commercial purposes." As drafted, the state and PNP hatcheries would remain unaffected.

Amendments Proposed

On Page 2, lines 1-5, the third finding asserts that serious disease and genetic risks are posed to wild stocks. As the FRED Division has stated on the record, in legislative hearings and to the task force, if a properly managed, regulated, and funded pathology and genetics program were in place, similar to that run by the FRED division for current public and private non profit hatcheries, then commercial farming of finfish would not pose a serious risk to the health and genetic integrity of wild stocks.

Sale of finfish under a scientific or educational permit is not allowed currently. Accordingly on Page 3, Section 2, the department recommends deleting item 3.

With regard to Section 2, item 4, the department recommends extending the sentence. After the word "ponds", insert: "provided these fish are not reared or released into waters of the state."

6-1973E
Utermohle
3/12/90

Original sponsor(s): REP. GRUSSENDORF, Ulmer, Goll, Davidson, Navarre, Wallis, Hudson, Taylor, C.Davis, Jacko, Kubina, MacLean, Swackhammer

IN THE HOUSE

CS FOR HOUSE BILL NO. 432 ( )

IN THE LEGISLATURE OF THE STATE OF ALASKA

SIXTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act prohibiting finfish farming; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. FINDINGS. Based on a legislative examination of the potential effects of allowing finfish farming in the state on the common property resources and on the overall economic well-being of the state; the number of serious concerns associated with finfish farming and the need for study of finfish farming that has caused the legislature to enact two moratoriums on finfish farming and establish a nonlegislative task force to study the issue and to report its findings and recommendations to the legislature; a review of the final report of the Alaska Finfish Farming Task Force which notes several possible benefits and some serious risks of finfish farming; the need for the legislature to take action before the current moratorium on finfish farming expires on July 1, 1990; the recommendation of the task force that the legislature not extend the moratorium, but make a final determination to either allow or prohibit finfish farming; and the testimony and evidence received; the legislature finds that

(1) the state has the healthiest stocks of wild salmon and other wild finfish in the world and benefits from thriving commercial, sport, and subsistence fisheries for these fish and a growing tourism industry related to sport fishing;

(2) the people, economy, and environment of the state are dependent in large measure upon the continued health of the state's wild finfish

resources;

(3) serious risks are posed by commercial finfish farming, including the spread of disease among wild fish by farmed fish, genetic intermingling of wild fish stocks with genetically manipulated farmed fish, degradation of water quality near finfish farms, and land use conflicts over the siting of commercial finfish farms;

(4) the state has invested significantly in marketing efforts to promote Alaskan finfish as wild and natural fish products, and this investment in developing the reputation of Alaskan finfish would be lost by allowing commercially farmed finfish to be produced and marketed from Alaska;

(5) the cost to the state to regulate the commercial finfish farming industry would be high;

(6) few jobs would be generated by a commercial finfish farming industry in the state;

(7) the state is responsible for ensuring the protection and wise use of the renewable natural resources of Alaska and providing a framework for a sound economy;

(8) a long-term decision must be made regarding the future of commercial finfish farming in the state;

(9) avoiding harm to the state's wild finfish, land, and water resources must take precedence over the development of a new speculative and potentially harmful commercial finfish farming industry;

(10) the best interests of the state are served by prohibiting commercial finfish farming.

* Sec. 2. AS 16.40 is amended by adding a new section to read:

Sec. 16.40.210. FINFISH FARMING PROHIBITED. (a) A person may not grow or cultivate finfish in captivity or under positive control for commercial purposes.

(b) This section does not restrict

(1) the fishery rehabilitation, enhancement, or development activities of the department;

(2) the ability of a nonprofit corporation that holds a salmon hatchery permit under AS 16.10.400 to sell salmon returning from the natural water of the state, as authorized under AS 16.10.450, or surplus salmon eggs, as authorized under AS 16.10.420 and 16.10.450;

(3) rearing and sale of ornamental finfish for aquariums or ornamental ponds provided that the fish are not reared in or released into water of the state.

* Sec. 3. This Act takes effect July 1, 1990.

A tale of two islands

One Maine island community decided to try salmon farming to supplement its traditional income from fishing; the other said, "No way."

By Nancy Griffin
Field Editor

The craggy, convoluted coast of Maine is studded with many islands where shrinking communities of rugged individuals stubbornly cling to a year-round way of life that grows increasingly more difficult to maintain.

Two such communities are Swans Island and Vinalhaven, somewhat different in size but with many common features. Most of the year-round families on both islands have lived there for generations. Most of those families now depend solely on lobstering for their livelihood, which means they saw their incomes drop during the past year along with the price of lobster.

There's another common thing: each community was approached during the past two years by companies from off-island wishing to establish salmon farms. Here the differences begin. Vinalhaven residents resoundingly and unequivocally rejected the aquaculture idea, while Swans Island people wrestled with, studied, argued about and finally accepted the notion.

"We have to use the sea," says Bruce Colbeth of the Swans Island Fishermen's Co-op. "Not everyone wants to be a lobster fisherman, and we don't have the option of commuting 20 miles to work, or bringing raw materials to the island, putting them together and shipping them out. We either work on the island or move out."

Swans Island is 7,500 acres with 350 year-round residents. Summer residents swell the population to 800. Vinalhaven, reached by ferry from Rockland, has 1,200 year-round residents and a summer population that reaches nearly 6,000.

Town officials in Vinalhaven were approached in September 1987 by a Norwegian representing a company called Atlantic Salmon (Maine) Inc. Frank Gjerset sought a 10-year lease for 25 acres of bottom off Vinalhaven, a specific site adjacent to the White Islands area.

"The first most townspeople heard of the proposal was a sheet of paper posted around town announcing the public hearing," says Victoria Dyer, who was then Vinalhaven's town manager. "It would have been nice if a representative of the firm came in first and explained to people what they wanted to do."

Observers say this failure to approach people and win them over to the idea probably did more harm to Atlantic Salmon's cause than anything else. The proposed lease area was prime lobster and scallop bottom, heavily used by the island's fishermen. Not only did lobstermen fear loss of access to the 25-acre spot, but they worried about contamination to nearby bottom from salmon droppings, antibiotics used in the pens, chemicals used in the fish food and diseases such as those that plagued Norwegian fjord-based pens and Swedish pens more than a year ago.

Islanders also expressed concern that the Norwegian company would bring workers from off-island, and, while local fishermen would lose some of their traditional fishing territory, little of the revenue generated by Atlantic Salmon would stay on Vinalhaven.

Five hundred Vinalhaven residents flocked to the public hearing in February 1988 ready to show their opposition to the proposal. They never had the chance. The meeting ended at 2 a.m. with the company still presenting its case and townspeople asking questions.

Officials decided to continue the public hearing in April, when townspeople who had signed up as interveners could present their side. In the interim, the town held a non-binding referendum on the proposal, and voters rejected the idea, 5 to 1. Shortly before the scheduled reconvening, Atlantic Salmon withdrew its proposal.

In a letter to the Commissioner of Marine Resources, the company said its reasons for withdrawing included the emotionalism and misinformation raised by some opponents.

"There was a lot of emotionalism, but also people who attended the meeting had legitimate concerns that were not addressed," says Emily Lane, the current Vinalhaven town manager, then a selectman.

"I did a lot of research, and I still think it's a terrible idea," says Maudeann Warren of Vinalhaven. Her husband, Roger, is a sixth-generation lobsterman. "They talk about jobs, but the average is only about three to five jobs per farm. I think it's tragic to see big corporations taking the life blood of small communities," she says.

A Different Approach

Swans Island residents watched th process with fascination. Just as the Vina haven saga was ending, they we approached about a salmon farming oper tion. The approach, however, was differe

"One man from Ellsworth came a talked first to me," says Colbeth, himself former lobsterman who plans to return his traps in a few years. "We were inte ested. But we'd just read in the papers the bad things about aquaculture, so we d a lot of research. We kept an open mind

Fishermen were invited to discuss t proposal presented by Mariculture Produ Ltd. and decide if they wanted to inves gate it further. "After " " says Colbe "They were the ones with the most to los

After three informational discussi meetings, the lobstermen told Colbeth pursue the project. Together, they cho 465-acre Toothacher Cove, parts of wh were heavily lobstered while other pa were not lobstered at all. The ones w fished in those areas were willing to give up for the good of Swans Island.

Then in March, things went haywi Colbeth reports. "We found handfuls papers this thick under windshields and the co-op — all over the island — full bad stuff about salmon farming. After read three or four pages, I felt sick. T president of the co-op read it and sudden turned against the project," he says.

Colbeth, however, felt the information packets represented propaganda. "I sai 'I've got to find out the truth.'" He drove Canada, visited several fish farms, inte viewed lobstermen in New Brunswick com munities with a video camera, and viewe videos that divers took periodically of th bottom under the pens at 50 different site

"The first two questions I asked everyo were: What about salmon pollution? An what about antibiotics?" says Colbeth. don't even know how they can call it poll tion. What are they going to do, stop all th fish from going to the bathroom in th water? Fish have to excrete. Pollution is n the right word; it's just a scare tactic wor

"One farm I looked at was beside fi weirs, and it also had lobster and clam fla right next to it," says Colbeth. "Everyone talked to was happy. A lobsterman the who was the biggest opponent of salmo farming now has 25 pens of his own. H said he was wrong."

The sea farming operations Colbe toured were small, tidal action was stron and no buildup showed under the pens. addition, Colbeth says the aquaculture ve tures were mainly owned by small oper tors who were often lobstermen.

One of the damning things found packets distributed on the island was newspaper picture of a clammer holding fistful of slime described in the caption salmon gurry from a pen site. When Co beth went directly to the office of the *St Croix Courier* and asked about the pictur a staffer provided him with a copy of th

retraction that had run the following week, explaining that the slime was a form of algae, not salmon gurry.

To quell concerns about antibiotics, Colbeth investigated what was used in Canadian pens. It turned out the two antibiotics used are both U.S. Department of Agriculture approved and are commonly used in lobster pounds to prevent red tail. "No one seems to have a problem with using it in lobster pounds," Colbeth says.

Colbeth also checked out stories about disease-ridden salmon farms in Norway. He found out that the Norwegians moved the pens from the still waters of the fjords to the open ocean to solve the problem.

Opposition

Lee McCarthy summers on Swans Island in a camp situated down the cove from the salmon pens. She opposed the farming operation and still does. She says her opposition arises strictly from environmental concerns.

"They sidestepped every possible environmental protection that was part of the law. Those pens violate Department of Environmental Protection minimums for the depth of water under the pens," says McCarthy.

She says intense political pressure brought to bear by Mariculture Products and the state Department of Marine Resources won a three-year probationary permit from the Army Corps of Engineers for the farming venture despite demands from the Environmental Protection Agency, National Marine Fisheries Service, and Fisheries and Wildlife Service that the project be cut back by 90%.

"I quickly found out the position of state agencies is: This will introduce jobs," says McCarthy. "I understand the state is interested in the economic viability of coastal communities, but we think they've jumped head first into a difficult issue with side effects people are just beginning to understand.

Bruce Colbeth (standing) of Swans Island visited salmon farms in New Brunswick and talked to local lobstermen and fishermen about their reactions to the operations before he decided in favor of a farm for his community. James Acheson (sitting), from the University of Maine, supports the idea of salmon farms in the state.

"Those fish are dropping 1,500-2,000 lbs. of waste products into the cove every day. Lobstering and scalloping are threatened," says McCarthy, who's read of the dangers of disease and pollution around fish farms in reports from Japan, Scotland and Norway.

"If scallops are in any danger from salmon farming, it won't be in Toothacher Cove," says Swans Island fisherman Kenneth Lemoine Jr. He's scalloped during the winter for several years. In a 15-minute tow where the pens are now, he says, you might get five scallops if you are lucky. "More likely you'd get three, or maybe one. As far as scallops go, that's waste bottom. It's just mud," he says.

"The species most likely to be affected by any pollution around salmon pens are the salmon themselves," says James Acheson, University of Maine professor of anthropology and marine studies and author of *Lobster Gangs of Maine*. Acheson toured salmon farms in Norway and Sweden last year and has read extensively on farming operations in other countries as well.

"To my knowledge, no damage is likely to occur to shellfish," he says. "If there was any pollution, shellfish would be more likely to thrive than the salmon. I see a more serious conflict between salmon farming and industry. Industry wants the right to add some pollution to the water, and fish farms can't stand any."

In Sweden, Acheson says he saw lots of empty fish pens. Fish had been wiped out in 1988 by disease due to overstocking and fish pens placed too close together. "They just didn't have the tidal flushing to get rid of it like we [in Maine] do," he says.

Comparing other countries or even other coasts to Maine is like comparing apples and oranges, says Acheson. "We probably have the ideal environment for fish farming, and using data from other places involves an interesting use of mis-scientific information."

Acheson believes the objections most people have to aquaculture revolve around a certain image of the state of Maine. Lobster boats are okay, a few other boats passing by are okay, but looking out at fish pens is not. It ruins the view and makes homeowners worry about property values.

Other Problems

If environmental issues were settled suddenly to everyone's satisfaction, salmon farms in coastal Maine still face economic risks, especially in winter. Superchill, which sometimes lowers coastal water temperatures

dramatically, can kill fish. Predators or storms can rip nets and release the salmon, or allow other predators in to destroy them.

A big difference between the experiences of Swans Island and Vinalhaven is that when Mariculture approached Swans Island, it promised to help set up any residents who wanted to get into salmon farming.

"We're using them for jobs, for expertise, for benefits such as insurance," says Colbeth. "We lose a lot of people from the island because they don't want to go lobstering. It's a hard job, and lobstering means you have to be self-employed. We can't have a year-round community without people.

"This is one of the things that can save our coastline. I think the summer people were the start of all this wild emotional speculation. People who come up for two or three weeks, maybe a month, and they don't want to look at salmon pens.

"It's very unfair to the natives who live here," says Colbeth. "I don't mind true facts; I want to hear it. But saying things that are not true is unfair to the people of the coast of Maine. They've made up some nice ones, I'll tell you.

"Fishermen hear it, and it is scary what they're saying. So the fishermen get behind them, like on Vinalhaven. We heard the same stories, but we investigated them and found out they're just not true."

New Brunswick provincial officials and biologists have been compiling a database of information during the past 10 years about the many salmon pens operating in their province.

"Initially, we took the strong position that we wanted to go relatively slow on the numbers of fish in cages; that's one reason the videos show it's clean under the pens. Tidal action is another," says Russell Henry, biologist with New Brunswick's Department of Fisheries and Aquaculture.

"Our whole objective is to carry out environmental studies to establish, from a solid data base, what are good levels. We did it more from a disease perspective," Russell explains. "It all goes together. If there are less fish, there is less stress and less potential for disease. The environmental impact will also be less.

"We can foresee pressure for increasing the numbers over the next three or four years. We want to be able to say, 'Yes, you can,' or 'No, you can't,' based on site-specific data," he says.

Underway

This winter, Swans Island has seven salmon pens on 18 acres, with plans to open another 11 pens in the spring. Unlike other operations — even New Brunswick's, which raft pens together — Swans Island pens each sit alone on an entire acre. No antibiotics are being used, and some of the 204,000 fish are up to 3 lbs.

When the Norwegians started farming, their pens contained between 8,000 and 9,000 fish per cubic foot of water in 3' tides. A Canadian experimental fish farm operator recommends maintaining only 1 lb. of fish per cubic foot of water to insure against disease.

"We actually have only two-thirds of a pound of fish per cubic foot of water and 10' tides," says Colbeth of the Swans Island operation. "We're not taking any chances. There is not a trace of anything under the pens. Divers go down weekly and check it out."

Four people are employed full time now, with several seasonal part-time employees. The plan is that when the operation expands to18 pens, the farm will have 10 full-time employees.

"I don't blame Vinalhaven for what they did. If fishermen didn't favor it, I wouldn't," Colbeth says. "I understand the company that approached them was going to bring their own people in and not leave much behind. If that was the case, I don't blame them a bit. All I can say, from what I've experienced and seen and from people I've talked to, there's no problem with the bottom under pen sites."

"At the time [of the Atlantic Salmon proposal], I was caught up in the island's [Vinalhaven] position," says former town manager Dyer. "In the meantime, I've followed with interest what's happened on Swans Island, and I've eaten farmed salmon.

"Now I think it's going to be valuable to Maine. I hope the errors that have been made in other places can be avoided. Maybe people on the coast can have another resource so they don't have to depend only on lobsters for their income," Dyer says. □

Alaska Mariculture Association

TO: House Resources Committee

FROM: Rodger Painter
Executive Director

DATE: March 5, 1990

RE: Finfish Farming Information

Attached are two recent articles that may be of some interest to the committee. The Fish Farming International article contains estimates from the UN's Food and Agriculture Organization that worldwide aquaculture production now tops 13 million metric tons worth $19 billion. When the legislature first started debating the fish farming issue four years ago, the FAO estimated world production at 10 million tons.

Members concerned about market impacts of farmed fish on Alaska salmon should read the article from the Alaska Fisherman's Journal. The article shows the interest of seafood buyers and consumers in fresh seafood, and underscores the importance of Alaska's involvement in finfish farming to meet market demand.

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fish farming
INTERNATIONAL

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HARVEST TOPS 13 MILLION TONS

WORLD production of aquatic products by farming is now estimated to be well over 13 million metric tons a year. Based on figures compiled by the Food and Agriculture Organization (FAO), this is a big increase on the earlier estimate of 11 million tons. The value of the harvest is around US$19 billion.

— and it's worth $19 billion!

Details of farm production by species and countries are given in the December 1989 bulletin of the FAO Aquaculture Development and Coordination Program (ADCP), which points out that part of the apparent rise may be due to more countries reporting their aquaculture harvests. Figures are now based on 142 countries and details in the bulletin are for 1987.

The ADCP terminated at the end of 1989 after 13 years. It began officially in 1977 after the big FAO Technical Conference on Aquaculture in Kyoto, Japan. It was funded by the UN Development Program (UNDP) with the purpose of implementing the Kyoto development strategy.

Among its activities to be continued by FAO will be the publication of the bulletin giving production figures.

The latest estimate of 13.2 million tons, shows that 11.1 million tons (84 per cent) was farmed in Asia, 1,047,593 tons (7.93 per cent) in Europe, and 449,993 tons (3.41 per cent) in North America.

China again topped the world league in volume of production, with 5.6 million tons (42.6 per cent of the total). This was followed by the 1,226,190 tons of Japan, 876,788 tons of South Korea, and 746,300 tons of India.

Finfish (6.8 million tons) accounted for 51.4 per cent of world production, seaweeds (3.14 m tons) 23.8 per cent, molluscs (2.67 m tons) 20.2 per cent, and crustacea (574,906 tons) 4.4 per cent.

Alaska Fisherman's JOURNAL March 1990

Alaska Seafood:

The View From

by Laurie Underwood

Alaska product.
For Alaska fishermen, it's everything. But for a distributor, Alaska product is just a small fraction of the seafood coming in and out of the warehouse from Asia, Latin America and throughout North America. For retailers, Alaska product is one item stocking the seafood counter – which is just one section of the meat department. And for consumers, Alaska seafoods offer a few more options in a supermarket full of the makings for convenient and affordably priced meals.

So how does Alaska product measure up? To find out, the *JOURNAL* called on seafood distributors and retail buyers around the country. Buyers in California, Oregon, Texas, Minnesota and Washington, D.C., offered insight into what Alaska suppliers are doing right and wrong, and how to compete better in today's fickle marketplace.

In a nutshell, buyers rated Alaska product as "top quality." However,

'... in terms of a 52-week-per-year business, I don't even consider Alaskan product anymore.'

as competition steps up from cultured and imported product, many say that Alaska suppliers need "to modernize" – to provide more fresh product, "retail ready" processing, and reliable supply and price information. Here's what they said:

HALIBUT:
Demand is High; Supply Problems Stifle Fresh Sales

The good news is that halibut seems to have a secure market niche around the country, with demand for fresh halibut high on both coasts and even in the Mid-West.

"I have to say [Alaska suppliers] have a pretty good thing going in that nothing competes with halibut. I know several people that just go crazy with the fresh halibut season. There's nothing like it," says Jeff Dulcich, vice president of sales and marketing for Pacific Sea Food Company based just outside Portland, Ore. PSF operates five distribution plants in California and Oregon. In the Northwest, Dulcich says, the only competition halibut faces comes from consumers who are not familiar with it. "Shark, swordfish and salmon compete with it head on. And cod competes with people who are very price conscious."

The scene is much the same in Los Angeles. At Von's supermarkets of Southern California, seafood buyer Rory Frank says that halibut is his top Alaska item. However, frozen halibut now competes on the freezer case with orange roughy from New Zealand and sea bass from Chile. Meanwhile, in the fresh case, many customers are hooked by lower-priced fish like "red snapper" (rockfish), perch and farmed catfish.

Even with heightened competition, retailers agree that demand for fresh halibut remains strong. "I don't think it competes really with any fish, except in some degree with swordfish and shark, being a white-fish fillet," says Peter Gryska, manager of seafood marketing for H.E. Butt Grocery Company, which operates 160 supermarkets throughout Central and South Texas. "I don't think [halibut] compares with other fish. It has its own place."

While buyers are happy with the demand for fresh halibut, most are unhappy with the supply. The chaotic atmosphere of the derby wreaks havoc on retailers' advertising campaigns. "I really object to the way the halibut is fished because it is so difficult to market and plan a fresh promotion," says Gryska. "It's a carnival atmosphere for the week it comes in and because of weather and everything, you never know if you're going to get it when you run your ad. And then its gone. So you just got everybody hooked on the product and it disappears."

"We could all sell more halibut if there was more fresh to sell, if the season were longer," says Ken Mills, director of perishables for United Grocers Inc., based outside of Portland, Ore. "And no one has anything to do with that except the government." Many retailers are supporters of the Seattle-based organization F.I.S.H. (Finding Intelligent Solutions to Halibut), which is working to increase fresh halibut availability by extending the season to nine months.

Besides the short season, retailers also complained that it is difficult to get clear information on openings. "The only problem I have with Alaskan seafood, on fresh side is how confusing the seasons are," says Gryska. "For example, here it is the beginning of the year and I am trying to roughly plan out what my advertising schedule will be. I don't know when there's gonna be an Alaska halibut opening. I have an idea it's going to be May. But whether it's the first week or the last week makes a big difference. If it's going to be something that's planned, let's plan it."

Getting information on supply and price can also be a headache for retailers. "One year, I literally had halibut in the air and I could not get a confirmed price," says Gryska. "Every May and every June, people call me up and say, 'Are you going to run any halibut? Are you going to run any salmon?' And I say, 'Sure. How much have you got available?' I don't know. 'What's the price?' I don't know. 'When are you going to have it? Sometime ... Do you want to book any? I mean, Give me a break!"

WILD SALMON:
Stiff Competition from the Farms

Many of the difficulties of short supply and lack of information posed by fresh halibut also plague the fresh wild salmon industry. Some retailers are bitter about being excluded from bidding on fresh salmon destined for sale overseas, predominantly to Japan. "When there's no fresh salmon available out of Alaska because it's all being sold for export, that's aggravating for a retailer and to me as a buyer and the consumer on the West Coast," says Mills of United Grocers in Oregon. "Here we are, one of the 50 states, and Alaska fisheries sell all of [the salmon] overseas. Shame on them. It doesn't instill a whole lot of loyalty. If they get a better price somewhere else, then God bless them. But at least give us a chance to bid."

The primary difference between

The Lower 49

supply problems with salmon and halibut is that, with salmon, many buyers have found a convenient alternative: fresh farmed salmon. Many have turned to it as the leading source of their salmon year round.

"What it's done is it's collapsed the frozen market here," says Dulcich, speaking of the Portland market. "They can get fresh fish all year long, and the perceived value of fresh fish is significant in Oregon. In fresh salmon, it's kept the price down in both wild and farmed."

"I am very sold on aquacultured product," echoes Gryska of HEB. "For consistency in price, consistency in quality, consistency in availability, nothing touches the fresh product out of the Northeast. Yes, during the summertime, chums and silvers are lower in cost than the East Coast product, but in terms of a 52-week-per-year business, I don't even consider Alaskan product anymore."

"It's just so easy for us to order farm-raised product. Why get all these headaches? Farmed product is always there, you're not waiting, whether you want 500 or 5,000 pounds," says John Hoppenjans, seafood buyer for Giant Food Inc. of Washington, D.C. The 148-store supermarket chain carries a small amount of fresh salmon in retail boxes; they carry fresh farmed salmon (mostly from Scotland) year round.

One of the marketing leverages that wild salmon suppliers have relied upon is the perception that wild product has a better taste and texture than farmed. Do consumers around the country perceive a quality difference between the two? Retailers say "yes," but add that preferences vary from region to region.

In the Northwest, there is a perception that wild salmon is richer and more flavorful, says Dulcich. "I think right now, wild has the connotation of being better, in Oregon at least." He adds that, for Oregonians, salmon is seen as an Oregon-area product, which has added appeal for consumers.

The perception is quite different in the Midwest, however, says seafood merchandiser Carson Roper of Lunds supermarkets in Minneapolis. "A lot of our customers were brought up on fish sticks. They equate flavor with 'fishy.' They prefer the milder flavor of farmed salmon."

A former Alaska fisherman himself, Roper believes that with a little consumer education, the market for wild salmon will preserve its niche. "There has been a transformation in the industry. But there will always be a market for wild caught salmon," says Roper. "A 7-to-11 pound king salmon is perfect for steaking. A lot of farmed fish is 1-2 or 2-4 pounds. When it comes to steaks, there'll always be a market for wild salmon."

Another hurdle that wild salmon suppliers face today, especially in the East Coast, is consumer fear of water pollution. Consumers in the Mid-Atlantic region tend to assume that farmed product is "cleaner and healthier" with "less chance of environmental effects," says Hoppenjans of Giant.

POLLOCK: Fillets Still Suffer from Name Games; Surimi Secures Market Niche

Some retailers are still feeling the delayed effects of the 1985 FDA ruling that made it illegal to market pollock under the name "snow cod."

"It's hurt sales, it really has," says Ron Corno, senior meat merchandiser with Fleming Foods of Milwaukie, Ore. Fleming now markets pollock either as pollock or "Alaska Whitefish."

"We had people programmed," says Corno, referring to snow cod. "Now people think it's a different item. It'll take some time to get its credibility back."

"Whitefish is a pretty generic name," adds Fleming meat deli merchandising manager Roger Kirkhart. "It just doesn't make you hungry at the sound of it."

Under any name, pollock faces stiff competition with other lower-end, price-value items, retailers say. "The way we sell pollock, it is competing directly with things like the farm-raised catfish nugget, frozen Canadian cod, and frozen South American fillets such as trout and whiting," says Gryska.

Surimi seems to enjoy a more secure market around the country. "It very much has a niche. We use it in ads regularly," says Corno. "I've not seen any decline in movement. As long as Dungeness and Alaska king crab prices stay at the present level, it'll hold its own."

"There's a strong following for surimi. It's convenient, it's an affordable alternative," adds Roper of Lunds. The Minnesota-based chain of eight stores carries four brands of surimi sticks and flakes. Roper feels that surimi markets will continue to grow as new products are developed. "The first generation was crab. Then came lobster, shrimp and scallops. The third generation will be oven-ready products. That to me is the next logical step: surimi pot pie, quiches, things like that."

'I know several people that just go crazy with the fresh halibut season.'

Halibut Processors Counter F.I.S.H. Flap

The halibut industry may have some problems, but fishing for F.I.S.H. is not going to solve them.

That was the gist of the message delivered by Ralph Hoard of Jolcie Seafoods to fishermen and members of the International Pacific Halibut Commission during its annual January meeting in Seattle. Hoard is president of the Halibut Association of North America. The group, known as HANA, represents 45 major buyers and processors of halibut from Alaska, British Columbia, Washington and Oregon. Together they purchase about 75 percent of the product delivered by West Coast longliners.

To understand the halibut beef, one must first know there are fish and then there is F.I.S.H. The latter is a group largely made up of [illegible] and retail and users of halibut, but who have spent the better part of a year lobbying for change in the halibut industry. Their message is simple: Find Intelligent Solutions for Halibut. Specifically, they want a system that will provide fresh halibut to consumers nine months out of the year. They say they don't care how the fishery is organized, but

continued on page 18

MEETING BUYER DEMANDS: Retailers Want Fresh Fish, Ready-To-Sell

Throughout the country, buyers had three basic messages to Alaska suppliers: We need more fresh fish; we need it on time; and we need more pre-cut, "retail-ready" product.

"It's a lot of work, but in the end, the customer wants fresh product," says Bruce Steinberg, senior seafood buyer for Giant. "A lot of us out here would love to sell fresh Alaska product. There's a lot more that could be done if they would promote fresh fish."

"It's always a supplier wanting to sell me 40,000 pounds of frozen pollock," adds Hoppenjans. "I want to say, I'm sorry, those days are over. If you want to deal with supermarkets, that is, give me fresh pollock fillets and sell it for three times the cost. We want fresh fish in small boxes. Gear it toward my supermarkets, and I'll buy it."

The view was much the same in Los Angeles. "We're gearing up for fresh fish," says Rory Frank of

Von's. "The quality [of Alaska product] is excellent. In frozen fillets, it would be my first choice. But now we are getting more into fresh fish." The chain now sells some 1.6 million pounds of Alaska halibut yearly, as well as salmon and king crab. However, Frank says his overall purchases of Alaska seafood have diminished slightly in the past five years as the store has shifted toward fresh seafood, and flying in other competitively priced species.

sell more halibut if there was

sell, if the season were longer.'

The logistics of air shipping fresh Alaska product poses another problem for buyers around the country, and many recounted halibut and salmon shipping nightmares.

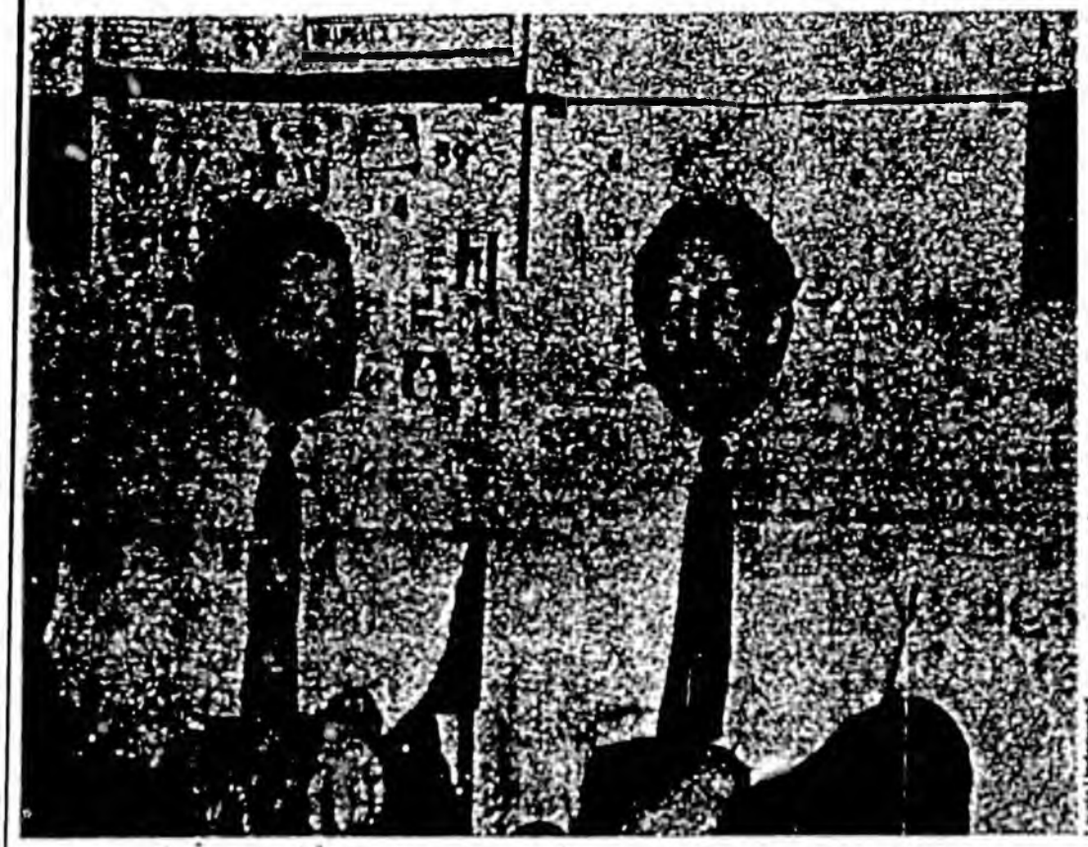
"The biggest deterrent to doing product from Alaska is getting it here on a timely basis with the quality that we expect. It hasn't gotten any better in the eleven years that I've been doing it," says Steinberg of Giant. "You'll find product left in Denver, in Chicago, missed connections. Ask anyone who air freights stuff out of Alaska what a nightmare it is to get it to the East Coast. Just when you think you have got something arranged, the airline downsizes to a plane that doesn't carry containers."

"It's a gamble, especially with halibut," added Roper of Lunds. "Everyone wants to be the first. But you can't all be the first."

Lastly, buyers say Alaska product is difficult to get cut-to-order, or packed in shipment sizes that are convenient for retailers. "There's nothing wrong with the fish. It's gorgeous fish. It's just the processing and handling," says Steinberg. "When the fish is in season, we need steaks and fillets. We can use a substantial amount if we sell an ad, but there aren't many people that are willing to make the extra commitment to selling us the steaks and fillets... The whole mentality is fish in a 40-pound carton with gel ice and a plane that might make it."

"The main thing is being willing to put product in a retail-ready form. Probably the one package style method that does not meet any specification of what a retail store wants to use is a 50-pound wetlock box. That is such an anathema to a retailer. Even worse is a 100-pound wetlock box," says Gryska. "They're difficult to handle, hard to move around. If people really want to get into business with retailers, they've got to put the product in a package that the retailers can use." Gryska says that most of the frozen product HEB carries comes steaked or filleted and ready to sell.

"If someone on the docks of Alaska wanted more money for their product, they could trim the halibut there. Don't just send it down here with the nape on and the tail on. Cut the wings off, cut the tail off, cut the collar bone off, get it into block-ready form. Then the product is worth more," says Gryska, adding, "[Alaskan processors] are much more adept at processing Alaska product than someone in Texas or Kansas."



ser: Roger Korkhart (left) and Ron Corno of Fleming Foods tell what it takes to sell fish in the

FEEDING THE CONSUMER MARKET: Stress Health, Convenience

While buyers say Alaska seafood enjoys a good reputation and healthy demand, competition is fierce and getting fiercer. Ultimately, the fish needs to appeal to consumers. Here's what retailers say about marketing Alaska product to consumers:

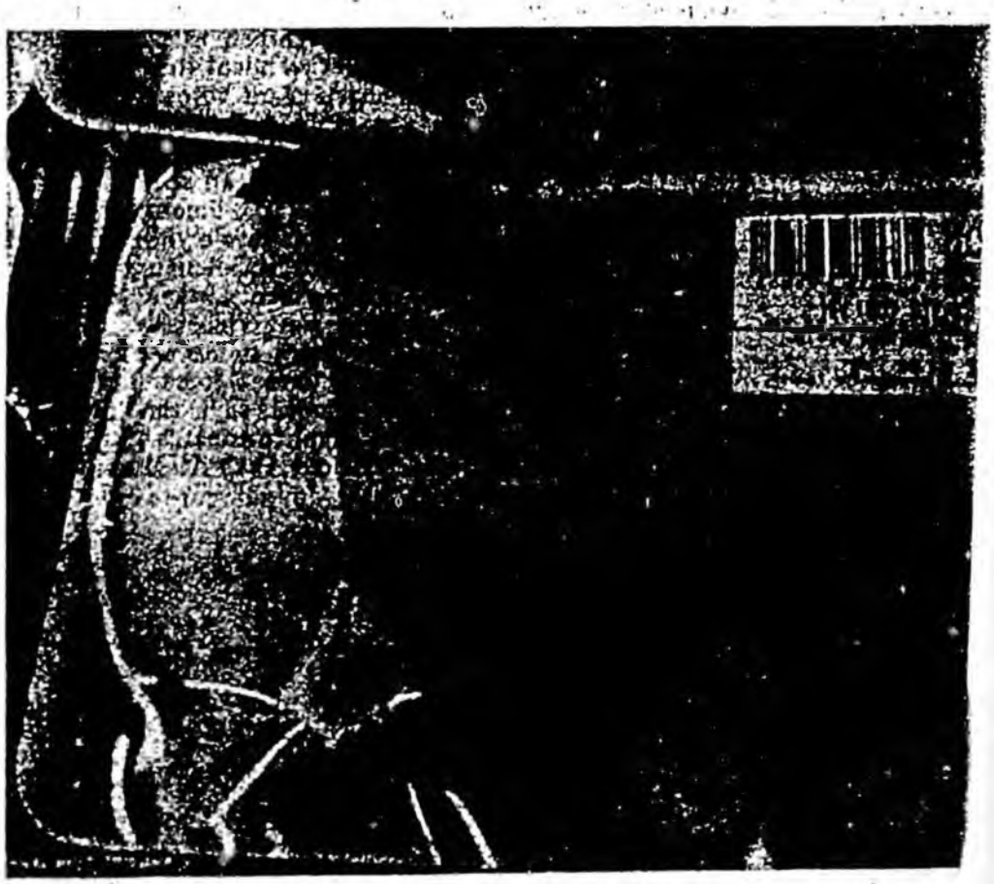
At the consumer level, the seafood industry's biggest competition comes from the rest of the meat department—a fact that few seafood suppliers realize. As Jeff Dulcich assesses the future of the industry, competition from other meats has him a bit worried. "I would think that seafood is in for a little bit of turbulence. One of the concerns that I have is that the beef and chicken councils, all of these other protein items that we compete with, have a good cooperative advertising budget and seafood lacks that," says Dulcich. "You don't compete with just fish, you compete with every protein item in the case—the price of hamburger, the price of chicken."

