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ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
RESOURCES COMMITTEE  
RULES COMMITTEE  
CHAIRMAN, SPECIAL COMMITTEE ON  
DOMESTIC & INTERNATIONAL  
COMMERCIAL FISHERIES



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May 7, 1991

Carl Rosier, Commissioner  
Department of Fish and Game  
P.O. Box 3-2000  
Juneau, AK 99802

Dear Commissioner Rosier:

Next Wednesday, May 15, The Senate Special Committee on Fisheries plans to meet to discuss hatchery issues. A copy of the memorandum announcing the meeting is enclosed for your information. As the memo explains, the meeting is to identify topics of interest and concern relating to Alaska's hatchery programs, and to discuss how to best gather information about those topics for legislative consideration next session.

I would like to invite you and/or any appropriate employees of the Department to attend and participate in this meeting. It would seem particularly valuable to have participation by those who have been involved with the Fish and Game-sponsored "Hatchery Forum" which met recently.

I would also appreciate your passing along an invitation to the Chairman of the Board of Fisheries or his designee to attend or participate in the meeting by teleconference hook-up. I understand that the Board has been working on some of the same questions and concerns regarding hatchery programs and statutes that are of interest to the committee.

My aide Mary McDowell will be coordinating the May 15 meeting. We would be grateful if your office would let her know as soon as possible who will be representing the Department of Fish and Game at the meeting.

Thank you.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dick", is written over the word "Sincerely,".

Senator Dick Eliason, Chairman  
Senate Special Committee on Fisheries



# STATE OF ALASKA

## DEPARTMENT OF FISH AND GAME

### OFFICE OF THE COMMISSIONER

WALTER J. HICKEL, GOVERNOR

P.O. BOX 3-2000  
JUNEAU, ALASKA 99802-2000  
PHONE: (907) 465-4100

May 10, 1991

The Honorable Richard Eliason  
Chairman  
Senate Special Committee  
on Fisheries  
Alaska State Legislature  
P.O. Box V  
Juneau, AK 99811

Dear Senator Eliason:

The Department of Fish and Game appreciates the opportunity to participate in discussions with the Senate Special Committee on Fisheries regarding hatchery issues. My personal participation will be decided by the fickle spawning habits of the Togiak herring and a special Board of Fisheries meeting scheduled for May 14-15 in Anchorage. The Chairman and Vice Chairman of the Board are both participants in the Togiak herring fishery. Your invitation will be forwarded to the Board Chairman, but the board probably will not be in a position to participate.

I will have the directors of Commercial Fisheries, Sport Fish, and Fisheries Rehabilitation and Enhancement Division available for the meeting. My staff will be coordinating with Mary McDowell of your office.

Thank you for your invitation to participate with the committee on this very timely item.

Sincerely,



Carl L. Rosier  
Commissioner

cc: Denby Lloyd  
Norval Netsch  
Jeff Koenings

# Alaska State Legislature

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SENATOR  
ARLISS STURGULEWSKI

While in Juneau  
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JUNEAU, ALASKA 99811  
(907) 465-3818

## Senate

MEMORANDUM

May 10, 1991

TO: Senator Dick Eliason, Chair  
Senate Special Committee on Fisheries

FROM: Senator Arliss Sturgulewski   
Senate District F

RE: Meeting regarding hatchery issues on May 15, 1991

Thank you for letting me know about your upcoming committee hearing. I have also been concerned about the State's hatchery program and have recently received some information that may be of interest to your committee.

Enclosed is a letter from Wards Cove Packing Company outlining some of the concerns they have regarding the state hatchery program. In addition there is also enclosed a thoughtful article on the future of hatcheries in the Northwest by Ray Hilborn of the School of Fisheries at the University of Washington.

Enclosure

A. W. BRINDLE  
H. A. BRINDLE

PROCESSORS OF  
CHOICE ALASKA SEAFOOD  
SINCE 1912

## Wards Cove Packing Company

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TELEX 328759

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P.O. BOX C-5030  
SEATTLE, WA 98105-0030

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April 24, 1991

The Honorable Arliss Sturgulewski  
Alaska State Senate  
P.O. Box V  
Juneau, Alaska 99811

*AX 1, 95*  
Dear ~~Senator~~ Sturgulewski:

When we last met in Juneau, you asked me to elaborate on the concerns I expressed to you over the direction of the salmon hatchery programs in Alaska.

It is my understanding scientists are in general agreement that the long-term status of Columbia River salmon has not been enhanced by the use of hatcheries. There now appears to be a much stronger emphasis being placed on utilizing wild stocks in association with environmental corrective measures to improve the status of the various runs. Considerable apprehension is evident concerning the impact past hatchery practices have had on the genetic integrity of wild stocks.

As you know, hatcheries had been viewed many years ago as the solution to offset the adverse impact of dams, irrigation, pollution and other habitat degradation. Alaska fortunately is not plagued with these environmental problems. It is therefore with serious concern that I ask you to investigate current enhancement practices taking place throughout Alaska. The wild or natural stocks of salmon of most regions in Alaska have been at record or near record levels in recent years. The maintenance of these wild stocks is imperative for the long-term stability of the salmon industry.

There is growing concern that the continued growth in the release of hatchery pinks in Prince William Sound, while enhancing the numbers of fish available to the common property fishery, may be related to the recent decline of wild pinks in that area. This is a concern that I believe needs to be addressed as I do not feel that it was, nor should it have been, the intention that the hatchery program should be detrimental to the maintenance and enhancement of Alaska's wild stocks.

The continued growth in release of hatchery pinks may also have a serious negative impact on the economics of commercial fisheries.

The Hon. Arliss Sturgulewski  
April 24, 1991  
Page 2

Alaskan salmon production is now at record or near record levels even in areas where there is little or no hatchery enhancement. The addition of substantial numbers of hatchery fish to a market where there is already potential surplus wild production can only further reduce the value of the fish to the detriment of both the harvesting and processing sectors. It does little good to produce fish for the sake of production. Market conditions must be taken into account lest the value of fish fall below that which is affordable to harvest.

Another area of concern that needs to be addressed is the experimental plan to produce female only pink salmon runs. The rationale behind this program is apparently based on the theory that the primary value in the female pink salmon is the roe. While roe is an important component in the value of female salmon, there is a very limited market for processed salmon roe, particularly that from pink salmon. Any program which leads to a significant increase in roe production will lead to further weakening of that market, again to the financial detriment of the harvesting and processing sectors.

Finally, there is the growing issue of genetic drift and genetic selectivity. Are the hatchery programs endangering the genetic diversity of Alaska's wild stocks? I will not expand on this issue as it is highly technical and of growing concern within the scientific community. However, it needs to be addressed.

I am enclosing a copy of a paper by Ray Hilborn which also addresses the issue of hatchery fish and the effect on wild stocks. I hope that after review of that paper and considering the matters raised in this letter you will agree with me that the Alaska hatchery program needs to be reviewed. It would be my suggestion that a forum be convened, perhaps under the sponsorship of the University of Alaska, where members of the fishing community could gather to discuss in depth the future direction of Alaska's salmon hatchery program.

Thank you for your consideration of my views. If you have any questions I will be happy to answer them.

Sincerely,



Alec W. Brindle

AWB:kmh  
Enclosure



## **Hatcheries and the future of salmon in the Northwest**

**Copyright 1990  
Ray Hilborn**

Below my office window at the School of Fisheries, University of Washington, is our small salmon hatchery. Every fall thousands of school children come to see the chinook and coho salmon return to their natal waters. Our graduate students show them the fish and demonstrate how eggs are taken, mixed with sperm, and magically the life cycle of salmon is renewed. These tours are the most significant public relations activity of our school, and through these tours most Seattle school children are brought into their most direct touch with a major part of the environmental heritage of the northwest.

It was only after three years of seeing the annual cycle of school visits that I began to wonder if we were really doing the right thing. Hatchery tours are common throughout the Northwest and I fear that the message they convey is that 1) salmon come from hatcheries, 2) habitat loss and pollution are so widespread that natural spawning fish are dying out or are extinct, and 3) the long term survival of salmon depends upon hatchery technology. My daughter's fourth grade teacher was planning a field trip to a state run hatchery for a tour. He was unaware that only 20 minutes away between 100,000 and 200,000 natural spawning sockeye salmon can be seen in a few miles of the Cedar river -- that indeed most of our rivers still support runs of wild spawning salmon.

I believe that fisheries scientists share a collective responsibility for the public belief that the maintenance of salmon runs depends upon hatchery operation. This belief is particularly pernicious because it inexorably leads to the acceptance of hatcheries as a mitigative measure for habitat loss and dam construction. This view can be expressed as "If the wild stocks are doomed anyway, lets just build the hatcheries and get it over with." This belief is not just found among the general public, many professional fisheries scientists also believe that the future of salmonids is in hatcheries. They believe that resources that could go into habitat protection or fisheries management would be better spent on artificial propagation.

The fisheries community in general is not aware that artificial propagation in the Northwest has failed to live up to expectations, nor are they aware that artificial propagation poses a substantial, and perhaps the major, threat to the long term viability of our salmon heritage.

It is not only for Pacific salmon that many believe that the future of fisheries lies with aquaculture. Indeed throughout the world most management agencies seem to be relying on some form of artificial propagation to "rebuild" fish stocks that are depleted due to poor fisheries management or poor habitat management. Artificial propagation has been proposed for such diverse species as herring, tuna, abalone and giant clams -- the list is nearly endless. Thus the lessons we have learned with salmonids in the our part of North America are of direct and important relevance around the world.

## Are Hatcheries Sustainable?

Fisheries management is a long term proposition, our responsibility is to assure that the fisheries resource will be maintained by our generation for the next generation. We need to assure that 20, and even 100 years from now there will still be salmon in our rivers. This means that the time horizon for fisheries scientists and managers must be much longer than the engineering horizon for dams on our rivers. Once the dams have rotted away or been taken down, we must be sure we will still have fish to use the rivers. While this may seem far-fetched, removal of the Elwah dam on the Olympic Peninsula, and the Hetch Hetchy dam in California are now being considered.

If hatcheries are to be used as mitigative measures, we must ask not only do they work now, but will they continue to work, and will they permit the maintenance of natural runs? Unfortunately, most evidence suggests that while hatcheries may work initially, their success decreases after a few years. The figure below shows the trends in survival for two major hatchery programs, coho in Oregon, and chinook in British Columbia. In each case, as the hatcheries programs have developed, the success of the hatcheries has decreased. The B.C. chinook example is an extreme point. Although more hatcheries were built throughout the 1980's so that by the mid 1980s there were ten times more chinook smolts released than in the mid 1970's, there were no more hatchery chinook being caught or escaping. This pattern of declining survival of hatchery reared fish is found in nearly every hatchery program in North America.

There is no well accepted explanation for the declining survivals from hatcheries, it may be genetic changes, predator build up, disease accumulation, or a host of other potential problems. The cause doesn't matter as much as the conclusion -- hatchery production is probably not sustainable over decades. To assume it will work for a century is a bold assumption indeed and one that puts our the salmon resources of our children at great risk.

## Impacts of hatchery fish on wild stocks

I believe we must rely on wild fish for the long term maintenance of our salmon populations. Wild fish are our heritage, and we must, in turn, pass it on to our descendants. Artificial production poses a great threat to the maintenance of wild fish. This threat comes in at least four forms, direct competition for food and other resources between wild and artificial fish, predation of artificial fish on wild fish, genetic dilution of wild fish by artificial fish allowed to spawn in rivers and streams, and increased fishing pressure on wild stocks due to artificial production.

There is ample evidence that salmonids compete for resources at most stages of their life history. The figure below shows the survival rate of sockeye salmon from Babine Lake, a tributary of the Skeena River in British Columbia. The number of juvenile sockeye leaving Babine Lake was increased by artificial spawning channels. The more fish that left Babine Lake and swam down the Skeena River, the smaller proportion of them survived their ocean life. A major impact of this change, is that the wild runs from the Skeena River have declined approximately 50%. Presumably the other sockeye on the Skeena were affected by the competition that is so obvious in the Babine Lake data. Salmon compete for food and space in freshwater and in the ocean. We should expect that as we increase artificial production they will



compete with wild fish, and the survival of wild fish will decrease -- it is folly to assume this will not happen.

Proponents of artificial propagation like to think of their hatcheries "giving a boost" to the wild stocks, particularly by allowing surplus hatchery fish to spawn in the wild. These extra spawners, turned away from the hatchery are hoped to add to the natural spawning population. Accumulating evidence suggests that the hatchery fish often do poorly in the wild, and that by reproducing with wild fish, the hatchery fish cause poorer survival of offspring of wild parents. Two mechanisms explain this, first hatchery managers select for fish that do well in hatcheries; that is fish that can hatch in plastic trays and learn to feed on a man-made diet. In the wild, fish must find mates, lay eggs in gravel, avoid predators, and find natural food. The requirements of a successful hatchery fish are very different from a successful wild fish and it should be no surprise that fish selected for a hatchery may do poorly when facing the rigors of a real river. Secondly, hatchery practice in the past often involved taking fish from one watershed and using them in a hatchery elsewhere. The thousands of years of natural selection for particular rivers have been swamped.

When hatcheries allow surplus fish to spawn in the wild, they are allowing all of these genes that have been brought in from elsewhere and have been selected for hatchery life, to dilute the naturally adapted genes of the wild fish. The net result may be that after a few generations there are no more wild fish -- we will, and indeed in many places now do have, mongrel fish not well adapted to any particular river. The great genetic diversity of the Northwest of 100 years ago is being lost at an horrifying rate, and hatcheries are accelerating this loss.

When hatcheries have a poor return of adults, they often capture wild fish to use as brood stock. This "creek robbing" would be a criminal offense if conducted by ordinary citizens and they would be called poachers. However, when conducted by hatchery staff it is somehow considered beneficial for the resource. I know of one case where a hatchery had an unusually poor return, and the hatchery staff diverted half of the wild spawning stock into the hatchery for an egg take. It then turned out they had a surplus of eggs, and they sold the surplus to private salmon farms.

When hatcheries are successful at producing adult fish, the potential harvest rate is very high, often 95% of the returning fish can be harvested because so few adults are needed for eggs. There is wide concern throughout the Northwest that we have allowed our fisheries harvest rates to match the potential productivity of hatchery stocks, causing wild stocks to be overfished. In some places this is obvious, parts of Puget Sound such as the Nooksack River, have been declared off limits for wild fish, and the harvest rates are so high that no wild fish make it back to spawn. Just north of Puget Sound, in Canadian waters between Vancouver Island and the mainland, harvest rates on coho salmon are as high as 95%, sustainable only by the most successful hatchery stocks. The net result of these high harvest rates is that as hatchery production has increased, wild stocks have declined, and the Canadians have no more coho now than they did 15 years ago, but now many of their coho come from hatcheries instead of natural streams.

## **The Real threat: the technological fix syndrome**

The real danger of hatcheries and other forms of artificial production is that they provide an excuse for habitat loss and poor fisheries management. If we believe in hatcheries,

then we can allow the rivers to be dammed, silted and destroyed. Just mitigate with a hatchery. While it seems we should know better by now, the lessons haven't really sunk in. New hatcheries are still being built in Washington and Oregon. B.C. and Alaska have both embarked on large scale hatchery programs despite the fact that their catches from wild fish are now at or above historic highs.

Even more dangerous, is the spread of the technological fix syndrome. If hatcheries don't work now, we will try some other form of hatchery technology. The current new idea is "supplementation" where eggs are incubated in a hatchery and then spread throughout a watershed to rear naturally. The technological fix has spread beyond salmon hatcheries -- now developers throughout the west coast want to build "artificial" habitat for lost wetlands. This is where the fisheries community must accept its responsibility, we have been extremely eager to help in the design and testing of new technology. Indeed fisheries schools have been, in effect, salesmen of the technology.

## Great Hatchery Successes

Whenever I speak out against the hatchery fetish, people ask about the great successes -- trout in freshwater lakes, salmon in the Great Lakes, and the Japanese chum salmon hatcheries. These programs are undoubtedly successful. Introduction of exotic species or monoculture often works reasonably well. Rabbits did very well in Australia, starlings do well in North America. The widespread introduction of trout around the world has produced some valuable recreational fisheries. However, in most cases this has amounted to the replacement of indigenous species by new species, not boosting the production of an existing wild population. Indeed my first response to each of these examples is that in every case the wild species that were there before have been almost totally replaced by the introduced or artificially produced fish.