On the up-side, the endorsement of seafood from the medical and health fields should continue to boost seafood sales, says Dulcich. "The American Medical Association has done wonders for the seafood industry. If that continues, I would expect (demand) to continue to grow."

A lot of Alaska seafood's ability to sell boils down to how it is promoted in the stores. Reports on the quantity and quality of literature provided through ASMI varied around the country. All buyers ranked ASMI publications among the best in the nation; however, the four buyers interviewed in Portland complained of receiving virtually no information. ("They do a marvelous job with what they produce. It's just a matter of getting it to me," says Dulcich, who says he has never been contacted directly by ASMI). Meanwhile in D.C., buyers at Giant say they receive "tons" of ASMI literature, but it isn't promoting the kind of product they are looking for.

"How excited can you get about

'One year, I literally had halib
and I could not get a confirmed



the same frozen salmon steak and the same piece of frozen halibut that they've been selling for 20 years?" asks Steinberg, adding that his customers demand fresh fish and are not enticed by the terms "flash frozen" or "fresh frozen" seafood. "If someone from Alaska marketing could get us some fresh product, we'd be excited about it. We could run a beautiful ad: Fresh Alaska sole, air freighted from the icy waters of Alaska... doesn't that sound appetizing?"

'How excited can you get about the same frozen salmon... and the same piece of frozen halibut that they've been selling for 20 years?'

"Point of Purchase" materials provide another avenue for promoting Alaska seafood, and most retailers said they could use more of them. "The number one marketing tool is recipes. The next thing after that would be brochures, where they talk about nutrition, handling, various ways of cooking," says Kirkhart of Fleming Foods, who adds that charts can help offset competition with other meat items. "Nutritional charts show how much better for you seafood is than the other proteins."

POP materials can also coax consumers who are unfamiliar with Alaska product into trying it. "A lot of people are still unfamiliar with fish. People are always leery of something new. The easier to prepare the more liable they are to buy," says Carson Roper of Lunds. Overall, Roper says that Alaska product simply competes with many more choices than it used to – a trend that will continue. "It's a much more competitive industry. Seafood is hot. Even with all the bad press we're getting, it's becoming more and more competitive."

What can Alaska suppliers do to better promote their product? "Cooperate within the industry. It's difficult when you're up in Alaska to think about where your product is going. But we need a dialogue established between retailers and suppliers and fishermen," says Roper. "It reminds me of a poster in a cannery I worked in in Alaska. It said: 'Remember, fish is food'."□

F.I.S.H. Flap

continued from page 15

they're willing to support an individual quota system if it does the job.

F.I.S.H. members say they hear their customers demanding fresh product on a regular basis. What they don't see is why the bulk of a 60-million-pound resource has to be harvested in three or four openings. The derby fishery not only gluts the market, but promotes wastage and poor quality, F.I.S.H. claims.

Led by fish aficionados like Joe Rowley of Fish Works! and executive chef John Melchior of the Pacific Regent in Bellevue, Wash., F.I.S.H. has taken its message not only to the North Pacific Fishery Management Council and the Halibut Commission, but it's taken the battle to the street corner with

By Rep.Ben Grussendorf and
Sen.Dick Eliason

EXPLANATION OF CS FOR HB 432 AND SB 397
(Draft CS dated 3-12-90)

This proposed committee substitute version of HB 432 (and SB 397) has been drafted in response to concerns expressed by both the Fish and Game Department and the general public about the need to clarify the final section of the bill.

The only changes in this CS from the original HB 432 (and SB 397) are on page three, section 2 (b). This section spells out what activities are allowed once the finfish farming ban is in place. First of all, we deleted the original number (3) as Fish and Game pointed out that sale of fish used for scientific and educational purposes is already not allowed so that exception was unnecessary.

Next, in the sub-section that was number (4) in the original bill and is number (3) in the CS, in the first line the word "ornamental" has been added before "finfish" to more clearly spell out the intent ("ornamental fish" is defined in AAC5.41.100(4)). In that same sub-section, at the request of the Fish and Game Department, we've added the words, "provided that the fish are not reared in or released into water of the state."

Finally, in section 2. (b) (2) we amended the language to make it more clear that private non-profit hatcheries may not do any finfish farming, but may continue to do the "cost recovery" fish sales that they currently do, and may sell surplus eggs to the state or to other PNPs as currently allowed by statute.

None of these changes affect the original intent of the bill, but are designed to simply clarify it.

I would hope that committees would adopt this version to work from in deliberations on HB 432 and SB 397.

See attached copies of statutes and regulation referenced in the new CS.

(g) Stocks of fish in hatcheries or rearing facilities in which a Class II disease has been detected must be immediately destroyed by the permittee if the commissioner or his authorized designee determines that the disease poses a threat to the health and perpetuation of native, wild, or hatchery stocks of fish in the hatchery effluent watershed or the intended release location. (In effect before 1988)

Authority: AS 16.05.251(a)

5 AAC 41.090. DELEGATION OF AUTHORITY. For the purposes of administering this chapter, the commissioner may delegate his authority to designated employees of the department. (In effect before 1988)

Authority: AS 16.05.020
AS 16.05.270

5 AAC 41.100. DEFINITIONS. In addition to the definitions set out in AS 01.10.060 and AS 16.05.940, in 5 AAC 41.001 — 5 AAC 41.100

(1) "completed application" means a form, series of forms, letters, or other documents that provide all of the information necessary for the commissioner or the commissioner's designee to issue, condition, or deny a permit;

(2) "department regional office" means the Alaska Department of Fish and Game, fisheries rehabilitation, enhancement and development division offices located as follows:

Region I — Southeastern Region
230 South Franklin Street
Juneau, Alaska 99801

Region II — Central, Westward and
Arctic-Yukon-Kuskokwim Region
333 Raspberry Road
Anchorage, Alaska 99502

(3) "fish pathology section" means the Alaska Department of Fish and Game, fisheries rehabilitation, enhancement and development division, fish pathology section, located at 333 Raspberry Road, Anchorage, Alaska 99502, telephone (907) 344-0541;

(4) "ornamental fish" means a fish commonly known as "tropical fish," "aquarium fish," or "goldfish," which are imported, cultured, or sold in the state customarily for viewing in aquaria or for raising in artificial systems, and not customarily used for sport fishing or human consumption purposes;

(5) "permit" means a fish transport permit, including any amendment or condition issued or approved by the commissioner or the

P.O. Box 72472
Fairbanks, Alaska 99707
March 7, 1990

Representative Cliff Davidson, Co-Chair
Representative Curt Menard, Co-Chair
House Resources Committee
P.O. Box V
Juneau, Alaska 99811

Dear Representative Davis:

I am currently trying to obtain the required permits to fish farming in the Fairbanks area. After reviewing the bills before your committee, I have learned that the bill intended to prohibit fin fish farming actually allows the type of farm I would like to start, whereas the bill intended to promote fin fish farming would effectively prohibit the type in which I'm interested.

Therefore, I would like you to consider the farming of grayling, rainbow trout, lake trout, burbot, arctic char, and non-food fish such as sticklebacks and minnows for their display as aquarium fish. According to the 1984 Yearbook of Agriculture, tropical fish farming is the fourth largest form of fish farming, underestimated at $20 million per year. There are now cooler systems available to provide the conditions necessary for keeping cold water fish in aquariums. I would like to take advantage of the Alaska mystique currently found in the lower 48 states and export grayling as an exotic species for aquarium lovers.

For this to work, it is necessary to legally:

- own the fish
- sell the fish to the public
- transport the fish
- obtain brood stock
- make a profit

Thank you for your consideration.

Nick Ericson

cc: House Resources Committee

KODIAK SEINERS ASSOCIATION
P.O. BOX 2399
KODIAK, ALASKA 99615
907/487-4939 907/487-2456

February 14th, 1990

Curt Menard
Rm. 110, Capitol
P.O. Box V
Juneau, AK 99811

Dear Mr. Menard:

The Kodiak Seiners Association supports bills HB 432 and SB 397 that would prohibit fish farming in Alaska. Much has been written in the fishing press on this issue. To avoid redundancy, we agree that the reported health and genetic complications arising in fish farms throughout the world, the potential for dangerous health implications for our presently healthy and abundant natural salmon stocks, and the potential for disruption and degradation of wild salmon markets, are reasons enough to justify the ban.

Taxes on Alaska's natural fisheries resources being the second largest source of revenue for the State, it would be irresponsible to place finfish resources at the risk by their possible exposure to disease-prone farm fish. In addition, were the same State monies that would be needed to fund the development and regulation of fish farming devoted instead to the enhancement of existing hatchery and wild salmon runs, the State would realize a certain and almost immediate revenue gain.

Finfish farming would be a counterproductive graft onto the healthy body of Alaska's natural fisheries.

Sincerely,

Kodiak Seiners Association
Board of Directors:

Eric Manzer	Dave Kubiak
Oliver Holm	Jeff Povelite
Dana Reid	Chuck McWethy
Chip Treinen	Armin Reimnitz

cc:

Arliss Sturgulewski	Rick Halford	Gov. Steve Cowper
Steve Frank	Fred Zharoff	Bert Sharp
Bill Hudson	Cliff Davidson	Walt Furnace
Dick Eliason	Jalmar Kerttula	Richard Foster
Bettye Fahrenkamp	Mike Navarre	Curt Menard
Mike Davis	George Jacko	SE Seiners Association
PWS Seiners Association		

Cowper Administration Position on Mariculture

Mariculture may provide substantial economic benefits to our coastal communities and help diversify and stabilize our economy if it is developed in an orderly fashion which provides the maximum benefit to Alaskans while ensuring protection for our fisheries resources, other resource users and the environment. In order to accomplish these objectives, any legislation authorizing a mariculture industry must satisfy the following principles:

1. <u>The mariculture industry must benefit Alaskans</u>.

   The mariculture industry must be developed in a manner which does not result in unfair competition with existing fisheries or cause undue economic displacement in our coastal communities. Legislation should, to the extent possible under the law, provide for local hire at mariculture facilities and give preferential access to mariculture permits and mariculture related tidelands leases to Alaskans.

2. <u>The mariculture industry must pay for itself and the state should get a fair return for the use of state resources</u>.

   Legislation should contain provisions for recovering administrative and other state costs associated with managing the industry. The legislation should also ensure that the state gets a fair return for the use of tidelands and other resources.

3. <u>The development of the mariculture industry in Alaska should be done in an orderly fashion which encourages a stable, dependable industry</u>.

   Legislation should provide general criteria which will lead to the development of a regulatory program which discourages speculation on permits and tidelands leases, encourages sound financial planning, and provides for a diverse industry ranging from "Mom and Pop" ventures to larger corporate operations.

4. <u>The mariculture industry must meet all state and federal requirements for human health, product quality and sanitation</u>.

   Legislation should ensure that mariculture facilities meet all state and federal requirements for human health, safety, and sanitation. Legislation should also require that mariculture products meet or exceed

   all state and federal product quality and human health standards, and provide the means to ensure that state

regulators can protect human health and product quality.

5. Mariculture activities must be managed to ensure protection of the biological integrity of natural plant and animal stocks.

   Legislation must address the issues of pathological and genetic protections for natural sea vegetable and fish stocks.

6. Mariculture activities must be managed in a manner which ensures adequate environmental safeguards and habitat protection.

   Legislation must ensure that mariculture facilities are sited, designed and operated to protect air and water quality, to provide for proper disposal of wastes, and to minimize adverse effects to important fish and wildlife habitat.

7. Mariculture facilities must be sited to minimize land-use conflicts, maintain navigation and ensure access to upland areas.

   Legislation should provide guidance for siting facilities to minimize conflicts with other tidelands users, reducing visual and aesthetic impacts, maintaining navigation and ensuring access across state tidelands.

8. Broodstock acquisition for mariculture purposes should be carefully regulated, especially for species subject to limited entry fisheries.

   Legislation should contain provisions limiting the acquisition of broodstock for species subject to limited entry fisheries. Legislation should grant the Department of Fish and Game the authority to regulate the acquisition, transport, and propagation of mariculture broodstock, and provide the Board of Fisheries the ability to resolve allocation decisions regarding broodstock acquisition if necessary.

STATE OF ALASKA

OFFICE OF THE GOVERNOR

BILL ANALYSIS

DEPARTMENT	DIVISION	BILL NUMBER	SPONSOR
Fish and Game	FRED	SB 397 [redacted]	Eliason, et. al., Grussendorf, et. al.

SHORT TITLE OF BILL

Prohibition of finfish farming

DEPARTMENT POSITION

Neutral

PREPARED BY	DATE	COMMISSIONER'S SIGNATURE	DATE
Brian J. Allee, Ph. D.	2/1/90	[signature]	2/8/90

SUMMARY

OTHER AGENCIES AFFECTED BY BILL	CONSTITUENT GROUP(S) AFFECTED BY BILL
Dept. of Environmental Conservation, Dept. of Natural Resources, Dept. of Commerce and Economic Development, OMB, Div. of Governmental Coor.	Commercial fishermen, sport fishermen, PNP hatchery operators, Regional Aquaculture Associations, Recreational Interests, Upland owners and Managers.
ORGANIZATIONAL SUPPORT FOR BILL	**ORGANIZATIONAL OPPOSITION TO BILL**
UFA, various commercial fishing groups and environmental groups	Potential private for profit fish farmers

FISCAL IMPACT ☒ NONE ☐ FISCAL NOTE ATTACHED

BACKGROUND/LEGISLATIVE INTENT

SEE ATTACHED

ANALYSIS OF BILL/PROGRAM EFFECTS

SEE ATTACHED

AMENDMENTS PROPOSED

SEE ATTACHED

PLEASE ATTACH A SEPARATE SHEET FOR ADDITIONAL COMMENTS OR ANALYSIS

01-009 (Rev. 3-88)

STATE OF ALASKA
1989 LEGISLATIVE SESSION

BILL VERSION : [illegible]
PUBLISH DATE : [illegible]/19/90

FISCAL NOTE

REQUEST:

Revision Date:
Title : Prohibition of finfish farming

Sponsor : Eliason et. al., Grussendorf, et. al
Requestor : Steve Cowper

Agency Affected : Fish and Game
BRU : FRED

Components :

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0

CAPITAL	0	0	0	0	0	0

REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

ANALYSIS : (Attach a separate page if necessary)

FY 90
See attachments.

Prepared by : [signature]
Phone : 465-4160
Division : ADF&G FRED Division
Date : 1/30/90

Approved by Commissioner : [signature]
Date : Feb 8 1989
Agency : ADF&G

Distribution (by preparer):
- Legislative Finance
- Legislative Sponsor
- Requestor
- Office of Management and Budget
- Impacted Agency(ies)

Bill Analysis SB 397/HB432

Background/Legislative Intent

In 1987, the Alaska State Legislature passed SB 297 placing a one year moratorium on finfish farming. The following year HCS SSSB 514 was passed, authorizing the farming of shellfish and aquatic plants, extending the moratorium on finfish farming until July 1, 1990, and establishing the five-member Alaska Finfish Farming Task Force. The shellfish farming program is currently being implemented. HCSSSSB 514 also contained a provision for inland farms in closed waters. The Board of Fisheries however, denied a proposal to make surplus coho eggs available to an interior-based applicant proposing to operate a recycle hatchery. In doing so, the Board of Fisheries asserted that public policy questions pertaining to brood stock acquisition and the privatization of a public resource were questions that should be addressed by the legislature, rather than set by precedent by the Board.

Although the task force was authorized in 1988, it was not funded until last spring. The members were appointed by Governor Cowper and began work last July. The task force recently issued its report and recommended that prior to the end of the moratorium on July 1, 1990, the legislature take statutory action to expressly allow or prohibit finfish farming. SB 397 would prohibit finfish farming by not allowing a person "to grow or cultivate finfish in captivity or under positive control for commercial purposes." As drafted, the state and PNP hatcheries would remain unaffected.

Amendments Proposed

On Page 2, lines 1-5, the third finding asserts that serious disease and genetic risks are posed to wild stocks. As the FRED Division has stated on the record, in legislative hearings and to the task force, if a properly managed, regulated, and funded pathology and genetics program were in place, similar to that run by the FRED division for current public and private non profit hatcheries, then commercial farming of finfish would not pose a serious risk to the health and genetic integrity of wild stocks.

Sale of finfish under a scientific or educational permit is not allowed currently. Accordingly on Page 3, Section 2, the department recommends deleting item 3.

With regard to Section 2, item 4, the department recommends extending the sentence. After the word "ponds", insert: "provided these fish are not reared or released into waters of the state."

REP. BEN GRUSSENDORF
RULES COMMITTEE
LEGISLATIVE COUNCIL

Alaska State Legislature

ANCHORAGE
JUNEAU, ALASKA

House of Representatives

RULES COMMITTEE CHAIRMAN

MEMORANDUM

TO: House Resources Committee Members

FROM: Rep. Ben Grussendorf

DATE: March 5, 1990

RE: HB 432

I am forwarding the attached material for your information. You may find the articles interesting as you are considering HB 432 which prohibits finfish farming in Alaska.

(c) The hearing shall be conducted by the department. At a hearing for a permit under AS 16.10.400(a)(1), the applicant, shall present a plan for the proposed hatchery, describing the capacity of the hatchery and other relevant facts that may be of interest to the department or the public. Interested members of the public shall be afforded an opportunity to be heard.

(d) The department shall record and consider objections and recommendations offered by the public at the hearing conducted under this section. It shall respond in writing, within 10 days after the hearing is held, to any specific objections offered by a member of the public at the hearing. (§ 2 ch 111 SLA 1974; am § 5 ch 14 SLA 1988)

Effect of amendments. — The 1988 amendment, effective March 31, 1988, repealed and reenacted subsection (c), which formerly related to the transferability of the hatchery permit.

Sec. 16.10.450. Sale of salmon and salmon eggs by hatchery. (a) Except as otherwise provided in a contract for the operation of a hatchery under AS 16.10.480, a hatchery operator who sells salmon returning from the natural waters of the state, or sells salmon eggs to another hatchery operating under AS 16.10.400 — 16.10.470, after utilizing the funds for reasonable operating costs, including debt retirement, expanding its facilities, salmon rehabilitation projects, fisheries research, or costs of operating the qualified regional association for the area in which the hatchery is located, shall expend the remaining funds on other fisheries activities of the qualified regional association.

(b) Fish returning to hatcheries and sold for human consumption shall be of comparable quality to fish harvested by commercial fisheries in the area and shall be sold at prices commensurate with the current market. (§ 2 ch 111 SLA 1974; am § 5 ch 154 SLA 1977; am § 6 ch 14 SLA 1988)

Effect of amendments. — The 1988 amendment, effective March 31, 1988, designated the formerly undesignated two sentences as subsections (a) and (b), added "Except as otherwise provided in a contract for the operation of a hatchery under AS 16.10.480" at the beginning of subsection (a), and made a series of minor stylistic changes throughout the section.

Sec. 16.10.480. Contracts for the operation of state hatcheries. (a) If the department determines that it is unable to continue operating a state-owned hatchery or that it is in the best interest of the state to provide for the operation of the hatchery by another person or by another person in cooperation with the state, the department may enter into a contract for the operation or cooperative operation of the hatchery.

(b) Notwithstanding AS 36.30, when selecting a contractor under (a) of this section, the department shall give a preference to the re-

Sec. 16.10.420. Conditions of a permit. The department shall require, in a permit issued to a hatchery operator, that

(1) salmon eggs procured by the hatchery must be from the department or a source approved by the department;

(2) no salmon eggs or resulting fry be placed in waters of the state other than those specifically designated in the permit;

(3) no salmon eggs or resulting fry, sold to a permit holder by the state or by another party approved by the department, may be resold or otherwise transferred to another person;

(4) no salmon be released by the hatchery before department approval, and, for purposes of pathological examination and approval, the department shall be notified of the proposed release of salmon at least 15 days before the date of their proposed release by the hatchery;

(5) diseased salmon be destroyed in a specific manner and place designated by the department;

(6) adult salmon be harvested by hatchery operators only at specific locations as designated by the department;

(7) surplus eggs from salmon returning to the hatchery be made available for sale first to the department and then, after inspection and approval by the department, to operators of other hatcheries authorized by permit to operate under AS 16.10.400 — 16.10.470;

(8) if surplus salmon eggs are sold by a permit holder to another permit holder, a copy of the sales transaction be provided to the department;

(9) *[Repealed, § 5 ch 110 SLA 1980.]*

(10) a hatchery be located in an area where a reasonable segregation from natural stocks occurs, but, when feasible, in an area where returning hatchery fish will pass through traditional salmon fisheries.

(§ 2 ch 111 SLA 1974; am § 5 ch 110 SLA 1980)

Sec. 16.10.430. Alteration, suspension or revocation of permit. (a) If a permit holder fails to comply with the conditions and terms of the permit issued under AS 16.10.400 — 16.10.470 within a reasonable period after notification of noncompliance by the department, the permit may be suspended or revoked, in the discretion of the commissioner after the regional planning team for the area in which the hatchery is located is notified and granted an opportunity to comment upon the proposed suspension or revocation.

(b) If the commissioner finds that the operation of the hatchery is not in the best interests of the public, the commissioner may alter the conditions of the permit to mitigate the adverse effects of the operation, or, if the adverse effects are irreversible and cannot be mitigated sufficiently, initiate a termination of the operation under the permit over a reasonable period of time under the circumstances, not to exceed four years. During the period of time that the operation is being terminated, the permit holder may harvest salmon under the terms of

The Fisherman (B.C) Dec '88

Norway sees mounting disease, pollution threat from fish farms

The deadly salmon disease furunculosis, previously unknown in Norwegian waters, is breaking out of fish farms and threatening beleaguered wild stocks, says a top government official.

Svein Aage Mehli, head of the division of Norway's Directorate for Nature Management which is charged with protection of wild salmon, told a Washington State regulatory hearing Nov. 14 that 5,000 farmed salmon infected with the disease escaped this summer into Hjorundfjordan near Molde.

Despite an intensive fishery to catch the fish and a system of net barricades at the mouths of salmon rivers, an infected fish was found in fresh water, he testified.

"If the disease spreads to natural stocks, the situation may be out of control in Norway," Mehli said.

"I feel we are on a sharp edge with diseases. If we have (the parasite) *Gyrodactylus salaris* in more rivers we may just accept our wild salmon is extinct."

(Furunculosis is present in B.C. waters and leads to loss of appetite, fluid retention, ulcers and eventually death in up to 60 percent of affected stocks. It had not been found in Norway until smolt transfers from outside the country were undertaken. Gyrodactylus also has been linked to fish farming and is treated by killing all host fish with rotenone.)

Mehli was qualified as an expert witness at a hearing in Lacey, Wash., of the Shoreline Hearings Board, which is hearing an appeal of a Skagit County decision to reject a fish farm in the mouth of the Skagit.

The fish farm proponents, a tribal group, are appealing the refusal of the Skagit County commissioners to issue permits for the farm on the basis that it threatens Skagit salmon and could pollute the sensitive estuary.

Proponents have denied there is any evidence of a disease threat to wild stocks from farmed salmon.

As a result, the appeal hearing has turned into a deep investigation of the environmental impact of salmon farms on wild stocks. Mehli was flown from Norway to testify on behalf of county commissioners, who backed up their decision by referring to the Suzuki Foundation report on Norway called *Journey to the Future*.

• Svein Aage Mehli, of Norway's environmental agency, testified last month to a Washington State regulatory agency.

Mehli responded angrily to suggestions by fish farm proponents that there is "no conclusive evidence" of disease spreading to wild stocks from farms.

"We are very concerned," he said. "It is not right to ask for conclusive evidence at such an early stage."

Furunculosis imported on smolts destined for salmon farms broke out two years ago and authorities felt they had eradicated it, he said.

This year's outbreak was a shock, as was the continued spread of bacterial kidney disease (BKD), which is very difficult to treat even with antibiotics.

"BKD poses a problem for natural stocks because it was diagnosed for the first time in 1980 and previously did not exist in nature," Mehli said. "It is very easy to see a connection between BKD (in salmon farms) and wild stocks in the river."

"It's reasonable to conclude" BKD spread from farms, he said, and Norwegian scientists "see logic in such a connection." BKD is diagnosed or suspected in 100 netpen operations and hatcheries.

Antibiotic use on Norwegian fish farms climbed to 48 tonnes last year, equal to the requirements for human use and animal husbandry combined.

"If you see the first diagnosis of redmouth disease in Norway just two years ago, it's impossible to ask what happened in such a case," Mehli continued. "Veterinarians underline the seriousness of that situation, that net pen operations have an impact."

Mehli said redmouth now is present in 300 facilities but was unknown until 1985.

"Net pen operations may function as a multiplying station for disease," Mehli said. "They will give greater disease pressure on natural stocks that we didn't see before netpen operations."

Mehli said further studies on the straying of farmed fish into rivers show a sharp increase in the presence of farmed fish. A year ago, 18 percent of the fish found in the rivers studied were of farm origin. In 1988, the figure rose to 40 percent. The origin was confirmed by scale samples and electrophoresis.

Asked if strong regulations could control disease, Mehli agreed they could "minimize problems if they go far enough. Norway has not gone far enough."

Norway is proposing a ban on the transfer of eggs and smolts between regions of the country, he said, and considering a ban on all imports of sexual products like eggs and milt.

Even though existing regulations list diseases which must not be present in imported eggs, the list is limited and "in Norwegian cage culture we know other diseases are knocking at the door."

In theory, he said, fish farmers "want to get rid of disease, but if they see profit in the short term they may react in a different way."

Mehli also confirmed fears of negative genetic effects of farmed fish on wild stocks if they interbreed. "We are very afraid it could affect their ability to migrate."

Netpen salmon have undergone careful selection for size and growth rate, he said, but researchers may have inadvertently selected other characteristics which could have a negative impact if reintroduced into wild stocks.

"First there is a genetic problem and second an environmental problem. If Atlantic salmon (escaping in Pacific waters) have the same requirements as coho or steelhead trout — and we know that salmon escape in great numbers — then you will have competition for space in the rivers."

As to their ability to spawn, "we see them in rivers, they are mature, ready to spawn and we are very worried of what will happen."

New zoning regulations now being implemented in Norway will ban farms within 20 kilometres of salmon rivers and close entire fjords to farming where

The Fisherman 5/23/89

Farms offer 'surplus' chinook

Surplus chinook smolts offered to the fisheries department by the B.C. Salmon Farmers Association should be destroyed, says the UFAWU, rather than released in a makeshift enhancement scheme.

At least eight farms offered the smolts for sale earlier this month, suggesting that some kind of technological breakthrough led to survival rates above their forecast.

In fact, the proposal to sell the "surplus" chinook to the Salmonid Enhancement Program is a bid for a bail-out by an industry facing collapsing prices, said the UFAWU May 10.

"Prices for farmed salmon have tumbled a dollar a pound in the past few months," said union spokesman Geoff Meggs. "They simply can't afford to feed these fish and are hoping the taxpayer will bail them out."

Fisheries department spokesman Ted Perry said at least six million fish were available in farms and hatcheries from Duncan to Powell River. He said DFO would not buy any fish, nor accept donations of fish that were not genetically pure Big Qualicum or Robertson Creek stock.

The fish would be released by DFO into the wild.

At press time, the farmers were insisting on selling the fish, which will starve unless fed by mid-June.

"Release of these fish poses a disease threat to wild stocks and would open the door to private ocean ranching," Meggs said. "Fish farmers have resisted every effort to win appropriate government regulations, but they're not shy about asking for government money when times get tight."

Uncontrolled growth of the industry has seen farm fish harvests rise to 6,000 tonnes last year from 387 tonnes in 1986. Prices have crashed from an average annual farm gate value of $3.17 to $2.27, according to B.C. provincial statistics.

"Spending on salmonid enhancement has been frozen," Meggs said, "but apparently money may be found for this boondoggle. It's a slap in the face to SEP volunteers who have donated thousands of hours and faced steady funding cuts to even to consider this kind of a scheme."

Consumer group urges farm salmon controls

Both levels of government should step up their regulation of the fish farming industry, says the Consumers' Association of Canada (CAC), to protect the consumer and wild salmon stocks.

In a comprehensive task force report on the industry released April 17, the CAC declares that "a self-regulated industry is not in the consumer's best interest."

Farmed fish is being sold "without specific regulations since pre-existing legislation is begin used to govern a new industry," the report says.

In particular, the task force recommends:

- stepped-up provincial government monitoring and regulation of the aquaculture industry;
- public sector testing of fish for market to determine levels of residues;
- monitoring of environmental impacts and prosecution of regulatory violations; and
- consumer labelling to distinguish farmed and wild fish and to report harvest dates.

The report also urges the B.C. Salmon Farmers Association to rejoin the Canadian General Standards Board committees on feed and feed additives to seek ways to reduce residues and contaminants.

The task force expressed concern about colorants, drugs and other medication used in aquaculture "which may remain in the product at the point of consumption."

Antibiotics are a very real problem, the report says, because "long-term consumption of subclinical dosages of antibiotics by humans (for example, by consuming antibiotic-containing fish) can lead to the development of resistant strains of bacteria in the body system."

Treatment of infection in humans can be undermined by such doses, the report notes and "there is a potential for allergic reactions by individuals sensitive to antibiotic traces."

(The farm industry has established a Quality Assurance program with spot-checking which it says will control this problem. Fish must be held 42 days after drug treatment before going to market. The provincial government is recommending at least double that time.)

The task force recommends much tighter controls and monitoring of antibiotic use, including certification of farmed staff handling drugs.

The CAC proposes an industry commitment to "produce, catch and process fish without negative impact to the environment."

All types of fish, farmed and wild, should be checked for chemical residues, PCBs and pesticides.

Consumers should insist on protection of wild stocks, the CAC concludes. "A fish farm industry at the expense of the wild stock would, in fact, reduce the choices of fish for the consumer."

The Fisherman (B.C.) Dec 1988

Fish farm use of antibiotics poses threat

The widespread use of antibiotics in fish culture poses a serious potential threat to public health, says a Washington State zoologist, and should be strictly controlled.

Arthur Whiteley, a zoologist with a long-standing interest in microbiology, told a Washington State Shorelines Hearing Board inquiry Nov. 14 that antibiotic use on fish farms will produce antibiotic resistant bacteria in the human food chain.

If these resistant bacteria occur in humans, "the diseases caused by that organism could not be medically treated.

"It would eliminate from the tools of the physician those he would want to control disease."

Whiteley was qualified as an expert witness in the hearing, which was set up to hear an appeal against a decision by Skagit County to deny permits for a fish farm near the mouth of the Skagit River.

Whitley produced a pile of scientific studies which show that "in almost every case resistant bacteria is selected by the use of antibiotics in fish culture."

In other words, use of antibiotics to treat bacteria causing fish disease kill all but the bacteria which is resistant to the medication.

Studies have proved that this resistance can be transferred from one type of bacteria to another, Whiteley said, and can create resistance to several types of antibiotic.

Whiteley said this type of transference has been documented in the case of a vibrio bacteria which causes disease in fish. In a laboratory, this resistance was transferred to different bacteria which exist in the North Pacific food chain and are pathogenic to humans.

"This has not been observed in the wild," he said, "but there is a probability it could occur. Experiments indicate the genetic mechanism is in place . . . and we can predict it will occur in nature under certain conditions."

The Centre for Disease Control in Atlanta has found the same phenomenon in beef and poultry, he said, and blame it for a dramatic increase in salmonella.

The only solution, he said, is to ban the use of antibiotics in fish culture which are used in human treatment.

In B.C., both oxytetracyline and erythromycin are used in fish culture even though they also are used in human medicine. There is no inspection to determine whether or not this transference of resistance is occurring in B.C. or whether fish sold to consumers is free of antibiotics.

UFAWU loses close vote

Additives to the Environment of Net-Pen Reared Fish

Pacific Marine Fisheries Commission 42nd Annual Meeting
Seattle, Washington, Ocober 16-18, 1989

PHD Arthur H. Whiteley and Annamarie Johnstone

We have been asked to address our remarks to the matter of additives to the environment of net-pen reared fish. In this particular forum, we assume the emphasis should be on additives that may have an impact on humans when these fish come to market, rather than the impact on the plant and animal communities in the natural environment, though these are not wholly separable.

By its very nature, net-pen rearing of salmon requires the use of numerous chemicals, sometimes in large amounts, some used in the fresh water hatcheries to produce the fry and smolts, some used in the grow-out period in the marine pens, and others used during processing of the fish for the market. Partial lists are shown in Table 1, compiled from Austin and Austin, 1987, from a 1988 report for the Nature Conservancy Council by the University of Stirling, and from other sources.

The lists include chemicals used in salmon and in other forms of fish culture, both in this country and in foreign countries. Inasmuch as farmed fish are imported from some of these other countries, inclusion of these chemicals in the lists may be relevant to the matter of seafood surveillance in the United States marketplace.

Chemotherapeutics. The most relevant additives for present purposes are antibiotics and therapeutants used to control bacterial diseases. Because of stress, disease may cause losses of 30-40%, sometimes higher. Diseases in salmon farms include *Vibrio anguillarum* (vibriosis), *Aeromonas salmonicida* (furunculosis), *Aeromonas hydrophila* (hemorrhagic septicemia), *Yersenia ruckeri* (red mouth), *Vibrio salmonicida* (Hitra disease), *Renibacterium salmonarum* (bacterial kidney disease). To combat these diseases, medicated food contining antibiotics is supplied. In Washington, the FDA approved antibiotics and therapeutants are oxytetracycline (OTC), Romet 30 (sufadimethoxine and orthomeprim) and sulfamerazine. In addition, Tribrissen (sulfadiazine and trimethoprim) is used in Norway and Scotland, and in British Columbia erythromycin is used to control BKD. In Japanese fish culture a wide variety of antibiotics has been used, but has recently restricted the use of chemotherapeutics in cultured fish (Aoki, 1988, pers. comm).

In the US, Norway, BC and Scotland, doses of drugs are as indicated in Table 1B. It is anecdotal, however, that additional amounts of antibiotics are used by farmers, who may mix the drugs with feed and binders. Control of use of antibiotics in Norway and Scotland is regulated by veterinarians, and this is supposed to be the case in B.C. In the British Isles it is apparently easy to find legal loopholes to permit other antibiotics and doses to be used (Austin and Austin, 1987). In Washington fish farmers are supposed to notify the Department of Fisheries if they use antibiotics, but veterinarian supervision is not required. Generally approval exists for only therapeutic use of these

drugs. Nonetheless they often are used prophylactically inasmuch as sick fish may not take the medicated food.

There appears to be no medical or public health supervision or regulation here, or in the other fish farming countries, on the use of antibiotics and chemotherapeutics other than the requirement of FDA approval of the three drugs and their dosages. There appears to be no monitoring by agencies of the use of these drugs or their persistence in marketed fish.

The amounts or drugs used are enormous. In Norway last year, 48 metric tons (105,000 lbs) of OTC alone were used - more than in animal husbandry and human health uses combined (Mehli, 1988, pers. comm. and press accounts). This figure has grown from 13,691 lbs in 1984 (Midtlying, 1985). The 1984 figure for Tribrissen, nitrofurazolidon and sulfamerazine is 30,204 lbs (Midtlying, 1985). Comparable figures for British Columbia and Washington are not at hand. Assuming the dosages cited earlier for the 13 Washington pens, calculation leads to a first approximation of about one ton of OTC, a figure similar to that given by a Washington fish pen operator (Dr. A. Bill, 1989, pers. comm.).

The relevant issue here is "Do these uses affect man?" Consumers clearly would be exposed to residual antibiotics in the fish meat. Because of the potential for these residues producing a serious problem in public health, Japan has recently restricted the use of chemotherapeutics, and does not allow cultured fish to move to market if residual drugs can be detected in fish meat (Aoki, 1988, pers. comm.). The potential for adverse effects has been emphasized by Austin (1988, conference in Vancouver, B.C.; Austin and Austin, 1987). The current regulations for control of such residues are based on admittedly minimal research. The FDA requires a 21 day withdrawal period after the last medicated feeding of OTC and 42 days for Romet 30 before slaughtering for the market. In B.C. the withdrawal period is 42 days, and in Norway 61 days. Very few data exist for measurement of persistence of these drugs in fish flesh after feeding. McCracken et al (1976) measured the presence of trimethoprim in trout muscle 77 days after medication; Salte and Liestøl (1983) calculated that the withholding period for trout receiving OTC should be 100 days at winter temperatures, and for Romet 30 they recommended withdrawal periods of 60 days, above 10^0C. All authors emphasize that temperature is a seriously complicating factor - residues of Romet 30 persisted for several months in fish at colder temperatures, leading Salte and Liestøl to recommend using the component drugs only in summer. Clearly these limited data do not support the FDA regulation of 21 days. New, more refined measurements of drug residues in salmon coming to market clearly are needed - a recurrent theme of the Austins. Some of these measurements are being made now at the University of British Columbia by McErlane et al. (1989), and Grondel et al. (1987) have published a pharmacokinetic analysis of OTC distribution in carp. In the absence of more detailed studies, humans ingesting farmed salmon may be receiving subtherapeutic doses of antibiotics. One would like to see regulations established for testing the product, by agencies, as it comes to market to ensure the absence of detectable residues. Methods used should be such as those approved by the National Committee for Clinical Laboratory Standards

used by the Clinical Laboratories, Laboratory Medicine, University Hospital, University of Washington.

The issue extends beyond the limits of the penned salmon. Much of the antibiotic fed escapes into the fluid environment and, notably, into the sediments that accumulate beneath the pens (Jacobsen and Berglind, 1988), where it may be exposed to native fish, shellfish, and other indigenous species, thus providing another avenue to humans who may catch and consume these forms.

The medical consequences of the mis-administration of antibiotics are numerous, and are well discussed in such modern treatises as Goodman and Gilman (1985) and Kucers and Bennett (1987). A number of them are antigenic and elicit immunological hypersensitivity responses; some have toxic effects in various tissues varying with the physiological and health state of the person; some particularly should be avoided during pregnancy; tetracyclines lead to discoloration of infants' teeth and may interfere with bone growth; some, notably the tetracyclines, may lead to the development of superinfections by resistant strains of bacteria; they may interfere with the normal immune repsonse; and the breakdown products of antibiotics, including OTC, can be toxic particularly in individuals with compromised livers. Basically, it is poor medical practice to ingest unneeded antibiotics or deteriorating antibiotics.

Another cluster of problems associated with use and misuse of antibiotics is the generation of strains of pathogenic bacteria that have resistance to the drugs. Such strains have now appeared in essentially all fish culture communities that have been adequately tested. Mostly the resistance factors are carried on R plasmids, which also usually are found to carry resistance determinants for 1 to 8 additional antibiotics, thus showing multiple drug resistance. In high proportions, these R plasmids are transferable to other bacteria, and thus drug-resistance may be disseminated to other ecosystems. Studies at the Centers for Disease Control have shown that outbreaks of salmonellosis could be traced to drug-resistant *Salmonella* derived through the foodchain back to land farms associated with agricultural antimicrobial use (Cohen and Tauxe, 1986). It is prudent to evaluate the possibility for a similar generation of R plasmids in fish farms and their dissemination to human populations in the marketplace. When drug-sensitive populations of pathogens are replaced by drug-resistant populations, then treatment of the affected fish becomes ineffective, and, if the R plasmids are in human pathogens, treatment of patients would be adversely affected. Particularly, it is a general principle that medically important antibiotics, including oxytetracycline, the sulfas and erythromycin, should be restricted in their nonmedical uses to minimize R plasmid selection and transmission.

When antimicrobials are used in fish farms near commercial or recreational shellfish beds, there is the further potential for drug-resistant organisms to be concentrated by the shellfish, through filtration, and thus enter human populations.

Food additives. The dry pellets, fed to the penned fish in the marine environment, contain fish meal, grains, fish oils and carbohydrates, supplemented by minerals and vitamins as indicated in Table 2. While these additives have no direct human import, it is reported that planktonic blooms of

the ichthyotoxic dinoflagellate, *Gyrodinium aureolum*, were enhanced by the biotin in fish farm wastes (Turner et al., 1984). These blooms cause mortalities to cultured fish, and, unfortunately, to wild fish as well (Bullock et al., 1985).

Pigment is added to the feed to produce a colored flesh in farmed salmon, inasmuch as the color of wild salmon flesh is derived from natural food organisms. In Great Britain, the carotenoid canthaxanthin, an analog of astaxanthin common in natural food organisms, is used in the form of carophyll red. It is stated in a report from the University of Stirling that this use is banned in the US because of possible carcinogenic properties of canthaxanthin (NCC Report, 1988). To date a petition for its use has not been submitted to the FDA (FDA, Seattle Office, 1989). A petition is presently under consideration for use of astaxanthin as a colorant. A main local supplier adds canthaxanthin as a colorant. There clearly are gray areas here where research and regulation is sorely needed.

Many wild fish are rich in omega 3, polyunsaturated fatty acids. A higher ratio of omega 3/omega 6 fatty acids is believed favorable for maintaining low cholesterol levels in humans. Cultured fish and other sea foods, because of their artificial diets, may have low levels of omega 3 fatty acids, and thus unfavorable ratios of omega 3/omega 6 (Suzuki et al., 1986; Chanmugam et al., 1986). Consequently, individuals eating farmed salmon in the expectation of gaining this supplement will typically be erring, unless the farmer has specifically added it as a dietary supplement and indicated this in marketing. The dry pellets supplied locally generally do not have omega 3 acids added as a supplement (Moore-Clark Co., 1989, pers. comm.) because these are contained in the fish oils of the fish meal used.

Moist pellets, which are more commonly fed during the hatchery phases of salmon farming, are derived from fish meal that is pasteurized, combined with additives, and frozen. However, moist pellets used in some fish farms in Puget Sound contained *Salmonella spp.* (Draft PEIS, WDF, p. 116, 1989). Moist pellets used in British Columbia have been found to contain *Salmonella* (Kelly, 1988, pers. comm.; Babink, 1988, pers. comm.). In these cases it is unclear whether the pathogens had survived the pasteurization, or had appeared subsequently. These pathogens can persist for a period of time in marine waters, are harbored by fish in polluted waters, without harm to them (Buttiaux, 1963). Marine shellfish can concentrate *Salmonella* and transmit them to humans. There is, therefore, a potential for fish culture to join animal husbandry as a mode for affecting humans in the manner described by Cohen and Tauxe (1986).

Hormones. At this time, hormones are being used in B.C., experimentally and perhaps to an extent in actual culture, to control the sex, size and behavior of penned salmon, both *Oncorhyncus* spp. and *Salmo salar*. Gonadotropin, gonadotropin releasing factor and analogs, and antiestrogens have been used in adult females to modify spawning. Androgens and estrogens are used to cause feminization, and, in combination with other techniques, to produce triploid and tetraploid stocks for production of sterile salmon. A review is provided by Donaldson (1986).

In general, these treatments are used on egg-producing females or on eggs and sperm, and the likelihood of carry-over of hormones to adult, marketable fish is tiny. Anabolic steroids including methyl testosterone,

thyroid hormones, somatotropins, certain pituitary hormones can be used to accelerate growth in juveniles and the timing of smoltification (Donaldson, 1986). If these hormones, or androgens and estrogens, were used for growth acceleration or other effects on near-harvest adults, then there would be cause for concern to human consumers.

Pesticides. A remarkable list of agents are or have been used in salmon culture. Examples are: formalin, malachite green, acriflavin, Nuvan, Neguvon, Chloramine T, MS222, copper sulfate, tributyltin, diquat, in addition to the chemotherapeutics. Some are used in Scotland and Norway which apparently are not used, or not permitted, in the U.S. and B.C. Lists are incorporated into Table I of this presentation.

Treatment of salmon lice (*Lepeophtherius salmonis*). These copepod ectoparasites pose a severe problem for adult penned fish in Scotland and Norway. In Europe, organophosphate pesticides (Nuvan^R (dichlorvos; Scotland) and Neguvon^R (trichlorfon which forms dichlorvos; Norway) are primarily used. Fish are treated by immersion in a concentration of 1 ppm for 1 hr, as needed. In 1984 39,600 lbs of Neguvon were used in Norway (Midtlyng, 1985). They are inhibitors of acetylcholinesterase activity in the cholinergic nervous system. These agents not only kill fish lice, but other crustacea in the environment as well, including commercially important species such as crabs, lobsters and mussels (Egidius and Moster, 1987), and they cause potentially serious problems to the treated fish (Davies and McKie, 1987; NCC Report, 1988). These agents are restricted by the EPA in the U.S. (Seattle EPA Office, 1989). In Washington, the carbamate Sevin^R (carbaryl) has been suggested for use for treatment of salmon lice, and it is used in oyster culture for controlling ghost shrimp. Sevin, also, is an inhibitor of acetylcholinesterase. Sevin has recently been restricted in parts of the United States, and its discharge is regulated by an NPDES permit. BRAVO (chlorothalonil), a fungicide has been suggested for and used recently on fishpen nets, a use banned by EPA because it is a class B carcinogen (EPA, Seattle, 1989).

Disinfectants and Antifoulants. Formalin and malachite green have been used for control of ectoparasites and fungi, usually in the fresh water phases of farming. Malachite green, a potential teratogen (NCC Report, 1988), is now banned. MS-222 is used under certain conditions for anaesthesia, but with a 21-day withdrawal period for clearance from tissues. Hatchery ponds are sterilized with chlorine.

To prevent fouling of nets by growth of algae and encrusting invertebrates, fish farmers have treated nets and pen structures with the antifouling agent, tributyltin (TBT). This substance, at exceedingly low concentrations, has a variety of adverse effects on marine invertebrates and perhaps on vertebrates (Bailey, D.S., 1987). When, in 1987, farmed salmon appeared in the Seattle markets carrying substantial amounts of TBT in their flesh, the state enacted a law prohibiting this use and partially eliminating it from use on boats. A similar law exists in the national statutes, in Great Britain and other parts of Europe. Despite this ban, a Canadian Governmental memorandum on August 11, 1988, titled "Private Salmon Hatcheries and Netpen Facilities, Some Serious Concerns" indicates that 25% of BC pens are still treated with unregistered boat hull paints, sometimes including TBT, which liberate

large quantities of particulate paint into the water, sometimes onto oyster beds, thus creating potential hazards for two kinds of aquacultured products.

If antifoulant is used on nets now, usually it is copper-based. Copper and other heavy metals are highly toxic to many marine invertebrates. Standards for permissible amounts of copper in farmed fish flesh appear to be lacking.

Summary. There are a number of chemicals and additives used in net pen culture now that have the potential for adverse human impact. Often these are used at the discretion only of the user, and with little or no external monitoring. There appears to be little or no input into this regulation by public health agencies.

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Table 1
Chemicals Used in Net Pen Culture of Fish
(From Austin and Austin, 1986; The Nature Conservancy Report, Scotland, 1988; and other sources)

Chemotherapeutics

- Oxytetracycline
- Romet 30[R] (sulfadimethoxine and orthomeprim)
- Sulfamerazine
- Tribrissen[R] (trimethoprim
- Erythromycin
- Penicillin G
- Oxolinic acid
- Minocycline
- Clindamycin
- Kitasamycin
- Rifampicin
- Hyamine 3500
- Copper sulfate
- Streptomycin
- Sulfisoxazole
- Kanamycin
- Fumequine
- Chloramphenicol
- Chloramine T
- Acriflavin
- Acetic acid
- Formalin
- Malachite green
- Iodine
- Iodophor
- Benzalkonium
- Nitrofurantoin

Pesticides

- Dichlorvos (Nuvan[R], an organophosphate)
- Trichlorfon (Neguvon[R], an organophosphate)
- Carbaryl (Sevin, a carbamate; used in oyster culture)
- Diquat

Antifoulants and Disinfectants

- Tributyl tin - now banned
- Copper paint
- Bitumen
- Chlorine
- Chlorothalonil

Anaesthetics

- MS-222 (tricaine methane-sulfonate)
- Benzocaine
- Carbon dioxide

Food additives

- Colorants-canthaxanthan
- Minerals
- Vitamins
- Omega 3 fatty acids

Table 1B

Doses of Antimicrobials Commonly Used in Salmon Net-pen Culture

Antimicrobial	Dose, mg/kg of fish/day	Days of Treatment
Oxytetracycline	75	10
Romet 30	50	5
Sulfamerazine	220	14
Tribrissen	30	10
Erythromycin	10-25, or unspecified	4-21

These regimens are repeated 2 or 3 times a year

Table 2
Mineral and Vitamin Food Additives in Salmon Pellets

(Data from Nature Conservancy Council Report 1988, and Moore-Clark Analysis)

Minerals

- Calcium phosphate
- Magnesium sulfate
- Sodium Chloride
- Potassium chloride
- Iron sulfate
- Zinc sulfate
- Copper sulfate
- Manganese sulfate
- Cobalt sulfate
- Chromium chloride
- Ethylenediamine dihydroiodide
- Selenium

Vitamins

- Thiamine hydrochloride
- Riboflavin
- Calcium pantothenate
- Niacin
- Pyridoxine hydrochloride
- Biotin
- Folic acid
- Cyanocobalamin
- Inositol
- Ascorbic acid
- Choline chorlide
- Menadione
- alpha tocopherol acetate
- p-aminobenzoic acid
- Retinol acetate
- Vitamin A
- Vitamin B12
- Vitamn D3
- BHA-BHT, antoxidant

Algea, disease, low prices hammer B.C. salmon farmers

British Columbia's fish farming industry, wracked by collapsing prices, disease, algae blooms and bankruptcies, is facing a major corporate shakedown.

Despite continued assurances by industry leaders that all is well, signs of trouble include:

★a rash of receiverships affecting about 12 farms and three companies;

★devastating algae blooms throughout the Strait of Georgia which have wiped out some farms and crippled others;

★industry agreement that the Sunshine Coast, the scene of a salmon farming goldrush only three years ago, may see an exodus of operations to colder, algae-free waters; and

★continued low prices which are driving down wild salmon prices and forcing more producers to the wall.

The most visible problem has been the algae blooms, which sweep in on hot, calm days and suffocate salmon in their pens within hours. Persistent low levels of algae are believed to contribute to stress and disease.

Losses to various diseases continues to be high on many B.C. farms, according to industry publications.

According to the *Sechelt Press*, a plankton bloom during the Labor Day weekend wiped out five farms, severly damaged five others and destroyed 300 tons of salmon worth about $2 million. The regional dump, which was to be closed to farm waste Oct. 20, was opened especially to handle the emergency.

Farms in Agamemnon Channel took the brunt of the assault, but the entire region was affected. Local fishermen heard radio chatter from farmers seeking some place to dispose of the sudden large volumes of dead fish.

Professor Larry Albright of Simon Fraser University told a public meeting on the impact of fish farms later that month that the entire Strait of Georgia is so infested with the algae that farms will be removed from the area completely.

Meanwhile, prices continue to drop, heading below $1 a pound according to some market reports. The break-even point is estimated to be around $2.25 to $2.50 a pound level.

The crunch of falling prices, provoked in part by aggressive marketing by Norwegian producers, is hitting farms hard in many areas.

Coopers and Lybrand, receiver for threee firms put into receivership by secured creditors, reports continued financial problems for farms in the Campbell River area.

Eric van Soeren, receiver for North American Salmon Corp., operator of six sites around Quadra Island, and Sea Grow, with operations at Nelson Island, saidSept. 19 that new buyers had not been found.

But both firms were thrown into receivership by Norwegian banks seeking to slow their losses on loans to B.C. producers. Now van Soeren is seeking a buyer for Atwood Bay farm near Desolation Sound and expects a busy fall with other troubled firms. He would not disclose who is buying the farm.

As a result of the chaos, the normally boosterish industry is shying away from an optimistic DFO analysis of the industry which predicts production could hit 80,000 to 100,000 metric tons by the year 2000.

Product of 50,000 tons is very realistic, the Price Waterhouse report claims. But industry spokesmen believe that disease and other problems will keep them in the low-growth range of about 20,000 tons until the turn of the century.

(Ed: The above article was reprinted with permission from The Fisherman, Geoff Meggs, Editor)

Fish farmer sues foreigners

A Washington state fish farmer and his corporation have sued in U.S. District Court alleging that foreign national interests have attempted to monopolize the commercial fish farming industry in his state. Lee A. Holley III of Lopez Island in northern Puget Sound alleges in his suit that foreign business interests, primarily Norwegian, operated through American national fronts to destroy competition in the industry, remove local control and violate antitrust laws.

Holley, owner of Northern Nights Fish Farms Inc., is suing several Norwegian corporations that have either sole or partial ownership of farms in Puget Sound. Also named in the suit are state officials and other individuals who allegedly contributed to illegal activity. Holley charges that large financial contributions were made to state political campaigns by the foreign interests, which, he says, also assisted in defeating a moratorium proposed against new businesses in San Juan County, where Holley lives.

Comments from the Norwegian companies and state officials were being withheld pending litigation, according to several reached by telephone.

— Brad Matsen

The Fisherman January 25, 1989

Fish farm drug hits wild stock

Fishermen harvesting shellfish off Scotland say a chemical used by salmon farmers is killing marine life.

Scientists at Aberdeen University have linked the chemical with increasing numbers of wild salmon going blind.

The controversy has erupted over Nuvan 500, which farmers use to control pests. Its byproduct dichlovros, is listed by the 1987 North Sea Conference as one of 26 most dangerous chemicals in waterways.

The debate highlights the serious problems salmon farming disease treatment can pose for the marine environment and other marine life.

According to the *London Observer*, in a report on its wire service Jan. 11, scientists at Norway's Institute of Marine Research in Bergen have found the chemical could be damaging sensitive lobster and crab larvae around the farms. Mussel and oysters also absorb the chemical.

Nuvan is strictly controlled on land, but salmon farmers have easy access because they are not subject to the same regulations.

Fishermen and environmentalists are demanding a ban on Nuvan, but farmers say they will be decimated by sea lice if Nuvan is taken from their arsenal. They favour voluntary controls.

Nuvan is not registered for use in Canada, meaning it is unavailable. Valery Brooks, of the B.C. Salmon Farmers Association, said sea lice are not a problem in this province, but a special session on lice is scheduled for an aquaculture conference in Dartmouth next month.

Scientists there have concluded that sea lice threaten the viability of salmon farming in Atlantic waters and 90 percent of farms must user treatments to control the parasite

A new problem for fish farmers

Foes of Puget Sound pens make an issue out of virus new to Northwest

By Jane Hadley
P-I Reporter

An exotic virus that caused fisheries officials to order almost 4 million fish and eggs destroyed at two hatcheries last week has given new ammunition to foe of fish-raising pens in Puget Sound.

Opponents of the net pens said yesterday they plan to make an issue of the virus at hearings tomorrow and Thursday on a state Department of Fisheries environmental impact statement on net pen fish farming.

But proponents of expanded fish farming on Puget Sound say it would be irresponsible to speculate on the source of the virus. They said there is no evidence pointing to Atlantic salmon or net pens as the cause, as some opponents charge.

But, Jerry C. Grover, of the U.S. Fish and Wildlife Service said logic pointed to the Atlantic salmon.

There are 13 existing net pen operations in the state, most of which grow the Atlantic salmon. Close to 20 other net pens have been proposed.

The virus, known as viral hemmorhagic septicemin or "VHS," was found in cell cultures in two hatcheries in December and positively identified Feb. 17. It has never before been reported in North America. It has caused substantial fish losses in Denmark and other European countries.

No fish reportedly have died of the disease in Northwest waters to date.

The virus was found in cell cultures at the Fish and Wildlife Service's Makah Hatchery near Neah Bay and a joint state-private hatchery at Glenwood Springs on Orcas Island.

"From the conversations I've heard, everyone's looking at the net pen aquaculture industry in Puget Sound and Canada," said Grover, fisheries associate manager for the U.S. Fish and Wildlife Service regional office in Portland.

Grover said it's important "not to be finger-pointing because we don't know" and labeled such a guess as "speculation."

He added, "It doesn't take too much gray matter to put two and two together. You have to ask how the thing leap-frogs from Europe to Puget Sound. The common denominator would be Atlantic salmon. That's what the scientists are talking about."

The state Department of Fisheries, several scientists and an industry spokesman immediately jumped on Grover's comments.

"I'm certain this issue will be thrown at the

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Seattle Post-Intelligencer
Feb 25 1987

Fish: Virus origin to be probed

From Page B1

industry, when, in fact, I think it's groundless," said Anne Kirske, executive director of the Washington State Fish Growers Association.

But environmentalists were just as indignant yesterday and accused the state Fisheries Department of being a "booster" of net pen farming.

"This is really a terribly threatening thing," said L. Joe Miller, president of the Marine Environmental Consortium, a coalition of numerous local groups fighting proposed net pen operations around Puget Sound.

"It's the kind of thing environment groups we work with have been anticipating and dreading and, now, here it is," he said. "The state and industry have said, no, this is not a realistic concern. They've said we're only worried about our views. Now they say this (virus) has come in on somebody's boot, which is really an insulting suggestion."

Grover discounted the "boot" theory and some other suggested sources. He said it's "kind of far-fetched, even impossible" to believe that somebody who traveled in Europe brought the virus in on his or her boot. The virus can survive only a short time outside living tissue, he said.

Grover said his agency, the state Fisheries Department, the Wildlife Department, and Indian tribes are launching a massive testing program to try to track down where the virus might have spread. The U.S. Fish and Wildlife Agency, for example, will test the 35 miles of the Sooes River and its tributaries that are upstream of the Makah Hatchery.

The current theory, he said, is that Sooes River fish shed the virus and it got into the hatchery through its water intake.

The Fisheries Department will test saltwater around Glenwood Springs as well as some net pen operations. He said test results should be available in late March.

Grover and Dr. Marsha Landholt, a fish pathologist at the University of Washington, said the rainbow trout is the most susceptible species of fish to get the disease from the virus. Coho salmon can carry the virus and pass it on without getting sick. But fisheries experts are worried about steelhead, because they are a type of rainbow trout.

Several weeks ago, Washington state rainbow trout were injected with the VHS virus in a federal laboratory and suffered "a high incidence of mortality," said Peck of the Fisheries Department. Landholt said VHS may seem "like a scourge to us because it's a new disease. But if you talk to people in Denmark and Europe that have VHS, they don't seem to worry to the degree we are. They seem to manage around it."

Landholt said they disinfect and destroy all fish in all infected hatcheries as well as those downstream.

Puget Sound anglers hooking Atlantic salmon

by Brad O'Connor
Times staff reporter

FISHING
WILDLIFE
NOTEBOOK

Steve Loop caused quite a stir in June when he showed up at Seacrest Boathouse in West Seattle with a 5½-pound Atlantic salmon he'd caught while fishing for blackmouth near the Southworth Ferry landing.

Atlantics are not supposed to be swimming around Puget Sound and it was only the second Dave Nelson, Seacrest manager, had seen in his 17 years at the boathouse.

Atlantics – 1 million or more of them – are in the Sound, but all are supposed to be confined to net pens where they are reared by private growers for markets mostly in the south, the East Coast and California.

Loops' Atlantic was an escapee.

Since June, Nelson has weighed about a dozen others, all caught on on hook and line, which is remarkable. While Atlantics provide some of the world's greatest freshwater sports fishing, they rarely are caught on sports gear in salt water.

"Ponder this," said Nelson, "if we've seen a dozen here, there must be many, many more swimming around out there."

He's correct. There are more.

Will Sandoval, biologist for the Muckleshoot Tribe, said his tribal fishermen have told of netting several Atlantics during summer and fall salmon seasons.

"Some told of catching three or four a day," he said.

Three that Sandoval checked during a state and tribal test fishery for sockeye in July were approaching sexually maturity.

"What concerns me is that they may have been looking for somewhere to spawn. Even if they can't spawn successfully, there's a risk they could be carrying some exotic disease."

Decades ago, attempts were made to establish spawning runs of Atlantics in Washington and British Columbia. All failed and the belief among some fisheries scientists is that further attempts to establish Atlantic runs on the West Coast also would fail.

In fact, most fisheries managers nowadays shudder at the thought of Atlantics spawning in any West Coast stream – not only because of the risk of disease, but because of increased competition for food and space with native trout and salmon.

Reports of Atlantic catches are funneled to Lee Hoines, a Department of Fisheries biologist at Olympia. Of the 203 reported to him last year, most were caught by commercial fishermen in the Bellingham area and around the San Juans.

However, two were caught in fresh water, [illegible] on the Nooksack River and another in July in Cedar Creek, a tributary of the Nisqually.

What if they did spawn successfully?

"My assumption is that they can't. I can't say that absolutely is the case, but I hope they don't," said Tim Flint, another WDF biologist.

Should corporations use public waters for private profit?

By John de Yonge
P-I Columnist

Consider these things about floating fish farms:

■ A typical net-pen fish farming operation on Puget Sound produces pollutants "equivalent to untreated sewage from approximately 10,000 persons." That's what a state report says. The pollution comes from fish feces, urine and food pellets deposited in the water and on the bottom of the Sound.

■ There are 13 commercial pens now operating over 63 acres of aquatic lands leased from the state. These 13 operations daily deposit to the bottom of Puget Sound nearly six times as much oxygen-demanding fecal matter and other wastes than does Metro's Renton Waste Water Treatment Plant, which serves 430,000 people. Materials that deplete oxygen can radically change or kill off the life forms in an unpolluted environment.

■ Siting 27 more fish farms, now delayed by opposition from upland property holders, environmentalists and county officials, would add a pollution load to Puget Sound equal to that from building four new cities the size of Everett.

■ The ". . . proper siting of 100 farms would not have significant impact on the aquatic environment." So says the state's just-issued environmental impact statement on floating net pens.

Those 100 fish farms would produce 53 metric tons of oxygen-demanding waste per day. That's 18 more tons a day than Metro's Renton and West Point treatment plants together produce from the sewage of 1 million people.

Analysis

The environmental impact statement was prepared by three private organizations that supply fish-farm companies with paid expert witnesses.

Under Gov. Booth Gardner, state policy is to hosanna any increase of fish farming in the state's waters and to downplay environmental problems that aquaculture may bring.

The official evangelist is the Department of Agriculture's Dr. John Pitts, veterinarian and former Jefferson County commissioner who appears at meetings and hearings — in one case, as a paid witness for a net-pen applicant — to pooh-pooh environmental objections raised by net-pen opponents.

Opponents are not just those who own shoreline property, who howl against a net pen being erected in their aquatic front yard. They've been fired up by what the state's environmental impact statement confirms: A new, nearby fish farm can give view property a one-time, financial knock.

Opponents include environmentalists like David Ortman of Friends of the Earth, who says: "Why should we be happy about fish farms that dump tons of fish poop every day into Puget Sound?"

They include commercial fishermen like the Puget Sound Gillnetters, who know something that has largely escaped the notice of sport anglers.

Atlantic salmon, not a salmon but a sea-run trout of the Atlantic seaboard, have escaped by the thousands from net pens here and in British Columbia. The B.C. government booms fish farms with a gusto exceeding even the ta-ra-ra-boom-de-ays from Gardner's men and from Brian Boyle, the separately elected head of the Department of Natural Resources, which manages shore bottoms and other public lands.

What's more, hundreds of thousands of Pacific salmon have also escaped from the pens, especially in British Columbia.

So what does that mean?

The state environmental impact statement points out that escaped exotic fish like the Atlantic salmon "could establis[h] self-sustaining populations and compete with indigenous fish," such as steelhead trout.

That may not be far off.

In the North Puget Sound last year, commercial and sports fisherman caught hundreds, probably thousands, of Atlantic salmon weighing up to 10 pounds.

More dangerous by far is that for the first time ever at least three sexually mature Atlantic salmon showed up miles from the sea in the Nooksack River last year, near Bellingham, and one in the Nisqually, near Olympia. Rumor has a fourth Atlantic netted in the Skagit River at Sedro-Woolley.

What's the worry about four fish, though they may be forerunners of thousands to come?

The environmental impact statement warns that accidental importation of "exotic" fish diseases associated with fish farms in Europe could devastate existing salmon and trout runs in state rivers.

Just in the past two weeks the public has learned that such a disease, viral hemorrhagic septicemia or VHS, has shown up at two hatcheries in state waters. It is the first time ever that VHS has been found in North America.

VHS, state fish-disease experts say, has never been found to occur naturally in Atlantic salmon. They say that the chance that Atlantic salmon in pens here are the source of the disease is "virtually zero." The disease was found in chinook and coho salmon, species raised extensively at federal, state and tribal hatcheries and at commercial net-pen operations.

The impact statement does not dwell on what has happened in Norway, where other diseases associated with that country's extensive net-pen industry have ravaged wild Atlantic salmon runs in 32 rivers. The government was forced to poison some streams, set up a salmon sperm bank to preserve wild genes and consider banning any new net pen within 12 miles of a river mouth, an obvious rule not yet under consideration here.

Nor does the statement dwell on the possibility of migrating wild fish catching indigenous fish diseases from net pens here or of net-pen escapees spreading such diseases into our river systems.

Fish farmers themselves helped call state attention to fecal build-up beneath pens, a build-up that kills clams, oysters and other bottom dwellers and can release poisonous hydrogen sulfide gas, which can kill all fish in a pen in minutes.

In 1986 Commissioner of Public Lands Boyle limited new net pens to sites where the water is at least 60 feet deep at low tide, a mile away from other pens and with enough current to flush away food and fecal deposits. He also limited the surface area of new pens to two acres or less.

These requirements ended up in "Recommended Interim Guidelines" written for the departments of Agriculture, Ecology, Natural Resources and Fisheries, which share regulation of the fish-farm industry, with Agriculture and Pitts calling most of the shots.

With no force of law and offered to help county commissioners site pens under state law, the guidelines deliberately do not talk about navigation problems, use conflicts and, most important, esthetics.

> **If the two sides could stop feuding and start talking about necessary standards, we could have a safe, considerable industry.**
>
> —Peter Katz, fish farmer

Commissioners have learned that if they turn down a net-pen proposal, the applicant will seek a full rehearing before the state's Shorelines Hearings Board, with Pitts certain to show up to put the stamp of Gardner's administration on having the permit granted.

Dwain Colby, an Island County commissioner, put the matter thus in a 1987 letter:

"While there may be legitimate reasons for denying a permit to locate a salmon net pen, local government has been placed in the position of being able to say 'yes' to such a proposal but not 'no.'"

Under Gardner, the Department of Ecology has refused to require net-pen operators to get pollution-limiting discharge permits under the federal Clean Water Act.

The Sierra Club Legal Defense Fund has announced it will sue the U.S. Environmental Protection Agency if necessary to force EPA to force Ecology to force every net-pen operator have such a permit.

The state's draft environmental impact statement declares that the major impacts of net pens can be cured by "proper farm siting to assure dispersion of wastes, flushing of the site and protection of sensitive areas."

It's a view that one can come to easily while talking to such eloquent fish farmers as Peter Katz, a marine scientist running the Paradise Bay Co. net farm at Port Townsend, and John Forster, a Ph.D. in aquaculture running Sea Farm Washington's similar operations at Port Angeles.

Both pen systems, clean, low in the water, quiet, full of fat, bright Pacific and Atlantic salmon, are barely noticeable in the working harbors that contain them.

But that's quite different than siting a pen in Frenchman's Cove on the west side of Hood Canal, as International Marine Farms Inc. proposes.

Or siting a pen, as Tailfin Inc. proposes, in a main salmon and trout-fishing cove between East Point and Bells Beach on the west side of Whidbey Island, where from her home Margaret Johnston looks out across Saratoga Passage to Camano Island. She heads the Marine Environmental Consortium, made up of 20 citizen organizations that oppose fish and other floating farms.

Katz argues for having the state set standards for siting and operating net pens, to ensure that the pens do not harm the environment and to give the net-pen operators a clear but flexible regulatory framework to live with. But Katz feels the industry is getting a bad rap from people like Johnston, who, he says, simply don't want a net pen in their aqueous front yard.

"If the two sides could stop feuding and start talking about necessary standards, we could have a safe, considerable industry . . . ," he says. "But we're years away from that."

Forster, president of the Washington Fish Growers Association, dismisses esthetic revulsion as the main drive behind the opposition to what he characterizes as a clean, beneficial industry with great prospects.

"It's more than esthetics. It's an intrusion into a life style that they don't like and they're using environmental problems as a [illegible]. Because of that, the debate is dishonest at the moment, terribly dishonest."

Johnston, at a gathering in her home with other members of the Marine Environmental Consortium, characterizes such comments as unworthy.

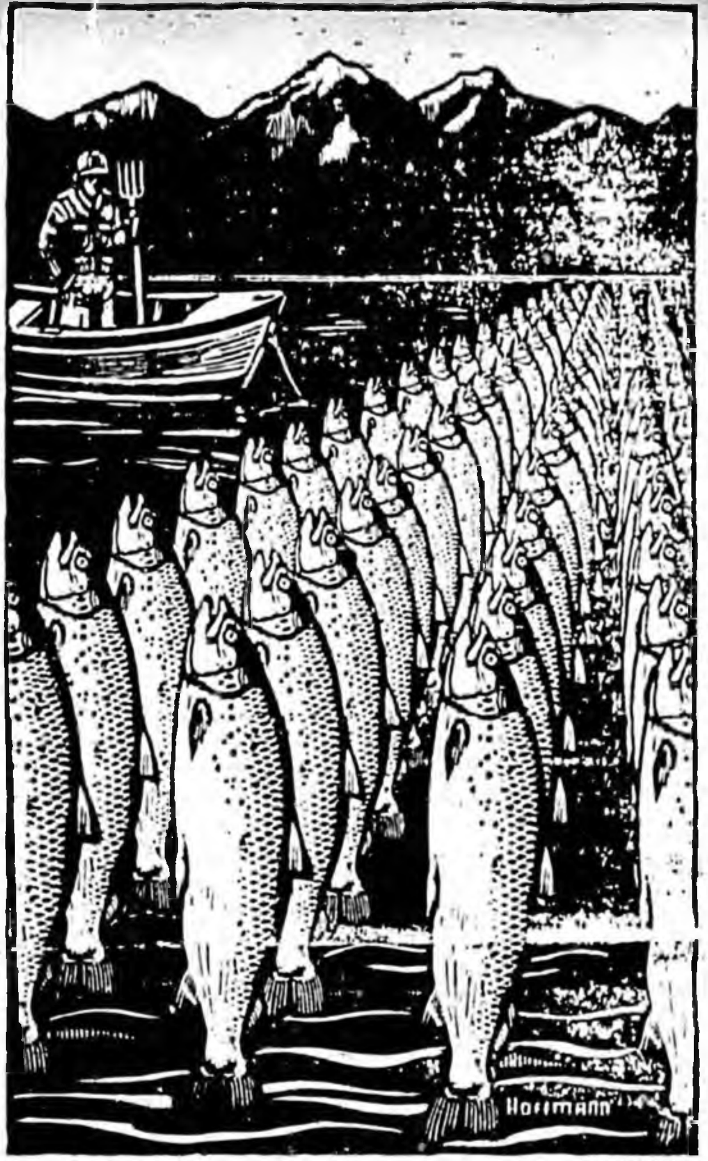
"The net-pen issue raises a fundamental issue of public policy that involves more than us, though the environmental questions are real and cannot be brushed aside by the industry or the state. The big question is: Should the public waters of Washington State be turned over to a few corporations for private profit?"

That's a proper question for us all to ask. It must be answered by political action. Gardner's administration has already answered: Yes.

To me it seems stupid to site more pens in pristine salt and fresh waters (yes, an application is pending in Eastern Washington) until we have better, more extensive scientific information about siting than what the draft environmental impact statement supplies.

Until we know if pens can be sited safely anywhere, we would be blind to commit ourselves to putting major sources of pollution in our unpolluted waterways and in waterways we are trying to clean up.

The tragedy of Norway's rivers demonstrates that.