Even with these great successes, we see echoes of our own concern here. Trout management is going away from hatcheries to nurturing of habitat for wild fish. This is documented in Ray Whites recent article in Trout, "We're going wild: a 30-year transition from hatcheries to habitat." In the Great Lakes, where introduced Pacific salmon generated a major recreational fishery, concern is mounting about declining hatchery survivals -- they just don't know if their salmon fishery is sustainable. The highly successful chum fishery in northern Japan has produced large catches of chum salmon for Japanese fishermen, but the total yield of salmon from northwest Pacific waters has not increased, it is quite possible that Japanese chum have simply replaced the naturally occurring mix of 6 species of salmon with a single species.

## What should be done.

Is there a place for hatcheries? I really don't know. Certainly if all hatcheries were now closed, the catch of chinook and coho salmon in the Northwest would drop greatly. We could certainly expect some wild stock production to rebound, particularly if we devoted some of the resources that have gone for hatcheries to habitat protection and improvement. Closing all hatcheries now would certainly cause a lot of pain to recreational, Indian and commercial fishermen -- but it might ensure the long-term survival of the fish and the fishermen who depend upon them.

On the Columbia River, where much of the habitat has been lost, and the series of dams poses a severe barrier to downstream migration of juvenile salmon, most people believe that we must have hatcheries. I am not convinced. The most successful salmon stock on the Columbia is the wild spawning chinook of the Hanford Reach, the one free flowing section of the main river. If we devoted all of the resources that now go into hatcheries on the Columbia to improving the downstream passage of fish, and to habitat protection, we might be quite surprised what the natural spawning fish would do if given a chance.

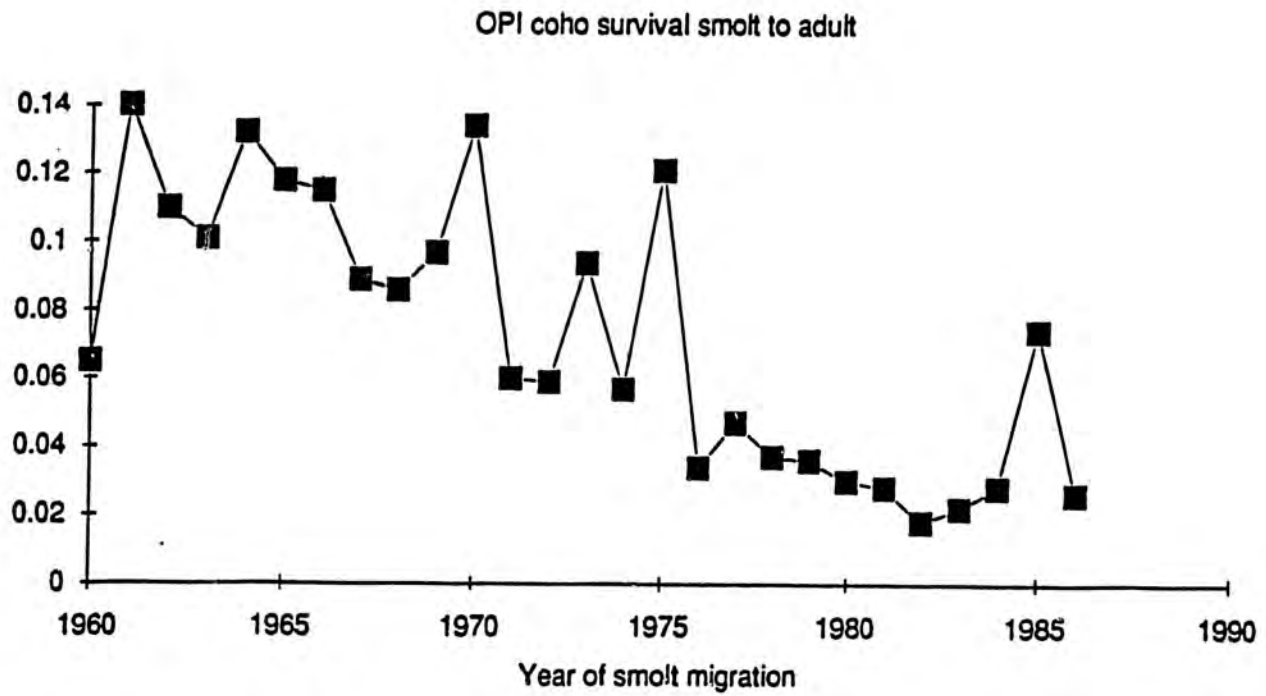
I do believe we should declare a moratorium on building of new hatcheries. We have taken an enormous gamble with our children's heritage. Now we must find out what we are doing to the wild fish, how to preserve them, and rebuild them. Michael Goodman has proposed that hatcheries must have a federal license that is reviewed periodically. Hatcheries that don't produce adult fish, and those that cause serious adverse impacts on wild fish would be shut down. I believe this is an excellent proposal.

As I look out my window at another group of school children touring our hatchery I wonder what kind of salmon their children will see. Will their world be one of high technology, with genetically engineered fish returning to computer controlled hatcheries, or will we maintain and improve our wild streams? Will their classes visit streams instead of hatcheries? Instead of imitating hatcheries by rearing fish in classrooms will the school children of the future adopt sections of streams for protection, know what wild spawning salmon need and make sure they have it?

## Further Readings

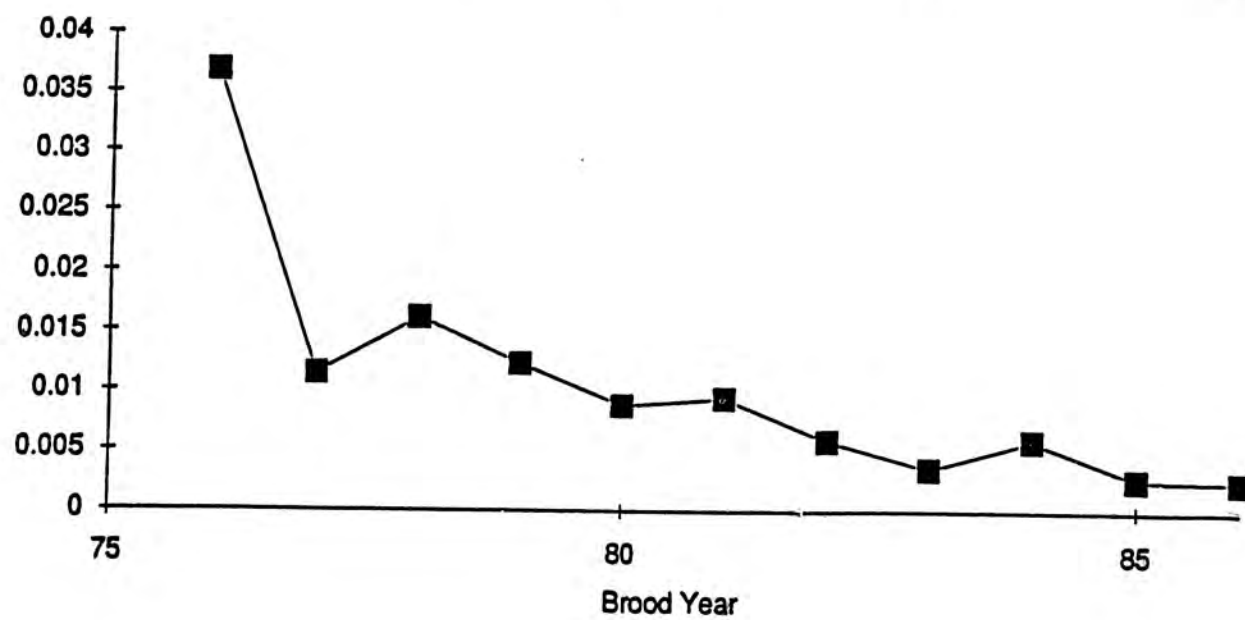
Those interested in knowing more about wild and hatchery fish should read "Mountains in the Clouds" by Bruce Brown, "We're going wild" a 30-year transition from hatcheries to habitat" by Ray J. White Trout Magazine, Summer 1989, and "Preserving the genetic diversity of salmonid stocks: a call for federal regulation of hatchery programs" by Michael L. Goodman, in Environmental Law Vol 20.

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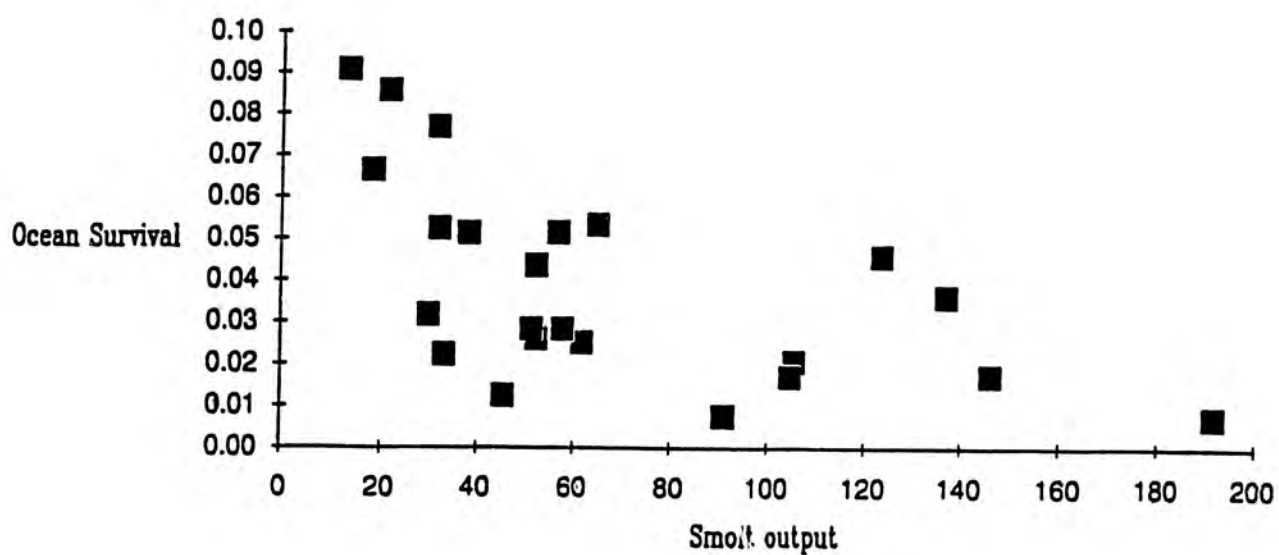


Canadian Hatchery Chinook Contribution Rate



BABINE.XLC

Babine lake 1959-1981





## Juneau Center for Fisheries and Ocean Sciences

University of Alaska Fairbanks

11120 Glacier Highway

Juneau, Alaska 99801

(907) 789-4441

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11 May 1991

Carl L. Rosier, Commissioner of Fisheries  
Alaska Department of Fish and Game  
1255 West 8th Street  
P.O.Box 3-2000  
Juneau, Alaska 99802-2000

Dear Carl:

Due to a previous workshop commitment in Seattle it is very difficult for me to attend the meeting called by Senator Dick Eliason on Wednesday, May 15, at 1:30 in the Butrovich Room regarding hatcheries and hatchery programs in Alaska. The purpose of the meeting is to identify major topics and to formulate specific questions regarding hatcheries which should be researched and addressed by the Legislature.

As I see it there are specific genetic questions involved in any hatchery program. The State already has a standing committee for answering such questions and to develop guidelines for future work. Dr. Tony Gharrett from the Juneau Center for Fisheries and Ocean Sciences is a member of this group.

Then there are a number of social and economic questions with some far reaching consequences and Lee Gorsuch has expressed an interest in such problems.

My effort to convene a workshop deals with the biological aspects of the hatchery program and the interaction between wild and enhanced stocks. This question has been raised in Norway, it will be discussed in Nanaimo in June this year and later at a NATO sponsored conference at Washington State University in Pullman.

An observed decline of wild stocks of pinks in Prince William Sound with its massive ocean ranching program has prompted the question of any link and raised the following questions:

1. What is the extent of straying of enhanced stocks of pinks or any other enhanced salmon?
2. What is the reproductive success of stray cultured and wild salmon?

3. To what extent will wild fish school together with enhanced stocks and eventually be caught in a restricted harvest area.

4. What is the carrying capacity of the feeding areas in the Gulf of Alaska, not only for pink salmon but also for sockeye salmon from other districts like Bristol Bay using the same feeding grounds?

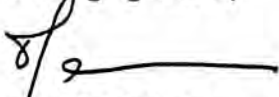
5. What is the value of an undisturbed gene pool which has developed over the last 10 -12 000 years since the ice cap receded?

Although the proposed workshop should only deal with Alaskan problems, it would be advantageous to solicit the assistance of a few experts from abroad. In Norway, Japan and the USSR enhancement programs have been practiced for a long time.

I feel confident that the workshop could conclude its work before the next session of the Legislature; but I also expect that there will remain some unanswered questions, which eventually may call for additional research. I have tentatively estimated the cost of a workshop convened at least for one week, to be \$ 50 000, half of which may come from new Science Center in Cordova.

One purpose of this letter is to convey to you Dean Alexanders interest in utilizing the talent of the School of Fisheries and Ocean Sciences and especially of the Juneau based group in assisting the State in solving some of the problems raised above.

Sincerely yours,



Ole A. Mathisen

cc: Representative Ulmer ✓  
Dr. Burkett  
Dean Alexander



# Alaska State Legislature

## COMMITTEES:

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WESTERN STATES LEGISLATIVE  
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## House of Representatives

ROBIN L. TAYLOR  
MINORITY LEADER

### MEMORANDUM

TO: Senator Dick Eliason, Chairman  
Senate Special Committee on Fisheries

FROM: Rep. Robin L. Taylor *R.L.T.*

DATE: May 13, 1991

REF: Meeting on hatchery issues.

As your committee begins its review of hatchery issues, I would appreciate it if attention is given to the attached correspondence from Alec Brindle of Wards Cove Packing Company.

Mr. Brindle raises valid concerns that should be part of your committee review. I believe the questions raised are important enough that some consideration should be given to the creation of a subcommittee to address them. Please also consider Mr. Brindle's suggestion regarding the involvement of the University of Alaska.

A. W. BRINDLE  
H. A. BRINDLE

PROCESSORS OF  
CHOICE ALASKA SEAFOOD  
SINCE 1912

## Wards Cove Packing Company

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April 24, 1991

APR 26 1991

The Honorable Robin Taylor  
Alaska State House of Representatives  
P.O. Box V  
Juneau, Alaska 99811

Dear ~~Representative~~ <sup>ROBIN</sup> Taylor:

When we last met in Juneau, you asked me to elaborate on the concerns I expressed to you over the direction of the salmon hatchery programs in Alaska.

It is my understanding scientists are in general agreement that the long-term status of Columbia River salmon has not been enhanced by the use of hatcheries. There now appears to be a much stronger emphasis being placed on utilizing wild stocks in association with environmental corrective measures to improve the status of the various runs. Considerable apprehension is evident concerning the impact past hatchery practices have had on the genetic integrity of wild stocks.

As you know, hatcheries had been viewed many years ago as the solution to offset the adverse impact of dams, irrigation, pollution and other habitat degradation. Alaska fortunately is not plagued with these environmental problems. It is therefore with serious concern that I ask you to investigate current enhancement practices taking place throughout Alaska. The wild or natural stocks of salmon of most regions in Alaska have been at record or near record levels in recent years. The maintenance of these wild stocks is imperative for the long-term stability of the salmon industry.

There is growing concern that the continued growth in the release of hatchery pinks in Prince William Sound, while enhancing the numbers of fish available to the common property fishery, may be related to the recent decline of wild pinks in that area. This is a concern that I believe needs to be addressed as I do not feel that it was, nor should it have been, the intention that the hatchery program should be detrimental to the maintenance and enhancement of Alaska's wild stocks.

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The Hon. Robin Taylor  
April 24, 1991  
Page 2

Alaskan salmon production is now at record or near record levels even in areas where there is little or no hatchery enhancement. The addition of substantial numbers of hatchery fish to a market where there is already potential surplus wild production can only further reduce the value of the fish to the detriment of both the harvesting and processing sectors. It does little good to produce fish for the sake of production. Market conditions must be taken into account lest the value of fish fall below that which is affordable to harvest.

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Finally, there is the growing issue of genetic drift and genetic selectivity. Are the hatchery programs endangering the genetic diversity of Alaska's wild stocks? I will not expand on this issue as it is highly technical and of growing concern within the scientific community. However, it needs to be addressed.

I am enclosing a copy of a paper by Ray Hilborn which also addresses the issue of hatchery fish and the effect on wild stocks. I hope that after review of that paper and considering the matters raised in this letter you will agree with me that the Alaska hatchery program needs to be reviewed. It would be my suggestion that a forum be convened, perhaps under the sponsorship of the University of Alaska, where members of the fishing community could gather to discuss in depth the future direction of Alaska's salmon hatchery program.

Thank you for your consideration of my views. If you have any questions I will be happy to answer them.

Sincerely,



Alec W. Brindle

AWB:kmh  
Enclosure

APR 26 1991  
1

## Hatcheries and the future of salmon in the Northwest

Copyright 1990  
Ray Hilborn

Below my office window at the School of Fisheries, University of Washington, is our small salmon hatchery. Every fall thousands of school children come to see the chinook and coho salmon return to their natal waters. Our graduate students show them the fish and demonstrate how eggs are taken, mixed with sperm, and magically the life cycle of salmon is renewed. These tours are the most significant public relations activity of our school, and through these tours most Seattle school children are brought into their most direct touch with a major part of the environmental heritage of the northwest.

It was only after three years of seeing the annual cycle of school visits that I began to wonder if we were really doing the right thing. Hatchery tours are common throughout the Northwest and I fear that the message they convey is that 1) salmon come from hatcheries, 2) habitat loss and pollution are so widespread that natural spawning fish are dying out or are extinct, and 3) the long term survival of salmon depends upon hatchery technology. My daughter's fourth grade teacher was planning a field trip to a state run hatchery for a tour. He was unaware that only 20 minutes away between 100,000 and 200,000 natural spawning sockeye salmon can be seen in a few miles of the Cedar river -- that indeed most of our rivers still support runs of wild spawning salmon.

I believe that fisheries scientists share a collective responsibility for the public belief that the maintenance of salmon runs depends upon hatchery operation. This belief is particularly pernicious because it inexorably leads to the acceptance of hatcheries as a mitigative measure for habitat loss and dam construction. This view can be expressed as "If the wild stocks are doomed anyway, lets just build the hatcheries and get it over with." This belief is not just found among the general public, many professional fisheries scientists also believe that the future of salmonids is in hatcheries. They believe that resources that could go into habitat protection or fisheries management would be better spent on artificial propagation.

The fisheries community in general is not aware that artificial propagation in the Northwest has failed to live up to expectations, nor are they aware that artificial propagation poses a substantial, and perhaps the major, threat to the long term viability of our salmon heritage.

It is not only for Pacific salmon that many believe that the future of fisheries lies with aquaculture. Indeed throughout the world most management agencies seem to be relying on some form of artificial propagation to "rebuild" fish stocks that are depleted due to poor fisheries management or poor habitat management. Artificial propagation has been proposed for such diverse species as herring, tuna, abalone and giant clams -- the list is nearly endless. Thus the lessons we have learned with salmonids in the our part of North America are of direct and important relevance around the world.



## Are Hatcheries Sustainable?

Fisheries management is a long term proposition, our responsibility is to assure that the fisheries resource will be maintained by our generation for the next generation. We need to assure that 20, and even 100 years from now there will still be salmon in our rivers. This means that the time horizon for fisheries scientists and managers must be much longer than the engineering horizon for dams on our rivers. Once the dams have rotted away or been taken down, we must be sure we will still have fish to use the rivers. While this may seem far-fetched, removal of the Elwah dam on the Olympic Peninsula, and the Hetch Hetchy dam in California are now being considered.

If hatcheries are to be used as mitigative measures, we must ask not only do they work now, but will they continue to work, and will they permit the maintenance of natural runs? Unfortunately, most evidence suggests that while hatcheries may work initially, their success decreases after a few years. The figure below shows the trends in survival for two major hatchery programs, coho in Oregon, and chinook in British Columbia. In each case, as the hatcheries programs have developed, the success of the hatcheries has decreased. The B.C. chinook example is an extreme point. Although more hatcheries were built throughout the 1980's so that by the mid 1980s there were ten times more chinook smolts released than in the mid 1970's, there were no more hatchery chinook being caught or escaping. This pattern of declining survival of hatchery reared fish is found in nearly every hatchery program in North America.

There is no well accepted explanation for the declining survivals from hatcheries, it may be genetic changes, predator build up, disease accumulation, or a host of other potential problems. The cause doesn't matter as much as the conclusion -- hatchery production is probably not sustainable over decades. To assume it will work for a century is a bold assumption indeed and one that puts our the salmon resources of our children at great risk.

## Impacts of hatchery fish on wild stocks

I believe we must rely on wild fish for the long term maintenance of our salmon populations. Wild fish are our heritage, and we must, in turn, pass it on to our descendants. Artificial production poses a great threat to the maintenance of wild fish. This threat comes in at least four forms, direct competition for food and other resources between wild and artificial fish, predation of artificial fish on wild fish, genetic dilution of wild fish by artificial fish allowed to spawn in rivers and streams, and increased fishing pressure on wild stocks due to artificial production.

There is ample evidence that salmonids compete for resources at most stages of their life history. The figure below shows the survival rate of sockeye salmon from Babine Lake, a tributary of the Skeena River in British Columbia. The number of juvenile sockeye leaving Babine Lake was increased by artificial spawning channels. The more fish that left Babine Lake and swam down the Skeena River, the smaller proportion of them survived their ocean life. A major impact of this change, is that the wild runs from the Skeena River have declined approximately 50%. Presumably the other sockeye on the Skeena were affected by the competition that is so obvious in the Babine Lake data. Salmon compete for food and space in freshwater and in the ocean. We should expect that as we increase artificial production they will

compete with wild fish, and the survival of wild fish will decrease -- it is folly to assume this will not happen.

Proponents of artificial propagation like to think of their hatcheries "giving a boost" to the wild stocks, particularly by allowing surplus hatchery fish to spawn in the wild. These extra spawners, turned away from the hatchery are hoped to add to the natural spawning population. Accumulating evidence suggests that the hatchery fish often do poorly in the wild, and that by reproducing with wild fish, the hatchery fish cause poorer survival of offspring of wild parents. Two mechanisms explain this, first hatchery managers select for fish that do well in hatcheries; that is fish that can hatch in plastic trays and learn to feed on a man-made diet. In the wild, fish must find mates, lay eggs in gravel, avoid predators, and find natural food. The requirements of a successful hatchery fish are very different from a successful wild fish and it should be no surprise that fish selected for a hatchery may do poorly when facing the rigors of a real river. Secondly, hatchery practice in the past often involved taking fish from one watershed and using them in a hatchery elsewhere. The thousands of years of natural selection for particular rivers have been swamped.

When hatcheries allow surplus fish to spawn in the wild, they are allowing all of these genes that have been brought in from elsewhere and have been selected for hatchery life, to dilute the naturally adapted genes of the wild fish. The net result may be that after a few generations there are no more wild fish -- we will, and indeed in many places now do have, mongrel fish not well adapted to any particular river. The great genetic diversity of the Northwest of 100 years ago is being lost at an horrifying rate, and hatcheries are accelerating this loss.

When hatcheries have a poor return of adults, they often capture wild fish to use as brood stock. This "creek robbing" would be a criminal offense if conducted by ordinary citizens and they would be called poachers. However, when conducted by hatchery staff it is somehow considered beneficial for the resource. I know of one case where a hatchery had an unusually poor return, and the hatchery staff diverted half of the wild spawning stock into the hatchery for an egg take. It then turned out they had a surplus of eggs, and they sold the surplus to private salmon farms.

When hatcheries are successful at producing adult fish, the potential harvest rate is very high, often 95% of the returning fish can be harvested because so few adults are needed for eggs. There is wide concern throughout the Northwest that we have allowed our fisheries harvest rates to match the potential productivity of hatchery stocks, causing wild stocks to be overfished. In some places this is obvious, parts of Puget Sound such as the Nooksack River, have been declared off limits for wild fish, and the harvest rates are so high that no wild fish make it back to spawn. Just north of Puget Sound, in Canadian waters between Vancouver Island and the mainland, harvest rates on coho salmon are as high as 95%, sustainable only by the most successful hatchery stocks. The net result of these high harvest rates is that as hatchery production has increased, wild stocks have declined, and the Canadians have no more coho now than they did 15 years ago, but now many of their coho come from hatcheries instead of natural streams.

### **The Real threat: the technological fix syndrome**

The real danger of hatcheries and other forms of artificial production is that they provide an excuse for habitat loss and poor fisheries management. If we believe in hatcheries,

then we can allow the rivers to be dammed, silted and destroyed. Just mitigate with a hatchery. While it seems we should know better by now, the lessons haven't really sunk in. New hatcheries are still being built in Washington and Oregon. B.C. and Alaska have both embarked on large scale hatchery programs despite the fact that their catches from wild fish are now at or above historic highs.

Even more dangerous, is the spread of the technological fix syndrome. If hatcheries don't work now, we will try some other form of hatchery technology. The current new idea is "supplementation" where eggs are incubated in a hatchery and then spread throughout a watershed to rear naturally. The technological fix has spread beyond salmon hatcheries -- now developers throughout the west coast want to build "artificial" habitat for lost wetlands. This is where the fisheries community must accept its responsibility, we have been extremely eager to help in the design and testing of new technology. Indeed fisheries schools have been, in effect, salesmen of the technology.

## Great Hatchery Successes

Whenever I speak out against the hatchery fetish, people ask about the great successes -- trout in freshwater lakes, salmon in the Great Lakes, and the Japanese chum salmon hatcheries. These programs are undoubtedly successful. Introduction of exotic species or monoculture often works reasonably well. Rabbits did very well in Australia, starlings do well in North America. The widespread introduction of trout around the world has produced some valuable recreational fisheries. However, in most cases this has amounted to the replacement of indigenous species by new species, not boosting the production of an existing wild population. Indeed my first response to each of these examples is that in every case the wild species that were there before have been almost totally replaced by the introduced or artificially produced fish.

Even with these great successes, we see echoes of our own concern here. Trout management is going away from hatcheries to nurturing of habitat for wild fish. This is documented in Ray Whites recent article in Trout, "We're going wild: a 30-year transition from hatcheries to habitat." In the Great Lakes, where introduced Pacific salmon generated a major recreational fishery, concern is mounting about declining hatchery survivals -- they just don't know if their salmon fishery is sustainable. The highly successful chum fishery in northern Japan has produced large catches of chum salmon for Japanese fishermen, but the total yield of salmon from northwest Pacific waters has not increased, it is quite possible that Japanese chum have simply replaced the naturally occurring mix of 6 species of salmon with a single species.

## What should be done.

Is there a place for hatcheries? I really don't know. Certainly if all hatcheries were now closed, the catch of chinook and coho salmon in the Northwest would drop greatly. We could certainly expect some wild stock production to rebound, particularly if we devoted some of the resources that have gone for hatcheries to habitat protection and improvement. Closing all hatcheries now would certainly cause a lot of pain to recreational, Indian and commercial fishermen -- but it might ensure the long-term survival of the fish and the fishermen who depend upon them.



On the Columbia River, where much of the habitat has been lost, and the series of dams poses a severe barrier to downstream migration of juvenile salmon, most people believe that we must have hatcheries. I am not convinced. The most successful salmon stock on the Columbia is the wild spawning chinook of the Hanford Reach, the one free flowing section of the main river. If we devoted all of the resources that now go into hatcheries on the Columbia to improving the downstream passage of fish, and to habitat protection, we might be quite surprised what the natural spawning fish would do if given a chance.

I do believe we should declare a moratorium on building of new hatcheries. We have taken an enormous gamble with our children's heritage. Now we must find out what we are doing to the wild fish, how to preserve them, and rebuild them. Michael Goodman has proposed that hatcheries must have a federal license that is reviewed periodically. Hatcheries that don't produce adult fish, and those that cause serious adverse impacts on wild fish would be shut down. I believe this is an excellent proposal.

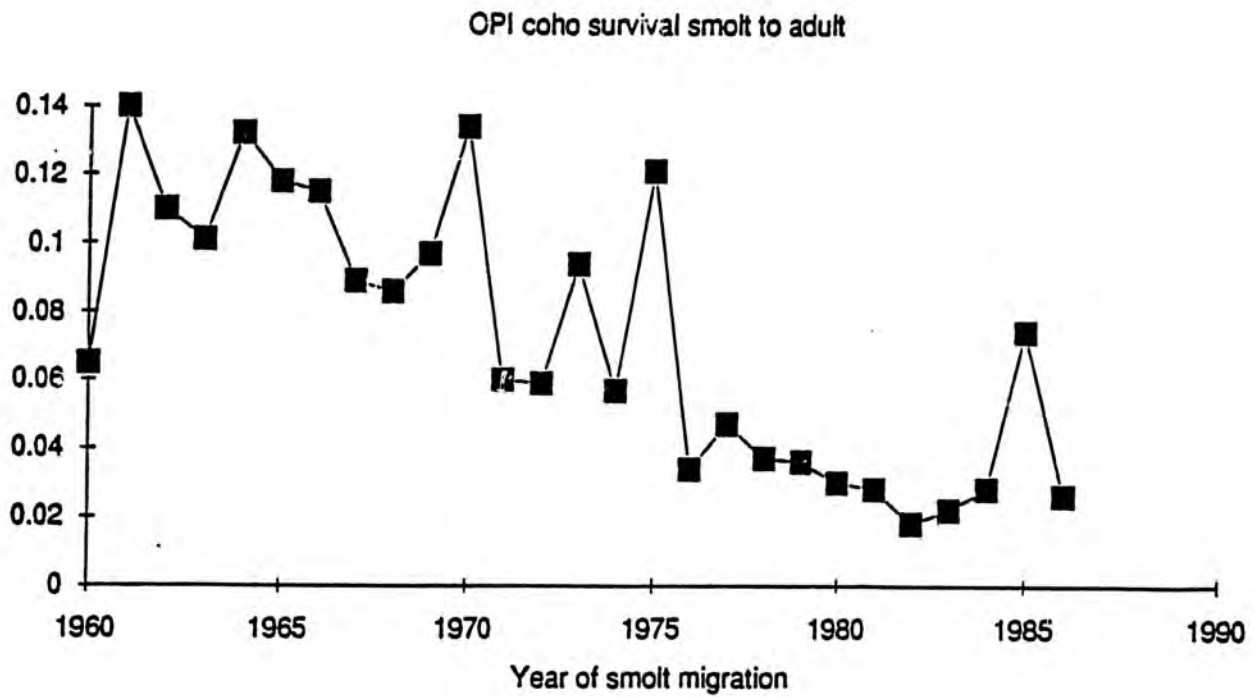
As I look out my window at another group of school children touring our hatchery I wonder what kind of salmon their children will see. Will their world be one of high technology, with genetically engineered fish returning to computer controlled hatcheries, or will we maintain and improve our wild streams? Will their classes visit streams instead of hatcheries? Instead of imitating hatcheries by rearing fish in classrooms will the school children of the future adopt sections of streams for protection, know what wild spawning salmon need and make sure they have it?

### Further Readings

Those interested in knowing more about wild and hatchery fish should read "Mountains in the Clouds" by Bruce Brown, "We're going wild" a 30-year transition from hatcheries to habitat" by Ray J. White Trout Magazine, Summer 1989, and "Preserving the genetic diversity of salmonid stocks: a call for federal regulation of hatchery programs" by Michael L. Goodman, in Environmental Law Vol 20.