DUANE HOFFMANN/P-I

Soapbox

De Yonge was right on fish-farm perils

By Arthur H. Whiteley, John W. Brookbank and Annamarie K. Johnstone

In his article (P-I Op-Ed, March 29), State Land Commissioner Brian Boyle took severe exception to John de Yonge's March 5 Focus Section article on fish farms.

We believe that de Yonge's pithy comments were right on target.

Boyle argues against relating fish-farm pollutants to untreated human sewage. In terms of organic sludge whose [illegible] oxygen from the water, and loading of the water with various nitrogen compounds and phosphate which act as fertilizers, the two pollutants are essentially alike.

The question of dilution of these discharges is relevant.

Metro's West Point Wastewater Treatment Plant dumps its soluble discharge into the main channel of Puget Sound at considerable depth, permitting dispersion. Fish-pen wastes are deposited on the site as feed pellets and feces, which settle as sediment and dissolved components that enter the water column. The sites are channels or embayments with restricted water flow, not rivers, with a one-way flow that flushes things away. Tides flow and ebb and currents in bays create eddies, leading to retention and accumulation of the pen wastes.

Metro sewage must undergo treatment, at substantial and justified expense to our citizens who create this waste. Discharge is monitored by a permit, mandated by federal Clean Water Act. The fish-pen solid waste enters the bay raw, untreated, without disinfection — and free to the fish farmer. Washington's pens have avoided the federal discharge permits, although the Sierra Club Legal Defense Fund threatens the state with legal action if this requirement is not enforced.

real. Just as it has been in Norway.

Boyle's understanding of the *Gyrodactylus salaris* issue in Norway is at variance with reports from Dag Dolmen of the Directorate for Nature Management in Trondheim. This trematode parasite has been introduced into Norway, according to Dolmen's analysis, "through stocking with salmon parr from infected hatcheries/fish farms." Johnson and Jensen report that total salmon catches in infested Norwegian rivers (1970 to 1984) dropped to 16 percent of levels in uninfested areas. There were mostly wild fish which have been nearly decimated by a parasite spread through "hatchery-/fish farm" stockings. The smolts that are stocked in salt water fish farms are reared as fry in fresh water hatcheries.

In November, Svein Mehli, head of the division of the Directorate for Nature Management concerned with protection of wild salmon in Norway, testified for Skagit County before the State Shorelines Hearing Board. Mehli reported the escape into Norway waters of thousands of pen-reared salmon carrying furunculosis, the appearance of bacterial kidney disease in farmed stock, the presence of redmouth disease in 300 salmon pens — a disease previously unknown in Norway — and of his concern about "other diseases knocking at the door." Given these facts, we disagree with Boyle's position that "environmental arguments against fish farms are essentially specious."

Boyle objected to de Yonge's extrapolation of the targeted 100 fish pens to the sewage equivalent of Seattle's sewage outfall — as "scientifically absurd." But Boyle can find a graph on pages 133 and 134 of the draft Programmatic Environmental Impact Statement to which he referred that shows that 100 pens will load Puget Sound with biological oxygen demand (organic sludge) 150 percent higher than that of the West Point plant, and add an amount of dissolved nitrogen to the embayments equal to that from this sewage plant. We think de Yonge stated things correctly.

In Norway, which has much smaller farms than are permitted here, pens are moved every couple of years to try to mitigate environmental problems. Moreover, they are located closer to the open water at the mouth of fjords. In some regions, alternate fjords are kept free of pens to create security zones between sites.

Atlantic salmon can become diseased in their pens and they do escape. This year commercial fishermen have recorded many Atlantics caught along with native salmon south of San Juan Island and between Bellingham and Point Roberts. Escaped Atlantics have been picked up in the Nooksack, Skagit and Nisqually rivers. These are adult fish, apparently ready to breed. We feel that there remains a possibility that they will breed, that they will become established and that they will compete on the breeding grounds with native salmonids — how successfully neither we nor Boyle knows yet. The presence of potentially diseased pen escapees among breeding natives poses a danger that in our opinions is

Boyle must be well aware of the current concern about appearance of viral hemorrhagic septicemia (VHS) in resident salmonids and doubtless has seen the U.S. Fish and Wildlife Service summary of March 3, 1989, which reports that this virus is confirmed in yearling coho and steelhead trout and fall chinook salmon fry from the Makah hatchery. We assume that he is aware of the opinion from the U. S. Fish and Wildlife Service that the logical, though not proved, avenue for entry of this new disease is via Atlantic net-pen culture. If these are proved to be "specious arguments," then we can drop them.

Is it fair for "the working stiffs" on the gillnet boats, purse seiners and reef boats — white and Indian alike — to be crowded off their fishing grounds, or worse, to have their resource diminished? Should clam growers, who have husbanded their rich resource for three generations, be forced to contend with pollution from a fish pen?

In order to generate new jobs and revenue, a wiser course for our state would be to accept the mitigation measure in the draft EIS — to culture salmon in tank farms. These should be on privately owned land with effluent monitored and regulated by permit and then discharged into deep water. In this way the negative impacts of floating mariculture — navigation hazards, storm-caused breakup of pens, dissemination of disease, release of untreated wastes, difficulties with antibiotics and impairment of aesthetics — would be eliminated. Lastly, land-based fin-fish culture would place the costs of this industry on those who profit from it.

■ Dr. Arthur H. Whiteley is professor emeritus of zoology at the University of Washington; Dr. John W. Brookbank is professor emeritus of microbiology and cell biology at the University of Florida; Dr. Annamarie K. Johnstone is a marine microbiologist. Soapbox columns are contributed by readers.

Newton Elkins

SPECIAL REPORT

West Coast Shake-out

Supply and demand tremors rattle B.C. growers.

by Peter Chettleburgh

THE SHAKE-OUT has begun. Sagging salmon prices, excessive debt, high interest rates and a worldwide glut of salmon have triggered a period of consolidation in the west coast salmon farming industry. On the East Coast where prices are firmer and farmers have been more conservative in their approach there is still a margin of profit, but it too is narrowing as prices continue to slide in the face of skyrocketing worldwide production (220,000 tonnes in '89).

Everyone said it would happen, but no one really wanted to believe it. On the west coast, where prices have been hovering at or below production levels for most of the summer, reality has struck home with a vengeance. The need for cash flow has caused many farmers to sell a lot of small pre-market fish for ridiculously low prices - 90¢ a pound was one figure this writer heard mentioned earlier this summer.

Since May we have heard of at least four west coast farms that have been put into receivership, another two that have been sold at fire sale prices and at least a dozen more which are in desperate need of working capital. Everyone else is holding on, praying for higher prices in the fall.

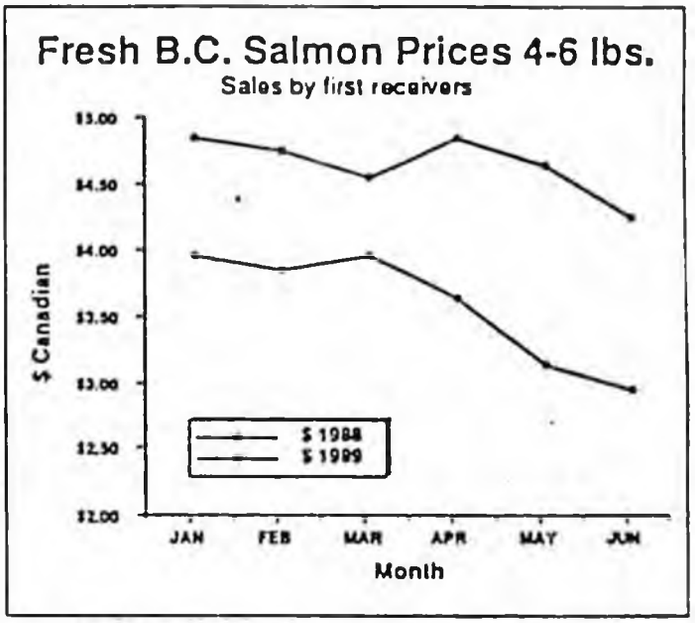
One of the big ones that went into receivership is the Fremstad Group which has four farms, a hatchery and processing plant in the vicinity of Campbell River. It's being handled by the accounting firm of Coopers and Lybrand which was looking for a buyer as we went to press in August.

Triangel Resources near Tofino on the west coast of Vancouver Island found itself in trouble earlier this spring and was taken over by General Sea Harvest, an affiliate of the Finnish conglomerate, Cultor Ltd. (formerly Finnish Sugar Co.), the parent company of Ewos Canada. General Sea and B.C. Packers were also looking at the assets of Ross Passage Salmon Farm, another west coast operation which found itself in trouble earlier this spring.

One other company that is known to be in receivership is Seagrow Industries Inc. (400 tonne capacity) with two sites in Jervis Inlet. The receiver, Coopers and Lybrand, was still looking for a buyer as we went to press.

There were also some amalgamations before the current shake-up began. For instance, within the last year Five Fishes (Sechelt) and Nordic Ventures (Quadra Island) were purchased by B.C. Packers, the large west coast fishing company-cum-processor owned by Westons. Apparently B.C. Packers is on the lookout for other expansion prospects, but doesn't plan to walk into a situation unless all the biological criteria, etc. are just right.

As a general comment, it can be said that the farms with some of the worst financial problems are in the Sechelt area. This is where the gold rush started in 1984 and it is the area that received a lot of the initial debt financing from Norway. Now the Norwegian financing has all but dried up and few investors are prepared to put additional money into the farms because of their current debt structure. Adding to their woes are the growing conditions which many in the industry agree are not as good as those north of Campbell River or on the west coast of Vancouver Island. Indeed, some of the salmon farm sites may end up in the hands of oyster growers who are already lining up for a chance at leases that will probably turn out to be better for shellfish than salmon.



The graph above tells the story. The top line shows prices for B.C. farmed salmon (4-6 lbs.) during the first six months of 1988, while the lower line shows prices for the first six months of 1989. Prices are FOB Vancouver (Source BCSFA).

$250 million investment

A recent estimate puts the total investment in B.C. salmon farms at about $250 million. And this does not include an additional investment of at least $50 million in the supply and services sector (cages, feed, nets, etc). Of this total investment, at least $85 million has come in through Norwegian banks, much of which is now exposed to major losses, according to a recent report in a Norwegian newspaper.

Even for the smaller farms, those with debt in the neighbourhood of $2-3 million, the debt servicing costs of 15-18% will skim off between $300,000 and $400,000 a year. That's a lot of fish, and a lot of debt relative to inventory, assets and equity, particularly in an industry that has yet to establish a solid production base. >>>>

Sept/Oct. 89

Problems for suppliers

Although the depressed prices are toughest on the farmers, the suppliers behind the scenes are also hit hard. Scantech Resources of Sechelt folded in July after becoming one of B.C.'s major suppliers of fish farm equipment in just four years. President Clark Hamilton says that he lost everything in the failure but is still a strong believer in the future of the industry in British Columbia.

Another supplier which was hard hit was Powell River Net Loft which ceased doing any further work for the fish farming industry in June. The suppliers that are the most exposed are the companies which specialize *solely* in fish farming equipment and services for the B.C market. They don't have the flexibility of companies that serve other industries or those that have national distribution.

What went wrong

It's small consolation that salmon farmers around the world are facing the same problems of overproduction and falling prices. Indeed, both the Scots and Norwegians are taking a serious beating in Europe where production continues to grow at about 50% per year while demand is at about 25%. In Norway the Fish Farmers Sales Organization (FOS) has recommended holding the number of smolts going into the sea at about 50 million this season. This is to reduce production and maintain prices in the years ahead. One of the consequences, however, will be a continued shakeout in the Norwegian smolt producing sector.

In British Columbia the problems seem even worse. Excessive debt financing, high jacking rates and high mortalities from algal blooms and BKD have continued to chip away at profit margins. B.C. growers have also had to cope with a relatively new and untried culture species, chinook. It doesn't have the 20 year track record of the Atlantic species which the Norwegians and Scots have been able to use to their advantage on both the production and marketing sides. It's taken extra time and money for west coast producers who already arrived late in the world growth curve of farmed salmon production.

> "At the end of the day salmon farming will end up like other producing sectors with only the low-cost producers surviving."

Glutted markets

As if this weren't enough, world markets are currently glutted with high inventories of frozen Pacifics, a legacy of an oversupply last year and ample reserves of fresh and frozen farmed Atlantics on world markets this year. Farmed Atlantics now take preference in most European and some North American markets, areas that were once dominated by wild Pacifics. Consequently, the price for both farmed and wild Pacifics has seen a dramatic fall since last December with farm gate prices for farmed chinook (6-9 lb.) dropping more than $1.50 per pound to $2.50 and lower for a while early this summer. (New Brunswick Atlantics (6-9 lb.) were wholesaling for about $1.25 more per

pound than B.C. chinooks of the same size mid-summer, while Norwegian Atlantics were about 50¢/lb less than the New Brunswick product.).

The depressed market conditions came at a particularly awkward time for B.C. growers. The 60 or so companies that started operations within the last four years are at a stage of maximum investment, everything's out on the line, but as yet they haven't had a good chance to make any major earnings and reduce their debt. And now, with salmon prices the way they are, you can be sure that any fish under 4 pounds is being sold below the break-even point.

The worst part is that there aren't any major miracles expected in the near future. Though there should be a modest price rise when the wild-catch season ends this fall, a significant jump in farm gate prices is not likely since the ever-increasing supply of farmed product from Norway, Scotland, Chile and Ireland is flooding markets in Europe and Japan, and making serious inroads into adjacent turf in the United States. It's a classic case of supply and demand theory in action and will only be stabilized by market expansion, strong promotional efforts, more efficient production techniques and well organized selling.

World's shrimp producers face same problems

Shrimp producers in southeast Asia are facing the same slide in prices that hit salmon farmers this year. According to a recent article in *Aquaculture Digest* (July 25, 1989) the pond-side price for giant tiger shrimp fell from $8.50 to $4.40 per kilo in Taiwan last spring and only recovered slightly during the summer. Taiwanese production costs are about $5.00 per kilo.

Once again the main culprit is a hyper-active production sector trying to sell product into already-glutted markets. According to *Aquaculture Digest* the winners in the shrimp game are likely to be the low-cost producers in China and Indonesia while the losers are going to be the high-cost, intensive shrimp farmers of Taiwan, the Philippines, Thailand and the rest of the world. Commercial shrimp fishermen will also have problems remaining competitive in the years ahead, the article adds.

Who will survive?

The farms in the best position are those with the least debt, highest efficiency and deepest pockets, all linked to an efficient means of selling their product. The big integrated national and multinational companies are in a strong position. They can benefit from profits in several segments of the production, processing and distribution chain.

But there is also a future for independent farms if they can maintain a low cost of production. To do so they must run a lean operation, maximizing growth rates, while keeping feed wastage and equipment purchases to the minimum. They will want to have the least expenses possible and get the best prices they can for their product by pursuing niche markets.

Production costs are hard to pin down, but estimates run between $2.50 and $3.50 a pound farm gate depending on the site and

... *Please turn to page 48*

W. C. SHAKE-OUT

Continued from page 23

what costs are included. This means that in mid August, with farm gate prices hovering at about $3.00 per pound, B.C. farmers could make a modest profit if they were operating on the lean side or could be losing up to 50¢ a pound if they were on the high side. Unfortunately, for many of them there was no choice but to sell chinook and coho that were starting to mature. A couple of farmers were seriously looking into the possibility of establishing *U-catch'em* pens catering to wealthy U.S. yachtsmen.

Key to success

One of the most important keys to success in the years ahead will be management. As aquaculture consultant Ted Needham pointed out in a recent issue of UK-based *Fish Farmer* magazine "... every farmer has to find out what his rearing costs really are. ... he can only do this if he works to proper budgets with monthly cash flows projected over two years and updated at least quarterly. All forecasts of fish growth should be based on what has been achieved to date rather than on some hoped-for improvements." Needham's advice is as sound here in Canada as it is in Scotland. The margin for sloppy record keeping slipped away sometime last winter.

What is the outlook?

Is there any light at the end of the tunnel? Depends on who you talk to, but with another 50,000 tonnes projected to come onto world markets next year (275,000 tonnes total) there's not much hope that prices will again reach 1988 levels.

Who are the consumers?

Who's going to eat all this fine, fresh fish? The European market is nearing saturation and what's left will probably go to Scottish and Norwegian producers. The Japanese market is still available but it takes work to penetrate and, once again, the canny Norwegians are already in there, picking up what the Japanese can't produce for themselves (domestic farmed salmon production for Japan is estimated at about 25,000 tonnes of coho this year). The most accessible market left is our big, convenient neighbor to the south and there's still lots of opportunity there if the Canadians will make a serious effort to go after it. Marketing and distribution are pivotal. It will take a concentrated, cooperative effort on the part of all Canadian producers of both wild and farmed fish.

At the end of the day salmon farming will end up like other producing sectors with only the truly low-cost producers surviving. They will sell their fish in a well disciplined market where demand will determine the production that is planned and financed. But at this point not even a prophet could say how long the restructuring will take and who the survivors will be. Ω

FRANK SIMON

Continued from page 42

The intense competition in the salmon business doesn't worry Simon either. "There is always room for a producer who's doing things right," he says. "We want to differentiate ourselves on the basis of quality. We believe that if we do everything right, we'll have a prominent position in the market." Ω

MIX AND MIS-MATCH

Genetic pollution is the most invidious consequence of the escape of farmed salmon, argues Richard Douthwaite, who fears that the mating of farmed with wild fish may eventually eliminate our native stocks

On 9 February 1988 a storm of unusual ferocity hit the west coast of Ireland and swept across the country, leaving a trail of destruction in its wake. In Clew Bay on the Atlantic coast winds were so severe that farmers went down to the beaches the next day with their tractors and collected large quantities of fish. It was no surprise that [illegible] on cages moored in the bay had broken up, releasing more than 30,000 fish into the open sea.

It is not always the weather which is to blame for fish farm escapes. One moonless night a few months before the storm, two men in a rowing boat cut the nets of 12 salmon cages moored in Mulroy Bay in Donegal. Almost 10,000 fish, worth £100,000, got away and the farm recaptured less than a quarter of them. The raiders' motive was to catch the escapees in their drift nets and then sell them.

Only recently has concern been expressed about the effects that these escapees might have on wild salmon stocks. Perhaps the matter should have been addressed earlier. The first Scottish attempts to rear salmon in cages were made in the late 1960s and it was as long ago as 1981 that Scotland's output of farmed salmon exceeded its wild catch, with Ireland reaching that position about four years later.

Today the problem is so large it cannot be ignored. Scottish farmed output is expected to be 54,000 tonnes in 1991, about fifty times the size of the wild catch, and Ireland hopes to produce 15,000 tonnes that year. There is so much salmon in cages at sea that if only two or three per cent break free in any year, they will substantially outnumber the native stock.

Escapes would not matter if the freed fish were genetically identical to those born in the rivers up which they swim. However, this is rarely the case. The salmon in each river – even sometimes in the carrier streams – are unique strains which have evolved in the ten thousand years since the ice sheets retreated. In most cases escapees will not be of that strain. There are 400 distinct stocks of wild salmon in Scotland, according to a report produced last year by the Scottish Wildlife and Country Link. It also states that wild salmon transferred from one river to another perform less well and have harmful effects on the native stock.

Farmed fish are increasingly being bred, like pigs and cattle, for characteristics which suit life in captivity rather than in the wild. Consequently, if escapees enter a river and mate with wild fish, they will pass on genes which tend towards placid behaviour, late sexual development and more rapid growth. Cross-bred young are therefore less likely than pure-bred natives to survive in the sea and return to the river as adults.

Even if farmed fish turn up in a river but mate with each other rather than with the wild fish, the effects are still adverse. They will

Genetic pollution is not the only threat which fish farming poses to the survival of wild salmon. Disease organisms and parasites multiply rapidly in the confined conditions of a salmon cage and from there they can easily migrate to affect other fish. It is for the reason that salmon farmers become wary of another farm establishing cages within a few miles of [illegible] which is why whole [illegible] in Scotland are allocated to one [illegible].

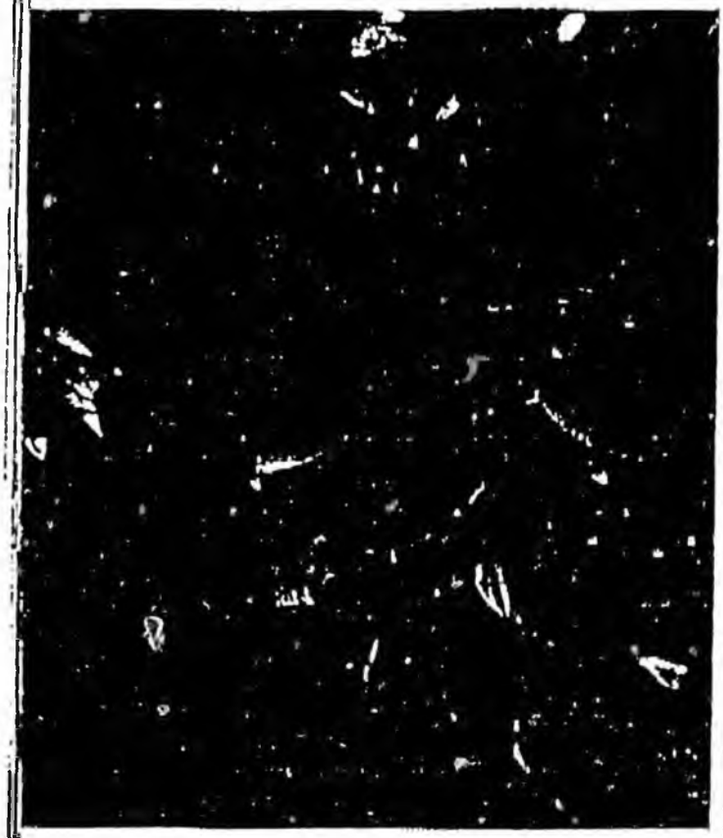
[illegible] appear in farmed salmon [illegible] year. Pancreas [illegible] are [illegible] Ireland in 1984 after occurring first in Scotland in 1976. Seventeen of the 21 farms in Ireland now have it and output is consequently down by 25 per cent because of deaths or stunted growth.

The most worrying disease appeared only last year, in Norway. Salmon Anaemia Syndrome kills 80-90 per cent of young fish. Again, its cause is completely unknown.

In spite of the threat that diseases present both to their own and to the wild stock, some fish farms are their own worst enemy. In Scotland dead diseased salmon are known to have been dumped at sea rather than incinerated on land, spreading pathogens far and wide.

There are also two dangerous parasites. One is a tape worm which uses the edible mussel as an intermediate host, then moves on to affect wild fish. The worm weakens wild salmon, rather than killing them directly, lessening their ability to return up turbulent rivers to their spawning grounds and also making them more vulnerable to disease.

The second parasite is a flatworm, *Gyrodactylus salaris*, which has completely wiped out stocks of wild salmon in 28 rivers in Norway. It was accidentally introduced when farmed fish were imported from infected hatcheries and put out into freshwater cages. The pest attacks parr – young salmon which have not yet developed the physical features that allow them to live in the sea. "It is the most serious threat to Atlantic salmon in Norway today," says Rear Admiral D.J. Mackenzie, director of the Atlantic Salmon Trust, Pitlochry. The only cure so far is a drastic one – to poison any remaining salmon in the river and then restock with uninfected fish.



compete with the natives for spawning areas and their young will compete for food. As a result, fewer native fry may survive to set off for the sea as smolts and consequently fewer adult natives will return after a year or more to complete the reproductive cycle. (A young salmon passes through fry, parr, smolt and grilse stages before becoming a mature adult.)

The situation is so serious that regular escapes from farms could eventually wipe out all native salmon. Research in Norway, where salmon have been farmed for much longer than in Scotland or Ireland, shows that in some rivers up to two-thirds of the fish are already of the farmed variety. 'If genetic pollution continues at its present rate, the hereditary variations of some of the river species will be halved within seven years,' says Professor Harald Skjervold whose research findings in this field all point to this alarming conclusion.

Any experienced salmon fisherman will confirm that salmon stocks vary from river to river. 'Some are early rivers where large salmon enter in the spring,' says leading salmon geneticist Professor Noel Wilkins of University College, Galway. 'Other rivers have significant runs only in late summer, when the returning fish are smaller and younger. Some rivers are noted for the fine shape of their fish, others are not.'

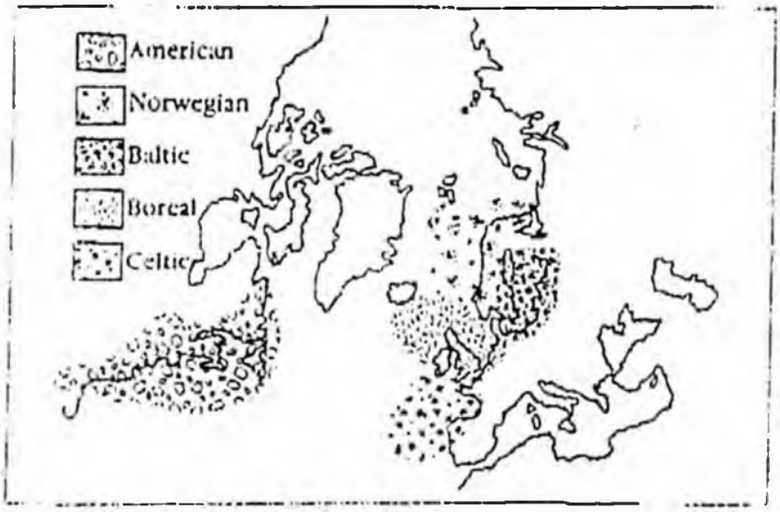
Andrew Young, who managed the fisheries of the Duke of Sutherland more than 130 years ago knew why this was: 'Each river has its own peculiar race of fish,' he wrote. 'We have now shown that salmon undoubtedly return to the river where they have spawned and where they belong to the race of fish that inhabit that particular river.' Professor Wilkins agrees: 'Salmon return to their own river with amazing accuracy and mating occurs predominantly between individuals who were born in the same river system.'

It is this inbreeding which has allowed the different strains to develop. In some rivers a higher proportion of fish come back after two or more winters at sea than after one year as grilse. Thus, if all the smolt are killed by disease or pollution one year, others are left to return to the river the following year to spawn, giving a chance for numbers to recover.

Fish farmers are deliberately trying to eliminate this characteristic: what they want are fish with a low grilsing rate, because it is more profitable to produce bigger fish which spend two winters in the sea than smaller fish which spend one. Norwegian salmon fit this bill and consequently their eggs have been widely used in Scottish and Irish hatcheries instead of the native strains. Farms also want their hatched fish to be ready to go to sea after one year in fresh water – it is obviously uneconomical to keep them in freshwater cages for an extra season. But again, in the wild, a stock in which some fish go to sea after one year and some after two has a better chance of surviving than one which does not.

Then there is the question of homing. Tagging experiments have shown that a higher proportion of wild fish return to their native rivers from the sea than do hatchery-bred fish released as fry into streams other than those from which their parents came. However, if any introduced fish which do return are caught and mated, their young will show a better return rate, which will

Previous page: grilse from the Spey. Above: fish jostle for food in the confinement of the cages. Right: distribution of the main races of Atlantic salmon



Although fishermen have known for hundreds of years that salmon stocks differ from river to river, scientists have only confirmed this belief within the last 20 years. Using a technique called electrophoresis they can analyse the proteins with which each fish is made up with great precision.

The first finding revealed by this technique was that there are five main races of Atlantic salmon, four of which share a common feeding ground off western Greenland. The Baltic salmon is the exception, feeding as an adult in the sea which gives it its name.

The second finding was that salmon vary genetically to a surprising extent from river to river, even within the same race. Dr Tom Cross, now of University College, Cork, examined fish from the Bandon and Munster Blackwater rivers in the south of Ireland and found significant differences in their liver enzymes even though they were both of the Celtic race and the river mouths only 80 miles apart. Dr Cross repeated his tests with Boreal fish from the Moy and Carrowniskey in north-west Ireland and found the Carrowniskey fish very different again.

'The differences that exist between salmon from different rivers,' says Dr Cross, 'are due to the small population sizes and the fact that they have been apart for 5,000 years. How important the differences are to survival, we cannot say. I think we ought at least to keep the the different races apart.'

• Contrary to claims by B.C. salmon farmers that salmon egg transfers pose little threat to wild stocks, an Atlantic salmon advisory body has advised extreme caution to avoid disease and genetic problems.

Report sees genetic threat

"None of the benefits of transfer of young Atlantic salmon and salmon eggs into Canadian waters outweigh the threats to native stocks," says a top body of Canadian fisheries scientists.

Fish farmers, the B.C. government and the federal fisheries department have allowed major imports of Atlantic salmon to Pacific waters, claiming they pose a minimal threat to wild stocks. The imports are scheduled to end in 1989.

But a review of egg imports by the Canadian Atlantic Fisheries Scientific Advisory Committee in 1986 warned that "there are unpredictable genetic risks associated with transferring European salmon stocks to North America and the potential benefits to Canadian aquaculture interests may be low."

CAFSAC is a top scientific advisory group which provides background information for Canadian representatives on international bodies studying conservation of Atlantic salmon.

Its conclusions go a long way to support the call issued by the UFAWU in May demanding a halt on any movement of salmon eggs and smolts, particularly Atlantics, until protection of wild stocks can be assured.

The CAFSAC scientists concluded that most of the benefits of imports accrued to the aquaculture industry because "it could allow the industry to expand as quickly as possible (and) it could be cheaper than purchasing local seedstocks."

In the long run, they said, it would "encourage the multinational nature of the aquaculture industry by allowing surplus seedstock in one country to be moved to another country."

But the imports carry the risk of disease, they warned, pointing to the Norwegian experience with the parasite Gyrodactylus salaris.

"Although the Canadian Fish Health Protection Regulations are considered among the best fish disease control mechanisms in the world," they wrote, "they are not infallible, a fact which, along with the large number of potential pathogenic organisms that are not considered under the Canadian regulations, makes the likelihood of an unwanted pathogen or strain of pathogen entering the country with fish from a certified (disease-free) source a very real possibility."

The CAFSAC report is part of a longer study by the North Atlantic Salmon Conservation Organization, a Scotland-based body supported by Atlantic salmon-producing nations.

B.C. salmon farmers have been enraged by UFAWU calls for controls to avert genetic pollution of wild stocks by farmed fish, claiming such pollution is unknown or unlikely to occur.

But NASCO warns that importation of European Atlantics to Atlantic Canada "provide risks of undesirable impacts on North American Atlantic salmon stocks.

"There are new disease or strains of diseases which may be introduced, also hybridization with North American stocks could result in loss of genetic diversity and reduced productivity."

NASCO concluded there is "an urgent need to develop new techniques to study the effects of hybridization, e.g. potential impacts of genetic impoverishment resulting from 'domesticated' or genetically engineered Atlantic salmon stocks (cultured salmon) spawning with wild stocks and hybridization of different strains of wild stock."

NASCO recommends that until definitive measures are in place to protect the genetic integrity of wild stocks, aquaculture projects should:

- use stocks originating as closely as possible to the project area,
- use sterile fish,
- establish "river preserves where no transfers or hatchery stocks is allowed in order to maintain the genetic integrity of some wild stocks; and
- manage stocks to ensure they are not reduced below a minimum size.

The Fisherman 7-15-88

Government of Canada
Fisheries and Oceans

Gouvernement du Canada
Pêches et Océans

NOTICE

Fish farming still draws opposition

Anchorage Daily News 2-20-90

By DAVID FOSTER
The Associated Press

RICH PASSAGE, Wash. — The history of salmon-fishing in the stormy North Pacific is filled with tales of brave fishermen riding the wild seas, but its future is being shaped in calmer waters.

Thousands of salmon in this sheltered arm of Puget Sound are captives in sunken pens the size of basketball courts. Crowded fin to fin, they swim endless laps, gobbling feed pellets and being fattened toward the day they'll be scooped up and whisked to market.

Yet while the crenulated coastline and pristine waters that stretch from Washington's Puget Sound to southeastern Alaska might be ideal for fish farming, the political climate is not so welcoming.

In Alaska, where commercial fishermen are a powerful

Please see Back Page, FISH FARMING

FISH FARMING: Young industry has run into resistance

Continued from Page A-1

lobby, bumper stickers in fishing towns proclaim "Real Fish Don't Eat Pellets," and the legislature is considering a permanent ban on fish farms when a two-year moratorium expires in July.

In Washington state, salmon farmers have the official blessing of the legislature, but that has helped little in the face of challenges from fishermen and environmental groups, which have defeated several proposed farms.

The fish waste produced by a two-acre salmon farm is equivalent to the sewage produced by a town of 5,000 people, claims a Washington citizens group called the Marine Environmental Consortium.

Environmentalists also fear introduced species such as Atlantic salmon — favored because they fetch a higher price and are more docile than Pacific salmon — will corrupt the local gene pool and spread disease. Wealthy owners of shoreside homes, meanwhile, don't want fish farms spoiling their views.

Promoters call fish farming an efficient way to help meet the world's growing appetite for fish. Not only does it provide a year-round supply of fresh salmon to supplement the seasonal wild catch, they say, it also creates jobs free of the hazards of commercial fishing, one of the nation's most dangerous occupations.

They also contend salmon-farming provides an economic incentive to preserve clean water.

"We're the best environmentalists of all, because we're dependent on it," said Jerry Polley, site manager for Global Aqua, the nation's largest salmon farm. "If something's wrong with the water quality, we're going to be the first to complain."

Production of farm-raised salmon, here and abroad, has boomed in five years, flooding markets traditionally held by wild salmon and driving down prices.

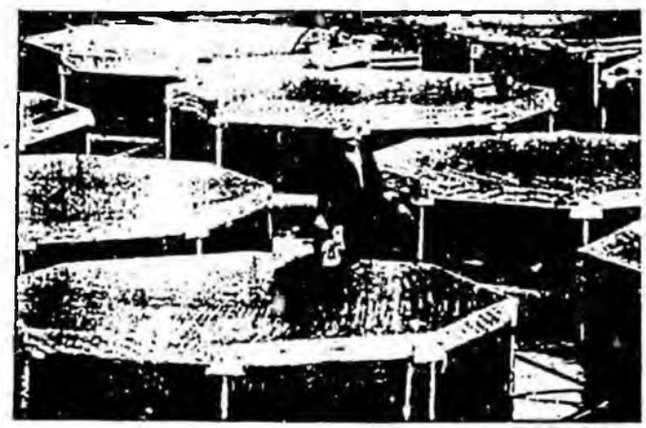
"For the first couple of years, as more salmon was around on a year-round basis, the farmed fish seemed to help the wild market," said commercial fisherman Randy Babich. "Now it's a battle at the retail counter."

Fish farming, or aquaculture, is hardly a new concept. For years, farmers have raised oysters in the Northwest, rainbow trout in Idaho and catfish in the Southeast. But techniques have developed more slowly in domesticating salmon, the mainstay of fisheries off Oregon, Washington, British Columbia and Alaska.

For years, it was practiced only by the Norwegians, forced into salmon farming by their declining wild fish populations. But interest has spread quickly since 1985, after Norway refined methods to raise salmon cheaply enough to compete with the wild catch.

In 1983, world production of farm-raised salmon was 23,500 metric tons, just 3 percent of the 670,000-ton wild salmon catch. By last year, farm-raised salmon production had soared to an estimated 202,000 tons, or 30 percent of the relatively constant wild catch.

Norway still leads the pack, producing about 75 percent of the world's farm-raised salmon, but other places, including Scotland, Chile, Canada and Iceland, are catching up.



Daily News file photo

Alaska Department of Fish and Game technician feed penned salmon at Little Port Walters in southeast Alaska

The United States, with 50 fish farms in Washington stat and Maine, lags far behind, producing 1 percent of the total

Many of the U.S. salmon farms are run by Norwegian companies, including Global Aqua's four-acre operation in Rich Passage, 10 miles west of Seattle.

Global Aqua's farm is fairly typical: a huge raft anchored offshore holds 40 pens, each lined with a net holding as much as 15 tons of fish, which range from finger-size smolt to fat-bellied salmon 2 feet long.

A half-dozen workers tend the pens from metal walkways, filling automatic feeders and mending nets. At harvest, workers herd fish into one end of the pens, scoop them out with an oversize dipnet and load them onto a boat. The salmon are still kicking when they reach a Seattle processing plant 30 minutes away.

In the three years it takes to raise salmon to harvest, farmers contend with prowling otters, hungry sea lions and diseases that can wipe out whole farms if left unchecked.

Aquaculturists say their operations will never be a major blot on the coastline.

"It would take just 40 acres of farms to produce all of the salmon that was imported into the United States in 1988," said Chris Gibson of Sea Farm Washington in Port Angeles. "The industry does not need a lot of space."