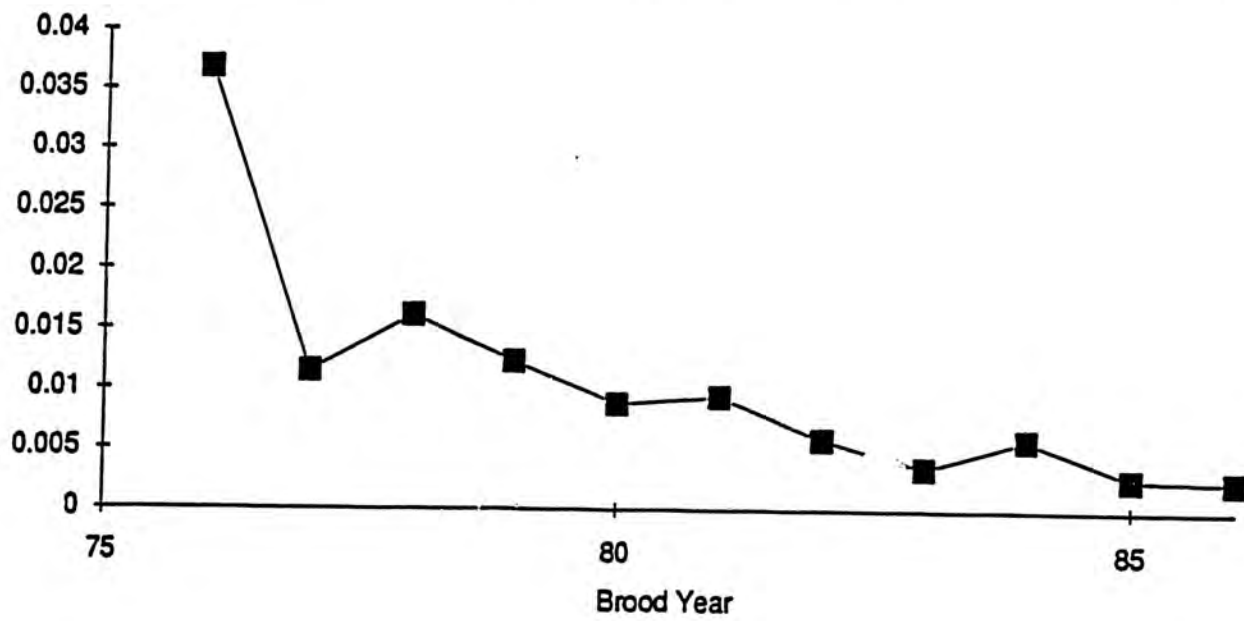


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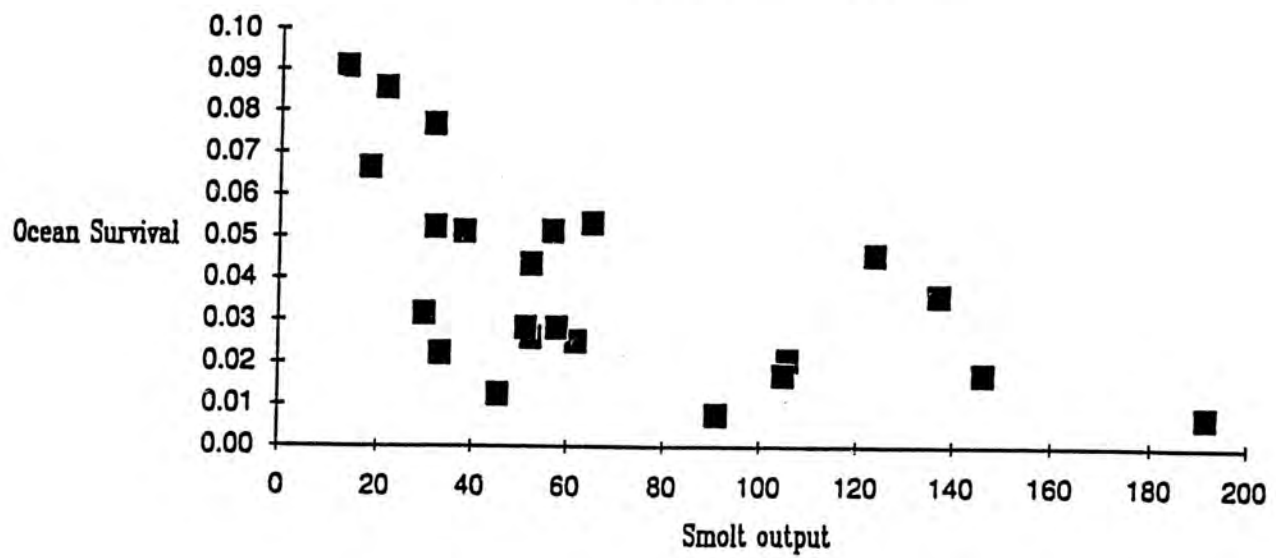
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Canadian Hatchery Chinook Contribution Rate



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Babine lake 1959-1981



# Taming T·H·E Wild Salmon

*As natural stocks dwindle, aquatic farming holds new promise—and problems—for fish production*

BY JON VARA

**T**HE STELLWAGEN BANK SEASCAPE is representative of most views of this watery planet: an unbroken sweep of ocean water and sky. On this October morning, however, the view is not a distant one. There are 3-to-6-foot seas running, and a thick mist, leaking cold drizzle, hangs close to the water.

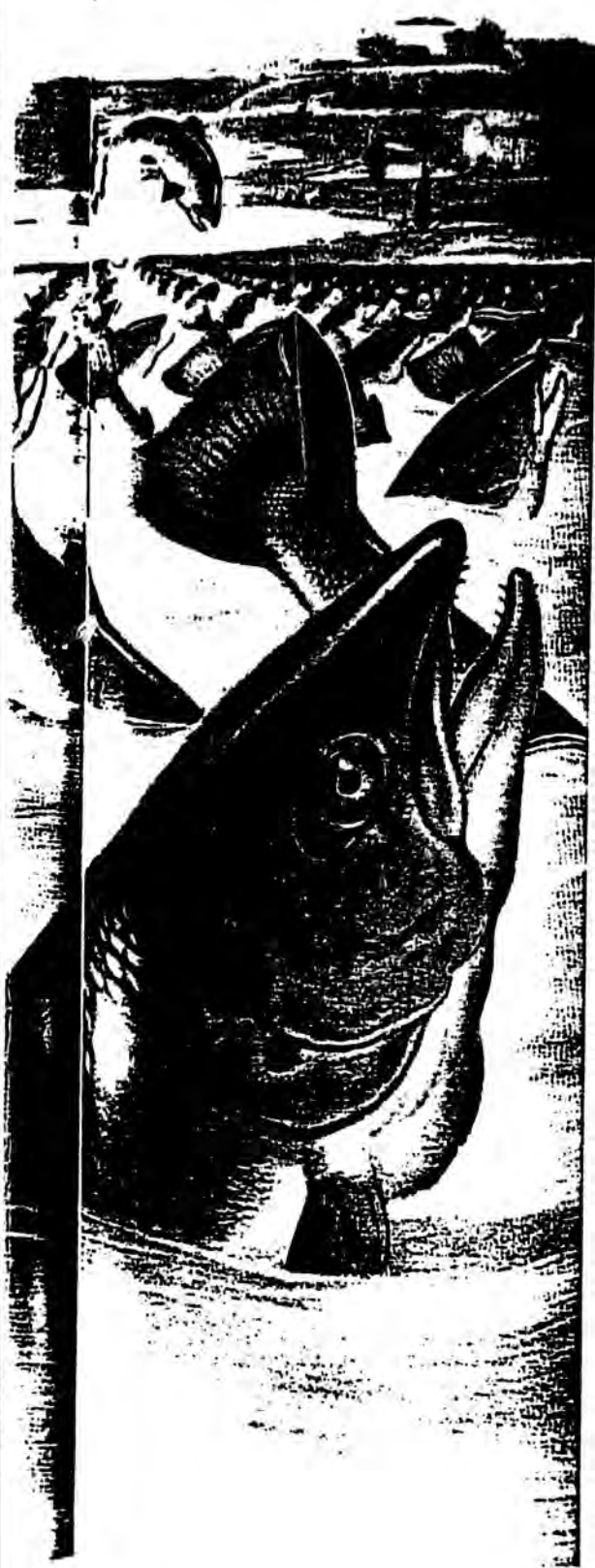
"It's not much of a day," Captain Frank Mirarchi had said as the *Christopher Andrew* eased out of Scituate Harbor, two hours before dawn. Mirarchi has a bad cold. A little more wind and rain, he says, and he could have stayed at home in bed with a clear conscience. Unprepossessing as it is, however, the day is too valuable to squander. Once winter sets in, Mirarchi knows, he'll be doing well to fish two or three days a week.

Stellwagen Bank—or Middle Bank, as it is better known to fishermen—is a submerged shoal that trends north from the northern terminus of Cape Cod. Mirarchi has been steering a course along the eastern slope of the bank for three hours, the funnel-shaped trawl net bumping unseen over the seabed, 120 feet below.

Long enough, he decides. He throttles back the engine—an action that instantly brings crewman Peter Downes scrambling from a bunk below—and climbs into his foul-weather gear. Mirarchi operates the winches and Downes manipulates heavy cables, chains and ropes through a practiced series of steps that culminates 15 minutes later as the overhead winch on the gallows frame winds in the last of the netting and brings the cod end—the baglike closed end of the funnel-shaped bottom trawl—up the steep stern ramp and onto the deck.

The trawl contains about 600 pounds of mixed fish. A third of it consists of skates, sea robins and undersized market species. They reset the trawl. Fish picks in hand—implements that resemble a policeman's nightstick with a 20-penny nail driven crosswise through the end—Mirarchi and Downes wade into the flopping mound of fish and begin sorting it by size and species.

ILLUSTRATION BY BEVAN LEISTER





In the process, some surprising objects come to light. There's a tangled 50-pound wad of gill netting, loaded with the limp, bone-white skins of long-dead dogfish. There are several aluminum beer cans and a clear-plastic soda bottle. From deeper in the pile, Mirarchi brings up an upholstered boat seat, an air-filter element from a diesel engine and a swatch of heavy nylon netting torn from a snagged trawl. The latter, he notes, is of a type no longer in general use.

"That's the old fine mesh," he says. "Just about everything that went into it stayed in the bag until you brought it up."

The net Mirarchi is using today, by contrast, is tied with 5½-inch "conservation mesh," which enables many undersized fish to escape. Large ones—unable to wriggle through the mesh—remain behind.

Relatively large ones, that is. Most of the yellowtail flounder, dab and gray sole in this bag weigh well under a pound. The largest of the cod looks as if it might go 8 or 10. There are no haddock in the net, and virtually none on Middle Bank.

It hasn't always been that way. It was not so long ago, Mirarchi says, that you could catch haddock with a hook and line just outside the harbor. Fifty-pound cod were not uncommon.

"Twenty years ago," he says, "we used to get 100-pound halibut out here. I've only seen two halibut this year, and neither one of them was over 10 pounds."

There are observers who say that fishermen like Frank Mirarchi may be going the way of the great schools of wild fish they once hunted. With cod and haddock in a steady decline over the past decade, fishermen are now harvesting species that for generations were considered unmarketable garbage—an assortment of bottom dwellers formerly considered too ugly to eat, including cusk, wolffish, hake and ocean

pout. While American consumers learn to accept these offerings, Japanese seafood buyers have already established outposts up and down the coast to pay premium prices for fresh fish as well as such exotica as sea urchins and morfish livers.

"Remember those old Tarzan movies?" Mirarchi asks. "Sometimes I feel like we're the guys with the spears. We're the guys who carry the ivory out of the jungle on our heads."

A FEW HUNDRED MILES UP THE COAST, Dan Marshall is scraping the bottom of a plastic feed bin with a hand scoop. He tosses a cup or two of pelleted feed to the salmon milling about the cage at his feet. They flash bright silver in the late-morning sun. There's an occasional splash. A foot-long salmon breaks the surface and skips across the water for a few feet, leaving a creamy trail of foam.

He squints, studying the speed at which they gobble the pellets. Another scoop of feed, more commotion in the water. Another pause.

"I don't know, Howie," Marshall says, finally. "They look awful good to me. I think you can push it up a third, you know, a third of a bag, this afternoon."

It's another day on the farm at Sea Farm Maine, in Lubec, Maine. Sea Farm Maine's acreage is a 25-acre plot of seawater in Johnson Bay, and its crop consists of about 200,000 Atlantic salmon.

The young salmon flashing in the sun at our feet began life at an inland hatchery, where fertilized eggs from carefully selected brood fish are hatched and nurtured in tanks of specially purified water for about a year, until the onset of smoltification—a physical change that indicates their readiness to move to salt water. The young fish—typically about 8 inches in length—lose the distinctive barred markings characteristic of their freshwater phase and assume a silver color. They also exhibit a change in behavior: instead of facing into the pumped current of water that swirls through the circular tanks, they turn and begin to swim with the current—a course, instinct tells them, that will lead to the sea.

The modern hatchery smolt, however, has a much quicker seaward trip than its wild counterpart—in the back of a truck equipped with an oxygen-injection system to keep the fish alive and healthy along the way.

If all goes well, Marshall explains as he patrols the steel catwalk running down the center of the floating pen, the year-old smolts, weighing an average of 3 ounces or so, will reach market size of 8 to 10 pounds within 18 months of entering seawater.

Several times a year, each pen of fish must be "split," a laborious process in which the fish are sorted by hand to separate them into groups of uniform size. Splitting is necessary, Marshall explains, because the salmon don't grow at the same rate.

"If you leave the bigger ones and the smaller ones together," he says, "you end up with a runt problem." For the same reason, it's essential to start with smolts of uniform size from the hatchery. "They establish a pecking order right from the beginning, and fish that start out small never have a chance to catch up."

Day in and day out, however, feeding the fish is the most time-consuming job—a delicate chore that calls for care and experience. If feed is distributed too slowly, the most aggressive, dominant fish will get more than their share. If feed pellets are simply shoveled into the cages, however, much of it will sink through the mesh bottom of the cage before the

*Wild fish are cleaned at sea, but the boat may not dock for a week. Farmed fish get to market in less than a day.*





fish have a chance to eat it. Consequently, every ounce of the day's allotment of feed pellets must be broadcast, scoop by scoop, across the entire surface of each cage. When done properly, it's a fluid, graceful movement, reminiscent of sowing seed grain by hand on a prepared field.

"You've got to be careful with feed," Marshall says. "Feed makes up almost half our operating cost."

As he explains, however, each unit of feed goes a long way. "When we started here, our feed conversion was around 2 to 1. But we've managed to fine-tune that down to less than 1.5 to 1."

Figures like those are enough to make a landlocked agronomist sit bolt upright and blink hard. Broiler chickens, for example, typically convert feed at an efficiency of around 5.5 to 1, meaning that 5.5 pounds of feed are required to produce each pound of edible poultry. Pigs convert feed at a ratio of 7 to 1. Beef cattle clock in at about 15 to 1.

As thrifty as salmon are, some farmed fish do even better. Mahimahi, for example—a pelagic fish native to the Pacific, now being cultured in Hawaii—seems to be the current champion. Under controlled conditions, researchers have achieved the apparently supernatural feed-conversion rate 0.62 to 1—equivalent to making 10 pounds of fish from 6.2 pounds of fish food.

**F**ISH OF VARIOUS KINDS have been raised in farm ponds in Europe and Asia for centuries. In North America, aquaculture is a relatively new phenomenon, with rapidly expanding production of farmed shrimp, trout, catfish, striped bass, mussels and coho and chinook salmon, two species native to the West Coast.

The Atlantic salmon industry, however—the first such enterprise to reach a worldwide market—got its start during the mid-1960s, when Norwegian researchers began to experiment with raising fish in dammed saltwater estuaries, and later in shore-based tanks through which seawater could be circulated with pumps. By the mid-'70s, these early efforts

*Broadcasting feed over the pens at Sea Farm Maine, a salmon farm whose "fields" are the waters off the coast of Maine.*

had been superseded by the floating-cage-culture system used today.

The demand for salmon has traditionally been strong in northern Europe, and the industry grew rapidly. In 1976, Norwegian growers produced about 2,000 metric tons of salmon; by 1989, the figure had increased to more than 120,000 tons. Along the way, a strong export market developed—thanks to the Norwegian Salmon Marketing Council, which spawned promotional literature by the ton—and fresh salmon began flowing to the rest of Europe, North America and the Far East, especially Japan.

By the early 1980s, the Norwegians were exporting not only salmon, but the technology to grow them. Norwegian-financed salmon farms began to proliferate in Scotland, Ireland, the Pacific Northwest, Atlantic Canada and—most recently—Maine. Sea Farm Maine, in fact, is a subsidiary of Sea Farm Inc., a corporation whose ownership is 50 percent Norwegian.

The industry's rapid growth has not been entirely smooth. During the early- and mid-1980s, many Norwegian farms suffered heavy stock losses from disease. To combat such problems—which were associated with the buildup of fish wastes and uneaten feed in the surrounding water—limits were placed on farm size and stocking density. (Those limitations, in fact, had much to do with the diaspora of Norwegian capital that led to the opening of salmon farms in North America.)

Norway's water-quality problems also served as an object lesson on the importance of good site selection. Today's salmon farmers recognize the importance of a strong tidal flow—an attribute often described, with unintended irony, as "flushing action"—in maintaining healthy fish.

Sea Farm Maine—like those elsewhere in the region—is



admirably sited in this respect. A pair of 20-foot tides—the highest in the nation—scrub out its cages each day. It's conceivable that water pollution will someday become a problem on this side of the Atlantic, as some critics charge. For the time being, however, it's a problem that remains mostly theoretical.

The potential for longer-term—and much more far-reaching—environmental effects has received far less attention. Foremost among them is the question of feed. Ironically, the growth of aquaculture—long looked to as the best hope for increasing the world's supply of protein—may actually reduce the amount of protein available to the world's hungry.

That is because farmed carnivorous fish, such as salmon, require large amounts of high-quality protein in their diets. And for the foreseeable future, at least, that protein is going to continue to come from the ocean, in the form of ground, dehydrated fish, known as fish meal. When the issue of protein is examined closely under a strong light, in fact, the impressive feed-conversion numbers typical of aquaculture assume a different perspective.

A beef steer, for example, feeds on grass for most of its life, converting lignocellulose—undigestible to humans—into usable protein. Even during the last four to six weeks before slaughter, when fed corn, soybeans or other higher-quality feed, the protein content of a beef animal's feed is relatively low.

**S**ALMON, BY CONTRAST—in common with shrimp, trout, striped bass and other highly profitable farmed species—require a large proportion of high-quality protein throughout the entire 18 months it takes them to reach market size. By weight, salmon feed is typically about half protein, of which three-fourths or more is derived from fish meal. And since the dry, pelleted feed contains very little water—much less than the fish themselves—the cultured fish receive the protein in a highly concentrated form.

To express that another way, each pound of farmed salmon, shrimp or other carnivorous fish represents roughly three pounds of wild ocean fish as feed. Cheap fish meal is to modern aquaculture what cheap chemical fertilizer is to a land-based corn or soybean farm: the essential input that makes all the wheels turn.

At present, most of the world's fish meal comes from small plankton feeders, such as herring and menhaden, although some meal is also produced from cannery waste and other fishing industry by-products. In accordance with the basic laws of biology, plankton-feeding fish are far more abundant than the larger predacious fish that feed on them.

That is not the same thing as saying that they will always be abundant. Given their habit of gathering in huge, dense schools, in fact, the sardinelike species that serve as the raw material for fish meal are highly susceptible to overfishing.

One of the first species to be exploited for large-scale fish-meal production, for example, was the abundant North Sea herring. Herring had long been heavily fished for human consumption, but with the additional pressure of the meal industry—which began operation in the early 1900s—stocks declined steadily until the mid-1950s, when they collapsed altogether. They have yet to recover fully, although limited fishing has resumed.

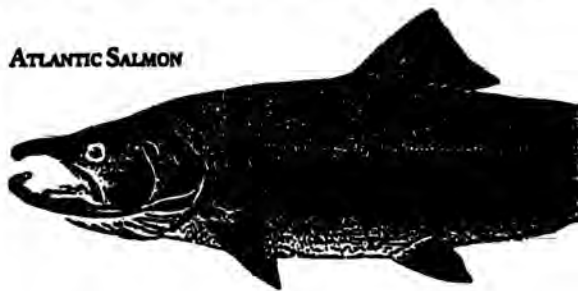
The loss of the North Sea herring fishery was instrumental in luring European factory ships across the Atlantic—beginning in the 1960s—to harvest the rich herring grounds

## Fresh From the Farm

*Crawfish and mussels, alive-alive-o!*

**M**AN HAS BEEN RAISING EDIBLE FISH for at least four millennia, but one of the first records of what might be called a truly modern approach to aquaculture comes from the Roman historian Pliny. According to Pliny, the nobleman Lucius Murena excavated a series of 'fish reservoirs' on his summer estate during the first cen-

ATLANTIC SALMON



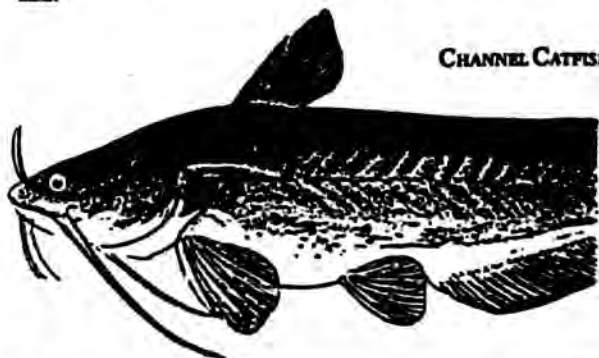
tury B.C., at a cost exceeding that of his house. It apparently proved to be a worthwhile investment, however; Pliny noted that the fish the ponds eventually produced were sold for four million sesterces.

The same forces that nudged Lucius Murena into the fish farming business—the desire to produce and sell a farm product at a profit, and the willingness to make a heavy capital investment in order to do so—are identical to those driving the burgeoning aquaculture industry today. While small-scale subsistence fish farming is still the rule in much of Africa and Asia, modern, large-scale aquafarms are ultimately more concerned with cash than with fish.

As a result, recent research and development efforts have tended to focus on species that fetch a high price in the marketplace. Atlantic salmon is the most familiar example, but certainly not the only one. The following list is by no means all-inclusive, but it does mention those aquaculturally produced species that the American consumer is increasingly likely to encounter at the supermarket.

Catfish accounts for half of all United States aquacultural production. Last year's total catfish harvest came to nearly 350 million pounds, with three-fourths of it coming from the state of Mississippi. (Catfish, in fact, is now the state's single most valuable agricultural export.) Mild, white, grain-fed catfish fillets can be found fresh in supermarkets all over the United States and well into Canada. Prices are generally comparable to that of cod or other white fish.

CHANNEL CATFISH



**Tilapia:** One of the few commercially farmed fish that thrives on an all-vegetable diet, tilapia are extraordinarily efficient protein producers. Long a favorite in the Third World, they have often – if unfairly – been regarded as trash fish elsewhere.

That appears to be changing, however. The mild, white-meat fillets of farm-raised tilapia, like catfish, are good-tasting and versatile, fitting into many types of recipes. Several large-scale aquafarms are now producing tilapia in quantity. One of the largest is Solar Aquafarms, Inc., which cultures, processes and markets its "Golden Tilapia" line in Sun City, California. Its passive-solar-heated tanks maintain optimum temperatures year-round. By mid-1991, Solar Aquafarms expects to produce 8 million pounds of tilapia, marketed mostly as skinless, boneless fillets.

**Trout:** Rainbow trout – a close relative of the Atlantic salmon – is one of the mainstays of the U.S. aquaculture industry, with about 57 million pounds produced annually. Idaho accounts for nearly two-thirds of the total, with most of the remainder coming from North Carolina, California and Wisconsin.

Trout farming has been an established business for the better part of a century, but trout farmers have been quick to take advantage of recent advances in biotechnology. Many growers now treat their

to stock the ponds are captured from the wild and that the wild shrimp rely on the coastal mangrove forest for breeding habitat.

**Mussels, clams and oysters:** The United States is the world's largest consumer of oysters, and as the environmental conditions in the Delaware and Chesapeake Bays – traditionally the major sources of wild oysters – continue to deteriorate, farmed oysters will capture an increasing share of the market. In 1987, domestic production of clam, oyster and mussel meats totaled at least 30 million pounds.



SCALLOP

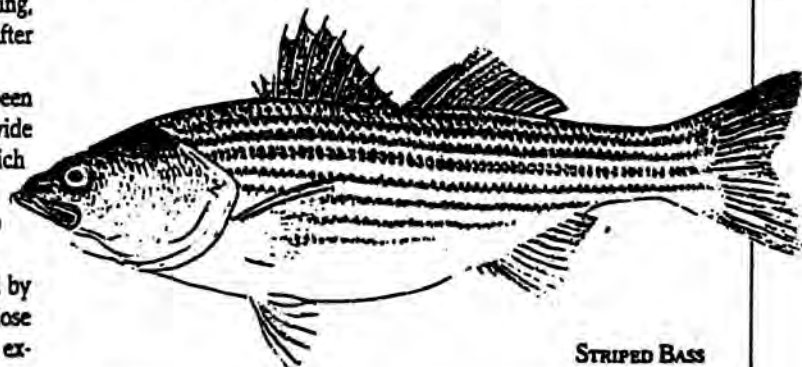


MUSSEL

The biggest obstacle to expansion of the shellfish farming industry is the availability of lease sites with acceptable water quality, since shellfish will absorb any contaminants present in the water in which they are raised. As a result, closed-tank systems will probably become increasingly important in the years to come.

**M**ANY OTHER SPECIES will be added to this list in the near future. Norwegian and Canadian researchers, for example, are working furiously to develop economical culture systems for Atlantic halibut. Given the current retail price for halibut – which routinely fetches \$6 to \$7 a pound, when it is available at all – they have considerable incentive to succeed. The Norwegians are already marketing modest quantities of farm-raised halibut, and it may be available in quantity by the end of the decade. Cod culture lies further in the future, but research is already well under way on both sides of the Atlantic.

Hybrid striped bass show promise, as well, with a number of producers successfully raising them in landlocked freshwater tanks.



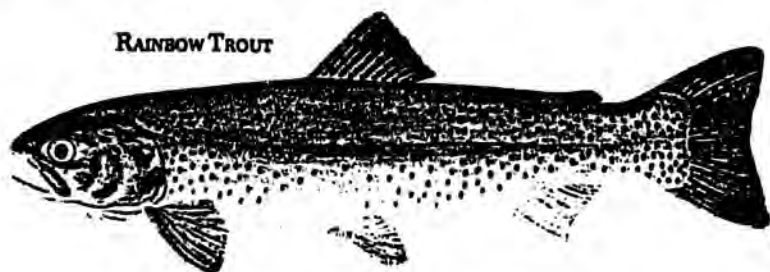
STRIPED BASS

A strong market already exists for striped bass – one which has gone increasingly unsatisfied in recent years, with the closure of the commercial striped-bass fishery.

Other species to watch include the troutlike arctic char, sea scallops, American lobsters and sablefish, or blackcod.

–J.V.

RAINBOW TROUT



breeding stock (although not the market fish themselves) with hormones to produce a strain of all-female progeny, which grow faster and yield better-quality flesh.

**Crawfish** – or, if you prefer, crayfish – are native to much of the United States, but only two species are currently raised for food on a significant scale. Louisiana provided at least three-fourths of 95 million pounds harvested last year – and consumed about the same proportion. As those figures suggest, crawfish is largely a regional specialty. About half of the total farmed yield comes from small, semicultivated ponds, and in rotation with rice farming, where the crawfish graze the stubble remaining in the fields after the rice harvest.

**Shrimp:** Shrimp is America's favorite seafood. Demand has been growing steadily for years, although the wild harvest worldwide has been static for the past decade or so. Farmed shrimp – which accounts for about a fourth of the world's total shrimp consumption – has made up the balance, and will continue to do so for the foreseeable future.

That has led to a worldwide boom in farmed shrimp, led by China, Taiwan, Ecuador and Indonesia. Ecuador, with its close proximity to the U.S. market, is our biggest supplier. Shrimp exports now account for about a fifth of that country's export income – more than bananas and cacao combined, and twice as much as coffee.

The rapid growth of the shrimp industry has had some unpleasant side effects, however. In Ecuador, thousands of acres of coastal mangroves have been destroyed to furnish land for shrimp ponds – an ironic development, given that most of the "seed" shrimp used



# Lethal Liaisons

*When the wild meet the tame, genetic disaster may occur*

**I**F FISH MARKETERS ARE REJOICING in the success of aquaculture, marine biologists have some deep concerns about the rapid growth of fish farming, fearing that the relationship between wild and farmed salmon may prove disastrous to the untamed strains. The problem, in essence, is one of intermingling – a process biologists call genetic introgression – between wild and domesticated strains of fish.

According to Dr. John M. Anderson of the Atlantic Salmon Federation in St. Andrews, New Brunswick – an organization that works with the breeding of domestic strains, as well as conservation of wild salmon – the process through which Atlantic salmon find their way from their home rivers to their winter feeding grounds and back is not completely understood. Current thinking, however, suggests that it is a two-part process that combines instinct and learning. The ability to navigate in the open ocean is almost certainly genetically transmitted. It could hardly be otherwise, since salmon unerringly find their way across hundreds or thousands of miles of ocean to a place they have never known.

The same genetic mechanism works in reverse when it leads the fish back to the right stretch of coastline generation after generation. But a salmon does not instinctively know its home river when it gets there; it has to learn to recognize it through a process described as "imprinting."

During the year or more that they spend in the fresh water of their home rivers, before entering the sea for the first time, the young salmon develop a permanent memory of the composition of the tributary where they hatched – its mineral content, the organic matter it contains, and perhaps other chemical markers. After smoltifying, the immature salmon head for the sea. On that downstream journey, it is believed, their last taste of fresh water provides the clue that enables them to find the same river mouth again when they return – a year or two later – to spawn.

Farmed salmon smolts, by contrast – which travel from the hatchery to the sea by truck – never imprint on a particular river system. As a result, those that escape into the ocean, as some inevitably do, behave erratically. Many may find their way to the same offshore winter feeding grounds used by wild salmon, and come back onshore during the spring spawning run. Lacking home rivers of their own, however, they may enter any river system in the area to spawn, more or less randomly.

By reproducing in the "wrong" river system, these homeless salmon tend to muddy the genetic waters. Although their progeny will imprint on the river system in which they hatch, they may lack

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*Farmed salmon have some genetic traits that are good for the market, but they lack others needed for survival in the wild.*

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the inherited ability to find their way from the winter feeding grounds to within "tasting range" of their adopted home river. The plight of such fish is analogous to that of a motorist who knows which exit to look for but can't find the correct highway.

Even wild salmon are not perfect navigators, of course. There has always been a certain amount of genetic exchange between

river systems through the medium of stray fish. Salmon farming, however, has increased the number of strays—and potential strays—exponentially. That is a particular cause for concern where wild salmon populations are sparse to begin with—as is the case in all of the Northeastern U.S. In the event of a major “spill” at a farm—which might involve thousands of fish—the relatively small wild population might find itself genetically overwhelmed.

All of that would be cause for alarm even if it were a matter of large-scale intermingling between populations of thoroughly wild fish. What causes fisheries biologists even greater concern, however, is that many farmed fish are by now several generations from the wild, having been selectively bred for certain characteristics.

One trait that salmon farmers seek to avoid, for example, is “gril-sification,” in which the salmon mature sexually at the end of their first year in salt water, at an average weight of 4 to 6 pounds. Because the market wants 8-to-10-pound fish, and because salmon gain weight very slowly after sexual maturity—when most of their energy goes into gonadal development—that costs the grower money. As a result, concerted efforts are being made to eliminate the trait from hatchery brood stock.

In the wild, however, early-maturing strains apparently have an advantage in some areas. In parts of Newfoundland, 90 percent or more of the wild fish mature after one winter at sea. If that naturally selected trait were diluted through contact with domesticated strains, the survival rate of the wild salmon in those areas could be compromised.

Those are more than theoretical possibilities. At a meeting held in Loen, Norway, in April 1990—attended by scientists and managers from most North Atlantic countries with salmon interests—it was established that escaped farmed salmon are indeed breeding successfully in the wild. In some Norwegian rivers, in fact, over half of the adults present during the spawning season are farmed fish. There is also evidence that suggests that farmed fish construct their gravel nests—or “redds”—somewhat later than the wild fish, disturbing preexisting redds in the process.

At the Loen conference, a number of possible countermeasures were considered. The designation of aquaculture-free zones in the vicinity of threatened wild stocks is one possibility, as is the sterilization of farmed stock at the hatchery. The establishment of gene banks—thus retaining the genetic diversity of wild fish for the future—was also supported. Finally, researchers stressed the importance of controlling the transportation of farmed stock from one region to another, to prevent the spread of disease or parasites. (It is generally agreed that the disappearance of wild salmon from 33 Norwegian rivers can be attributed to a species of freshwater parasite, *Gyrodactylus salaris*, transmitted

from imported Swedish hatchery stock.) As William Hershberger—a fisheries biologist at the University of Washington—states, “We just don’t know much about the kinds of problems genetic mixing can lead to, since most farmed animals are already extinct in the wild.” It would be ironic if *Salmo salar*’s comeback at the market heralded its disappearance from the wild.

—J.V.

in the Gulf of Maine, on Georges Bank, and as far south as Cape Hatteras. That influx quickly reduced the Gulf of Maine stocks by half—nearly killing off the Maine sardine industry—and devastated the stocks of Georges Bank, where catch totals fell from nearly 400,000 tons in 1967 to 40,000 tons in less than 10 years.

None of those past excesses—or many others not mentioned—can be blamed on the aquaculture industry. By far the largest share of the world’s fish-meal supply is used in poultry feed. By most estimates, aquacultural feeds now account for about 10 percent of the total. As world aquaculture continues to grow, however, so will the demand for feed. The U.S. Department of Agriculture estimates that at least a quarter of the world seafood production will be farmed by the end of the decade, better than doubling its current contribution. No one knows what that will mean to the world’s oceans.



Farm-raised salmon are netted, then dropped in the “knock-out tank,” where they are immobilized with carbon dioxide.

“It makes me a little nervous,” says Susan Goldhor, a zoologist who serves as a consultant to the fish and shellfish processing industry. “You have to question the wisdom of putting so much pressure on the bottom of the food chain.”

An alternative, of course, is to cultivate that end of the food chain directly. Raising plankton-feeding fish—or fish that feed on larger aquatic plants—does away with the need for such intensive protein mining. Shellfish like clams, mussels and oysters feed on microorganisms filtered directly from seawater, as do some finfish, such as tilapia. Carp—one of the most heavily produced fish, which has been raised in ponds in Europe and Asia for centuries—thrives on an all-vegetable diet.