It may need even less space in coming months. Worldwide growth of salmon farming and recent overproduction in Norway have glutted the market with fish. Prices have plunged, and many farms are selling below cost just to keep cash flowing.

In British Columbia, lax regulation and a surge of Norwegian investment capital helped the number of fish farms soar from five to 135 in the past six years. But now many are in trouble. Nineteen have filed for receivership in the past year, and small businesses are being bought out by large investors better able to outlast the lull in prices.

Aquaculture boosters profess confidence in their long-term place in the salmon trade.

Genetic fears of pen salmon are real

Other View

☐ By SONJA CORAZZA

Alaska fishermen's concerns over genetic pollution and disease problems associated with escaped pen-farmed salmon are not unwarranted. Some 13% to 20% of all farmed fish escape, as documented by Norwegian scientists and European countries.

Also, verly large numbers of fish occasionally escape from pens. Their scientific studies show that the escapees do spawn in rivers up to a proven distance of 20 kilometers from their net pens. As a consequence of this research, and with great concern for the genetic integrity and survival of their wild salmon stocks, Norway has just imposed a series of new regulations on the pen-farmed salmon industry.

No salmon farms will be located within 20 kilometers of salmon rivers, and entire fjords will be closed to farming where salmon rivers are present.

This past December in Jarvis Inlet, B.C., 300,000 pen-farmed salmon escaped in winter storms that hit Canada. Floating net pens were found for miles up and down the coast.

Norway, in the salmon farming business for 20 years, has found itself combatting new diseases in net pens every year. Last spring, fish farmers requested that the government hire 100 new fish disease specialists (adding to their 60 disease specialists and nearly 150 fish veterinarians) before allowing any new permits to be issued in their country. A group of farmers who have lost tons of their farmed salmon due to a deadly salmon disease called *furunculosis* and government controls is suing the Norwegian government for $25 million. Last summer 5,000 fish infected with *furunculosis* escaped in Norway. Despite intensive efforts to capture the diseased fish, an infected fish was found in a freshwater stream.

In order to control disease in pens, Norway's use of antibiotics in pen farming has risen 170% in the past two years to reach a level of 48 tons, more than the use in animal husbandry and human use combined. With the present focus on health and nutrition, how does this reliance on antibiotics fit our view of pen-farmed salmon as a healthy addition to our diets?

Norway's most severe threat to their wild salmon stocks is from a parasite called *gyrodactylus salaris* that is responsible for wiping out 30 wild-salmon rivers. The *gyrodactylus salaris* parasite entered Norway via imported salmon eggs from Sweden. Importing eggs was prohibited by regulation, but those regulations were lifted as the result of pressure by farmers with economic concerns. The only control for the fatal parasite is by treating the rivers with a chemical called rotenone; unfortunately, rotenone kills everything in the rivers, not just the parasite, hence the loss of wild salmon by the tons in Norway.

Ownership of the pen-farming industry continues to be an issue. In Washington state, a local fish farmer is suing foreign corporations, primarily Norwegian, for attempting to monopolize the industry. Who would own the farms in Alaska?

The Alaska State Legislature should fund the Mariculture Task Force, a forum where these concerns and others need to be researched.

SONYA CORAZZA of Homer heads the Mariculture Committee of the United Fishermen of Alaska. This article came "signed" by United Fishermen of Alaska, as follows: Alaska Crab Coalition, Alaska Independent Fishermen's Marketing Association, Alaska Longline Fishermen's Association, Alaska Trollers Association, Bering Sea Fishermen's Association, Bristol Bay Drift-netters Association, Concerned Area M Fishermen, Cook Inlet Aquaculture Association, Copper River Fishermen's Cooperative, Cordova District Fisheries United, Kenai Peninsula Fishermen's Association, North Pacific Fisheries Association, Northern Southeast Regional Aquaculture Association, Peninsula Marketing Association, Petersburg Vessel Owners Association, Prince William Sound Aquaculture Corp., Prince William Sound Seiners Association, Seafood Producers Cooperative, Southeast Alaska Seiners, Southern Southeast Regional Aquaculture Association, United Cook Inlet Drift Association, United Southeast Alaska Gillnetters, Western Alaska Cooperative Marketing Association, and at-large delegates, Bill Hall, Ruel Holmberg Sr. and Bob Honkola.

seafood producers have turned to an increasing degree to foreign suppliers. The reason is that the cost of local packaging has risen to 20-40% more than that of imported products.

Spokesmen for Kassagerd Reykjavikur and Plastprent, two of the main manufacturers, said demand was always subject to fluctuation and that no massive change had yet taken place. Eggert Hauksson, Plastprent's managing director said that as yet only a fraction of the corporation's packaging needs had been supplied from abroad. "Obviously we have to hold our own costs down, and while the dollar is so weak we must use the opportunity. If the króna is devalued, everything will change overnight."

position had never been so tight, with so little tolerance of price increases on the market. Bjarni Lúdviksson, managing director at Icelandic Freezing Plants Corporation, said that as yet only a fraction of the corporation's packaging needs had been supplied from abroad. "Obviously we have to hold our own costs down, and while the dollar is so weak we must use the opportunity. If the króna is devalued, everything will change overnight."

NEWSNET

PROCEEDINGS against Mike Ikenze, the former Icelandic Consul in Nigeria who acted as an intermediary in attempts to sell stockfish from a group of Icelandic producers in 1984, have been dropped following his agreement to repay one-quarter of the GBP300,000 which he received for use in landing sales contracts.

SHRIMP CATCHES around Eldey off the southwest of the country are likely to be banned for some time following poor results of trial catches in the area. Only 20kg were caught in a two-hour trial haul recently. Closure of the area could have serious results for local fishermen, who have in many cases filled their quotas for other species.

LUMPFISH CATCHES this season have been very poor, and production of lumpfish caviar is expected to amount to only about 9,000 barrels, against 27,000 last year.

A NEW EXPORTING enterprise has begun in Sandgerdi, a village in the southwest of the country, where two local residents, Thorbjörn Danielsson and Eirikur H. Sigurgeirsson, have been assisted by chef Sigmar B. Hauksson in marketing whelk and crab in Sweden and France. Sales to a Swedish restaurant have already been agreed, and exports to France are to start in the autumn. The Swiss market is also being considered.

JUNE CATCH FIGURES

In tons	June		Jan-June	
	1988	(1987)	1988	(1987)
Cod	80,624	(99,492)		

Hopes high for capelin

The capelin season began on 10 July, with 49 Icelandic vessels sharing a provisional quota of 398,000 tons. With the prices for meal and oil rising because of poor soya harvests in the USA and growing demand in the Far East, hopes are high for a successful season. The quota is to be revised in November.

News from Iceland August 1988

Salmon fishing:

Problems posed by sea-cage escapees

Salmon fishermen trying their luck this season in the Elliðaár rivers, which flow through the eastern part of Reykjavík and are popular with local residents, are complaining that large numbers of the salmon they are landing are "escapees" from aquaculture stations and are consequently smaller and less attractive than the wild types.

According to biologists studying the problem, the fish are fairly easy to recognize. They generally have damaged fins and are shorter and fatter than the true natives of the river. In many cases they weigh only about one pound.

Biologists are concerned about the effects of the presence of the cultivated fish in rivers. A survey made two years ago estimated that 60-70 cultivated salmon had entered Elliðaár, a significant number in terms of the genetic effect on the local stock. Studies from Norway show that up to 10% of the fish in rivers near large aquaculture stations can be "escapees."

Alaska Water Resources Board
Resolution No. 89-22

Possible Impacts of Fish Farming

WHEREAS: A strong market for fresh salmon and therefore a demand for rearing areas exists for pen reared salmonid fin fish.

WHEREAS: The State of Alaska has an abundance of salt and fresh water environments ideally suited for this economic activity.

WHEREAS: There is a persistent and ever growing clamor on the part of fin fish growers to have Alaskan water resources made available to them.

WHEREAS: The State of Alaska has a very large, extremely valuable wild fish population distributed throughout the state upon which very valuable commercial, subsistence and recreational fisheries are also dependent.

WHEREAS: After an initial period of very rapid growth and expansion into lucrative markets for their product the fin fish industry elsewhere in the world is now beset with problems of disease, parasitic infestations and escapement of penned stocks leading to the degradation of wild salmon stocks.

WHEREAS: There are among the so far identified dangerous diseases and infestations those that are demonstrably able to be transported from country to country and from continent to continent under present conditions.

WHEREAS: Among these afflictions there are disease infestations for which there is no known treatment and parasitic infestations which once established would require the roetinone treatment of entire river systems to eradicate.

NOW THEREFORE BE IT RESOLVED: The Alaska Water Resources Board recommends that there be no fin fish farming of salmon or trout in Alaska until it can be established that the disastrous consequences of inadequately regulated fin fish farming now being experienced in other parts of the world will nor occur here; and

NOW THERFFORE: The Board further recommends that the Fin Fish Task Force created but not funded by the 15th Alaska Legislature be reactivated, funded and charged with the task of assemblying the necessary information to assure that fin fish farming, if allowed, will not constitute a deadly hazard to our wild stocks.

Adopted this 9th day of March, 1989
Alaska Water Resources Board

Peg Tileston

Peg Tileston, Chairwoman
Alaska Water Resources Board

Juneau Empire
2-20-90

Japanese buying up Norwegian fish

Surplus of pen-reared fish threatens Alaska's seafood markets in Japan

THE ASSOCIATED PRESS

ANCHORAGE – Norwegian fish farmers are attempting to sell a huge surplus of pen-reared salmon in Japan, long the main market of Alaska seafood processors.

The 88 million pounds of frozen fish could add to an already glutted Japanese salmon market, and drag down prices for this summer's Alaska salmon harvest, according to a U.S. embassy cable from Japan.

More than 80 percent of Alaska's salmon goes to Japan, most of it frozen.

The Norwegians so far have been unable to sell most of their frozen fish, but may cut prices in order to move it, according to the cable released by the U.S. International Trade Administration. If that happens, the Norwegian salmon "will be a threat to U.S. frozen, chum, coho and sockeye salmon," the cable said.

"If they dump it on the market, that would create one hell of a mess," said Roger Dahlke, marketing manager for Trident Seafood, a Seattle processor with plants in Bristol Bay and the Aleutians.

Dahlke said Trident is currently trying to sell a lot of Alaska salmon in Japan. But the company is making little headway in a market swamped with both fresh farm-raised fish and frozen fish left over from last season.

As of December, wholesale prices for sockeye salmon had dropped by more than a third from summertime levels, according to Pacific Fishing Magazine. Prices haven't moved much since then, according to industry officials.

Bill Atkinson, publisher of a seafood newsletter that tracks Japanese markets, doubts the Norwegians will be willing to drop their price low enough to compete on the glutted frozen market.

"The Norwegians are not really interested at selling at a loss," Atkinson said. "And the Japanese are not going to accept a high price for them when there are all the other less expensive fish available."

But one unnamed importer cited in the embassy cable said at least 44 million pounds of the frozen Norwegian fish probably will end up in Japan, knocking down salmon prices just as Alaska's annual harvest begins.

"This scenario, if true, is very critical for U.S. salmon fishermen," embassy officials said. Japanese buyers might import Norwegian salmon in an attempt to force down Alaska salmon prices during preseason negotiations, the cable said.

"With this type of volume they could start eroding traditional (Alaska) sockeye markets," said Gary Ervin, president of the Kenai Peninsula-based Seafoods From Alaska.

Pen-reared salmon production has been expanding rapidly since the Norwegians pioneered the aquaculture technology in the early 1980s. Saimon farming has been banned in Alaska but is legal in Europe, South America, the South Pacific, Canada and the Pacific Northwest.

Farmers feed the salmon until they reach market size. They offer the fish fresh on a year-round basis. Most Alaska salmon is sold frozen or canned.

Within the past five years, farm-raised salmon have taken over most of the European market, as well as much of the East Coast market, according to a report by the state-funded Alaska Finfish Farming Task Force Force.

Last year Norway produced more than 330 million pounds of salmon, a nearly 60 percent increase from 1988, and farmers have been unable to sell all that fish.

That production, combined with a record Alaska salmon harvest and a strong Japanese chum harvest, created a huge glut on the worldwide market. The amount of unsold fish is estimated by the state finfish task force at more than 500 million pounds. That equals the entire 1989 export of Alaska salmon to Japan.

When Norwegian fish farmers could not sell all their fish, they froze large amounts and began pushing it toward Japanese markets long claimed by Alaska.

"I think the impact of farm-reared salmon on traditional Alaska markets is profound, and simply going to accelerate," said Chuck Becker, Anchorage district director of the U.S. Commerce Department's International Trade Administration.

[illegible]
[illegible]
[illegible] Alaska 99801
Jan 28, 1990

Dear Resource Committee Members,

Finfish Farming, whether Shore based or in Ocean Pens, if introduced to Alaskas Economics at this time will be disastrous.

As a Alaskan Sport and Commercial Fisherman for 30 years, when Fin Fish Farming was first introduced my interest was overwhelming. To think I could have it all. Thirty years of fishing the most abundant stocks of Sea life any where in the world. And now, Reap the benefits, and do so in my back yard without dealing with mother nature on such a competitive bases, in addition to Flare openings, 24 hour Halibut openings, 1/2 hour Herring openings, total closures on King and Tanner Crab and many other hardships that the Alaskan Fishing Industries along with the State of Alaska and its Tax payers have had to suffer.

After many hours of research and questioning of people in and out of the Fin Fish Industries I am sorry to say, this is one time I CANT HAVE MY CAKE AND EAT IT TOO. Here are some of the examples

1. ADEC involvement
   a. On site Pollution of diseased fish
   b. Containment of fish waste and discarded feed
   c. Disposal of fish carcasses at time of brood stock take
   d. Drainage of circulation waters needed for Tank Farms, and disposal when polluted
   e. Standard requirements for Fish processing under State Law
2. Alaska Dept of Fish and Game
   a. Genetic pollution of wild stocks
   b. Allocation of broodstock
   c. Full time monitoring of disease control
   d. The assurance that disease is not transmitted by bird species
3. U.S. Army CORPS
   a. Protection of Ecosystem
   b. Protection of Wet Lands

The list could go on One that could choke any Alaskan Mom Pop group desiring to enter into this new Field of Farming. What we are trying to convey and hope you will consider is the direct benefit will again be only for a few, as like Limited Entry. And although Fin Fish Farming might well be a Legacy some Senators would like to add to their collection, to not allow the enactment of State laws Banning Fish Farms, is totally irresponsible to the Tax Payers at this time, and is another burden placed on future generations.

With all the regulations, intense disease and genetic possibilities, high cost of doing business in Alaska, along with increased marketing due to the increasing numbers of finfish farms in the world, less than a handful of farms could survive. Self benefit and profit as opposed to the risk to the wild stock environment just doesn't add up.

With such a high level of demand with the States Environment and Natural Resources by all Alaskan user groups, you really have bigger and better things to commit yourselves to achieve.

I am in full support of Senate Bill number 397, and House Bill Number 432.

Sincerely,

John W Hillstrand

John W. Hillstrand

cc: Betty Fahrenkamp
Jalmar Kerttula
Richard I. Eliason
Steve Frank
Rick Halford
Arliss Sturgulewski
Fred F. Zharoff
Curt Menard
Cliff Davidson
George G. Jacko
Mike Davis
Richard Foster
Mike Navarre
Walt Furnace
Bill Hudson
Bert M. Sharp

REPRESENTATIVE
BEN GRUSSENDORF

P O Box 928
SITKA ALASKA 99835
(907) 747-8458

RULES COMMITTEE
LEGISLATIVE COUNCIL

DISTRICT 3
ELFIN COVE
PELICAN
PORT ALEXANDER
SITKA
TENAKEE

Alaska State Legislature

WHILE IN JUNEAU
P O Box V
JUNEAU ALASKA 99811

(907) 465-3824
(907) 465-3720

House of Representatives

RULES COMMITTEE CHAIRMAN

MEMORANDUM

TO: Rep. Cliff Davidson
Rep. Curt Menard

FROM: Rep. Ben Grussendorf

DATE: March 5, 1990

RE: HB 432

Attached is a draft CS for HB 432 which I would like to propose for adoption by the House Resources Committee. Senator Eliason (the prime sponsor of the companion bill SB 397) and I drafted this CS in response to concerns expressed by both the Fish and Game Department and the general public about the need to clarify the final section of the bill.

The only changes in this CS from the original HB 432 (and SB 397) are on page three, section 2 (b). This section spells out what activities are allowed once the finfish farming ban is in place. First of all, we deleted the original number (3) as Fish and Game pointed out that sale of fish used for scientific and educational purposes is already not allowed so that exception was unnecessary. Next, at the request of the Fish and Game Department, in the item that was number (4) in the original bill and is number (3) in the CS, we added the words, "provided that the fish are not reared in or released into water of the state."

Finally, in section 2. (b) (2) we amended the language to make it more clear that private non-profit hatcheries may not do any finfish farming, but may continue to do the "cost recovery" fish sales that they currently do, and may sell surplus eggs to the state or to other PNPs as currently allowed by statute.

None of these changes affect the original intent of the bill, but are designed to simply clarify it.

I would hope that the committee could adopt this version to work from in its deliberations on HB 432.

Alaska Mariculture Association

TO: House Resources Committee

FROM: Rodger Painter
Executive Director

DATE: March 5, 1990

RE: HB 432 (Prohibiting Finfish Farming)

House Bill 432 and its companion measure (SB 397) would impose a ban on all finfish farming activities. The Alaska Mariculture Association (AMA) believes this is an unreasonable response to the concerns of fishing groups which have focused on the net pen rearing of salmon in the marine environment.

The Alaska Finfish Farming Task Force spent several months grappling with these concerns, and determined that net pen rearing of salmon can be regulated in a manner minimizing environmental and biological impacts. The task force also stated that upland finfish farms present few potential problems, and the impacts of marine culture of non-salmon species would be much less than salmon in net pens.

While AMA agrees that the marine farming of salmon can be carefully managed to result in minor impacts on wild stocks or the environment, we respectfully request that you take care to separate upland farms and marine culture of non-salmon species from the net pen rearing of salmon. These are very different issues and should not be treated with the broad brush approach of lumping together all forms of finfish farming.

Upland fish farming virtually eliminates the potential for escapees and impacts on the genetic integrity of wild stocks. Likewise, the potential for transfer of disease from fish cultured in upland farms to wild stocks can be eliminated with proper treatment of wastewater discharges.

We urge you to question why operations such as the small-scale coho salmon farm in Fairbanks two years ago should be banned. Under a narrow exception in the three-year moratorium on finfish farming, Andy and Pam Wescott of Fairbanks started farming in tanks in their workshop.

130 Seward St., Suite 201 • Juneau, Alaska 99801 • (907) 463-3600

The operation utilized water from a private well, and wastewater was disposed in the city sewer system. The broodstock came from surplus salmon returning to a local stream. The operation had no disease problems, and the director of the state's hatchery program said the fish were very healthy and were in excellent condition.

Yet, the Wescotts were forced to close down their farm when the Board of Fisheries refused to approve the required authorizing regulations.

There are numerous small freshwater salmon, trout and arctic char farms extending extending throughout the Pacific Northwest as far north as Whitehorse. Should Alaskans be denied these same opportunities? What are the objections to these land-based aquatic farms? Are there valid public policy reasons to ban an environmentally and biologically sound industry?

AMA believes a similar case can be made for the marine farming of non-salmon species, such as arctic char, steelhead, black cod and halibut. We urge you to question the necessity for prohibiting marine net pen culture of these species.

The fishermen's concerns always have been the net pen rearing of salmon. The primary objection to other forms of finfish farming is that it represents the camel's nose under the tent and it might set the stage for later approval of salmon farming. Is that how Alaska is going to diversify its economic base? What kind of statement would be made about the legislature's commitment to economic development by the passage of HB 432 in its present form?

No. 1

STATE OF ALASKA
19 90 LEGISLATIVE SESSION

BILL VERSION: CSHB 432(Res)
PUBLISH DATE: HOUSE 3/16/90

cc

FISCAL NOTE

REQUEST:

Revision Date: _____
Title: Prohibition of finfish farming

Agency Affected: Fish and Game
BRU: FRED

Sponsor: Ellason et. al., Cowsenhorf, et. al
Requestor: Steve Cowper

Components: _____

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

ANALYSIS: (Attach a separate page if necessary)

FY 90
See attachments.

Prepared by: _____ Phone: 465-4160
Division: ADF&G, FRED Division Date: 1/30/90

Approved by Commissioner: _____ Date: Feb 8 1989
Agency: ADF&G

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

Bill Analysis --

Background/Legislative Intent

In 1987, the Alaska State Legislature passed SB 297 placing a one year moratorium on finfish farming. The following year HCS SSSB 514 was passed, authorizing the farming of shellfish and aquatic plants, extending the moratorium on finfish farming until July 1, 1990, and establishing the five-member Alaska Finfish Farming Task Force. The shellfish farming program is currently being implemented. HCSSSSB 514 also contained a provision for inland farms in closed waters. The Board of Fisheries however, denied a proposal to make surplus coho eggs available to an interior-based applicant proposing to operate a recycle hatchery. In doing so, the Board of Fisheries asserted that public policy questions pertaining to brood stock acquisition and the privatization of a public resource were questions that should be addressed by the legislature, rather than set by precedent by the Board.

Although the task force was authorized in 1988, it was not funded until last spring. The members were appointed by Governor Cowper and began work last July. The task force recently issued its report and recommended that prior to the end of the moratorium on July 1, 1990, the legislature take statutory action to expressly allow or prohibit finfish farming. SB 397 would prohibit finfish farming by not allowing a person "to grow or cultivate finfish in captivity or under positive control for commercial purposes." As drafted, the state and PNP hatcheries would remain unaffected.

Amendments Proposed

On Page 2, lines 1-5, the third finding asserts that serious disease and genetic risks are posed to wild stocks. As the FRED Division has stated on the record, in legislative hearings and to the task force, if a properly managed, regulated, and funded pathology and genetics program were in place, similar to that run by the FRED division for current public and private non profit hatcheries, then commercial farming of finfish would not pose a serious risk to the health and genetic integrity of wild stocks.

Sale of finfish under a scientific or educational permit is not allowed currently. Accordingly on Page 3, Section 2, the department recommends deleting item 3.

With regard to Section 2, item 4, the department recommends extending the sentence. After the word "ponds", insert: "provided these fish are not reared or released into waters of the state."

Sec. . AS 16.40.100 is amended by adding a new subsection to read:

(e) The commissioner may not issue a permit under this section for the aquatic farming of finfish in nets, pens, or other enclosures located in the marine or estuarine water of the state. Aquatic farming of finfish may be permitted only at an upland location.

Sec. . AS 16.40.100(d) is repealed and reenacted to read:

(d) Notwithstanding other provisions of law, the commissioner may not issue a permit under this section for the farming or hatchery operations involving

(1) a subspecies, race, or variety of Pacific salmon that does not occur and reproduce in the state or the water of rivers that cross the border between the state and Canada;

(2) Atlantic salmon.

Sec. . AS 16.40.130 is amended to read:

Sec. 16.40.130. IMPORTATION OF AQUATIC PLANTS, FINFISH, OR SHELLFISH FOR STOCK. A person may not import into the state an aquatic plant, finfish, or shellfish for the purpose of supplying stock to an aquatic farm or hatchery unless authorized by a regulation of the Board of Fisheries.

* Sec. AS 16.05.940(14) is amended to read:

(14) "[FISH OR] game farming" means the business of propagating, breeding, raising, or producing [FISH OR] game in captivity for the purpose of marketing the [FISH OR] game or <u>game</u> [THEIR] products, and "captivity" means having the [FISH OR] game under positive control, as in a pen [, POND,] or an area of land [OR WATER] that is completely enclosed by a generally escape-proof barrier; [IN THIS PARAGRAPH, "FISH" DOES NOT INCLUDE SHELLFISH, AS DEFINED IN AS 16.40.-199;]

* Sec. AS 16.40.100(a) is amended to read:

(a) A person may not, without a permit from the commissioner, construct or operate

(1) an aquatic farm; or

(2) a hatchery for the purpose of supplying aquatic plants, <u>finfish,</u> or shellfish to an aquatic farm.

* Sec. AS 16.40.100(b) is repealed and reenacted to read:

(b) A permit issued under this section authorizes the permittee, subject to the conditions of AS 03.05 and AS 16.40.100 - 16.40.199, to acquire, purchase, offer to purchase, transfer, possess, sell, and offer to sell stock and aquatic farm products that are used or reared at the hatchery or aquatic farm.

* Sec. AS 16.40.100(c) is amended to read:

(c) The commissioner may attach conditions to a permit issued under this section that are necessary to protect natural fish and wildlife resources<u>, including standards for treatment of water discharged by a hatchery or aquatic farm to prevent the spread of disease and pollution of fish and wildlife habitats</u>.

* Sec. AS 16.40.105 is amended to read:

Sec. 16.40.105. CRITERIA FOR ISSUANCE OF PERMITS. The commissioner shall issue permits under AS 16.40.100 on the basis of the following criteria:

(1) the physical and biological characteristics of the proposed farm or hatchery location must be suitable for the farming of the finfish, shellfish, or aquatic plant proposed;

(2) the proposed farm or hatchery may not require significant alterations in traditional fisheries or other existing uses of fish and wildlife resources;

(3) the proposed farm or hatchery may not significantly affect fisheries, wildlife, or their habitats in an adverse manner; and

(4) the proposed farm or hatchery plans and staffing plans must demonstrate technical and operational feasibility.

* Sec. AS 16.40.120(a) is amended to read:

(a) A person may not acquire aquatic plants, finfish, or shellfish from wild stock in the state for the purpose of supplying stock to an aquatic farm or hatchery required to have a permit under AS 16.40.100 unless the person holds an acquisition permit from the commissioner.

* Sec. AS 16.40.120(g) is amended to read:

(g) Aquatic plants, finfish, and shellfish acquired under a permit issued under this section become the property of the permit holder and are no longer a public or common resource.

* Sec. AS 16.40.120(c) is amended to read:

(c) The commissioner shall specify the expiration date of an acquisition permit and may attach conditions to an acquisition permit, including conditions relating to the time, place, and manner of harvest. Size, gear, place, time, licensing, and other limitations applicable to sport, commercial, or subsistence harvest of aquatic plants, finfish, and shellfish do not apply to a harvest with a permit issued under this section. The commissioner [OF FISH AND GAME] shall issue or deny a permit within 30 days after receiving an application.

* Sec. AS 16.40.140(a) is amended to read:

(a) A private hatchery required to have a permit under AS 16.40.100 may sell or transfer stock from the hatchery only to the department, to an aquatic farm or other hatchery that has a permit issued under AS 16.40.100, or to a hatchery that has a permit issued under AS 16.10.400; except that shellfish stock may also be sold or offered for sale to an aquatic farm or related hatchery outside of the state.

* Sec. AS 16.40.199(2) is amended to read:

(2) "aquatic farm product" means an aquatic plant, finfish, or shellfish, or part of an aquatic plant, finfish, or shellfish, that is propagated, farmed, or cultivated in an aquatic farm and sold or offered for sale;

* Sec. AS 16.40.199(5) is amended to read:

(5) "hatchery" means a facility for the artificial propagation of stock, including rearing of juvenile aquatic plants, finfish, or shellfish;

* Sec. AS 16.40.199(8) is amended to read:

(8) "stock" means live aquatic plants, finfish, or shellfish acquired, collected, possessed, or intended for use by a hatchery or aquatic farm for the purpose of further growth or propagation.

* Sec. AS 43.75.015 is amended by adding a new subsection to read:

(d) Aquatic farm products produced at an aquatic farm are subject to the tax levied under this section.

APR 03 '90 13:28 LEG. AFFAIRS - SOLDOTNA

Alaska State Legislature

Please enter into the record my testimony to the ? committee name

committee on H.Bill 432/ Mariculture, dated 4-3-90.
bill/subject

My name is David Richards, & am the Secretary/ Treasurer of the Cook Inlet Professional Sportfishing Association. I am here to represent Cipsa on this bill. Our association has taken the position that we are opposed to the establishing of fish farming in Alaska. Thank You.

Signed: David Richards
Testifier

CIPSA.
Representing (Optional)

393 Bering, Soldotna
Address

262 4768
Phone No.

4/3/90

...To whom it may concern,

I am in full support of House Bill 432 to prohibit finfish farming in Alaska. I have been a resident of Alaska since 1969 and have been a commercial fisherman for 17 years. The uncertainties of finfish farming are very scary to me as well as my entire crew. I am also a veterinarian in Anchorage so my income is not entirely based on fishing but I strongly feel that the commercial fishing industry is vital for Alaskan economy. I feel it would be a big mistake to allow finfish farming in Alaska.

Thank you for your consideration.

Sincerely

Riley K. Wilson DVM

Riley K. Wilson D.V.M.
2101 Tudor Hills Dr
Anch AK 99507

hm 561-4657
wk 563-3945.

6-1973E
Utermohle
3/3/90

Original sponsor(s): REP. GRUSSENDORF, Ulmer, Goll, Davidson, Navarre, Wallis, Hudson, Taylor, C.Davis, Jacko, Kubina, MacLean, Swackhammer

IN THE HOUSE

CS FOR HOUSE BILL NO. 432 ( )

IN THE LEGISLATURE OF THE STATE OF ALASKA

SIXTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act prohibiting finfish farming; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. FINDINGS. Based on a legislative examination of the potential effects of allowing finfish farming in the state on the common property resources and on the overall economic well-being of the state; the number of serious concerns associated with finfish farming and the need for study of finfish farming that has caused the legislature to enact two moratoriums on finfish farming and establish a nonlegislative task force to study the issue and to report its findings and recommendations to the legislature; a review of the final report of the Alaska Finfish Farming Task Force which notes several possible benefits and some serious risks of finfish farming; the need for the legislature to take action before the current moratorium on finfish farming expires on July 1, 1990; the recommendation of the task force that the legislature not extend the moratorium, but make a final determination to either allow or prohibit finfish farming; and the testimony and evidence received; the legislature finds that

(1) the state has the healthiest stocks of wild salmon and other wild finfish in the world and benefits from thriving commercial, sport, and subsistence fisheries for these fish and a growing tourism industry related to sport fishing;

(2) the people, economy, and environment of the state are dependent in large measure upon the continued health of the state's wild finfish

resources;

(3) serious risks are posed by commercial finfish farming, including the spread of disease among wild fish by farmed fish, genetic intermingling of wild fish stocks with genetically manipulated farmed fish, degradation of water quality near finfish farms, and land use conflicts over the siting of commercial finfish farms;

(4) the state has invested significantly in marketing efforts to promote Alaskan finfish as wild and natural fish products, and this investment in developing the reputation of Alaskan finfish would be lost by allowing commercially farmed finfish to be produced and marketed from Alaska;

(5) the cost to the state to regulate the commercial finfish farming industry would be high;

(6) few jobs would be generated by a commercial finfish farming industry in the state;

(7) the state is responsible for ensuring the protection and wise use of the renewable natural resources of Alaska and providing a framework for a sound economy;

(8) a long-term decision must be made regarding the future of commercial finfish farming in the state;

(9) avoiding harm to the state's wild finfish, land, and water resources must take precedence over the development of a new speculative and potentially harmful commercial finfish farming industry;

(10) the best interests of the state are served by prohibiting commercial finfish farming.

* Sec. 2. AS 16.40 is amended by adding a new section to read:

Sec. 16.40.210. FINFISH FARMING PROHIBITED. (a) A person may not grow or cultivate finfish in captivity or under positive control for commercial purposes.

(b) This section does not restrict

(1) the fishery rehabilitation, enhancement, or development activities of the department;

(2) the ability of a nonprofit corporation that holds a salmon hatchery permit under AS 16.10.400 to sell salmon returning from the natural water of the state, as authorized under AS 16.10.450, or surplus salmon eggs, as authorized under AS 16.10.420 and 16.10.-450;

(3) rearing and sale of finfish for aquariums or ornamental ponds provided that the fish are not reared in or released into water of the state.

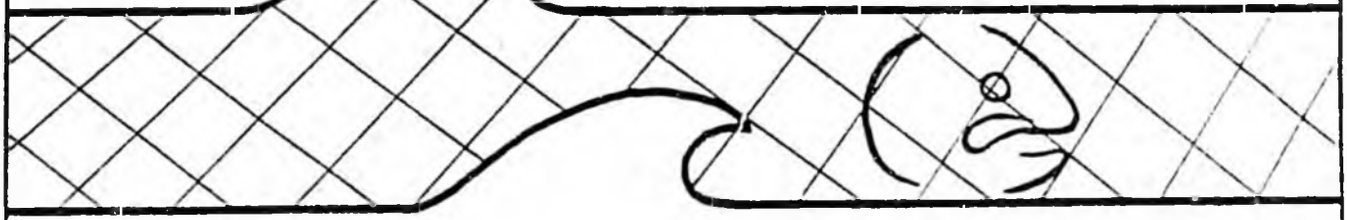
* Sec. 3. This Act takes effect July 1, 1990.

Alaska

FINFISH FARMING TASK FORCE

REPORT

to the



ALASKA

LEGISLATURE

January 15, 1990

Alaska Finfish Farming Task Force

REPORT TO THE ALASKA LEGISLATURE

January 15, 1990

Alaska Finfish Farming Task Force
P.O. Box AM
Juneau, AK 99811
907/465-3568

Sen. Tim Kelly, President of the Alaska Senate
Rep. Sam Cotten, Speaker of the Alaska House of Representative
Pouch V
Juneau, AK 99811

Senator Kelly and Representative Cotten:

Transmitted herein is the final report of the Alaska Finfish Farming Task Force. The task force has met its charge as stated in Ch. 145 SLA 1988; the findings and recommendations included in this report reflect that mission.

These findings and recommendations have resulted from our review of prior research, inspection of finfish farms, the testimony of experts, and public comments. This report represents the consensus of the entire task force. All of our findings and recommendations were agreed upon by every task force member.

The time constraint on the task force prevented us from considering every issue in great depth. We have focused our efforts on those issues over which there is the most controversy and on the issues for which more definitive answers are available. We hope that you will find this report useful to your deliberations.

With the submission of this report, the task force will cease to exist as a formal body. However, our project coordinator has been retained to be available as needed through the legislative session to assist in the deliberations of this important issue.

Finally, on behalf of the task force, I would like to take this opportunity to thank you for creating this opportunity to participate in an important public policy issue.

Sincerely,

Theodore R. Merrell

Theodore R. Merrell, Chairman
Alaska Finfish Farming Task Force

TABLE OF CONTENTS

Chapter 1

INTRODUCTION

The viability and desirability of finfish farming in Alaska, particularly salmon, has long been a subject of controversy. The state is currently under its second finfish farming moratorium. This one expires on July 1, 1990.

The Alaska Finfish Farming Task Force was created by the Alaska Legislature in 1988 (Ch. 145 SLA 1988) to study the socioeconomic, biological, and environmental issues related to finfish farming. The task force was charged with addressing finfish farming in Alaska in freshwater, in marine environments, and in tanks or other upland structures containing marine water. In addition, the task force was to consider hatchery operations related to finfish farming.

By statute, the composition of the task force must represent a variety of perspectives. Specifically, the task force is comprised of one representative of the commercial salmon fishermen, one aquatic farming advocate, one private economist, one fisheries biologist, and one public member with no involvement in the seafood or aquatic farming industry. State employees were not eligible to serve on the task force.

Although the legislation authorizing the task force was passed in 1988, the Legislature did not fund the task force until its 1989 legislative session. In July 1989, Governor Cowper announced his appointments to the task force; the first meeting was held in late July.

This task force is not the first body in the state to consider the issue of finfish farming. During the Sheffield Administration, the Governor's Mariculture Advisory Committee was formed to look at the issue. In addition, the Alaska Legislature has considered various pieces of legislation pertaining to aquatic farming.

One of the first actions of the task force was to familiarize itself with the work that preceded it. In addition, it considered new information on social, environmental, and economic impacts that has recently become available from the operation of West Coast and foreign salmon farms. The world markets for salmon are changing dramatically; many assumptions regarding salmon farming economics and marketing that are based on historical data may not be relevant today.

In 1989, the State of Alaska implement its plant and shellfish mariculture regulations, giving state officials additional experience in the regulation of an industry that shares many of the characteristics of the proposed finfish farming industry.

To ensure that it evaluated finfish farming based upon the most current information available, the task force took testimony from experts on every major issue. In addition, the task force toured salmon farms and hatcheries in the Puget Sound area. It visited both salt water marine pen farms and fresh water smolt and pan-sized fish farms.