The economics of aquaculture, however, are such that the products with the highest cash value are those like shrimp, salmon and other species with very high protein demands. Predictably, that is where development has been most rapid (see “Fresh From the Farm,” page 34).

THREE CENTURIES AGO, when Atlantic salmon ran up Northeastern rivers by the hundreds of thousands, they were sometimes used to fertilize corn. Indentured servants often insisted on contract clauses limiting

DEAN ABRAMSON



# Let Them Eat Dogfish

"Fish" no longer means cod or haddock

**W**ATCH OUT FOR THIS ONE," fisherman Frank Mirarchi says. He tosses a writhing, snapping, 3-foot long wolffish into a sorting bin.

A decade ago, wolffish were routinely thrown back over the side or converted into fish meal. This one, however, will be eaten, probably by a restaurant patron who orders fish chowder, a fish fillet sandwich or the generic deep-fried fish dinner. Cod or haddock—which is what the unqualified word "fish" used to mean in the Northeast—are almost always marketed by name these days. That has left the generic white fish category to former trash species, such as hake, cusk, ocean pout and wolffish. Before long, in fact, the category may be broadened even further, to include several species of small sharks known collectively as dogfish.

A sizable portion of the dogfish catch is destined for Europe, where, Mirarchi explains, it will become a salty, smoked snack food called *schillelocken*—or "golden curls"—that is a popular beer-hall treat in Germany. Most, however, will be served as just plain fish. English fish-and-chips establishments have been big users of dogfish for many years. To encourage the opening of a domestic market, the U.S. Department of Commerce—which determines which names may legally be attached to fish species in the marketplace—recent-



Today's catch may include many species formerly considered trash fish.

ly gave the okay for retailers to present dogfish under the more appealing name "cape shark."

"I won't tell you it's the best fish in the world," Mirarchi says, "but if it's handled right, it can taste pretty good."

But even if cape shark catches on in a big way, it may prove impossible to keep the market supplied for long. Dogfish are abundant today because fishermen on this side of the Atlantic have worked hard at not catching them for the better part of 500 years. They have extremely low reproductive rates, take many years to attain sexual maturity, and school by sex for much of the year. As a result, large mature females—the preferred raw material for *schillelocken*—are easily harvested in bulk. Until they're gone, at least; that's why the Europeans are buying them here. —J.V.

the amount of salmon in their diets.

That is hardly the case today, when most of the Atlantic salmon raised in Maine—as in most North American salmon farms—ends up at white-tablecloth eating establishments. Restaurateurs have embraced it—along with shrimp, striped bass, rainbow trout, oysters, mussels and a lengthening list of other aquacultural products—for a number of reasons. Unlike many wild species, which are highly seasonal, farm-raised seafood is available throughout the year. While wild-caught seafood may be less expensive than its farm-raised counterparts during seasons of abundance, year in and year out the farmed product often comes out ahead.

Even more important, from the standpoint of the restaurant trade especially, farmed fish tend to be consistent in both size and quality. That tends to reduce preparation time, simplify menu planning and increase the number of satisfied patrons.

In the traditional seafood industry, by contrast, quality is spotty, at best. At the wholesale level, most fish and other seafood is marketed in about the same manner as corn, soybeans or other nonperishable commodities. Under the current system, most fish is bought and sold sight unseen. The fish at the bottom of the iced fishhold—which may be a week old or more by the time a boat ties up at the dock—commands the same price as the fish on top of the pile, which may have been caught that morning.

That system made a certain amount of sense 20 years ago, when fish was regarded as a cheap substitute for chicken wings or hamburger. But today, with fresh cod often selling for almost as much as sirloin steak, it has become a liability. Frank Mirarchi feels that it is costing the traditional fisheries customers.

"You stand at the dock in New Bedford," he says, "and plenty of times you'll see baskets of fish sitting in the sun in the middle of a cloud of flies. The fisherman doesn't get any more for quality fish than he does for garbage, so quality doesn't matter to him. That kind of attitude goes right down the line. The supermarket starts out with fish that's a week old; they don't want to get stuck with it. They rinse it in brine every night to keep it from smelling too bad. A week later somebody buys it, and they wonder why it tastes awful."

**T**he salmon in Sea Farm Maine's cages, by contrast, follow an express, straight-line path to market. In October, Sea Farm Maine will begin harvesting the 8-to-10-pound salmon that have been putting on weight in its floating cages for the past year and a half. The big silvery fish are netted and quickly transferred to the "knockout tank"—a 4-foot square plastic box filled with seawater that has been saturated with carbon dioxide gas—which quickly immobilizes them. The veins that supply blood to their gills are severed, and they are dropped into a second tank filled with water and crushed ice to "bleed out," a process that improves the texture and flavor of the flesh.

Those initial steps occur at the cages in Johnson Bay. The slaughtered fish will then be loaded onto one of two converted mackerel schooners—the *Grayling*, built in 1917, or the *Medrick*, three years older—for transfer to the R.J. Peacock Canning Company plant, a mile away. There they will be gutted, washed and packed in ice-filled waxed cartons for shipment. Twelve to 16 hours after emerging from the water, Sea Farm Maine's salmon—marketed under the Sterling Brand label—will be ready for early-morning

buyers at the Boston fish market.

If the fishmongers and restaurateurs are eager to see aquaculture flourish, they are not alone. Economists see a potential boost to our balance of trade. (The United States currently imports 60 percent of its seafood, which accounts for a trade deficit of \$3.3 billion.) Politicians see jobs. Cooks and consumers see cheaper, better-quality seafood. The traditional fishing service and supply industries—purveyors of rope, foul-weather gear, floats, netting and similar products—have experienced little difficulty in adjusting to the needs of aquaculturists.

All but forgotten in this feast of economic development are the commercial fishermen themselves, to whom aquaculture represents the same sort of enclosure of the commons that occurred on land centuries ago. Sea Farm Maine, for example, pays the state of Maine about \$1,000 a year for the exclusive right to a 25-acre column of seawater and the underlying seabed in Johnson Bay. Assuming that all the conditions are met, the lease will remain in effect for 10 years.

Ron Smolowitz is a fishing-industry consultant and columnist for the trade publication *Commercial Fisheries News*. He worries that the increasing emphasis on aquaculture will imply, to some, that the ocean itself is expendable.

"That's wrong," he says. "We still haven't begun to manage the ocean for food production."

A potential long-term solution, Smolowitz feels, is to start thinking of the continental shelves as range or pastureland, rather than hunting grounds. That might mean trying to eliminate some species, while fostering or introducing others.

"People say, 'No, you can't do that, you'll alter the ecological balance.'" He pauses. "What do they think is happening out there right now?"

**F**ROM THE BEGINNING, people have wanted to see wild Atlantic salmon as one of the main beneficiaries of salmon farming. The reasoning was simple: it should be cheaper to grow salmon than to catch it. According to Economics 101, wild-caught salmon should be wholly unable to compete with its farm-raised counterpart, and the heavy fishing pressure on this species would be relieved.

Unfortunately, it hasn't worked out that way. The world's wild harvest has hovered at somewhere between 5,000 and 8,000 metric tons annually for the past few years (farmed Atlantic, by way of comparison, accounted for 170,000 metric tons), and the wild salmon has no trouble finding buyers.

Because the word "wild" plays so well in the marketplace, in fact, wild salmon commands a premium price—often two or three times that of farmed fish. That is ironic, since the farmed product—thanks to more careful handling and faster shipment to market—usually is equal to or better than wild salmon, as blind taste tests have repeatedly shown.

"At first glance," says a State of Maine development publication, "the advantages of aquaculture would appear to be disadvantages for wild product. Closer inspection of seafood markets, however, indicates a probable favorable effect—at least in the longer term—on wild-product markets."

Perhaps. In the shorter term, though, traditional fishermen are not lining up to become fish farmers. That does not surprise Dan Marshall.

"Fishermen are basically hunters," he observes. "They know more about the ocean than you or I ever will, but they don't know much about raising animals." The bottom line, according to Marshall, is that it's easier to teach a farmer to run a skiff and an outboard motor than it is to teach a fisherman the finer points of feed conversion and disease control.

Marshall himself is the proof of that. Before he took the job managing Sea Farm Maine's operation, he spent a number of years as a farm manager for DeCoster Farms, Maine's largest producer of eggs and broiler chickens. Burton Blanch, the president of the Cobscook Bay Finfish Association, is a former dairy farmer who turned to salmon farming in 1985.

Like their landlocked brethren, fish farmers have one overriding worry: overproduction and low prices. The price of salmon, Dan Marshall observes, has been dropping for several years. "The days of \$2-a-pound profits are over," he says. "If we make 50 cents a pound this year, I'll be happy."

Still, he is optimistic about the future. A vigorous secondary processing industry, he says, will do much to stimulate demand.

"I saw that happen in the poultry business," he says. "Sales were flat for years, and then someone came up with the idea of chicken nuggets, and business took off."

Last year, Marshall and young Bobby Peacock of the R.J. Peacock Canning Company experimentally sliced some smaller salmon—too small for normal market outlets—into steaks with a bandsaw and packed them in sardine cans. Marshall gave me a can to try, and it was good.

"I think you're going to see a lot more of that kind of thing," he says. "You'll see salmon in microwave packages, and I think you'll see it in Weight Watchers' meals. The whole industry is still at the caveman stage."

Jon Vara is a regular HARROWSMITH COUNTRY LIFE contributor who lives in Marshfield, Vermont.



*As the price of farm-raised salmon drops—and profits decrease—canneries like the R.J. Peacock Co. in Maine are experimenting with marketing strategies to stimulate demand.*





# Alaska State Legislature



SENATOR  
ARLISS STURGULEWSKI

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Senate

## MEMORANDUM

May 14, 1991

TO: Senator Dick Eliason, Chairman  
Senate Special Committee on Fisheries

FROM: Senator Arliss Sturgulewski  
Senate District F

RE: State fish hatchery issues

Thank you for calling together the Special Committee on Fisheries to examine issues regarding fish hatcheries in Alaska. In order to help the committee identify issues for further discussion I am submitting the following questions for consideration. These are certainly not exhaustive but hopefully will fit in the "big picture" in a constructive way.

### MARKETING

The 1990 salmon harvest set a record of 154.8 million fish caught exceeding the previous record harvest of 153.7 million fish in 1989. Some estimates are that hatchery salmon may be 20-25% of the total statewide harvest and that in some specific regions the harvest may be as high as 70-90% for some specific species. What are the ramifications of the hatchery salmon impact on the marketing of salmon in general and on wild salmon in particular? What is the state's role in marketing salmon? What is the global market impact of salmon hatcheries throughout the world and specifically what is the effect on Alaska's salmon?

May 14, 1991

Page 2

## MANAGEMENT

Does the increased salmon harvest over the past decade require a review of management policies regarding the enhancement of wild salmon and the production of hatchery salmon? Should the state encourage the maximum production of state and private hatcheries or should there be regional differences by species and quantity? Is there an optimum number of hatcheries or fish production? Is there an optimum number of salmon either wild or hatchery or a combination that should be produced by region, throughout the state or ocean-wide? What is the carrying capacity limit for salmon by area?

## STATE POLICY

During the past administration in 1987 and 1988 the Commission of Fish and Game attempted but failed to develop a fisheries policy for the state. For example: it stated the following two hatchery objectives among others: 1) Encourage investment by private enterprise in the enhancement, development and economic utilization of the fisheries resources. 2) Conduct a comprehensive and economically sound enhancement program involving public and privately operated facilities and other enhancement projects. Are these policy statements current and valid or should they be reviewed?

## ALLOCATION

Should there be a review of the current allocation system of salmon? As the utilization of commercial, sport and subsistence groups change over time and public and private hatchery production increases would any other allocation system be appropriate? What is the relationship between hatchery production and current subsistence laws and regulations?

## GENETICS

What impact does the state supported system of salmon hatcheries, including both state operated and private non-profit hatcheries, have on the health of our wild stocks of Alaska salmon? Is there any long term generic damage that may result from the interaction of a hatchery raised salmon with natural stocks? What impact do new techniques such as floating salmon hatcheries have on Alaska's wild stocks?



# Alaska State Legislature



SENATOR  
ARLISS STURGULEWSKI

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May 14, 1991

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# Alaska State Legislature

SENATOR RICHARD I. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

May 22, 1991

Senator Lyman Hoffman  
Box V  
Juneau, AK 99811

Dear Senator Hoffman:

As you know, the Senate Special Committee on Fisheries, of which you are a member, is beginning a review of Alaska's fisheries enhancement programs, particularly hatchery programs. The first phase of this project is the creation of an ad hoc group of House and Senate staff members who will conduct an information-gathering and research project during the upcoming interim.

While this hatchery research project will be under the auspices of the Senate Fisheries Committee, I would like to appoint your legislative aide, Molly McCammon, to serve as the coordinator for the staff work over the summer months. My aide Mary McDowell, plans to return to the office in late fall and will be involved again at that point, but we would very much appreciate your making Molly available to head up this initial research phase. Molly is very well qualified for this responsibility and the other staffers who will be working on the project look forward to working under her coordination.

Please let me know as soon as possible if this plan meets your approval. This review by the Fisheries Committee is timely and important to the future of fisheries enhancement. I appreciate the work that you and your staff are willing to do on it.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dick", written over the word "Sincerely,".

Senator Dick Eliason, Chairman  
Senate Special Committee on Fisheries



#### ADDITIONS TO HATCHERY ISSUES LIST

ADF&G structure -- should FRED Division be so separate from Comm. Fish., Sport fish, and subsistence Divisions? Enough coordination among the divisions?

Under PNP operations -- add "methods for making cost recovery" -- explore other ways to recover costs that will help encourage oversite by fishermen, etc.

Under Marketing -- add Role of ASMI. Also where do hatchery fish fit into fish quality improvement efforts?

Broaden scope of review to include all fisheries enhancement efforts in Alaska, not only hatcheries.

Explore the impacts of opening up of subsistence to everyone on hatchery and wild stocks.



**COOK INLET  
AQUACULTURE ASSOCIATION**

HC 2, BOX 849  
SOLDOTNA, AK 99609-9707  
(907) 283-6761

June 3, 1991

Senator Dick Eliason  
P.O. Box V  
Juneau, Alaska 99811

Dear Senator Eliason:

Cook Inlet Aquaculture Association is pleased that you have chosen to review the State's private nonprofit aquaculture program during the interim. It has been more than 15 years since the program began and a review is certainly in order.

CIAA would like to participate in the review process. We probably possess information and insights which would expedite program review. Please call on us if we may be of service.

Sincerely,

Thomas E. Mears,  
Executive Director

Draft

June 24, 1991

Dear Interested Alaskan:

I am writing to you because of your involvement and interest in the state's hatchery and enhancement program. The Legislature is currently undertaking a thorough review of this program. Our intensified efforts have been underway for nearly two decades now, and we believe it is time to look back to where we started, see where we are at today, and determine where we want to go with the program in the future, ranging from fine-tuning to possible re-direction.

The work on this project is primarily being done by legislative staff, with the assistance of the Legislative Research Agency and the Department of Fish and Game. The project's chief coordinator is Molly McCamr is on loan from Senator Lyman Hoffman for this project, a reached at 465-4453 or P.O. Box V, Juneau, AK 99801. If you have any questions, comments, or concerns, be sure to contact her directly.

I am enclosing for your information a copy of the project work plan, a list of all the persons involved in the research, and a tentative time schedule.



Some people have expressed concern about what the intent of this group might be. I want to put your fears at rest. The first stage of this process is to gather information about the program and identify the various issues, concerns, and conflicts. We're counting on your help with this process. Once we get a draft report of this information, we'll be looking to all of you to help us develop possible options for strengthening, improving, and possibly re-directing the program. I cannot emphasize enough how strongly we believe that your participation in this process is vital. At this point, you can be involved by reviewing the enclosed work plan, and contacting Molly or the individual team leaders with specific comments. We're also looking at holding an intensive workshop to discuss the future of the hatchery program sometime in the fall. Once a final report is issued, I plan to hold extensive formal hearings on it before the Senate Special Committee on International and Domestic Fisheries next legislative session.

I hope you are as excited about this project as I am. There is a lot of support for the hatchery program. I think a review of this nature can only make it better.

Sincerely,

Senator Dick Eliason



# Alaska State Legislature

SENATOR RICHARD I. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

June 28, 1991

^F1^

Dear ^F2^:

I am writing to you because of your involvement and interest in the State's hatchery and enhancement program. The Legislature is currently undertaking a thorough review of this program. Our intensified efforts have been underway for nearly two decades now, and we believe it is time to look back to where we started, see where we are today, and determine where we want to go with the program in the future, ranging from fine-tuning to possible redirection.

The work on this project is primarily being done by legislative staff, with the assistance of the Legislative Research Agency and the Department of Fish and Game. The project's chief coordinator is Molly McCammon. She is on loan from Senator Lyman Hoffman for this project, and can be reached at 465-4453 or P. O. Box V, Juneau, AK 99811. If you have any questions, comments or concerns, be sure to contact her directly.

I am enclosing for your information a copy of the project work plan, a list of all the persons involved in the research and a tentative time schedule.

Some people have expressed concern about what the intent of this group might be. I want to put your fears at rest. The first stage of this process is to gather information about the program and identify the various

June 28, 1991

Page Two

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I hope you are as excited about this program as I am. There is a lot of support for the hatchery program. I think a review of this nature can only make it better.

Sincerely,

Senator Dick Eliason

^N

1-Address^R

2-Sal^R

^E

Mr. Norman Cohen  
739 Fifth Avenue  
Juneau, AK 99801^R  
Mr. Cohen^R

^E

Mr. Jerry Madden  
P. O. Box 240616  
Douglas, AK 99824^R  
Mr. Madden^R

^E

Ms. Debra Lyons  
P. O. Box 296  
Petersburg, AK 99833^R  
Ms. Lyons^R

^E

Ms. Kate Troll  
Southeast Alaska Seiners Assn.  
Box 9579  
Ketchikan, AK 99901^R  
Ms. Troll^R

^E

Mr. Bruce Weyhrauch  
302 Gold Street  
Juneau, AK 99801^R  
Mr. Weyhrauch^R

^E

Mr. Ray Gillespie  
10390 Mendenhall Loop Road  
Juneau, AK 99801^R  
Mr. Gillespie^R

^E

Mr. Gordon Ito  
Kotzebue Fishermen's Assn.  
Box 307  
Kotzebue, AK 99752^R  
Mr. Ito^R



^E

Mr. Bert Greist  
Northwest Arctic Borough  
Planning Department  
P. O. Box 1110  
Kotzebue, AK 99752^R  
Mr. Greist^R

^E

Mr. Don Amend, Gen. Manager  
Southern Southeast Regional  
Aquaculture Assn. (SSRAA)  
1621 Tongass Avenue, #103  
Ketchikan, AK 99901^R  
Mr. Amend^R

^E

Mr. Tod A. Jones  
Alaska Aquaculture, Inc.  
P. O. Box 1288  
Wrangell, AK 99929^R  
Mr. Jones^R

^E

Mr. Robert M. Meyer  
Meyers Chuck Aquaculture Assn.  
5001 Nottingham Way  
Anchorage, AK 99501^R  
Mr. Meyer^R

^E

Mr. Robert Campbell  
Bell Island  
American Aquaculture Corp.  
P. O. Box 6338  
Ketchikan, AK 99901^R  
Mr. Campbell^R

^E

Robin Larsson  
Aquaculture, Inc.  
P. O. Box 1499  
Wrangell, AK 99929^R  
Robin^R

^E

Mr. Michael A. Brogan  
Gro-Fish, Inc.  
1435 "N" Street  
Anchorage, AK 99501^R  
Mr. Brogan^R

⌘

Mr. Peter Esquiro, Gen. Manager  
Northern Southeast Regional  
Aquaculture Assn. (NSRAA)  
1308 Sawmill Creek Road  
Sitka, AK 99835^R  
Peter^R

⌘

Mr. Mel Seifert  
Sheldon Jackson College Aquaculture Program  
P. O. Box 479  
Sitka, AK 99835^R  
Mr. Seifert^R

⌘

Mr. Bill Coltharp, Manager  
Sheldon Jackson College Aquaculture Program  
P. O. Box 479  
Sitka, AK 99835^R  
Mr. Coltharp^R

⌘

Mr. Ladd Macaulay  
Douglas Island Pink & Chum, Inc.  
2697 Channel Drive  
Juneau, AK 99801^R  
Mr. Macaulay^R

⌘

Mr. Brock Meredith  
Kake Nonprofit Fisheries Corp.  
P. O. Box 523  
Kake, AK 99830^R  
Mr. Meredith^R

⌘

Mr. Eugene W. Richards  
Burro Creek Farms  
P. O. Box 455

Skagway, AK 99840^R

Mr. Richards^R

⌘

Mr. Bart Watson

Armstrong-Keta, Inc.

P. O. Box 21990

Juneau, AK 99802^R

Mr. Watson^R

⌘

Ms. Martha Jack

Angoon Aquaculture Assn., Inc.

P. O. Box 138

Angoon, AK 99820^R

Ms. Jack^R

⌘

Mr. Bruce Suzumoto, President

Prince William Sound Aquaculture Corp.

P. O. Box 1110

Cordova, AK 99574^R

Mr. Suzumoto^R

⌘

Mr. John McMullen, Special Projects

Prince William Sound Aquaculture Corp.

P. O. Box 1110

Cordova, AK 99574^R

Mr. McMullen^R

⌘

Dr. Jack M. Van Hying

NERKA, Inc.

P. O. Box 80165

Fairbanks, AK 99708^R

Dr. Hying^R

⌘

Mr. Jason Wells, Project Director

Valdez Fisheries Development Assn.

P. O. Box 125

Valdez, AK 99686^R

Mr. Wells^R

⌘

Mr. Tom Mears

Cook Inlet Aquaculture Assn.

HC 2, Box 849

Soldotna, AK 99669-9707^R

Mr. Mears^R

^E

Mr. Jim Bingman, President

Bristol Bay Regional Aquaculture Assn.

P. O. Box 82

Dillingham, AK 99576^R

Mr. Bingman^R

^E

Mr. Charles McCallum, President

Chignik Regional Aquaculture Assn.

P. O. Box 1297

Seward, AK 99664^R

Mr. McCallum^R

^E

Mr. Oliver Holm, President

Kodiak Regional Aquaculture Assn.

P. O. Box 3407

Kodiak, AK 99615^R

Mr. Holm^R

^E

Mr. Carl L. Rosier, Commissioner

Department of Fish and Game

P. O. Box 3-2000

Juneau, AK 99802-2000^R

Commissioner Rosier^R

^E

Mr. Jeff Koenigs, Director

FRED Division

Department of Fish and Game

P. O. Box 3-2000

Juneau, AK 99802-2000^R

Mr. Koenigs^R

^E



^N

1-Address^R

2-Sal^R

^E

Cook Inlet Fisherman Fund  
Forest Service Biologist  
Grand Mesa Gunn National Forest  
2250 Highway 50  
Delta, CO 81416^R

Member^R

^E

Women's Fisheries Network  
2442 N.W. Market Street #199  
Seattle, WA 98107^R  
Network Members^R

^E

North Pacific Fish Vessel Owners  
1800 Emerson, Suite 101  
Fishermens Terminal  
Seattle, WA 98119^R  
Owners^R

^E

Mr. Brad Bailey  
7324 Skyview Lane North, #N202  
Tacoma, WA 98406^R  
Mr. Bailey^R

^E

Alaska Setnetters Association  
P. O. Box 111611  
Anchorage, AK 99511^R  
Members^R

^E

Cordova Aquatic Marketing Assn.  
P. O. Box 359  
Cordova, AK 99574^R  
Members^R

^E

Marine Advisory Program  
P. O. Box 830  
Cordova, AK 99574^R

Members^R

^E

Marine Advisory Program

P. O. Box 1549

Dillingham, AK 99576^R

Members^R

^E

United Cook Inlet Drift Assn.

P. O. Box 4649

Kenai, AK 99611^R

Members^R

^E

Kodiak Longliners Assn.

P. O. Box 1366

Kodiak, AK 99615^R

Members^R

^E

Marine Advisory Program

202 Center Street, Suite 201

Kodiak, AK 99615^R

Members^R

^E

Kenai Peninsula Fish Co-Op Assn.

34824 Kalifornsky Beach #E

Soldotna, AK 99669^R

Members^R

^E

Marine Advisory Program

P. O. Box 297

Kotzebue, AK 99752^R

Members^R

^E

United Fishermen of Alaska

211 Fourth Street, Suite 106

Juneau, AK 99801^R

Members^R

^E

Petersburg Vessel Owners

P. O. Box 232

Petersburg, AK 99833^R

Owners^R

⌈

Alaska Crab Coalition  
3901 Leary Way N.W. #6  
Seattle, WA 98107^R

Members^R

⌈

Alaska Marketing Assn.  
Bldg C-3, Room 232  
Fishermens Terminal  
Seattle, WA 98119^R

Members^R

⌈

Alaska Factory Trawler Assn.  
4039 21st Avenue West  
Suite 400  
Seattle, WA 98199^R

Members^R

⌈

Bering Sea Fishermens Assn.  
725 Christiansen Drive  
Anchorage, AK 99501^R

Members^R

⌈

Kuskokwim Fish Co-Op, Inc.  
P. O. Box 245  
Bethel, AK 99559^R

Members^R

⌈

Cordova District Fishermen Unit  
P. O. Box 939  
Cordova, AK 99574^R

Members^R

⌈

Bristol Bay Herring Marketing Co.  
P. O. Box 1710  
Dillingham, AK 99576^R

Members^R

⌈

North Pacific Fish Association

P. O. Box 796

Homer, AK 99603^R

Members^R

^E

Alaska Draggers Association

P. O. Box 991

Kodiak, AK 99615^R

Members^R

^E

Kodiak Regional Aquaculture Assn.

P. O. Box 3407

Kodiak, AK 99615^R

Members^R

^E

Fish Industrial Technical Center

Pouch K

Kodiak, AK 99615^R

Members^R

^E

Marine Advisory Program

3 Bunnell

303 Tanana Drive

Fairbanks, AK 99701^R

Members^R

^E

Alaska Mariculture Assn.

130 Seward Street, Suite 504

Juneau, AK 99801^R

Members^R

^E

United Southeast Alaska Gillnetters

P. O. Box 021186

Juneau, AK 99802^R

Members^R

^E

Marine Advisory Program

P. O. Box 1329

Petersburg, AK 99833^R

Members^R

^E



Marine Advisory Program  
1297 Seward Avenue, Room 207  
Sitka, AK 99835^R  
Members^R

⌘

Deep Sea Fishermens Union  
of the Pacific

5215 Ballard Avenue N.W.  
Seattle, WA 98107^R

Members^R

⌘

Fishing Vessel Owners Assn.

Room 232, Bldg C-3

Fishermens Terminal

Seattle, WA 98119^R

Members^R

⌘

Alaska Independent Fish  
Marketing Association

700 - 14th Street

Bellingham, WA 98225^R

Members^R

⌘

Bristol Bay Driftnetters

3605 Arctic #742

Anchorage, AK 99503^R

Members^R

⌘

NANA Seafoods

(NANA Taguigmitat)

Box 49

Kotzebue, AK 99572^R

Members^R

⌘

Western Alaska Co-Op  
Marketing Association

P. O. Box 213

Dillingham, AK 99576^R

Members^R

⌘

Setnetters Assn of Bristol Bay

P. O. Box 4311

Homer, AK 99603^R

Members^R

^E

Kodiak Longline Vessel Owners

P. O. Box 135

Kodiak, AK 99615^R

Owners^R

^E

United Fishermens Marketing Assn.

P. O. Box 1035

Kodiak, AK 99615^R

Members^R

^E

Peninsula Marketing Association

P. O. Box 248

Sand Point, AK 99661^R

Members^R

^E

Mr. Fred Chase, Vice Chairman

Wildlife Safeguard

1257 New Richardson Highway

North Pole, AK 99705^R

Mr. Chase^R

^E

Alaska Trollers Association

130 Seward Street, Suite 213

Juneau, AK 99801^R

Members^R

^E

C and E D

P. O. Box D

Juneau, AK 99811^R

Members^R

^E

Alaska Longline Fish Association

P. O. Box 1229

Sitka, AK 99835^R

Members^R

⌘

SEACOPS

700 Water Street Upper

Ketchikan, AK 99901^R

Members^R

⌘

Alaska Shellfish Growers Assn.

P. O. Box 1499

Wrangell, AK 99929^R

Members^R

⌘



# Alaska State Legislature

SENATOR RICHARD L. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

July 2, 1991

Mr. Rick Lauber  
Pacific Seafood Processors Assn.  
321 Highland Drive  
Juneau, AK 99801

Dear Mr. Lauber:

I am writing to you because of your involvement and interest in the State's hatchery and enhancement program. The Legislature is currently undertaking a thorough review of this program. Our intensified efforts have been underway for nearly two decades now, and we believe it is time to look back to where we started, see where we are today, and determine where we want to go with the program in the future, ranging from fine-tuning to possible redirection.

The work on this project is primarily being done by legislative staff, with the assistance of the Legislative Research Agency and the Department of Fish and Game. The project's chief coordinator is Molly McCammon. She is on loan from Senator Lyman Hoffman for this project, and can be reached at 465-4453 or P. O. Box V, Juneau, AK 99811. If you have any questions, comments or concerns, be sure to contact her directly.

I am enclosing for your information a copy of the project work plan, a list of all the persons involved in the research and a tentative time schedule.

Some people have expressed concern about what the intent of this group might be. I want to put your fears at rest. The first stage of this process is to gather information about the program and identify the various



July 2, 1991

Page Two

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I hope you are as excited about this program as I am. There is a lot of support for the hatchery program. I think a review of this nature can only make it better.

Sincerely,



Senator Dick Eliason



# Alaska State Legislature

SENATOR RICHARD I. ELIASON

*President of the Senate*

P. O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

July 2, 1991

Mr. Alec Brindle  
Ward Cove Packing Company  
Box C - 5030  
Seattle, WA 98105-0030

Dear Mr. Brindle:

I am writing to you because of your involvement and interest in the State's hatchery and enhancement program. The Legislature is currently undertaking a thorough review of this program. Our intensified efforts have been underway for nearly two decades now, and we believe it is time to look back to where we started, see where we are today, and determine where we want to go with the program in the future, ranging from fine-tuning to possible redirection.

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July 2, 1991

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I hope you are as excited about this program as I am. There is a lot of support for the hatchery program. I think a review of this nature can only make it better.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dick Eliason".

Senator Dick Eliason

# STATE OF ALASKA

## DEPARTMENT OF FISH AND GAME

### OFFICE OF THE COMMISSIONER

WALTER J. HICKEL, GOVERNOR

P.O. BOX 3-2000  
JUNEAU, ALASKA 99802-2000  
PHONE: (907) 465-4100

July 19, 1991

The Honorable Dick Eliason  
Alaska State Legislature  
P.O. Box V  
Juneau, AK 99811

Dear Senator Eliason:

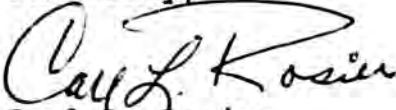
Thank you for your June 28 letters to myself and Fisheries Rehabilitation, Enhancement and Development (FRED) Division Director, Dr. Jeff Koenings, concerning the Legislature's ongoing Hatchery Research Project.

In my May 10 letter to you, I accepted your invitation for department staff to participate in this endeavor and gave the FRED Division the lead role in developing a working relationship with legislative staff assigned to this project. In the interim, there have been several meetings between Molly McCammon and Dr. Koenings and between legislative and Alaska Department of Fish and Game (ADF&G) staffs to both coordinate the research effort and to identify time schedules and issues. The work plan you provided includes many of the comments and suggestions of ADF&G staff, and additional information has been and continues to be provided by department staff to legislative work group coordinators when requested.

I am pleased to see there will be ample opportunity for public participation, and I understand the work plans and schedule have been sent out to private nonprofit operators, aquaculture associations, and interested gear groups. I agree that there is a lot of support for the hatchery program, as it has proven to be a very successful program since its inception nearly 20 years ago. This is a large research project of great importance to this department. The FRED Division will continue coordinating information retrieval and technical review.

Thank you for keeping me informed of the research group's progress, and be assured my department will cooperate fully.

Sincerely,



Carl L. Rosier  
Commissioner

cc: Jeff Koenings



# WESTERN ALASKA COOPERATIVE MARKETING ASSOCIATION

---

1

(907) 842-5592 • BOX 213 • DILLINGHAM, ALASKA 99576

August 12, 1991

Senator Dick Eliason  
PO Box V  
Juneau, Alaska 99811

Dear Senator:

We certainly are overjoyed to see that finally the State of Alaska is going to review the aquaculture programs that are in place and hopefully will start to redirect this program.

We feel that this existing aquaculture program is creating the excess wild stock salmon on the market which in turns has decreased our marketable salmon into a economic disaster situation.

We will be drafting our comments to Ms Molly McCammon's attention and we certainly look forward to some sort of resolution to this major problem.

Thank you for adding our organization's name to your listing.