Due to the limited time available to the task force to perform its mandated tasks, it has focused on the specific issues set forth in Ch. 145 SLA 1988:

-- protecting the health of the existing fisheries resource;

-- siting of farms to protect the environment and minimize use conflicts;

-- the supply of finfish farming broodstock;

-- the cost of regulating finfish farming;

-- the economic benefits and costs of finfish farming; and

-- strategies for improving the marketability of Alaska salmon, particularly those species that compete with farmed salmon.

The task force has incorporated other concerns into its evaluation of these issues as appropriate.

The remainder of this report addresses the six major topics listed above. Each of these topics is divided into its component specific issues. Each issue is defined in broad terms, and a set of findings, briefly summarizing information pertaining to the issue that was collected by the task force, is provided. Where pertinent, the trade-offs associated with the different approaches to addressing each issue are discussed. Finally, the task force presents its recommendations as to the manner in which future State efforts should address each issue and some general conclusions and concerns about the role of finfish farming in Alaska.

The task force did not begin its work with any supposition that finfish farming is desirable or undesirable for Alaska. To address some of the issues included in the legislation authorizing the task force, however, it is necessary to presuppose the existence of a finfish farming industry. For example, one cannot determine the cost of regulating a finfish farming industry without assuming that an industry will exist. The reader should

not construe any finding or recommendation pertaining to a specific issue to be either endorsement or disapproval of finfish farming in Alaska.

For clarity, a brief explanation of a few terms used in this report and in the discussion of finfish farming is provided below.

- **Finfish** is used as a generic term for finfish indigenous to Alaska, except where noted.

- **Finfish farming** is the growing of fish to market size in an enclosed environment. **Aquatic farming** includes sea plants and shell fish as well as finfish.

- **Ocean ranching** is the release of hatchery-reared fish into the public waters for eventual recapture.

- **Aquaculture** is the cultivation of fish and plants in both fresh and salt water. However, in Alaska, the term is specific to the State's and private nonprofit hatcheries' ocean ranching programs.

- **Mariculture** is fish cultivation in salt water. However, in Alaska, the term is used to refer to all aquatic farming activities.

To avoid confusion, we have tried to be explicit in our references to finfish farming and ocean ranching by avoiding the more general terms, mariculture and aquaculture.

Chapter 2

THE HEALTH OF THE FISHERIES

Any effort to initiate finfish farming in Alaska must provide for the maintenance of the health of the state's existing commercial, recreational, and subsistence fisheries. There is continuing public concern regarding the effects of finfish farming on disease transmission and genetic alterations in wild stocks.

Finfish farming also could affect the health of existing fisheries through its impacts on the environment. This issue is addressed as the first concern in Chapter 4.

DISEASE

Concern

Can diseases from finfish farms be transmitted to wild and hatchery finfish stocks, with substantive adverse impacts on those stocks?

Findings

a. Fish raised in farms are subject to increased stress from handling and from the high density of fish per volume of water; this increased stress makes farmed fish more susceptible to disease than are fish in the wild.

b. Diseases occurring in farmed stocks also occur in the marine environment and in wild stocks.

c. Disease transmission between captive stocks and wild stocks is a two-way problem. Captive stocks are probably more susceptible to disease because of increased stress. The potential for disease transmission between captive and wild stocks exists in both ocean ranching operations and fish farm operations.

d. The importation of nonindigenous stocks poses the risk of importing diseases that are not present in existing wild and hatchery stocks. To control the spread of disease,

the State has imposed strict regulations limiting the movement of salmon and their gametes within Alaska and prohibits the importation of live fish or gametes from outside the state.

e. Disease pathogens can travel through the water table in land-based farming operations. Upland finfish farming can result in the contamination of the water table with pathogens that infect fish.

f. The risk of disease transmission from captive to wild stocks increases in direct proportion to the degree to which captive fish and the water they use contact wild fish. Of the three alternatives for finfish farming (upland freshwater, upland marine, and marine pens), marine pens, with the certainty of fish escapement, pose the greatest risk of spreading disease.

g. Upland marine and fresh water facilities pose less risk of contamination of natural waters than do marine pens.

h. The addition of finfish farming to aquaculture activities in Alaska would increase the demand for the pathology services necessary to control disease. Providing these services to a finfish farming industry would strain existing State technical and financial resources.

i. Pathology services are available in other fish farming regions from private laboratories.

j. Pathological services can be provided by persons certified by the American Fisheries Society under State authority. This practice currently exists in the ocean-ranching program.[1]

Recommendations

1. The finfish farming industry can be accommodated without significant threat of disease to wild and hatchery stocks if the State continues to meet its responsibilities in fish disease control and if monies are provided for additional health services or private pathological services are created.

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[1] This finding is repeated in Chapter 5, as finding f.

2. Current policies prohibiting importation of live salmonids, including gametes, should be placed into statute and rigorously enforced.[2]

3. To ensure adequate control of disease in the finfish farming industry, the State will need to provide for the development of private pathology services or increase staff and funding for existing State services.

4. If the State allows private pathology services, there should be a licensing or certification process.

5. Water discharged from upland marine and fresh water facilities should be screened and the effluent treated.

GENETICS

Concern

Does escapement of farmed finfish pose a threat to the genetic integrity of wild stocks?

Findings

a. Each finfish stock has its own unique genetic characteristics. Therefore, the interbreeding of wild stocks with selectively bred farmed stocks could alter the genetic characteristics of wild stocks.

b. Fish farmers would practice selective breeding to enhance characters that are best suited for the farm environment. Over time, farmed fish stocks will diverge genetically from the donor wild stocks; the characteristics for which farmed stocks are bred diminish their suitability to life in the wild.

c. The greater the extent of fish escaping from fish farms, the greater the possibility that farmed fish will either interbreed with or compete with wild stocks.

---

[2] This recommendation is repeated in Chapter 2, as recommendation 2 in the section on genetics.

d. The survival capacity of escaped farmed stocks is uncertain. While it is possible for farmed stocks to survive outside a farm environment, it is not clear what percentage would breed successfully.

e. The genetic impact on stocks of wild fish resulting from interbreeding with escaped farm fish would depend on the ratio of farmed fish to wild fish of the same species in the stream.

f. The State's genetic policy prohibits the importation of live salmonids into the state.

g. The State's genetic policy does not allow for stocks to be transported between major geographic regions of the state.

h. The State's genetic policy has been adopted to protect Alaska's diverse natural salmon and trout stocks; however, it is not always rigorously followed.

i. Several options exist for protecting the genetic integrity of wild stocks, including: restricting farming to upland marine or fresh water tanks; using triploid farm stocks (fish that have a third set of chromosomes, rendering them sterile); and establishing wild stock genetic reserves.

Recommendations

1. The existing State genetics policy is adequate to protect the genetic integrity of the state's fisheries and should be rigorously applied to fish farming.

2. Current policies prohibiting importation of live salmonids, including gametes, should be placed into statute and rigorously enforced.[3]

3. The State should not permit the siting of finfish farms within a 20 kilometer radius from the mouth of a stream that has significant production of the same species.

4. The task force concurs with the Alaska Chapter of the American Fisheries Society resolution on genetic sanctuaries:

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[3] This recommendation is repeated in Chapter 2 as recommendation 2 in the section on disease.

One recommendation for the protection of wild stocks in the Genetic Policy is the establishment of wild stock sanctuaries. These sanctuaries would be areas in which no enhancement activity is permitted except gamete removal for broodstock development. Populations of fish in these areas would represent "gene banks" of wild-type genetic variability. Sanctuary status could also be a conservative use status for the protection of particular significant or unique wild stocks.

[Editor's Note: the task force uses the term reserve, instead of sanctuary, elsewhere in this report.]

5. The State should form an ad hoc committee to determine whether the State is strictly adhering to its genetics policy.

Chapter 3

BROODSTOCK

The major broodstock issues are the sources of donor broodstock for finfish farming activities in Alaska and the creation of finfish broodstock as privately-owned resources.

OWNERSHIP OF BROODSTOCK

Concern

Should the State allow the private ownership of broodstock?

Findings

a. Finfish broodstocks are a common property resource.

b. Finfish farmers would need control over their broodstock to develop domesticated stocks most suitable for farming.

c. Private ownership of broodstock could lead to the exportation out of state of gametes or live salmonids that are now unique to Alaska.

d. Private ownership of broodstock could lead to patentable genetic alteration based on the indigenous species.

e. A system of private nonprofit hatchery regulations could be designed that would allow farmers to develop pedigreed broodstock without losing State ownership.

f. Finfish farming hatcheries would require a new statutory authorization for operation.

Recommendations

1. The State should not permit private ownership of broodstock.

2. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority.[4]

3. All hatcheries within Alaska should be operated under nonprofit status.

4. A new permit allowing the cultivation of eggs and the sale of smolt to the finfish farming industry should be required. Existing hatcheries may be limited or precluded from participation by the conditions of their existing permits.

5. The State should create a new statutory authorization for the operation of finfish farming hatcheries.

6. There should be a statutory ban on the export of indigenous finfish stocks.

SOURCES OF BROODSTOCK

Concern

How can finfish farmers be provided secure sources of donor broodstock? How can finfish farmers be allocated broodstock to minimize the impact on the common property resource?

Findings

a. The State of Alaska owns all finfish broodstock; there are no privately-owned broodstock in Alaska.

b. Current laws, policies, and aquaculture activities do not provide for a source of broodstock for finfish farming.

c. Given current State policy on disease and genetics, the initial source of broodstock for finfish farming would have to come from State hatcheries, private nonprofit hatcheries, or wild stocks.

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[4] This recommendation is included in Chapter 3 as part of recommendation 1 in the section on sources of broodstock.

d. Existing genetic policy limits sources of donor broodstock to stocks found in the general vicinity of a net pen or upland tank farm.

e. Sources of donor broodstock for enclosed freshwater systems can be less restrictive than broodstock for marine net pen farms, both in species and in stock selection, because of the lower potential for impacts on wild stocks from enclosed freshwater systems.

f. Use of indigenous broodstock would provide finfish farms with stocks that are more resistant to naturally occurring diseases.

g. Some broodstock sources are more desirable than others because of characteristics such as fish size, color of flesh, reduced tendency toward premature sexual development, and size of the donor population.

h. Finfish farmers require a high degree of control over their selective breeding and husbandry practices in order to develop broodstock biologically and economically suited to farm operations.

i. Finfish farmers eventually would be able to develop their own broodstock with State permits and could supply new farms with smolt.

j. Current salmon management practices fully allocate returning adult salmon to either natural spawning escapements or to the sport, commercial, and subsistence fisheries.

k. Salmon egg surpluses do occur in the State and private nonprofit hatchery systems; however, current statutes would prevent these surpluses from being used as sources of donor broodstock for finfish farming.

l. Private nonprofit hatcheries harvest and sell fish to cover their costs. There is no provision in current statutes for private nonprofit hatcheries to sell eggs or smolt for cost recovery.

m. Egg surpluses occur due to overescapement up rivers and streams. Overescapement is one source of broodstock for existing hatchery programs. Current statutes prohibit the use of overescapement as a source of broodstock for finfish farming.

n. Direct sales from fishermen holding live fish transport permits would be the least desirable method of broodstock acquisition for finfish farming due to the lack of disease and genetic control.

o. A single hatchery may maintain several genetically different broodstocks as long as each is segregated from the others.

p. Sources of broodstock for finfish farming could be identified by Regional Planning Teams.

Recommendations

1. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority. Cultivation and in-state sale of broodstock and smolt by finfish farmers should not be prohibited.[5]

2. The finfish farming industry should develop its own stocks under new State provisions for nonprofit finfish hatcheries.

3. New private nonprofit hatcheries under State authority would be required to rear broodstock for finfish farming operations.

4. The preferred initial source of broodstock is surplus hatchery eggs. Other sources include overescapement, cost recovery fish, and allocation by the Board of Fisheries.

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5 Part of this recommendation is repeated in Chapter 3 as recommendation 2 in the section on ownership of broodstock.

Chapter 4

SITING OF FINFISH FARMS

Physical characteristics of finfish farm sites affect the degree to which farms alter the local environment, and farms may interfere with other users of water and adjacent uplands. Physical characteristics of sites also affect the economic viability of finfish farms.

ENVIRONMENTAL IMPACTS

Concerns

What are the environmental impacts of finfish farms? How can they be minimized?

Will predator control measures by finfish farmers adversely affect populations of birds and mammals?

Findings

a. Proper siting of finfish farming facilities is the most important element in minimizing the transference of disease, genetic interference with wild stocks, degradation of water quality, aesthetic degradation, and predation by marine mammals, and in avoiding conflicts with existing users and designated uplands uses.

b. The primary environmental impacts of net pen farming stem from increased sedimentation, changes in the benthic infauna (bottom-dwelling organisms), and reduced water quality in the vicinity of the pens resulting from the deposition of fecal material and uneaten feed.

c. The degree of impact of net pen farming varies inversely with the degree of flushing, which depends largely on water depth and current.

d. The degree of impact of net pen farming varies directly with the surface area occupied by pens and the stocking density of the fish farms.

e. Criteria for the siting and intensity of farming activities can be used to reduce the environmental impacts of marine pen farming in an area.

f. Pre-site surveys and periodic monitoring of water quality and the benthic community beneath pens are essential to ensuring minimal environmental impacts.

g. The primary environmental impacts from fresh water and marine upland tank farming operations stem from their use and disposal of water.

Recommendations

1. The State should use existing siting guidelines to develop a set of criteria specifically applicable to finfish net pen farming in Alaska. These include the State of Washington's Recommended Interim Guidelines for the Management of Salmon Net-Pen Culture in Puget Sound and the Alaska Department of Natural Resources' Etolin Island Area Mariculture Pilot Project. Guidelines for siting should also reflect the Alaska Department of Fish and Game's disease and genetics policies.

2. The State should use the Consistency Review Process of the Alaska Coastal Management Program in permitting finfish farm sites. The Alaska Coastal Management Program provides "a framework for local and public participation in State decisions, and a mechanism for the resolution of conflicts between government agencies, individuals, and local communities." However, special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement.

3. Only nonlethal predator control measures, such as bird and mammal exclosure nets and electric fences, should be allowed for finfish farming.

USER CONFLICTS

Concerns

Will the presence of finfish farms restrict, preclude, or degrade current or potential uses of sites and adjacent areas by others for commercial, recreational, and subsistence activities?

How can the State identify potential conflicts with existing uses of uplands and coastal areas, especially where those uses do not require State permits?

Findings

a. Net pen farms may have adverse aesthetic impacts on upland land owners or other users.

b. An average finfish farm would take up one to two acres of surface area. Additional subsurface area would be required.

c. Net pen farms may interfere with navigation around the site and restrict access to uplands.

d. Finfish farms may preclude or interfere with other commercial and recreational uses of farm sites or adjacent uplands.

e. Year-round commercial activities by finfish farms may be incompatible with use of uplands set aside for wild or scenic purposes, such as State and federal parks, monuments, and wilderness areas.

f. The State does not have a complete inventory of existing uses of State waters other than those operating under a specific State permit except for Etolin Island, Prince of Wales Island, and Prince William Sound. The use of State waters for navigation, sport and commercial fishing, water sports, or anchorage are activities for which State permits are not usually required.

g. The State's consistency review procedure for coastal permitting and its existing aquatic farm permitting procedures provide some mechanisms for identifying and resolving user conflicts.

h. The State's salmon enhancement program uses marine net pens, and they are routinely permitted under existing regulations.

Recommendations

1. Area planning represents the best method of determining consistency of uses. However, where area plans do not exist, the consistency review process must allow

for expanded public review to ensure consistency with activities that do not require State permits.

2. Fish farms and ancillary use of adjacent uplands must be compatible with zoning and designated uses of the uplands. No finfish farming should be permitted in waters adjacent to State and federal parks.

Chapter 5

COST OF REGULATION

The development of a finfish farming industry in Alaska will require the development of some new regulatory programs and the expansion of some existing ones.

Concerns

What is the cost of providing necessary regulation and oversight to a finfish farming industry? How could the finfish farming industry bear some of these costs?

Findings

a. Success of the finfish farming industry will require the support and cooperation of the government agencies charged with monitoring, permitting, and enforcement.

b. The cost of conducting site evaluation, preparing adequate site plans, and other work anticipated in the permit application process is a significant front-end cost to finfish farmers.

c. The Department of Environmental Conservation, the Department of Fish and Game, the Department of Natural Resources, and the Division of Governmental Coordination would all have regulatory responsibilities related to finfish farming.

d. The task force estimates that approximately $500,000 would be required annually by State agencies to regulate a finfish farming industry, assuming 10 to 15 permit applications per year requiring the equivalent of 5 additional full-time positions.[6]

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[6] The exact cost of regulating finfish farming will vary according to the specific provisions contained in enabling legislation and the number of permit applications that are received. Recent draft estimates provided by State agencies project a cost of $1.15 million to regulate an industry with 50 permit applications per year. The fiscal note to CSSB 106 (L&C) (1987) estimated that it would cost approximately $640,000 to regulate all forms of aquatic farming.

Federal and local governmental agencies would also experience some costs associated with regulating finfish farming.

e. The cost of administering regulatory requirements for hatcheries would be similar whether for ocean ranching or finfish farming.

f. Pathology services can be provided by persons certified by the American Fisheries Society under State authority. This practice currently exists in the ocean ranching program.[7]

Recommendations

1. The State should reduce its regulatory expenses by encouraging the use of private pathology services.

2. The finfish farming industry should pay economic rent for use of public resources. Forms of rent include local and State property taxes, State income taxes, sales taxes, permit fees, tideland leases, and a raw fish tax of three percent of the farm gate value.

3. Special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement. Applicants should bear the cost of these public notice provisions.

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[7] This finding is repeated in Chapter 2 as finding j in the section on disease.

Chapter 6

ANALYSIS OF COSTS AND BENEFITS

Development of a finfish farming industry will provide economic benefits to finfish farmers, their suppliers and processors and, through taxation, State and local governments. At the same time, costs will accrue to State and local governments, and users of coastal marine waters, tidelands, and uplands. The costs and benefits to the state of this new industry must be weighed carefully.

In addition, it is important to look closely at the economics of finfish farming, to avoid making false assumptions about the economic viability of the industry.

COSTS AND BENEFITS ACCRUING TO ALASKA AND ITS RESIDENTS

Concerns

Do the socioeconomic, environmental, and biological costs associated with the introduction of finfish farming to Alaska outweigh its benefits?

Are the benefits associated with finfish farming likely to be concentrated among few individuals and businesses, who may or may not be Alaskan, while costs associated with finfish farming are likely to be borne by many Alaskans?

Findings

Costs:

a. The State's fishery management and limited entry programs, State and private nonprofit ocean ranching efforts, and federal management of the 200-mile economic zone have improved the economic health of the commercial salmon fisheries in Alaska.

b. Allocation of broodstock to finfish farming could result in fewer smolt available for common-property ocean ranching programs.

c. The commercial fishing industry could suffer economic loss from lower prices caused by the increase in supply of fish resulting from finfish farming. (See Appendix B for detailed estimates.)

d. The existence of a finfish farming industry in Alaska would preclude the use of a marketing strategy that equates Alaska salmon with wild salmon and emphasizes its desirability as a natural product.[8]

e. The costs associated with disease, genetic change, diminished water quality, loss of anchorages or recreational opportunities, and loss of other commercial opportunities can be mitigated through proper regulation of the finfish farming industry.

f. Non-Alaskan investment in the finfish farming industry would lead to the exportation of profits.

g. The costs associated with the finfish farming industry would not be evenly dispersed geographically.

h. An indirect impact of finfish farms could be diminished public concern for protecting the habitat of wild stocks.

Benefits:

a. The finfish farming industry would create jobs. Finfish farming might provide jobs in rural areas with otherwise limited employment opportunities.

b. There would be a year-round supply of fresh salmon from Alaska, benefiting processors and consumers.

c. Secondary industries, such as pathological services and transportation, would benefit from a finfish farming industry.

d. Existing ocean-ranching facilities seasonally use large amounts of fish feed. Land-based fish processing plants in Alaska produce by-products suitable for the meal used.

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[8] This finding is repeated in Chapter 7 as finding g in the section on competition between farmed fish and Alaska commercial fisheries.

in fish feed. The addition of finfish farming could eventually bring fish feed demand to levels high enough to sustain in-state fish feed production.

e. Current waste disposal practices by fish processors may not be tolerated by regulatory agencies in the future; development of in-state fish feed production for the finfish farming industry could utilize this waste. In addition, fish processors might purchase some currently underutilized species of fish for use in fish feed.

f. Finfish farming could provide an alternative source of revenue for hatcheries, although the task force does not advocate State and private nonprofit hatcheries' moving away from their original purposes.

g. Benefits from finfish farming would not accrue immediately upon authorizing the industry. If legislation were passed in 1990 allowing finfish farming, eggs would not become available until 1992 at the earliest because of the need to allocate eggs for that purpose. Fish would enter marine pens in the spring of 1993 and would not reach market size for another eighteen months. Therefore, finfish farms would not achieve a positive cash flow until late 1994, at the earliest. (See the time line in Appendix A for a complete explanation.)

Recommendation

1. The State of Alaska should not subsidize finfish farming beyond the amount needed to regulate the industry.

ECONOMIC VIABILITY OF FINFISH FARMING IN ALASKA

Concern

Will the present economics of finfish farming constrain the ability of individuals to enter the industry?

Findings

a. Finfish farming is a high-risk industry for which there are very few insurers.

b. People with no experience in fish farming or cultivation will probably be uninsurable.

c. Insurance for unanticipated losses will be a requirement for obtain ng conventional financing for finfish farms.

d. Growth rates and food conversion rates of farmed fish are very important factors that influence the cost of growing fish to market size.[9]

e. Low water temperatures that characterize Alaska waters slow growth rates and, by extending the time needed to grow fish to market size, may increase the debt service cost associated with finfish farming.

f. There are economic incentives toward vertical integration in salmon farming to take advantage of all profit centers.

g. A few small, family-owned, fresh water farming facilities exist in Washington; they cater to specific market niches.[10]

h. Net pen farms in the Pacific Northwest are, for the most part, owned by corporations and are capital intensive.

i. For a two-acre net pen farm, it is estimated that capital of at least $1 million over a 30-month period would be needed before a cash flow from market-sized salmon would begin.

j. High capitalization and other costs required for finfish farming may limit its growth in Alaska.

k. The present poor world-wide economic climate for farmed fish will limit entry of Alaskans into the finfish farming industry and may help avoid the boom and bust cycle experienced by the finfish farming industry in British Columbia.

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[9] This finding is also contained in Chapter 7, in the section on marketing opportunities for farmed Alaska salmon.

[10] This finding is also contained in Chapter 7, in the section on marketing opportunities for farmed Alaska salmon.

Chapter 7

MARKETING

There have been major changes in world markets for Alaska finfish recently. In 1982, Alaska produced 59 percent of fresh and frozen salmon (includes chinook, coho, sockeye, and pen-reared) in the world; pen reared salmon accounted for 5 percent. In 1987, Alaska produced 43 percent of fresh and frozen salmon; pen reared accounted for 32 percent.

Neither the potential for finfish farming in Alaska nor its impacts on the commercial fishing industry can be properly evaluated without considering the marketing issues involved. Nor is it possible to evaluate the impact of the industry to the state without considering other alternatives for Alaska to respond to the widespread availability of farmed salmon on the world markets.

MARKET POTENTIAL FOR ALASKA FINFISH FARM PRODUCTS

Concern

What is the market potential for Alaska farmed finfish?

Findings

a. Species of finfish that have been commercially reared in net pens and are indigenous to Alaska include chinook and coho salmon, rainbow trout, steelhead, and Arctic char. Other indigenous species with the potential for farming include sablefish (black cod), grayling, sheefish, and sockeye salmon.

b. Black cod and halibut farming are still in the research and development phase, but are very promising.

c. Alaska farmed finfish will have to compete in already crowded world markets.

d. There are some market niches (for example, Arctic char) that have yet to be exploited.

e. Some finfish farmers in Washington and British Columbia have stopped raising chinook and coho salmon (species indigenous to Alaska) in favor of Atlantic salmon for economic reasons.

f. Feed composition can be used to modify color and nutritional quality of farmed salmon to increase its market value.

g. At current prices, there is an estimated surplus of 100,000 metric tons (about 14 percent of demand) of salmon on world markets, resulting in continued downward pressure on prices.

h. Prices for farmed salmon have fallen during 1989 along with the prices for wild salmon. Salmon filling specific market niches have been able to avoid dramatic price drops, e.g., pan-size coho salmon.

i. On the average, a farmed finfish will cost more per pound to produce than a wild fish.

j. Production of pen-reared salmon has recently outpaced market demands for fresh fish, and a considerable volume is now entering the frozen market. Fresh and frozen Atlantic salmon now compete with Alaska sockeye and coho in the Japanese market.

k. World production of farmed salmon in 1989 exceeded projections. Norway had projected farmed salmon production of 120,000 metric tons in 1989, up from 89,000 metric tons in 1988. Norway's actual production in 1989 is now estimated to be 150,000 metric tons.[11]

l. Projections for world-wide production of farmed salmon in 1990 are 186,000 to 220,000 metric tons.

m. Alaska is a price taker in a world dominated by pen-reared salmon.

n. There is presently room for expansion in the market for high quality, fresh finfish, especially in the Midwest.

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[11] David Aiken, World Aquaculture, "The Economics of Salmon Farming," Vol. 20(3), September 1989, p.15.

o. Downward pressure on prices will persist as a result of increased production of both wild and farmed salmon.

p. Currently, the demand for pan-sized (under 2 lbs.) salmon and salmon over 6 lbs. is good; there is little market demand for salmon between 3 and 6 lbs.

q. Growth, survival, and food conversion rates of farmed fish are very important factors that influence the cost of growing fish to market size.[12]

r. Small, family-owned, fresh water farming facilities exist in Washington; they cater to specific markets.[13]

s. A guaranteed year-round supply of fresh Alaska salmon (wild and farmed) could enable processors to attract and hold customers, who prefer certainty of supply from a single source.

COMPETITION BETWEEN FARMED FISH AND ALASKA COMMERCIAL FISHERIES

Concern

Will salmon farming in Alaska tend to undermine the price of wild salmon, adversely affecting Alaska's existing commercial fishing industry?

Findings

a. Markets for Atlantic and Pacific salmon raised in fish farms overlap with salmon taken in the Alaska fisheries. As production increases, competition will increase. (See Appendix B.)

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[12] This finding is repeated in Chapter 6, in the section on the costs and benefits to the finfish farming industry.

[13] This finding is repeated in Chapter 6, in the section on the economic viability of finfish farming in Alaska.

b. Some market-niche fisheries have been hit harder than others; troll-caught salmon, for example, historically have earned a premium price on fresh and quality-sensitive markets but now face stiff competition from pen-reared Atlantic salmon.

c. Alaska has lost most of its European market for salmon for smoking to farmed Atlantic salmon from Norway and Great Britain.

d. Alaska salmon has been displaced in U.S. fresh salmon markets east of the Mississippi River by farmed Atlantic salmon grown in Norway and on the coast of Maine and in Canada's Maritime Provinces.

e. Alaska salmon has been displaced in U.S. fresh salmon markets west of the Mississippi River by farmed Atlantic salmon grown in Washington, British Columbia, and Chile.

f. More pen-reared salmon is appearing in frozen salmon markets; an estimated 17,000 metric tons will be sold in the Japanese frozen market in 1989. Alaska frozen salmon sales to Japan compare at 100,000 metric tons in 1989.

g. The existence of a finfish farming industry in Alaska would preclude the use of a marketing strategy that equates Alaska salmon with wild salmon and emphasizes its desirability as a natural product.[14]

h. Competition in world markets between farmed salmon and Alaska wild salmon will continue to occur whether or not Alaska permits finfish farming.

MARKETABILITY OF ALASKA SALMON

Concern

What strategies exist for improving the marketability of Alaska salmon, especially those species that compete with farmed salmon?

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[14] This finding is repeated in Chapter 6 as finding d in the section on costs and benefits accruing to Alaska and its residents.

Findings

a. The three most important factors affecting the marketability of Alaska wild salmon are price, consistency of supply, and quality.

b. Market forces will determine the price of Alaska wi[illegible]lmon.

c. No biological strategy exists for improving the consistency of supply of Alaska wild salmon throughout the year.

d. Strategies for improving the marketability of Alaska wild salmon are limited to focusing on quality.

e. Alaska does not have a mandatory quality inspection [illegible]gram.

f. On world markets, Alaska salmon are perceived as [illegible]eing of consistently high quality.

g. Improved quality assurance and inspection programs would improve the position of Alaska salmon in world marke[illegible]s.

h. New markets can be developed for profitable value-added finfish products such as easy-to-prepare specialty items.

i. Negative public perceptions about chemical additives associated with farmed salmon may enhance market opportunities for Alaska wild salmon.

Recommendations

1. Alaska must develop a strategy to respond to its eroding market share for salmon sales.

2. A mandatory quality assurance and inspection program for the Alaska salmon industry that would include catcher boats, tenders, and processors should be implemented as soon as possible.

3. In conjunction with improved quality, marketing efforts should be expanded to include an aggressive, world-wide marketing program, extolling the virtues of Alaska wild salmon.

Chapter 8

GENERAL FINDINGS AND RECOMMENDATIONS

Throughout their deliberations, the foremost consideration of the members of the Alaska Finfish Farming Task Force has been to ensure that Alaska's stocks of salmon and other species of fish and their pristine environment are not jeopardized. To this end, the task force evaluated all of the major issues; it invited testimony from more than two dozen individuals who are authorities on specific aspects of finfish farming (Appendix C) and reviewed dozens of relevant documents (Appendix F). The products of these examinations are a series of factual findings and recommendations concerning specific issues based on these facts. The issues and recommendations are summarized as follows:

The environmental and biological impacts of finfish farming can be minimized through careful attention to proper siting and enforcement of the conservative regulatory policies outlined in Chapters Two and Four.

Current fisheries management techniques are designed to minimize disease and genetic problems. Risk management of disease and genetic problems found in finfish farms would be no different than for current fisheries management.

The State should retain ownership of its valuable finfish stocks. Ultimately, the goal of finfish farming broodstock development is to use farmed fish as broodstock, thus minimizing continued dependence on publicly owned broodstock. The preferred initial source of initial broodstock is surplus hatchery eggs. Other sources include overescapement, cost recovery fish from nonprofit hatcheries, and allocation by the Board of Fisheries.

The cost of providing adequate regulation of a finfish farming industry would be high, but successful development would bring employment and other benefits to Alaska. Although development of finfish farming eventually might bring in enough revenue to offset the costs to the State, costs would accrue to the State from the permitting and regulatory programs even if the industry fails. The Legislature is the appropriate body for deciding where to rank development of finfish farming in its funding priorities at a time when State revenues remain low and show signs of future declines.

Current market conditions for farmed salmon are poor. However, a developing finfish farming industry in Alaska may find some marketing opportunities.

Markets for Alaska seafood will be adversely affected by the global development of salmon farming, regardless of what happens to salmon farming in Alaska, and a long-term strategy to improve the marketability of Alaska salmon should be developed.

As directed by the enabling legislation, the task force examined various finfish farming activities. It has determined that risks differ among these farming activities. When compared to marine pens, the impacts of upland enclosed systems are greatly reduced by isolation, species limitation, and fewer potential user conflicts.

The potential genetic and socioeconomic impacts of rearing non-salmon species of finfish in marine net pens also appear to be less than those involved with salmon net pen culture, although farming of most of these species is still in the research and development phase.

The task force did not address some of the specific concerns expressed in written public comments on the draft report, because these issues are already covered by existing regulations (e.g., disposal of dead fish in hatcheries, use of antibiotics and food additives, and treatment of diseased fish).

The task force concludes that the findings, Alaska's unique position as a leading seafood producer, and the broad range of potential types of finfish farming activities do not support an unequivocal "yes" or "no" as to whether any particular type of finfish farming should be permitted. That is a political decision that will have to be made by the Legislature. Further study and debate are unlikely to change significantly the task force's findings of fact; consequently, there is no reason to extend the current moratorium beyond its expiration date of July 1990. Therefore, the task force's final recommendation is as follows:

> The Legislature should resolve the issue of finfish farming by statutory permission or prohibition before the moratorium expires.

If the Legislature decides to allow finfish farming, it is imperative that the necessary regulatory framework be in place in advance of any farming activity. If this caveat is satisfied, the task force concludes that fish farming would have little or no adverse effect on wild stocks in the environment. Most of the necessary regulations can be adapted or extended without change from those that are already in effect for the State's ocean ranching and hatchery programs, but additional funding must be provided to extend them to fish farming.

SUMMARY OF RECOMMENDATIONS

Chapter 2

Disease

1. The finfish farming industry can be accommodated without significant threat of disease to wild and hatchery stocks if the State continues to meet its responsibilities in fish disease control and if monies are provided for additional health services or private pathological services are created.

2. Current policies prohibiting importation of live salmonids, including gametes, should be placed into statute and rigorously enforced.

3. To ensure adequate control of disease in the finfish farming industry, the State will need to provide for the development of private pathology services or increase staff and funding for existing State services.

4. If the State allows private pathology services, there should be a licensing or certification process.

5. Water discharged from upland marine and fresh water facilities should be screened and the effluent treated.

Genetics

1. The existing State genetics policy is adequate to protect the genetic integrity of the state's fisheries and should be rigorously applied to fish farming.

2. Current policies prohibiting imp[illegible] live salmonids, including gametes shou[illegible]d be placed into statute and rigor[illegible]rced.

3. The State should not permit the siting of finfish farms within a 20 kilometer radius from the mouth of a stream that has significant production of the same species.

4. The task force concurs with the Alaska Chapter of the American Fisheries Society resolution on genetic sanctuaries:

One recommendation for the protection of wild stocks in the Genetic Policy is the establishment of wild stock sanctuaries. These sanctuaries would be areas in which no enhancement activity is permitted except gamete removal for broodstock development. Populations of fish in these areas would represent "gene banks" of wild-type genetic variability. Sanctuary status could also be a conservative use status for the protection of particular significant or unique wild stocks.

5. The State should form an ad hoc committee to determine whether the State is strictly adhering to its genetics policy.

Chapter 3

Ownership of Broodstock

1. The State should not permit private ownership of broodstock.

2. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority.

3. All hatcheries within Alaska should be operated under nonprofit status.

4. A new permit allowing the cultivation of eggs and the sale of smolt to the finfish farming industry should be required. Existing hatcheries may be limited or precluded from participation by the conditions of their existing permits.

5. The State should create a new statutory authorization for the operation of finfish farming hatcheries.

6. There should be a statutory ban on the export of indigenous finfish stocks.

Sources of Broodstock

1. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority. Cultivation and in-state sale of broodstock and smolt by finfish farmers should not be prohibited.

2. The finfish farming industry should develop its own stocks under new State provisions for nonprofit finfish hatcheries.

3. New private nonprofit hatcheries under State authority would be required to rear broodstock for finfish farming operations.

4. The preferred initial source of broodstock is surplus hatchery eggs. Other sources include overescapement, cost recovery fish, and allocation by the Board of Fisheries.

Chapter 4

Environmental Impacts

1. The State should use existing siting guidelines to develop a set of criteria specifically applicable to finfish net pen farming in Alaska. These include the State of Washington's Recommended Interim Guidelines for the Management of Salmon Net-Pen Culture in Puget Sound and the Alaska Department of Natural Resources' Etolin Island Area Mariculture Pilot Project. Guidelines for siting should also reflect the Alaska Department of Fish and Game's disease and genetics policies.

2. The State should use the Consistency Review Process of the Alaska Coastal Management Program in permitting finfish farm sites. The Alaska Coastal Management Program provides "a framework for local and public participation in State decisions, and a mechanism for the resolution of conflicts between government agencies, individuals, and local communities." However, special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement.

3. Only nonlethal predator control measures, such as bird and mammal exclosure nets and electric fences, should be allowed for finfish farming.

User Conflicts

1. Area planning represents the best method of determining consistency of uses. However, where area plans do not exist, the consistency review process must allow for expanded public review to ensure consistency with activities that do not require State permits.

2. Fish farms and ancillary use of adjacent uplands must be compatible with zoning and designated uses of the uplands. No finfish farming should be permitted in waters adjacent to State and federal parks.

Chapter 5

1. The State should reduce its regulatory expenses by encouraging the use of private pathology services.

2. The finfish farming industry should pay economic rent for use of public resources. Forms of rent include local and state property taxes, state income taxes, sales taxes, permit fees, tideland leases, and a raw fish tax of three percent of the farm gate value.

3. Special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement. Applicants should bear the cost of these public notice provisions.

Chapter 6

Costs and Benefits Accruing to Alaska and its Residents

1. The State of Alaska should not subsidize finfish farming beyond the amount needed to regulate the industry.

Chapter 7

Marketability of Alaska Salmon

1. Alaska must develop a strategy to respond to its eroding market share for salmon sales.

2. A mandatory quality assurance and inspection program for the Alaska salmon industry that would include catcher boats, tenders, and processors should be implemented as soon as possible.

3. In conjunction with improved quality, marketing efforts should be expanded to include an aggressive, world-wide marketing program, extolling the virtues of Alaska wild salmon.

Chapter 8

1. The Legislature should resolve the issue of finfish farming by statutory permission or prohibition before the moratorium expires.

APPENDIX A

PRODUCTION SCENARIO FOR A 200 METRIC TON CHINOOK SALMON FARM

Appendix A presents a scenario for the operation of a hypothetical salmon farm in Alaska if enabling legislation were passed in 1990. The scenario is composed of 1) estimated timelines for the development of a marine net pen salmon farm and a fresh water hatchery; 2) an overview of the production of salmon, including a growth/mortality model, a production schedule, and a feeding and marketing model; and 3) an economic review, including a cash flow/operating expenses model and a brief discussion of the economic returns to the state.

The scenario assumes that the most economically viable finfish farm in Alaska would be a salt water net pen salmon facility with the following characteristics:

a. The size of an individual farm site, whether a family-operated farm or a corporate farm, would be between one and two surface acres. It would produce between 200 and 400 metric tons annually (100,000 to 200,000 fish), depending on the size of the fish and production.

b. The farm could be operated by a family with some part-time labor or by a corporation with three to five full-time employees.

c. Major infrastructure for a 200 metric ton farm includes six to eight 15 x 15 meter steel or plastic net pens, nets for each pen, anchors and lines for the farm, work boat, and a storage facility for supplies and fish feed.

I. ESTIMATED TIMELINE FOR THE DEVELOPMENT OF A CHINOOK SALMON FARM IN ALASKA

Table 1 provides an approximate timeline for the major steps in the development of a salmon farm, assuming that legislation providing for finfish farming is enacted in the 1990 legislative session. It includes the time frame for the development of the marine pen facility and for the development of a fresh water hatchery to serve the farm.

Table 1. TIMELINE FOR ESTABLISHING AN ALASKA FINFISH FARM

ACTIVITY	TIME
Finfish Farming Legislation enacted into law[1]	July 1990
Finfish Mariculture Regulations Adopted[2]	January 1991
Potential Applicants Identify Farm Locations, Broodstock Sources and Permit Requirements	July 1990 - April 1991
DNR Publishes Notice of Districts Open for Applications[3]	Prior to April 1, 1991
State Agencies Accept Consolidated Finfish Farm Applications	April 1, 1991 - June , 1991
State Review of Applications	June 1, 1991 - Dec. , 1991
All Necessary Permits Issued	December 1, 1991
Secure Supplier of Smolts (State or PNP Hatchery)[4]	Winter/Spring 1992
Smolt Supplier Begins Fresh Water Growth of Eggs/Fry	Fall 1992
Net Pens Placed in Water[5]	Spring 1993
Smolts Delivered to Marine Farm Site[6]	April - June 1993
Harvest/Sales Begin[7]	November 1994

[1]Assumes legislation enacted at the beginning of new fiscal year. Could be earlier depending on effective date of enabling legislation.

[2]Assumes agencies can promulgate regulations (similar to existing Aquatic Farm Regulations) in six months.

[3]Assumes finfish farming permit process to be similar to existing Aquatic Farm permit process.

[4]Assumes smolt production to be contracted out to an existing State or PNP hatchery. Eggs could be surplus to the hatchery, from cost recovery fish, or egg take from surplus wild stock.

[5]If surplus smolts were available, pens could go into the water as early as spring 1992.

[6]Assumes one year of fresh water growth for smolt before going into salt water. Another operation is to use "zero-check" smolt (no over winter of fish in fresh water, instead fry are placed directly into salt water).

[7]Sales begin after 19th month in marine growout facility and continue into the 25th month.

TABLE 1. (CONTINUED)

ACTIVITY	TIME
Development of Fresh Water Hatchery Facility:	
Identify Source of Fresh Water and Location of Hatchery[8]	July 1990 - January 1991
Application for Fresh Water Hatchery Permits	January 1991
Permits for Finfish Farm Hatchery Issued	November 1991
Eggs Placed into Hatchery[9]	July - October 1992
Smolt from Finfish Farming Hatchery Placed into Salt Water Pens	April - June 1993
Egg Take from Captive Broodstock	July - October 1995, 1996

[8]Assumes the fish farm company will develop its own fresh water hatchery at the same time as it develops the marine growout facility.

[9]Assume sources of eggs to be from one of the following: surplus eggs from existing hatcheries, cost recovery fish from PNPs, or wild egg take.

II. PRODUCTION OVERVIEW

The production cycle includes the following:

-egg take or purchase of fertilized eggs,
-incubation of eggs and the production of fry,
-fresh water rearing of fry to smolts
-marine growout of juvenile salmon to market size, and
-marine growout of mature salmon for broodstock.

1. EGGS AND SPAWNING

Initial sources of eggs before a farm develops its own broodstock include purchase of either surplus eggs or eggs from cost recovery fish from existing State or private nonprofit hatcheries. A farm that produces 200 metric tons annually will require 100,000 smolt. Fifty-seven female chinook salmon would be required to produce 100,000 smolt, assuming 2,500 eggs per individual salmon and a 30 percent mortality rate from egg to smolt. [100,000 smolt/(2,500 eggs/female x 70% survival rate.]

Assuming a conservative male/female ratio of 1:2, a 200 metric ton farm will require about 85 chinook salmon. Thus, for a 10,000 metric ton industry, 4,250 adult chinook salmon are needed for broodstock annually.

2. SIZES OF FISH

When fry emerge from the substrate and start feeding, they average about 0.4 grams each and are transferred into a freshwater raceway. At an average weight of twelve grams, they are transferred to the growout net pens in sea water. When they reach six to eight pounds, they are slaughtered and sold.

3. SCHEDULING THE PRODUCTION CYCLE

Scheduling is based primarily on the physiological activity of the fish in the different phases of operation and secondarily on economic considerations (e.g., when to harvest). Table 2 provides an outline of one complete production cycle. This table can be cross-referenced with Tables 3 and 4 to determine the sizes and the biomass of the production at various stages of the production cycle.

TABLE 2. PRODUCTION SCHEDULE FOR A SOUTHEAST ALASKA CHINOOK SALMON FARM

TASK	----YEAR 1 ----- JASONDJFMAMJ	----YEAR 2----- JASONDJFMAMJ	----YEAR 3----- JASONDJFMAMJ	----YEAR 4----- JASONDJFMAMJ
FRESH WATER GROWTH •EGG TAKE[1] •SPAWNING •FERTILIZATION •HATCHING[2]				
•FRY EMERGE FROM INCUBATOR[3] •TRANSFER TO PONDS •START FEEDING				
•SMOLTING •TRANSFER TO SALT WATER CAGES[4]				
SALTWATER GROWTH • FEED FISH • SEPERATE BY SIZE • MAINTAIN PROPER DENSITY • MAINTAIN FARM				
HARVEST/SALES START[5]				
BROODSTOCK • SPAWNING • FERTILIZATION • INCUBATION IN FW				

NOTES

[1] Wild egg take or purchase from existing hatchery (state or PNP) until development of own broodstock
[2] 50 to 75 days after fertilization (900 Temp. Units)
[3] 100 to 150 days after fertilization
[4] Smolting occurs 60 - 150 days after emerge from incubator
[5] Sales begin after 19th month in marine growout facility

4. GROWTH AND MORTALITY MODELS

Growth and loss patterns are presented in Table 3 for the freshwater rearing stage and Table 4 for the salt water rearing stage. These tables can be used to aid in planning management strategies for stocking, transferring and grading farmed fish, installation of net pens, and timing sales. The tables assume a strategy of getting the largest smolts possible into saltwater as early in the year as possible to take advantage of seasonally warming ocean waters. The strategy also times sales in the winter months when wild salmon are in short supply.

The data in Tables 3 and 4 are based on the following assumptions:

a. The average size of fry is 0.4 grams when "buttoned up," during the month of November, and they are transferred to salt water as 12-gram (average) smolts.

b. The farm will experience a monthly mortality rate of one to two percent (fresh water cumulative mortality of approximately six percent and a salt water cumulative mortality of about 34 percent).

c. The average water temperature is approximately 12 degrees C for fresh water growth, and in salt water, the average temperature is 10 to 15 degrees C during summer months and above 6 degrees C in winter. (These temperatures were taken from data for mean monthly sea surface temperatures in southeast Alaska.)

d. Salt water growth rates for Chinook salmon are based on actual rates experienced in northern B.C. and at the NMFS Little Port Walter station in southeast Alaska.

e. Mortalities assume fish losses due to disease, precocity, predation, algae blooms, and unknowns. The model uses a B.C. industry-wide standard of two percent average mortality per month. Column 10 in Table 4 presents the cumulative mortality expressed in percentage of the original number of fish.

TABLE 3. GROWTH/MORTALITY MODEL FOR FRESH WATER REARING

MODEL OF A 100,000 FISH SALMON FARM

MONTH	MONTHS IN POND	NUMBER OF FISH	AVG WEIGHT FISH (g)	DAILY GROWTH RATE	% MORTALITY (Assumed)
November (start feed)	0	113000	0.4	0.000	0
December	1	110740	1.1	0.034	2
January	2	109633	2.7	0.030	1
February	3	108536	5.0	0.021	1
March	4	107451	8.0	0.016	1
April	5	106376	12.0	0.014	1

TABLE 4. GROWTH/MORTALITY MODEL FOR MARINE GROW OUT

MODEL OF A 100,000 FISH (INITIAL) PACIFIC SALMON FARM IN SOUTHEAST ALASKA

MONTH/YR	MONTHS IN GROWOUT	NUMBER OF FISH	AV. WEIGHT/ FISH (lbs.)	DAILY GROWTH RATE (%)	BIOMASS (lbs.)	MORTALITY % Assumed	NUMBER FISH LOST	BIOMASS LOST	CUMULA % MORTA
January (Year 1)									
February									
March									
April	0	100000	0.026		2600	0	0	0	0
May	1	95000	0.051	2.246	4845	5	5000	255	5
June	2	92150	0.100	2.244	9215	3	2850	285	8
July	3	91229	0.195	2.226	17790	1	922	180	9
August	4	90316	0.381	2.233	34410	1	912	348	10
September	5	89413	0.510	0.972	45601	1	903	461	11
October	6	88519	0.601	0.547	53200	1	894	537	12
November	7	87634	0.702	0.518	61519	1	885	621	13
December	8	86757	0.801	0.440	69493	1	876	702	14
January (Year 2)	9	85022	0.900	0.388	76520	2	1735	1562	16
February	10	83322	1.001	0.355	83405	2	1700	1702	18
March	11	82489	1.201	0.607	99069	1	833	1001	19
April	12	81664	1.450	0.628	118412	1	825	1196	20
May	13	80847	1.800	0.721	145525	1	817	1470	21
June	14	80039	2.600	1.225	208100	1	808	2102	22
July	15	79238	3.604	1.088	285574	1	800	7395	23
August	16	77653	4.350	0.627	337792	2	1585	6894	25
September	17	75324	4.805	0.332	361931	3	2330	11194	28
October	18	73817	5.405	0.392	398983	2	1506	8143	30
November (Sales Begin)	19	73079	5.955	0.323	435187	1	738	4396	31
December	20	72348	6.057	0.057	438214	1	731	4426	32
January (Year 3)	21	70901	6.206	0.081	440014	2	1447	8980	34
February	22	68774	6.305	0.053	433622	3	2127	13411	36
March	23	68087	6.406	0.053	436163	1	688	4406	37
April	24	66725	7.007	0.299	467541	2	1362	9542	39
May	25	66058	7.808	0.361	515778	1	667	5210	40

5. FEEDING AND MARKETING MODEL

The feeding and marketing model presented in Table 5 projects feed consumption, weight of fish, and sales revenue over the production cycle. It can be used to plan feed purchases, storage capacity, and sales revenue.

The model assumes an average conversion rate (pounds of feed required to produce one pound of salmon flesh) of 1.7, with a range of 1.3 to 1.9. This rate is based on actual data from the NMFS Little Port Walter research.

The model utilizes feed cost assumptions for extruded feed from Moore-Clark in LaConner, Washington. Extruded feed is more expensive than dry feed ($.46/lb. versus $.32/lb. FOB Sitka, Alaska).

The model assumes sales occur after the fish reach a six pound average to obtain maximum value for the crop. Thus, sales begin in November (the 19th month) of the second year in salt water and continue at a rate of 15 percent of the biomass through May (25th month).

III. ECONOMIC CONSIDERATIONS AND BUDGET ANALYSIS

Cash flow requirements for a 200 metric ton southeast Alaska Chinook salmon farm are presented in Table 6. Growth, mortality, and feed conversion rates and sales are from Tables 2, 3, and 5.

CAPITAL EXPENSES

Pens. The analysis assumes the use of premanufactured steel net pens, assembled and installed by the supplier. Two 15 x 15 meter net pens, necessary for initial smolt growth and required for the first year, cost $19,000 each. A total of four of these pens are required by the start of the second year. Two large 33 x 33 meter pens valued at $38,000 each are needed during the second year. Cost data are from Viking Pacific Seacage Systems (Oppdrett Service Canada LTD) in North Vancouver, B.C. The cost includes the cost of anchoring the cages. Also included in the model are two 15 x 15 meter wooden net pens in the second year to be used as mobile enclosures to transfer fish from one pen to another and for grading fish.

Nets. Nets for smaller pens are assumed to cost $3,000 each; the larger pens require nets assumed to cost $10,000 each. A space net is planned for each size. The cost also includes the price of a predator net. Nets have a life expectancy of five years. Replacement costs are included.

Power Plant. The model includes the purchase of a 20 kilowatt generator. Cost of maintaining and rebuilding it are included.

Boat. The model assumes a work boat is needed at a cost of $14,000 for boat and motor. Another $5,000 is needed every two years for motor replacement. A replacement boat is planned for year six.

TABLE 5. FEEDING/MARKETING MODEL

MODEL OF A 100,000 FISH (INITIAL) PACIFIC SALMON FARM IN SOUTHEAST ALASKA

MONTH/YR	MONTHS IN GROWOUT	BIOMASS (lbs.)	CONVERSION RATE	FEED CONSUMPTION (lbs./month)	CUMULATIVE FEED CONSUMPTION	FEED COST/ MONTH ($0.46/lb)	CUMULATIVE FEED COST	NUMBER OF FISH SOLD	AV. WEIGHT/ FISH (lbs.)	PRICE ($/lb)	GROSS SALES REVENUES
January (Year 1)											
February											
March											
April	0	2,600	0	0	0	0	$0	0	0.03	$0.00	$0
May	1	4,845	1.3	2,919	2,919	1,343	1,343	0	0.05	0.00	0
June	2	9,215	1.5	6,555	9,474	3,015	4,358	0	0.10	0.00	0
July	3	17,790	1.5	12,862	22,335	5,916	10,274	0	0.20	0.00	0
August	4	34,410	1.5	24,931	47,267	11,468	21,743	0	0.38	0.00	0
September	5	45,601	1.6	17,904	65,171	8,236	29,979	0	0.51	0.00	0
October	6	53,200	1.6	12,159	77,330	5,593	35,572	0	0.60	0.00	0
November	7	61,519	1.6	13,310	90,640	6,123	41,694	0	0.70	0.00	0
December	8	69,493	1.7	13,555	104,196	6,236	47,930	0	0.80	0.00	0
January (Year 2)	9	76,520	1.7	11,946	116,142	5,495	53,425	0	0.90	0.00	0
February	10	83,405	1.7	11,705	127,847	5,384	58,810	0	1.00	0.00	0
March	11	99,069	1.7	26,628	154,475	12,249	71,059	0	1.20	0.00	0
April	12	118,412	1.7	32,884	187,359	15,127	86,185	0	1.45	0.00	0
May	13	145,525	1.8	48,802	236,161	22,449	108,634	0	1.80	0.00	0
June	14	208,100	1.8	112,636	348,797	51,813	160,447	0	2.60	0.00	0
July	15	285,574	1.8	139,453	488,251	64,149	224,595	0	3.60	0.00	0
August	16	337,792	1.8	93,992	582,243	43,236	267,832	0	4.35	0.00	0
September	17	361,931	1.8	43,449	625,693	19,987	287,819	0	4.81	0.00	0
October	18	398,983	1.8	66,693	692,386	30,679	318,498	0	5.41	0.00	0
November (Sales Begin)	19	375,637	1.9	83,980	776,366	38,631	357,128	10,000	5.96	$2.06	$122,673
December	20	317,680	1.9	58,492	834,858	26,906	384,035	10,000	6.06	2.41	145974
January (Year 3)	21	256,925	1.9	8,291	843,149	3,814	387,849	10,000	6.21	2.77	171906
February	22	190,143	1.9	8,780	851,929	4,039	391,887	10,000	6.31	2.77	174649
March	23	127,197	1.9	3,825	855,753	1,759	393,647	10,000	6.41	2.77	177446
April	24	66,277	1.9	2,001	857,755	921	394,567	10,000	7.01	2.77	194094
May	25	0	1.9	0	857,755	0	394,567	9,459	7.81	2.77	216282
TOTAL				857755		$394,567		69,459			1203023

Note: Sales are assumed to begin in November of the second year (19th month) and continue at a rate of 10,000 fish/month through May of year 3 (25th month)
Sale prices are for round fish sold to processors

TABLE 6 . CAPITAL AND OPERATING COSTS AND YEARLY CASH FLOW PROJECTIONS FOR 200 METRIC TON ANNUAL PRODUCTION
(Thousands of U.S. Dollars)

CAPITAL COSTS:	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	TOTAL
Pens	76	86	0	0	0	0	162
Nets	15	32	0	0	0	15	62
Anchoring	5	5	0	0	0	1	11
Automatic feeders	1	1	0	0	0	1	3
Power plant	10	0	2	0	0	10	22
Equipment	8	8	5	10	10	10	51
Accomodations	100	0	0	0	0	0	100
Boat	14	0	5	0	5	9	33
Miscellaneous	20	16	8	8	8	2	68
Depreciation	19	29	29	29	29	29	164
TOTAL CAPITAL EXPENSES	268	177	49	47	52	83	676
OPERATING EXPENSES:							
Smolts ($0.50 each)	50	50	50	50	50	50	300
Feed	48	340	395	395	395	395	1968
Labor	104	104	104	104	104	104	624
Management	50	50	50	50	50	50	300
Insurance	6	52	93	93	93	93	430
Medicine/Vet.	8	8	8	8	8	8	48
Maintainance & Fuel	16	16	16	16	16	16	96
Contingency	24	24	24	24	24	24	144
TOTAL OPERATING EXPENSES	306	644	740	740	740	740	3910
TOTAL EXPENSES	574	821	789	787	792	823	4586
SALES REVENUE	0	441	1203	1203	1203	1203	5253
NET REQUIREMENT	($574)	($380)	$414	$416	$411	$380	$667
CUMULATIVE NET REQUIREMENT	($574)	($954)	($540)	($124)	$287	$667	

Discounted Investment — net req./total investment

Equipment. This category covers everything from diving gear and hydraulic winches to water testing equipment and rain gear.

Accommodations. The model assumes the farm will conduct support activities from a barge attached to the net-pen structure. The facilities include living quarters, storage shed for feed, work shop, lab, and office. It is budgeted to cost $100,000.

Depreciation. Net pens, accommodations, power plant, and boat are depreciated at 10 percent per year for a ten-year useful life.

OPERATING EXPENSES

Smolts. The model assumes the farm will initially purchase smolts until its own broodstock mature. The cost per smolt is assumed to be $.50.

Feed Costs. Costs are based on quotes from Moore-Clark's Washington plant for container shipments from Seattle, with freight rates for delivery in Sitka provided by Lynden Transfer.

Labor. The cost of a farm manager is budgeted at $50,000.The salaries of five production employees (production supervisor, two culturists, and two laborers) are budgeted at $104,000 per year. The culturist and laborer positions are budgeted at $8 per hour. For both the laborer and culturist positions, one eight-hour shift per day is required during the six months of reduced daylight, and two eight-hour shifts per day are required for the other six months. Supervisor wages are budgeted at $10 per hour and the position is full-time year round.

Insurance. Insurance coverage for fish stocks is calculated at four percent of the market value of the fish held in net pens, which is the B.C. industry standard.

Medicine/Veterinarian. This $8,000 is based upon the expenses of a B.C. farm for vaccinations and pathology services performed by private veterinarians and pathologists.

Sales revenue. The model assumes a farm site price of $2.77 per pound round weight.

ECONOMIC RETURN TO THE STATE OF ALASKA

The state will receive economic rent from the finfish farming industry in the following ways:

Aquatic farm product tax for finfish. This revenue is estimated to be three percent of the farmgate value (gross sales). This tax is similar to the raw fish tax. For a farm that produces 200 metric tons annually, the estimated annual gross sales revenue is $1,203,000 (from Table 6, assuming the farm is operating at capacity). Thus, the aquatic farm product tax for a 200 metric ton farm would be $36,090 annually. For a 10,000 metric ton industry (fifty 200 metric ton farms), the total annual farm product tax is estimated at $1,804,500. Note that the revenue from this tax is split evenly between the local municipality or borough and the State.

Tideland lease from the State. Currently, there are no tideland leases from the State for shellfish farms; as a result, no estimates are available. However, the revenue to the State from the tideland lease is based on the appraised fair market value. An average farm of two surface acres would lease the amount of tideland utilized, which includes the area up to location of the anchors. Thus, depending on depth, current, and location, the area of the lease would range from approximately 10 to 20 acres per farm.

Permit fees. Current fees include a $50 filing fee, $100 annual permit fee, and a $50 per acre fee if utilizing a permit rather than a lease for tideland use.

Corporate income tax. Estimated at $4,500 up to the first $90,000 of net income, plus 9.4 percent of all net income over $90,000.

Local property tax. Varies depending on the municipality or borough in which the farm is located.

Local sales tax or raw fish tax. This revenue varies depending on whether the local taxing authority has a sales or raw fish tax, and whether the farm is located inside a local taxing authority (municipality or borough).

APPENDIX B

IMPACT OF FARMED SALMON PRODUCTION ON SALMON PRICES

Increased worldwide production of farmed salmon has put downward pressure on the price of Alaska wild salmon. Alaska's salmon fishermen are concerned that production of Alaska farmed salmon will further this price erosion. With available data, we can estimate a range for the lost revenue to Alaska commercial fishermen resulting from an increase in the production of farmed salmon.

In Appendix A, the operation of a 200 metric ton salmon farm is described. The task force has envisioned that over a period of 5 to 15 years from the date finfish farming may be permitted, the industry will grow slowly from 10 to 100 fully productive farms of about 200 metric tons each.

Recent estimates of the elasticity of demand for pacific salmon can be use l for a rough estimate of the effect that a farmed salmon industry in Alaska could have on the price o Alaska wild salmon.

It is difficult to provide an accurate estimate of the elasticity for salmon since demand for salmon is increasing and the composition of production is changing with more farmed salmon on the market. Also, the elasticity of demand for salmon depends on the markets in which it is sold. The results provided here should be considered ballpark estimates.

From elasticities provided in Anderson (1988), assuming our maximum estimate of 100 farms each producing 200 metric tons, and assuming a world production of 568,000 metric tons with an exvessel price of $3.00 per pound, we get a range of loss to the Alaska commercial fishing industry due to a decline in price of $15-51 million (See Table 1).

The lower end of this range would occur if wild and farmed salmon competed mostly in the Japanese market, a likely scenario. The high end assumes competition only in the expensive seafood restaurant market, less likely since this market could not absorb more than a small fraction of the total production of wild salmon.

These estimates are based on mostly negative assumptions. It is unlikely that the Alaska salmon farming industry would produce 20,000 metric tons for many years to come. Also, most farmed salmon fills market niches that do not compete with wild salmon. Also, the markets that would be targeted by Alaska farmed salmon producers would likely be filled by another producer if Alaska does not permit finfish farming.

The contribution of salmon farms to the economy may be larger than the negative effects. Refer to Appendix A for information on the economic benefits of salm on farming.

TABLE 1
IMPACT OF ALASKA FARMED SALMON ON ALASKA PRICES

	ELASTICITY	CURRENT PRICE PER LB.	WORLD PACIFIC SALMON (MT)	ALASKA CATCH (MT)	HYPOTHETICAL ALASKA FARM OUTPUT (MT)	RESULTING PRICE CHANGE PER LB.	LOSS TO AK COM. FISHING
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	200	(0.00)	($275,023)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	200	(0.00)	($212,232)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	200	(0.00)	($516,432)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	200	(0.00)	($149,932)
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	1,000	(0.00)	($1,375,115)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	1,000	(0.00)	($1,061,161)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	1,000	(0.01)	($2,582,160)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	1,000	(0.00)	($749,659)
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	10,000	(0.03)	($13,751,146)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	10,000	(0.02)	($10,611,615)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	10,000	(0.06)	($25,821,596)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	10,000	(0.02)	($7,496,592)
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	20,000	(0.06)	($27,502,292)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	20,000	(0.05)	($21,223,230)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	20,000	(0.12)	($51,643,192)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	20,000	(0.03)	($14,993,185)

(1) FROM "WORLD MARKETS FOR SALMON: PEN REARED SALMON IMPACTS"

ELASTICITIES ARE FROM P.189.
PACIFIC SALMON PRODUCTION IS FOR 1987 P.73.

THESE IMPACTS ASSUME ALASKA FARMED SALMON COMPETES ONLY WITH PACIFIC SALMON AND DOES NOT ACCOUNT FOR INCREASING DEMAND FOR SALMON.

TO THE EXTENT THAT ALASKA FARMED SALMON COMPETES WITH ATLANTIC SALMON AND AS DEMAND INCREASES, THE IMPACT ON ALASKA COMMERCIAL FISHING INDUSTRY DIMINISHES.

APPENDIX C

SUMMARY OF TASK FORCE ACTIVITIES

CREATION OF THE TASK FORCE

The Alaska Finfish Farming Task Force was created by the Alaska Legislature under Chapter 145, SLA 1988; the effective date of the act was June 9, 1988.

Under Ch. 145, SLA 1988, the task force was charged with providing an interim report, due by January 30, 1989, and a final report, due by January 30, 1990, to the Legislature addressing "finfish farming in fresh water, in marine environments, and in tanks or other enclosed structures that contain marine water and that are located on land." The task force was also to consider related hatchery operations.

The legislation directed the task force to examine:

(1) whether the farming of finfish can be conducted in a manner that protects the health of the state's fishery resources;

(2) criteria for the siting of finfish farms to minimize land use conflicts and to protect the environment;

(3) net economic costs and benefits of finfish farming in the state to state residents, including jobs created or lost for state residents, tax revenue (assuming an appropriate tax rate), cost of State regulation and monitoring, and effects on markets for salmon caught by the state's commercial fishing fleets;

(4) the cost of providing adequate regulation of finfish farming to protect wild stocks, the environment, public health, and existing beneficial uses of the state's coastal water and land, and the role of the private sector in providing pathological and other services;

(5) identification and analysis of appropriate sources of supply of stock for finfish farms, including but not limited to private nonprofit hatcheries, private for-profit hatcheries, and wild stocks, and their likely effect on existing state policy; and

(6) strategies for improving the marketability of Alaska salmon, particularly those high-value species competing with farmed salmon for domestic and export sales.

No funds were appropriated for task force operations until the 1989 legislative session. As a result, the original deadline for the interim report passed before the task force was established.

Following the 1989 legislative session, the Office of the Governor began organizing the task force. For administrative purposes, the task force was located in the Office of the Governor, Division of Administrative Services. A project coordinator was hired in late June.

TASK FORCE MEMBERS

In late July 1989, Governor Cowper appointed the following task force members: Ken Castner, representative of commercial salmon fishermen; Mary Lou Cooper, public member; Gordon Harrison, private economist; Theodore Merrell, fisheries biologist; and Brent Paine, aquatic farming advocate. Mary Lou Cooper was designated chairman.

In August 1989, Gordon Harrison resigned from the task force to take a job as director of the Legislative Research Agency. Under Ch. 145, SLA 1988, State employees were not permitted to serve as task force members. John Weddleton was appointed as Mr. Harrison's replacement in September 1989.

On October 16, 1989, Mary Lou Cooper resigned as chairman while continuing to serve on the task force. Theodore Merrell was elected chairman by unanimous consent of the task force.

FUNDING

During the 1989 session, the Legislature appropriated $50,000 to the task force. Of this, $16,600 was appropriated for FY 89 and $33,400 was appropriated for FY 90. Because task force activity did not commence until after July 1, 1989, the appropriation for FY 89 lapsed.

In September 1989, the task force received $10,000 from the Department of Commerce and Economic Development through a reciprocal service agreement (RSA). In early November 1989, the Legislative Council awarded $10,000 to the task force. In total, the task force had $53,400 to spend on its efforts.

TASK FORCE MEETINGS

The task force held a series of meetings for the purpose of collecting information and developing its report to the Legislature.

The meetings are briefly described below. A list of persons testifying at each meeting is provided. For additional information, see the minutes of the meetings in Appendix D.

July 31, 1989, Juneau

Topics: Review enabling legislation and budget; develop goals and objectives; plan future activities.

Individual Testifying:

Deborah Greenberg, Special Assistant, Alaska Department of Fish and Game

September 6 & 7, 1989, Anchorage

Topics: Disease, genetics, and broodstocks; report format.

Note: While in Anchorage, task force members also attended various sessions of the American Fisheries Society Convention concerning aquatic farming and related issues.

Individuals Testifying:

Conrad Mahnken, National Marine Fisheries Service, Northwest and Alaska Fisheries Center
Dr. Lee Harrell, National Marine Fisheries Service, Northwest and Alaska Fisheries Center
Dr. Brian Allee, Director of Fisheries Rehabilitation, Enhancement and Development, Alaska Department of Fish and Game
Alex Wertheimer, National Marine Fisheries Service, Auke Bay Laboratory

September 27 & 28, 1989, Juneau

Topics: Siting and marketing; presentation from Tim Kennedy, Cordova fisherman and part owner of fish farms in Washington and British Columbia; presentation from Bill Heard, with the National Marine Fisheries Service, Auke Bay Laboratory.

Individuals Testifying:

Laura Dameron, Southeast Alaska Conservation Council
Rodger Painter, Alaska Mariculture Association
Diane Mayer, Office of the Governor, Division of Governmental Coordination
Janet Burleson, Department of Natural Resources, Division of Land and Water Management
Brian Allee, Department of Fish and Game, FRED Division
Sonja Corazza, United Fishermen of Alaska
Tim Kennedy, commercial fisherman and salmon farm owner
Paul Peyton, Department of Commerce and Economic Development, Division of Business Development
Bill Atkinson, Private Consultant on Japanese markets for seafood (by teleconference)
Bill Heard, National Marine Fisheries Service, Auke Bay Laboratory

October 16 & 17 1989, Juneau

Topics: Review of previous findings; broodstock ownership, si' ng, disease, genetics; and commercial fisheries economics, re' ulation, and management.

Individuals Testifying:

Dr. Anthony Gharrett, University of Alaska and National Marine Fisheries Service
Gale Good, Alaska Trollers' Association
Sonja Cc azza, United Fishermen of Alaska (by teleconference)
Ken Parker, Director, Alaska Department of Fish and Game, Division of Commercial Fisheries
Rodger Painter, Alaska Mariculture Association

November 5 & 6, 1989, Juneau

Topics: Regulating finfish farming; costs and benefits of a finfish farming industry; marketing issues; findings and recommendations.

Individuals Testifying:

Chip Toma, private citizen
Rick Harris, Sealaska Corporation

December 5, 1989, Work Session by Teleconference

Topic: Review of draft report and public comments received.

December 18, 19 & 20, 1989

Topic: Finalize report to Legislature.

ADDITIONAL ACTIVITIES

September 24 - 26, 1989, Tour of Puget Sound Fish Farms

On September 24, 25, and 26, task force members Ken Castner, Mary Lou Cooper, Theodore Merrell, and Brent Paine toured finfish farms in the Puget Sound area. Also present on the tour were Rick Harris, Sealaska, Tom Moyer, Legislative Aide to Sen. Bettye Farhenkamp, and Jon Sherwood, project coordinator for the task force.

On the afternoon of September 24, the task force visited the Squaxin Island marine pen fish farm and ocean ranching facility and viewed the proposed site of Swecker Farms marine pen fish farm, both in south Puget Sound.

On the morning of September 25, the task force visited Swecker Farms' processing facility in Olympia and its fresh water tank farm and hatchery facility in Rochester. That afternoon, the task force visited the Sea Farms Washington marine pen fish farm at Port Angeles. In addition, the task force conducted an aerial inspection of several marine pen operations in north Puget Sound.

On the evening of September 25, the task force met with representatives of the Marine Environmental Coalition, a group opposed to most aquatic farming in Puget Sound.

On the morning of September 26, the task force met with several members of the University of Washington faculty, addressing to them questions on disease, genetics, broodstock development, environmental impacts and research activities.

The faculty members were Dr. Ken Chew, Dr. Marsha Landolt, Dr. Bill Hershberger, Dr. Bob Stickney, and Dr. Donald Weston.

The trip to Puget Sound was hosted by Sealaska Corporation. The task force paid for its airfare to and from Seattle and for its food and accommodations. Sealaska Corporation paid for transportation within Washington and for the rental of a meeting room at the University of Washington campus for the morning of September 26. (An ethics report is on file with the Department of Law.)

November 17, 1989, Draft Report Released

On November 17, the task force released its interim report, including the draft version of its final report, to the Alaska Legislature. By November 20, copies of the report were mailed to the 130 people on the task force's mailing list, as well as all of the Legislative Information Offices.

A press release announcing the release of the report was also sent out. The task force received additional requests for the report. Eventually, a total of approximately 300 copies of the report were distributed to interested parties.

The task force received over seventy separate written comments on the draft report.

Throughout its existence, the task force gathered relevant information on finfish farming. Individual task force members collected data on various related topics, and information sent the task force from any source was distributed to the task force or (in the case of a few lengthy documents) summarized for the task force by the project

coordinator or a task force member. (See Appendix F, Bibliography, for a complete listing of sources.)

The task force developed a mailing list numbering approximately 150, including legislators, state and federal officials, various advocacy groups, and interested members of the press and public. Anyone who asked was put on this mailing list. After each meeting, the task force sent out letters summarizing the meeting and setting forth upcoming task force activities.

APPENDIX D

MINUTES OF MEETINGS

ALASKA FINFISH FARMING TASK FORCE
July 31, 1989

MINUTES

The meeting was called to order at 9:00 by Mary Lou Cooper, Chairperson of the Task Force. Task Force members present were: Mary Lou Cooper, Ken Castner, Gordon Harrison, Ted Merrell, and Brent Paine. No members were absent.

Mary Lou Cooper introduced the members of the task force and staff to the audience. Members of the audience identified themselves.

Mary Lou Cooper reviewed the rules and methods of operation of the Task Force.

Jon Sherwood, project coordinator for the Task Force, provided a brief overview of the legislation authorizing the Task Force. He explained that the Task Force is to produce an interim report by December 1, 1989 and a final report by January 15, 1990. He also reviewed the Task Force's budget. The Task Force is funded for $33,000.

Task Force members then engaged in a discussion of their goals and how they would like to achieve them. Ted Merrell stated that the American Fisheries Society was holding its annual meeting in Anchorage in September and there would be a symposium on pen rearing salmon at the meeting. The Task Force decided to meet in Anchorage during the AFS meeting to take advantage of the expertise that would be available there.

Deborah Greenberg, Special Assistant with the Department of Fish and Game, addressed the Task Force on the legislative history of aquatic farming in Alaska. She then explained the Cowper administration position on mariculture. She also summarized the issue papers on finfish farming prepared by the interagency working group on mariculture. The issues included land use, water quality, disease, brood stock, habitat protection and product wholesomeness.

Ted Merrell asked whether minutes of the meetings would be provided. The Task Force decided that minutes indicating who spoke, the general topics, any formal decisions, and a list of observers should be kept.

The Task Force held a discussion of the topics for consideration included in its authorizing legislation. Members asked questions and exchanged information on finfish farming. Much of this discussion focused on the issue of minimizing land use conflicts. The task force identified a number of people to contact for additional information on this issue.

At 12 p.m., the Task Force adjourned for lunch.

The meeting was reconvened at 1:20 p.m. The task force members continued their discussion of the issues contained in the authorizing legislation. As each issue was discussed, contact persons were identified.

The issue of broodstock was addressed briefly. The task force then returned to their discussion of land use conflicts and siting.

Mary Lou Cooper raised the cost-benefit issue. Gordon Harrison stated that it would be a major task and depend on the assumptions made by the task force. Task force members discussed loss of jobs in the fishing industry, market niches, reasons for farming finfish, the cost of regulation, taxation of finfish farming, and the need to look at the three possible types of farming operations: freshwater, upland tanks, and marine pens.

Jon Sherwood handed out travel authorization forms for reimbursement of travel and per diem costs. He also passed out an article on salmon farming provided to the task force by Frank Homan, of Senator Sturgulewski's staff.

The task force discussed the cost of regulation issue contained in the authorizing legislation. Ken Castner said that this issue duplicated parts of the cost-benefit issue, except that it addressed the role of private sector in regulation. He stated that this role is a policy question. A brief discussion was held on this issue.

Mary Lou Cooper raised the issue of broodstock sources. Ken Castner suggested that the task force should review the debate before the Board of Fisheries in December of 1988. Brent Paine stated that he had put together papers on broodstock supplies while working for the Legislature. The task force discussed the practical and policy issues associated with supply of broodstock.

The task force discussed the issue of improving the marketability of Alaska salmon. Ken Castner suggested calling the producers of the Seafood Report radio program in Kodiak for the name of a good marketing person. Mary Lou Cooper mentioned ASMI as a possible resource. Ted Merrell suggested contacting the Alaska Trollers Association.

Ken Castner commented on how the task force members should conduct themselves in public. He said he did not want to see the task force members be perceived as public experts, and suggested that task force members keep their comments private. He stated that he did not want to do anything to poison or damage the quality of the task force's report.

Following the discussion of the issues, it was decided to divide the topics for consideration into five subjects: siting, cost-

benefit analysis, the amount and cost of regulation, broodstock-genetics-disease.

The task force discussed how to proceed. It was decided that each member would take one topic and work with Jon Sherwood to prepare a presentation for one of the meetings.

Ken Castner stated that he would like to teleconference with the other task force members for an hour or so before the next meeting. The task force agreed to do so, acknowledging that Gordon Harrison, and possibly Ted Merrell, would be unavailable to participate.

Mary Lou Cooper offered to take the marketability issue, Brent Paine the broodstock-genetics-disease issue, Gordon Harrison the cost-benefit analysis, Ted Merrell the siting issue, and Ken Castner the cost of regulations.

The task force briefly discussed the structure and intent of the marketability issue.

The task force decided to address the regulation and broodstock-genetics-disease issues at the next meeting. It was decided that the siting and marketing issues would be addressed at a meeting in the last week in September, and the cost-benefit issue would be addressed in an October meeting.

Ken Castner stated that he would like to have Jon Sherwood begin working on early drafts of the report soon. He said that the task force should devote 25 percent of its time to discuss writing.

The task force members updated their addresses and phone numbers for one another. The meeting was adjourned at approximately 5:30 p.m.

List of persons in attendance

Greg Erickson
Deborah Greenberg
Rick Harris
Sheila Helgath
Frank Homan
Eric King
Karl Ohls
Sandy Perry

APPROVED 9/7/89

ALASKA FINFISH FARMING TASK FORCE

September 28 & 29, 1989

MINUTES

The meeting was called to order at 8:35 a.m. on Thursday, September 28, by Mary Lou Cooper, Chairman. All task force members were present: Mary Lou Cooper, Ken Castner, John Weddleton, Ted Merrell, and Brent Paine.

Members of the task force introduced themselves to the new task force member, John Weddleton. Jon Sherwood introduced Fran Armon, who assists Jon in the office, providing administrative support for the task force.

Ken Castner reviewed the task force's past activities for John Weddleton. He listed the five catagories of issues under consideration: broodstock, genetics, and disease; siting; cost of regulation; markets/marketing; and benefits and costs. Brent Paine reviewed the minutes from the last meeting for John Weddleton to provide a general idea of what the task force has accomplished to date.

The task force discussed siting issues, including local control, conflict minimization, environmental concerns, and the Washington interim guidelines for siting.

The task force members identified questions for Bill Atkinson, a fish marketing consultant, to be faxed to Atkinson so he would be prepared to answer them during the conference call on Friday.

Laura Dameron, with SEACC, spoke with the task force stating her concerns: impacts of the coastal environment and socio-economics and lifestyle impacts. SEACC opposes all fish farming because of upland impacts, pollution, water demands, and the potential loss of desire for habitat protection.

Rodger Painter, with the Alaska Mariculture Association, spoke with the task force on the need for rational policy guidelines for siting of finfish farms. He pointed out that state regulations for shellfish farming provide for local control and that the Washington interim siting guidelines address important siting criteria. He also offered his thoughts concerning the economic viability of finfish farming and how state regulation might affect it.

The task force adjourned for lunch and reconvened at 1:30 p.m.

Diane Mayer, with the Division of Governmental Coordination, discussed the state's Project Consistency Review procedures for use of coastal waters.

Janet Burleson, with the Division of Land and Water Management, discussed how the state's permitting process works for aquatic farms.

The task force addressed several questions to Brian Allee, Director of the FRED Division, Department of Fish and Game.

Sonja Corazza, with United Fishermen of Alaska, discussed negative impacts of finfish farming. Her concerns were that pens change the habitat of wild fish, that fish escape in large numbers, and that marketing farmed salmon on Alaska wild salmon quality is wrong. She also addressed siting issues, stating that area planning is very important. She suggested requesting mapping positions with the Department of Natural Resources and the Department of Fish and Game to consolidate habitat and use charts for public use.

The meeting was adjourned at 5:15 p.m.

The meeting was reconvened Friday at 8:30 a.m. by Ken Castner. Due to illness, Mary Lou Cooper was not present; all other members were present.

The task force approved the minutes of the last meeting with amendments. They then discussed the draft of the report's introduction and health of the fisheries section and suggested changes to be incorporated by the project coordinator.

Tim Kennedy, commercial fisherman and salmon farm owner, spoke with the task force. He stated that Alaska finfish farming would not be economically viable without raising Atlantic salmon, and noted that he would not start a fish farm up here.

Paul Peyton, with the Division of Business Development, discussed the economics of fish food production and addressed the outlook for salmon in world markets.

The meeting was adjourned for lunch at 11:25 a.m. and reconvened at 12:45 p.m.

The task force reviewed the siting issues discussed the previous day.

Bill Atkinson, expert on Japanese markets for seafood, was contacted via a conference call. Atkinson addressed several questions on Japanese markets for seafood and the impacts of farmed salmon on these markets.

Bill Heard, with the National Marine Fisheries Service at Auke Bay Laboratories, addressed research in raising salmon at Osprey Bay. He stated that indigenous species could be raised successfully, although he could not speak about the economic viability.

The meeting was adjourned at 5:00 p.m.

Minutes approved October 17, 1989

List of persons in attendance:

Brian Allee, Department of Fish and Game
Susan Bradley, Coastal Zone Management
Janet Burleson, Division of Land and Water/Department of Natural Resourses
Sonja Corazza, United Fishermen of Alaska
Laura Dameron, Southeast Alaska Conservation Council
Bill Heard, National Marine Fisheries, Auke Bay Laboratories
Sheila F. Helgath, Legislative Research
Frank Homan, Senator Sturgulewski's staff
Bill Janes, Environmental Conservation
Tim Kennedy, Fish Farm Owner
Amy Kruse, Environmental Conservation
Diane Mayer, Division of Governmental Coordination/Office of the Governor
Robert Mikol, Northern Deep Sea Fisheries, Inc.
Rodger Painter, Alaska Mariculture Association
Sheila Peterson, Senator Eliason's staff
Paul Peyton, Commercial Fisheries Development/Department of Commerce and Economic Development
Rick Reed, Habitat Division/ Department of Fish and Game
Lana Shea Habitat Division/ Department of Fish and Game
John S. Thiede, Department of National Resources

ALASKA FINFISH FARMING TASK FORCE
September 6 & 7, 1989

MINUTES

The meeting was called to order at approximately 1:30 p.m. on September 6 by Mary Lou Cooper, Chairperson. Task force members present were Mary Lou Cooper, Ken Castner, Ted Merrell, and Brent Paine. No members were absent.

Mary Lou Cooper noted that Gordon Harrison had resigned his position on the task force to take a job with the Legislative Research Agency. She stated that the Governor's Office had not found a replacement for Mr. Harrison at that time.

The task force discussed the questions it wanted to resolve at the meeting, a proposal from Sealaska Corporation to tour operating farms in the Puget Sound area, and correspondence received from Sen. Fahrenkamp regarding the task force.

Conrad Mahnken, with the National Marine Fisheries Service, Northwest and Alaska Fisheries Center (NWAFC), joined the task force in a discussion of the genetic and broodstock issues. Both Atlantic and Pacific salmon were discussed..

Dr. Lee Harrell, fish pathologist with NWAFC, discussed the incidence of disease in pen-reared salmon and the potential for spreading disease to the wild stock.

At approximately 5 p.m., the task force adjourned for the afternoon.

The task force reconvened at 9 a.m. on September 7. Dr. Brian Allee, director of the Alaska Department of Fish and Game FRED Division, discussed disease, genetics, and broodstock issues with the task force.

Dr. Allee spoke to the state's existing hatchery programs, efforts to cultivate indigenous species of finfish, and the concept of creating areas free of salmon farming near critical salmon streams.

After breaking for lunch, the task force continued their discussion of Sealaska's invitation to take the task force on a tour of finfish farming operations in Puget Sound. The task force decided to accept the invitation.

The task force discussed the report with project coordinator, Jon Sherwood, who outlined some of the options for structuring the report. The task force directed the project coordinator to begin writing the report using an issue-by-issue format.

Alex Wertheimer, with the National Marine Fisheries Service, Auke Bay Laboratories, spoke to the task force regarding protection of the wild salmon stocks from disease.

The task force approved the minutes of the last meeting. Ken Castner requested that the word "produces" on p. 2 be corrected to "producers." The task force concurred.

The task force discussed developing its preliminary recommendations on the disease, genetics, and broodstock issues.

The task force then enacted its preliminary recommendations as follows:

-- Only indigenous broodstocks should be used in finfish farming in Alaska. No stocks should be imported from out of state.

-- The State will need to allow the use of private pathology services for the finfish farming industry to grow.

-- Current state policies on disease control should be applicable to finfish farming.

The meeting was adjourned at approximately 5 p.m.

ALASKA FINFISH FARMING TASK FORCE
October 16 & 17, 1989

MINUTES

The meeting was called to order in Juneau at 8:34 a.m. on October 16 by Mary Lou Cooper, Chairman. Task force members present included Ken Castner, Mary Lou Cooper, Ted Merrell, Brent Paine, and John Weddleton.

Ms. Cooper announced her resignation as chairman and asked for the selection of a new chairman. By unanimous consent, the members approved Ted Merrell as the new chairman of the task force. Brent Paine took over as chairman of this day's meeting.

Jon Sherwood, project coordinator of the task force, apprised the members that state ethics requirements compel the members to report the services they received from Sealaska Corporation during the September meeting. Although the services do not constitute a conflict of interest, each member must report receipt of those services. Jon Sherwood will submit the required report on behalf of task force members.

Mr. Castner presented an Alaska Native Brotherhood resolution opposing finfish farming and a 1987 study on how commercial fishing affects Homer.

After reading various materials, the members discussed the format of the task force report. They reviewed a series of questions to ask Dr. Anthony Gharrett, a biologist with the University of Alaska Southeast Auke Bay Laboratory and the National Marine Fisheries Service. Mr. Gharrett made comments concerning the destrction of discrete genetic pools in the Pacific Northwest and encouraged the task force to prevent that occurence in Alaska.

Mr. Merrell recounted his interviews with state officials regarding the relationship among state resource agencies, the permitting process, siting issues, and the establishment of sanctuaries. The members talked about these issues, the role of infrastructure for the economic survival of mariculture, and the question of public versus private ownership of broodstock.

The task force then discussed siting. Mr. Castner stressed the importance of this issue by stating that "siting is everything in this game" and that any legislation authorizing finfish farming should contain a fiscal note that reflects the costs of siting. Mr. Paine agreed and said that conflict and confrontation can be diffused if siting is set up properly.

Members concurred that the proper siting of finfish farms should address the transference of disease, genetic interference with wild stocks, environmental degradation, aesthetic degradation, conflicts with existing users, avoidance of marine mammals, avoidance of water-borne organisms lethal to the farmed stock, and avoidance of conflict with designated uplands or neighborhood uses.

Members also wanted to include mention of the state of Washington's interim guidelines for siting and of the Alaska Coastal Zone Management Plan's permitting process for resolving siting issues.

Mr. Paine suggested that siting and the permitting process should be addressed as two separate issues. Mr. Merrell suggested that the Alaska Coastal Zone Management Plan's permitting process be used as a model for the finfish farming permitting process. He then asked for clarification on the structure of the task force report. Mr. Sherwood outlined the distinctions between conclusions and findings. Conclusions, he explained, should be statements of public policy. Findings should be points of agreement among the task force members on matters of fact.

Members then discussed the permitting process. Ms. Cooper and Mr. Merrell supported the inclusion of maps in the public notification process. Questions then arose about the adequacy of the state's inventory of sites.

At 10:30 a.m., Dr. Anthony Gharrett discussed disease and genetics among salmon, the homing habits of various salmon species, siting, how the Alaska Department of Fish and Game enforces its genetics guidelines, the genetic differences that exist among lakes within the same area, patentable gamete production and the aquaculture research by Japan and the Soviet Union. He distributed a proposal calling for the Alaska Department of Fish and Game to implement its genetic policy by establishing, on a regional basis, sanctuaries for wild fish populations. Mr. Gharrett entertained questions from the members until 11:35. Discussion then returned to siting and permitting.

After lunch, the task force members heard testimony from Gale Good, member of the Alaska Trollers' Association. Mr. Good described his industry and voiced his opposition to finfish farming.

The members spent the rest of the day discussing findings and conclusions relating to siting. Specific issues addressed were: water quality; effluents; water circulation; the use of uplands; predation; disease; aesthetics;

pollution; user conflicts; having finfish farmers produce annual performance reports to governmental agencies; the distinctions among marine pens, marine upland tank facilities, and freshwater upland facilities; distances between farms and wild anadromous streams; distances between farms; and, the incremental implementation of finfish farming.

The meeting was adjourned at 5:14 p.m.

* * * * * * * * * * *

The task force reconvened at 8:45 a.m. on October 17. John Weddleton presided over the day's meeting. Task force members present included Ken Castner, Ted Merrell, Brent Paine, and John Weddleton. Due to illness, Mary Lou Cooper was absent.

The members adopted, with corrections, the minutes from the September 28 and 29 task force meeting and briefly discussed broodstock issues.

At 9:00 a.m., the task force members listened to United Fishermen of Alaska's Sonja Corazza's testimony on the history of the Alaska fishing industry, the limited entry program, the ocean ranching program, and the implementation of the 200-mile limit. She pointed out that in Anchorage alone, 3900 fishermen contributed $126 million to the economy. Because of the underfunding of the Alaska Department of Fish and Game, she claimed that errors in fisheries management have incurred losses to fishermen. She ended her testimony by voicing her opposition to finfish farming.

After listening to Ms. Corazza's testimony, the members resumed their discussion on broodstock selection for enclosed freshwater systems, the importation of eggs, the use of Atlantic salmon in the Pacific Northwest, the selling of smolt, and other broodstock issues.

At 10:10 a.m., the members heard testimony from Ken Parker, Director of the Division of Commercial Fisheries, Alaska Department of Fish and Game. Mr. Parker presented a fiscal history of his division and described its duties. He provided information about the catches and ex-vessel values among various fisheries; the number of fisheries permits, licenses, and processors and buyers. He showed the relationship between receipts and expenditures for commercial fisheries management before entertaining questions from the members.

Mr. Parker's testimony ended at 11:15 a.m. The members continued their discussion on broodstock issues.

At 11:35 a.m., Rodger Painter, President of the Alaska Mariculture Association addressed the task force, urging support for the development of finfish farming in Alaska. In addition to handing out the latest edition of the "Alaska Mariculture Report" (Volume 3, No. 6), he distributed a paper responding to concerns relating to the permitting process, the ability of regulatory agencies to deal with finfish farming issues, the impacts on wild stocks, disease control, support of adequate funding for regulatory programs, the demands on Alaska's environment by every industry -- from tourism to logging, public use issues, Alaska's declining market share of salmon, and the obtaining of salmon eggs for mariculture. He also addressed the role of private non-profit groups in the cultivation of broodstock. Citing his past experience at the Alaska Seafood Marketing Institute, he noted how the state still has a poor quality assurance program.

After the lunch break, the task force members discussed their agenda, the testimony they had received, developing strategies for retrieving Alaska's 1988 market share of salmon, and issues relating to quality, allocation, habitat, broodstock, costs/benefits, recapitalizing the fishing fleet, permit costs, and marketing.

After a brief break at 3:00, the members established the following meeting dates and deadlines:

November 5 & 6.....Task Force Meeting in Juneau
November 17.....Release of Draft Report
December 5.....Work Session on Draft Report
December 13.....Deadline for Public Comments
December 17 & 18.....Task Force Meeting in Juneau

Citing previous testimony, the members summarized their findings on marketing issues.

The meeting was adjourned at 5:35 p.m.

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The following people attended the task force meetings:

Sonja Corazza, United Fishermen of Alaska*
Laura Dameron, Southeast Alaska Conservation Council

Dr. Anthony Gharrett, Biologist, University of Alaska Southeast Auke Bay Laboratory and the National Marine Fisheries Service
Gale Good, Alaska Trollers' Association
Deborah Greenberg, Special Assistant, Alaska Department of Fish and Game
Sheila Helgath, Legislative Research Agency, Alaska State Legislature
Frank Homan, Aide, Senator Arliss Sturgulewski
Michael Kaill, Biologist, Fisheries Rehabilitation, Enhancement, and Development Division, Alaska Department of Fish and Game
Dale Kelly, Alaska Trollers' Association
Eric King, Alaska Trollers' Association
Richard Lauber, Pacific Seafood Processors' Association
Lynn Morley, Teleconference Moderator, Legislative Affairs Agency, Alaska State Legislature
Dave Moses, Aide, Senator Paul Fischer*
Karl Ohls, Aide, Senator Fred Zharoff
Rodger Painter, President, Alaska Mariculture Association
Ken Parker, Director, Division of Commercial Fisheries, Alaska Department of Fish and Game
Sheila Peterson, Aide, Senator Dick Eliason
Chip Thoma, Observer

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* Participated via teleconference

Minutes were approved 12/19/89.

ALASKA FINFISH FARMING TASK FORCE
November 5 & 6, 1989

MINUTES

The meeting was called to order in Juneau at 9:45 a.m. on Sunday, November 5, 1989 by Ted Merrell, Chairman. Task force members present included Ken Castner, Ted Merrell, Brent Paine, and John Weddleton. Mary Lou Cooper was absent.

Jon Sherwood, project coordinator of the task force, distributed copies of a required "ethics" report on task force activities and the draft report of findings and recommendations dated October 29, 1989. He discussed the maintenance of task force records and announced that on Friday, November 3, the Alaska State Legislature's Legislative Council approved $10,000 additional funding for the task force.

The members discussed task force staffing and agreed to have Mr. Sherwood on contract to testify on behalf of the task force before committees during the upcoming legislative session. They also discussed how to distribute the draft report, the press release that would accompany the report, and what an interim report should contain.

Mr. Merrell announced that Mary Lou Cooper spoke to him about the possibility of her resigning from the task force and that he had requested that she not do so. Members concurred with having her remain on the task force.

At 10:10 a.m., Chip Thoma addressed the task force. He voiced his strong opposition to allowing finfish farming in Alaska. He stated that finfish farming would undermine the marketing of Alaska salmon as a "pure, fresh, cold" commodity that would benefit from the "increasing trend in consumer buying and eating habits [by] stay[ing] away from raised or harvested foods that are linked with pesticides, toxins, or additives..."

The task force then discussed the costs of regulation caused by the introduction of finfish farming to Alaska. Mr. Paine cited fiscal notes from earlier legislation authorizing finfish farming. The members discussed this, the fiscal demands of siting requirements, the number of possible permits to administer, the fiscal impact on other resource programs with the introduction of finfish farming, and the spin-offs of those new demands to other regulatory agencies such as the Board of Fish.

Discussion then resumed on the draft report the task force planned to release on November 17. Several members voiced their concern about the public misconstruing the document as

being conclusive or as representing each individual member's position.

Mr. Sherwood suggested having a cover letter accompany the draft report, in which the task force could solicit public comment while emphasizing that the document is only a draft.

After lunch, the task force discussed costs/benefits issues, including: the volatility of salmon prices; market niches for farmed and wild salmon; the history and purpose of the limited entry program and its conservational and economic repercussions; marketing strategies; the threat finfish farming poses to the livelihood of fishermen; the effects on the market of price, quality, and consistency of supplies; the possible losses to wild salmon stocks from using gametes to start farming operations; finfish farming as an allocation issue; having hatcheries profiting from the sale of smolts; the possible benefits of sharing facilities between finfish farmers and ocean ranchers; incremental start-up of finfish farming; establishing genetic reserves; and, the production of fish meal.

At 4:25 p.m., Rick Harris, of Sealaska Corporation, spoke in support of allowing finfish farming in Alaska and its possible benefit to coastal areas. He argued that finfish farming can help market Alaska salmon as a commodity that is available year-round. Mr. Harris suggested that one form of economic rent would be the servicing of a remote site net pen for common property benefit. The fish would be provided by the state or non-profit hatcher. The finfish farmer would feed the fish until their release and provide and maintain the pen facility.

After a brief break, the task force members resumed their discussion of costs/benefits.

The meeting was adjourned at 6:10 p.m.

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The task force reconvened on Monday, November 6, 1989, and was called to order at 8:43 a.m. by Chairman Ted Merrell. Task force members present were Ken Castner, Ted Merrell, Brent Paine and John Weddleton. Mary Lou Cooper was absent.

The task force began discussing the profile of finfish farmers and the role they would play in the various aspects of the fishing industry. Mr. Castner was concerned that they might not defend the issues that affected the commercial fishing industry, but rather look after only their personal interests. Mr. Paine disagreed, stating that good

The task force adopted the November 2, 1989 draft labeled "Draft with Ted's Changes" for purposes of discussion.

It was decided that costs and benefits needed to be broken into two categories: 1) State of Alaska; and 2) the industry. It was determined that a time line to show the development of a fish farm to market stage was needed for inclusion in the report.

Mr. Castner requested that duplicate references under a heading be footnoted, for purposes of cross-referencing.

The task force decided that the costs associated with the beginning of the industry (insurance, markets, etc.) needed to be included in the report. Time frame estimates were predicated on a 1991 allocation, leaving site approval for 1991, with smolt and fish availability in 1992.

After a brief break, the task force discussed marketing. Findings were clarified and regrouped. The task force decided that separate findings were required for fresh and frozen markets.

The task force discussed: competition between farmed and wild salmon; improved marketing of wild salmon through quality assurance programs; and marketing wild salmon as natural, chemical-free salmon.

The task force recessed for lunch at 12:18 p.m. and reconvened at 1:30 p.m.

The task force briefly returned to its discussion of quality assurance.

Mr. Castner recommended that the report introduction contain a section on the make-up of the task force. He also thought definitions were needed on mariculture, aquaculture and finfish farming.

Several findings in the draft report were amended to provide clarifying language.

Having completed its review of the draft report, the task force verified the November 17, 1989 release of the draft report.

The meeting was adjourned at 5:22 p.m.

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The following people attended the task force meetings:

Laura Dameron, Southeast Alaska Conservation Council
Deborah Greenberg, Special Assistant, Alaska Department of Fish and Game
Rick Harris, Sealaska Corporation
Frank Homar, Aide, Senator Arliss Sturgulewski
Tom Moyer, Aide, Senator Bettye Fahrenkamp
Sheila Peterson, Aide, Senator Dick Eliason
Kate Tesar, Aide, Representative Fran Ulmer
Chip Thoma, Observer

Minutes were approved 12/19/89.

ALASKA FINFISH FARMING TASK FORCE
December 5, 1989
WORK SESSION

MINUTES

The work session teleconference was called to order at 2:30 p.m. on Tuesday, December 5, 1989, by Ted Merrell, Chairman. Task force members present were Ted Merrell, Mary Lou Cooper, Ken Castner, Brent Paine and John Wedileton.

Opportunities for public comment and participation were discussed. A request by Chuck Piedra, of Elfin Cove, to expand the public comment period and testimony methods, was noted. It was decided to continue the same comment procedures as in previous meetings of the task force. No written comments relative to substantive changes in factual findings in the draft report had been directed to the task force as of the December 5 meeting. The task force reiterated that written comments on the draft report should be received by December 13, 1989, to ensure consideration.

The task force reviewed and edited the final chapters of the draft report. Jon Sherwood, project coordinator, discussed the format and content of the final chapter of the report.

The work session was adjourned at 4:42 p.m.

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The following people observed the task force meeting:

In Juneau--

Chip Thoma, Observer
Mary McDowell, Aide to Senator Dick Eliason
Frank Homan, Aide to Senator Arliss Sturgulewski
Gordy Williams, Angoon
Karl Ohls, Aide to Senator Fred Zharoff

In Anchorage--

Valerie Brown, Alaska Wildlife Alliance
Jay Nelson, Aide to Representative Cliff Davidson
Bryce Edgemon, Aide to Representative George Jacko
Charles McKee, Observer

Minutes were approved 12/19/89.

ALASKA FINFISH FARMING TASK FORCE
December 18-20, 1989

MINUTES

The Alaska Finfish Farming Task Force meeting was called to order on December 18, 1989, in Juneau, at 1:19 p.m., by Ted Merrell, Chairman. Members present were Ted Merrell, Mary Lou Cooper-Elton and John Weddleton. Brent Paine and Ken Castner were absent due to weather and eruption of Redoubt Volcano causing flight cancellations.

Format and appendices of the final report were discussed. Mr. Merrell noted patterns to the public comment received. Members felt that comments from the public sector about the draft report indicated a need for clarification of numerous points, but no significant changes in format or content. Minutes of October 16-17, November 5-6, and December 5, 1989 meetings were reviewed and corrected. Final approval was postponed pending Mr. Castner's approval.

Brent Paine arrived at 2:28 p.m. The task force recessed at 2:30 p.m., returned at 3:29, and adjourned at 3:30 p.m.

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Ted Merrell called the task force to order on December 19, 1989 at 8:53 a.m. Members present were Ted Merrell, John Weddleton, Mary Lou Cooper-Elton and Brent Paine. Ken Castner was absent but arrived later at 9:34 a.m.

Members began reviewing the revised draft on an item by item basis, starting with the Cost of Regulation (Ch. 5). The consensus was that the actual costs will depend on the legislation that is passed.

Discussion of regulatory costs continued, including taxation and public notice costs. A recommendation limiting predator control to non-lethal methods was adopted. The task force addressed the compatibility of wilderness areas and national monuments (Ch. 4) with finfish farming, and modified the recommendation on that subject.

The task force recessed for lunch at 12:30 p.m. and reconvened at 1:45 p.m.

Minutes of October 16-17, November 5-6 and December 5, 1989 meetings were approved as corrected.

The task force continued its review of public comments on the draft report and adopted many changes in wording to clarify the findings and recommendations.

Brent Paine's Production Model draft and timeline of a typical finfish farm was discussed. The task force agreed that a clear

description of a finfish farm should be included in the production model section.

The Health of Fisheries (Ch. 7) was taken up next. Disease transmission, genetics and risks were clarified. A consensus was reached on content and format of the final chapter of the report: All recommendations in the body of the report should be repeated; the facts do not support an unequivocal "yes" or "no" to finfish farming in Alaska; the legislature should not extend the current moratorium; and finfish farming could be done without harming fishery resources if strictly regulated. Ted Merrell agreed to prepare a draft of the chapter for review by the task force next morning.

The task force was adjourned at 6:45 p.m.

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Ted Merrell reconvened the task force at 8:15 a.m. on December 20, 1989. Members present were Ted Merrell, John Weddleton, Ken Castner, Brent Paine and Mary Lou Cooper-Elton.

The task force completed Chapter 8, General Findings and Recommendations. Costs and Benefits (Ch. 6) were considered and clarified. Marketing (Ch. 7) was discussed and it was decided that it needed to be revised and expanded to reflect numerous comments by the public. John Weddleton agreed to rewrite this section and return a revised draft to Jon Sherwood as soon as possible.

Jon Sherwood will prepare a final draft of the task force's report, incorporating all the changes that were adopted and the additional sections from Brent Paine and John Weddleton. This draft will be sent to task force members for approval by the first week of January, 1990.

No further meetings of the task force will be necessary, but a final teleconference to approve any changes in the report to the legislature, may be required.

The meeting was adjourned by Chairman Ted Merrell at 1:05 p.m.

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The following people attended the task force meeting:

Rodger Painter, Alaska Mariculture Association
Mary McDowell, Aide to Senator Dick Eliason
Frank Homan, Aide to Senator Arliss Sturgulewski
Sheila Helgath, Legislative Research Agency
Kate Tesar, Aide to Representative Fran Ulmer
Barnaby Dow, Aide to Representative Mike Davis
Chip Thoma, Observer
Gordon Williams, Self/Alaska Trollers/Angcon F&G Adv. Committee

APPENDIX E

LIST OF PERSONS SUBMITTING COMMENTS ON DRAFT REPORT

ALASKA FINFISH FARMING TASK FORCE

PUBLIC COMMENT TO DRAFT REPORT

#	Name	Organization	Address
1.	James Kallander		PO Box 2272, Cordova, AK 99574
2.	Joe Craig		Box 941, Douglas, AK 99824
3.	Lonnie Haughton	F/V China Cove, Inc.	PO Box 3006, Ketchikan, AK 99901
4.	News articles	Seattle P.I. &	Alaska Fisheries Journal
5.	William Royce	AFS	10012 Lake Shore Blvd NE,SEA,WA 98125
6.	Paul Zimmerman	Keener Packing Co.	PO Box 890, Kenai, AK 99611
7.	Sen. Zharoff	State Legislature	PO Box 405, Kodiak, AK 99615
8.	Barry Griffin	Nor'Eastern Trawl	7910 NE Day Rd W, Bainbridge Is, WA
9.	William Wilson	AIFRB	13611 Capstan Dr., Anc., AK 99516
10.	Rep. Jacko	State Legislature	PO Box 47001, Pedro Bay, AK 99647
11.	James Mackovjak	Pt. Adolphus Seafoods	PO Box 63, Gustavus, AK 99826
12.	Concerned citizens	Elfin Cove	Elfin Cove
13.	Charles Piercy	F/V Tuckanoe	PO Box 1025, Ward Cove, AK 99928
14.	Charles Piedra		Box 4, Elfin Cove, AK 99825
15.	Jeff Hetrick		PO Box 7, Moose Pass, AK 99631
16.	Joseph Mehrkens	SE AK Nat Res Center	PO Box 20212, Juneau, AK 99802
17.	Kathryn Troll	SE AK Seiners Asso.	PO Box 9579, Ketchikan, AK 99901
18.	Brian Paust-see#60	Coop Ext Svc-Sea Grant	PO Box 1329, Petersburg, AK 99833
19a.	Ralph Mackie	Craig Fishery Adv Com	(see #28 below-dupl.)
19b.	Julie Hursey	F/V Thunder	Box 213, Petersburg, AK 99833
19c.	Debra Lyons		Box 296, Petersburg, AK 99833
20.	Chris Nerison	Cordova Dist Fshrmn Un	PO Box 939, Cordova, AK 99574
21.	Charles Piedra		Box 4, Elfin Cove, AK 99825
22.	Shirley Piedra		Box 4, Elfin Cove, AK 99825
23.	Denby Lloyd	Office of Governor	Box A, Juneau, AK 99811
24.	Rosemary Enderle		PO Box 10, Elfin Cove, AK 99825
25.	David Bedford		PO Box 1211, Petersburg, AK 99833
26.	Ralph Guthrie		Box 595, Petersburg, AK 99833
27.	Chris Sharpsteen		Box 1255, Petersburg, AK 99833
28.	Ralph Mackie	Craig Fishery Adv Com	PO Box 252, Craig, AK 99921
29.	Sid Cox	United Cook Inlet Drft	Box 4649, Kenai, AK 99611
30.	Jerry Wickstrom		3605 Arctic #745, Anc, AK 99503
31.	Pete Granger	Seafood Producers Coop	2875 Roeder Ave, Bellingham, WA 98225
32.	Mardi Hutchens		11340 Borealis, Eagle River, AK 99572
33.	Chip Thoma		
34.	Nick Yurko	Gast Channel F&G Adv C.	9412 Longrun Dr., Juneau, AK 99801
35.		United Fishermen of AK	211 4th St. Ste 106, Juneau, AK 99801
36.	Cheryl Sutton	Kenai Pen Fshmns Asso	Box 546, Soldotna, AK 99669
37.	Wolf Benson	Benson Sea Farms	PO Box 1541, Petersburg, AK 99833
38.	Laura Dameron	SE AK Conservatn Cil	PO Box 21692, Juneau, AK 99802
39.	Roger Painter	AK Mariculture Asso	130 Seward St., Ste 201, Juneau, AK
40.	Cathy Conner	Juneau Audubon Society	PO Box 21725, Juneau, AK 99802
41.	David Rogers	Sea Culture of AK Inc	130 Seward St., Ste 504, Juneau, AK
42.	Paul Barnes	AK Fish Trade	Box 211121, Auke Bay, AK 99821
43.	Rebecca Knight		PO Box 1331, Petersburg, AK 99833
44.	Robert Martin	T&H Reg Electrical Aut	PO Box 210149, Auke Bay, AK 99821
45.	Wallace Fields	Kodiak Reg Aquaculture	Box 1691, Kodiak, AK 99615
46a.	Sen. Fahrenkamp	Sen. Resources Com	PO Box V, Juneau, AK 99811
46b.	Sheila Helgath	Leg. Research Agency	PO Box Y, Juneau, AK 99811-3100

#	Name	Organization	Address
47.	Sen. Jones	State Legislature	352 Front St., Ketchikan, AK 99901
48.	Scott Swanson		3800 Valley Ave, Juneau, AK 99801
49.	Valerie Brown	AK Wildlife Alliance	PO Box 202022, Anchorage, AK 99520
50.	Paul Peyton		1647 Harbor Way, Juneau, AK 99801
51.	David McFadden	F/V Sand Dab	PO Box 668 Petersburg, AK 99833
52.	Geron Bruce	Unit SE AK Gillnetters	PO Box 021186, Juneau, AK 99802
53.	Oliver Holm	Kodiak Reg Aquaculture	Box 3407, Kodiak, AK 99615
54.	John Nielsen	AK Shellfish Grower's	Box 220029, Anchorage, AK 99522
55.	William Heard	(replcemnt) NMFS-AukeB	PO Box 210155, Auke Bay, AK 99821
56.	Sen. Eliason	State Legislature	PO Box V, Juneau, AK 99811
57.	Rep. Ulmer	State Legislature	PO Box V, Juneau, AK 99811
58.	Bruce Smith		PO Box 45, Gustavus, AK 99826
59.	Steve Pennoyer	NOAA, Marine Fish.	PO Box 21668, Juneau, AK 99802-1668
60.	Brian Paust's art.	Coop. Ext. Svc.	(see #18)
61.	Rep. Davidson	House Resources Com.	PO Box V, Juneau, AK 99811
62.	Richard Harris	SEALASKA Corp.	One Sealaska Plaza, Juneau, AK 99801
63.	Neil Kinney		(Homer?)
64.	Brad Pierce		
65.	Dennis Watson	City of Craig	PO Box 23, Craig, AK 99921
66.	Rebecca Knight		PO Box 1331, Petersburg, AK 99833
67.	Dan Hull		310 N 46th #402, Seattle, WA 98103
68.	Nick Barlett		Box 4032, Homer, AK 99603
69.	Jim Green		1033 Millar St., Ketchikan, AK 99901
70.	Dan Berkshire		13010 Sher Circle, Anc, AK 99516
71.	Nevin Holmberg	US F&W Svc	PO Box 021287, Juneau, AK 99802-1287
72.	Doris Howe	(From Sen. Eliason)	Box 67, Gustavus, AK 99826
73.	Brian Allee	ADF&G, FRED Div.	PO Box 3-2000, Juneau, AK 99802-2000
74.	Chip Toma	(articles from indiv.)	
75.	Dale Kelley	AK Trollers Asso.	130 Seward St.,#213, Jnu, AK 99801
76.	Concerned citizens		Juneau, Douglas, Auke Bay, Hoonah,Tok

APPENDIX F

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