Sincerely,



*for* Harvey Samuelson,  
President



# Alaska State Legislature

Official Business

## MEMORANDUM

P.O. Box V  
State Capitol  
Juneau, Alaska 99811

TO: Senator Dick Eliason

FROM: Molly McCammon, Coordinator *Molly*  
Legislative Hatchery Research Project

DATE: August 30, 1991

RE: Status report on research project

---

Work on the Legislative Hatchery Research Project has been proceeding all summer. The following is the status of each of the four work groups:

**I. History & Development of Hatcheries.** Legislative Research has completed a legislative history of the hatchery program. I'll be sending you a copy separately. A second report summarizing salmon production trends and policies worldwide, by country, and in Alaska should be done next week.

**II. Economics & Marketing.** This group decided to leave the marketing issues to the Governor's Salmon Strategy Task Force. Instead we have been focusing on economic issues to determine what impact hatchery production has on prices and revenues and what effect increased hatchery production will have. We are in the process of developing a proposal for some additional research, and once Ginny Fay returns from vacation, we need to discuss this with you in further detail.

**III. Fisheries Management.** Reports are due next week on biological and genetics issues (Leg Research) and on the role of regional aquaculture associations (Joe Ambrose in Rep. Taylor's office). We have been waiting until the season is over before focusing on the management issues and conflicts section. The Fish Board has scheduled a two day workshop in mid-September and has our group on their agenda.

**IV. Roles and Responsibilities in Statewide Enhancement Program.** Barnaby Dow and I have been interviewing a lot of people regarding the planning process and will have an initial report done in about two weeks. Kate Tesar will have a draft report on hatchery funding completed before she leaves for her new career as a lobbyist.

**Conclusion:** We are slightly behind schedule, with our original goal of a draft report in early September now postponed to early October. The two big issues that need further discussion and your input are the economic studies and a possible forum or workshop in order to get more public involvement. I've asked Sheila if we could set up a telephone call mid to late next week if your time and schedule permit.



# Alaska State Legislature

## House of Representatives

BEN GRUSSENDORF  
SPEAKER

P. O. Box 928  
SITKA, ALASKA 99835  
(907) 747-8458

WHILE IN JUNEAU  
POUCH V  
JUNEAU, ALASKA 99811  
(907) 485-3824  
(907) 485-3720

### MEMORANDUM

TO: Senator Dick Eliason  
Senate President

FROM: Rep. Ben Grussendorf  
Speaker

DATE: September 26, 1991

RE: Research Contracts for the Hatchery Work  
Project

I have reviewed your suggestions for the proposed research contracts for the hatchery work project and have no objection to your use of Senate funds for these contracts.



# ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
RESOURCES COMMITTEE  
RULES COMMITTEE  
CHAIRMAN, SPECIAL COMMITTEE ON  
DOMESTIC & INTERNATIONAL  
COMMERCIAL FISHERIES



P.O. BOX 143  
SITKA, ALASKA 99835

P.O. BOX V  
JUNEAU, ALASKA 99811  
(907) 465-4916

FAX (907) 465-4928

September 11, 1991

Senator-designee Shirley Craft  
Legislative Council  
2048 C South Rural Road  
Tempe, Arizona 85282

*OK per Craft -  
Shirley  
by Joan Hope  
9/27/91*

Dear Ms. Craft:

As you are probably aware, legislative staff, under the auspices of the Senate Special Committee on International and Domestic Fisheries, have been conducting an intensive review of the state's fish enhancement program. This review was initiated at the end of last session as a result of an increasing number of issues raised regarding the management of hatchery production, and the best options for spending declining state dollars. Certainly this past fishing season has made such a review even more timely and pertinent.

A major element of the research group's work plan (Attachment A) is to determine the economic impacts of the salmon enhancement program. Staff have thoroughly reviewed existing economic studies and have determined that further research is needed in order to help us determine the net benefits and costs of the salmon enhancement program. Five principal research components (Attachment B) have been identified for a total cost of \$58,000:

1) Hatchery Cost and Production Model to be conducted in-house, \$0.

2) Biological Population Model to be conducted by Dr. Jeremy Collie, University of Alaska Southeast, \$10,000.

Sept. 11, 1991  
page two

3) Salmon Demand Model to be conducted by Dr. John Boyce,  
University of Alaska Fairbanks, \$18,000.

4) Fishing Cost Model to be conducted by Dr. Matthew Berman,  
University of Alaska Anchorage, Institute For Social and Economic  
Research, \$20,000.

5) Model Synthesis to be conducted by Dr. Terry Smith,  
University of Alaska Anchorage, Institute for Social and Economic  
Research, \$10,000.

We are working with the University administration to reduce the overhead component of these contracts and thereby reduce the total cost of this project. However, we are anxious to get started and would like your support to go ahead with funding. If tentative approval of funding can be obtained from Legislative Council members by about September 20, then work could begin by October 1, the first four components would be completed by mid-December, and we would have an overall report by February 1, 1992. Formal action to approve the expenditure of Senate leadership funds on these contracts would be slated for the Legislative Council's next meeting.

I would like your support as a member of the Legislative Council in approving the transfer of the funds needed for this project to the Special Fisheries Committee in order to contract for this work. If you have further questions on the actual project, please contact either the overall project coordinator Molly McCammon at 465-4453, or the Economics Working Group leader Ginny Fay at 465-3711.

I would appreciate hearing from you as soon as possible.

Sincerely,



Senator Dick Eliason, Chairman  
Senate Special Committee on Domestic  
and International Fisheries

# Alaska State Legislature

*Chair, Resources Committee  
Vice-chair, Transportation Committee  
Member, Rules Committee  
Member, Committee on Committees*

*District A  
Ketchikan, Wrangell, Petersburg,  
Hyder, Myers Chuck, Kupreanof*



**Senator Lloyd Jones**

352 Front Street  
Ketchikan, AK 99901  
907 225-9082  
Fax: 907 225-8546

P.O. Box V  
Juneau, AK 99811  
907 465-3743  
Fax: 907 465-3922

## **MEMORANDUM**

October 3, 1991

TO: Senator Dick Eliason  
Senate President

FROM: Senator Lloyd Jones *LJ*

SUBJECT: **Hatchery Research Project Funding**

I understand that there is a proposal which will be before Legislative Council to appropriate \$58,000 out of leadership monies to fund a package of several marketing/economic studies. These studies would be in conjunction with the hatchery research project which was authorized by the Senate Special Committee on Fisheries last session.

I want to let you know that I will support this funding request when it comes before Legislative Council.

# ALASKA STATE LEGISLATURE

SENATE STATE AFFAIRS,  
CHAIR

ETHICS COMMITTEE,  
CHAIR



Senator Pat Pourchot

ANCHORAGE  
P.O. BOX 104836  
ANCHORAGE, AK 99510  
(W) (907) 581-7823  
(H) (907) 338-2425

JUNEAU  
P.O. BOX V  
STATE CAPITOL  
JUNEAU, AK 99811  
(907) 465-3712

## MEMORANDUM

TO: Sen. Dick Eliason, Chair  
Senate Special Committee on  
Domestic and International Fisheries

DATE: Sept. 30, 1991

FR: Senator Pat Pourchot, Member  
Legislative Council

RE: Legislative Hatchery Work Project

This is to indicate my approval for the expenditure of Senate leadership funds on a research contract for the Legislative Hatchery Work Project.





Official Business

**Alaska State Legislature**  
**Senate**

*Office of The Majority Leader*

**Rick Halford**  
P.O. Box V  
State Capitol  
Juneau, Alaska 99811  
Phone (907) 463-4958

P.O. Box 190  
Chugiak, Alaska 99567  
Phone (907) 694-4958

**M E M O R A N D U M**

**TO:** Senator Dick Ellason  
Senate President

**FROM:** Senator Rick Halford *RH*

**RE:** Expenditure of leadership funds for salmon enhancement research

**DATE:** 10/9/91

---

**Senator Ellson:**

I have no objection if you should decide to expend \$58,000 in leadership funds to cover additional research to determine the economic impacts of the salmon enhancement program.

# State of Alaska

House Majority Leader  
COMMITTEES  
HOUSE JUDICIARY  
HOUSE RULES  
HOUSE STATE AFFAIRS  
SPECIAL COMMITTEE  
MILITARY AND VET. AFFAIRS  
LEGISLATIVE COUNCIL



Representative Max F. Gruenberg, Jr.  
District 11  
Spenard, Upper Midtown Anchorage

P.O. Box V  
JUNEAU, AK 99811  
(907) 465-3718  
465-4968/4986  
(SESSION)

3111 C STREET, SUITE 440  
ANCHORAGE, AK 99503  
(907) 561-7621

## MEMORANDUM

DATE: October 9, 1991

TO: Senator Dick Eliason

FROM: Representative Max F. Gruenberg, Jr. *Max*

SUBJECT: Senate Special Committee on International and  
Domestic Fisheries Funding

In your September 11, 1991 letter you asked for my support, as a member of the Legislative Council, for funding several committee projects totalling \$58,000. I am in support of this funding.

# Alaska State Legislature

## Senate

*Office of The Majority Leader*

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### M E M O R A N D U M

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RE: Expenditure of leadership funds for salmon enhancement  
research

DATE: 10/9/91

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I have no objection if you should decide to expend \$58,000 in leadership funds to cover additional research to determine the economic impacts of the salmon enhancement program.

STATE OF ALASKA  
House of Representatives  
District 27

Representative Cliff Davidson  
Chairman  
House Resources Committee



Box V, Juneau, AK 99811  
(907) 486-2487  
Box 746, Kodiak, AK 99615  
(907) 486-8250

**MEMORANDUM**

**TO:** President Richard Eliason  
Alaska State Senate

**FROM:** Representative Cliff Davidson  
Vice-Chair, Legislative Council

**DATE:** October 16, 1991

**SUBJECT:** Leg. Council approval of expenditure of funds over \$5,000.

As the acting Chairman of the Legislative Council, this memorandum is to register my approval of the transfer of \$58,000 of Senate leadership funds to the Senate Special Committee on International and Domestic Fisheries in order to contract for work to study the state's fish enhancement program as specified in your September 11 memorandum to Legislative Council members.

Please contact my office at 486-8250 if you have any questions.

Thank you.



STATE OF ALASKA  
House of Representatives  
District 27

Representative Cliff Davidson  
Chairman  
House Resources Committee

Box V, Juneau, AK 99811  
(907) 465-2487  
Box 746, Kodiak, AK 99615  
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MEMORANDUM

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FROM: Representative Cliff Davidson  
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DATE: October 16, 1991

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Please contact my office at 486-8250 if you have any questions.

Thank you.



Juneau Center for Fisheries and Ocean Sciences

School of Fisheries and Ocean Sciences  
University of Alaska Fairbanks  
11120 Glacier Highway  
Juneau, Alaska 99801

(907) 789-4441 Office  
(907) 789-4447 FAX

---

31 October 1991

The Honorable Senator R.I. Eliason  
Alaska State Legislature  
P.O.Box V (MS 3100)  
Juneau, Alaska 99811

Dear Senator Eliason:

The workshop on the "Biological Interactions of Natural and Enhanced Stocks of Salmon" will soon start. I want to thank you for making travel funds available, which have enabled us to invite a large number of experts. Enclosed is a copy of the Agenda which is final except for a few minor changes or additions. Also enclosed is a copy of the final Prospectus distributed to the participants.

I shall keep you informed on our progress.

Sincerely yours,

Ole A. Mathisen  
Professor of Fisheries

Oct. 30, 1991

**TENTATIVE AGENDA**  
**Workshop on the**  
**"Biological Interactions of Natural and Enhanced**  
**Stocks of Salmon in Alaska"**

**Saturday, November 9**

Participants arrive during the day.

6:00-7:30 pm Welcoming reception, at the Powder House  
 (transportation provided).

All the planary meetings are held in the Masonic Hall (located at the north end of First Street). The daily schedule is as follows:

7:45 - 8:30 a.m. Continental Breakfast (at the Masonic Hall)  
 8:30 - 10:00 a.m. First Morning Session  
 10:00 - 10:30 a.m. Coffee Break  
 10:30 - 12:00 Second Morning Session  
 1:30 - 3:00 p.m. First Afternoon Session  
 3:00 - 3:30 p.m. Coffee Break  
 3:30 - 5:00 p.m. Second Afternoon Session

**Sunday, November 10**

First Morning Session - 8:30-10:00 a.m.

**Opening remarks:**

1. G.L. Thomas, Director Prince William Sound Science Center
2. Goals of the Conference - Ole Mathisen, Univ. of Alaska-Juneau
3. Prince William Sound Aquaculture Corporation - John McMullen, President
4. State Genetic Policy - Jim Seeb, Alaska Dept. of Fish & Game

**Session 1 -- Ocean carrying capacity**  
**10:30-12:00**

1. *A theoretical evaluation of the carrying capacity of Prince William Sound, Alaska for juvenile Pacific salmon.*  
 R. Ted Cooney
2. *Density dependent changes in chum salmon, *Oncorhynchus Keta*, returning to Iwate Prefecture, Japan.* Hitoshi Ida
3. *Factors affecting marine growth of Bristol Bay sockeye salmon.*  
 Don Rogers

Agenda - Page 2

4. *Interaction in natural carrying capacity limitations for natural and enhanced stocks of salmon.* Percy Washington

**Session 2 -- Management of mixed stocks**

1:30-3:00 p.m.

1. *Trends in abundance of hatchery and wild stocks of pink salmon in Cook Inlet, Prince William Sound and Kodiak, Alaska.*  
Doug Eggers
2. *Management of mixed enhanced and wild salmonids in British Columbia.* (B.E. Riddell unable to attend - replacement???)
3. *Gene frequencies and the management of Pacific Salmon: Identification of wild and hatchery fish in mixed fisheries.*  
Jim Seeb

**Session 3 -- Summary and general discussion**

3:30-4:30 p.m.

**Evening**                      Seafood dinner at the Reluctant Fisherman  
Social hour, 6:30 p.m.; Dinner, 7 p.m.

**Monday, November 11**

**Session 4**

8:30-10 am -- **Basic Genetic Structure**

1. *Conservation of genetic diversity in salmonid fishes: why, what and how.* P.W. Allendorf
2. *The productive value of stream distances for estimating genetic relationship in salmonid species.* Fred Utter
3. *Population structure of chum salmon.* Lisa Seeb
4. *The importance of fine genetic structures in natural populations.* Tony Gharrett

**Session 4 continued**

10:30-12:00

5. *Quantitative genetic variation of life history traits in pink salmon.* William Smoker
6. *Genetic stock identification of Yukon River chum and chinook salmon.* Richard Wilmot



## Agenda - Page 3

7. *Genetic stock identification of Bristol Bay area salmon.* Rebecca Everett.

**Session 5 -- Straying**

1:30 - 2:00 pm

1. *Homing, straying and the interaction between wild and enhanced stocks of salmon.* T.P. Quinn
2. (TBA) Sven Ebbesson (unable to attend -- paper to be distributed?)

**Session 6 -- Long Term Case Histories**

2:00-3:00 pm

1. *Interactions between wild and cultured Atlantic salmon -- A review of the experience in Norway.* Tor Heggberget
2. *The status of wild and hatchery propagated Swedish salmon stocks after 40 years of hatchery releases in the Baltic rivers.* Torleif Eriksson

**Session 6 continued**

3:30-5 pm

3. *The status of the Snake River chinook.* Ernest Brannon
4. *The Soviet experience in the field of salmon interactions.* Mikhail Glubokovsky
5. General discussion

**Tuesday, November 12**

Field trip to Wally Norenberg Hatchery at Esther Island (western Prince William Sound) -- *Weather dependent, this may be delayed until Wednesday.*

**Wednesday, November 13****Session 7 -- Interactions in Prince William Sound**

8:30-10 am

1. *Historical production of wild and enhanced stocks of pink salmon in Prince William Sound.* Sam Sharr

Agenda - Page 4

**Session 7 continued**

**10:30-12 noon -- Interactions in Prince William Sound**

**Session 8 -- Interactions in Southeast Alaska**

**1:30-3 pm**

- 1. Chinook Enhancement in Southeast Alaska. Bill Heard**
- 2. An Overview of the Pink, Chum and Coho Enhancement programs in Southeast Alaska. Don Amend**

**Session 8 continued**

**3:30-5 pm -- Interactions - General discussion**

**Thursday, November 14**

**Session 9 -- Interactions regarding other species, especially sockeye**

**8:30-10 am**

**Session 9 continued**

**10:30-12 Noon**

**Session 10 -- The Working Party: Writing sessions divided into sub-groups**

**1:30-5:00 pm**

**Friday, November 15**

**Session 11 -- Approval of document**

**8:30-12 Noon**

**Afternoon**

**Departures**



## Juneau Center for Fisheries and Ocean Sciences

School of Fisheries and Ocean Sciences  
University of Alaska Fairbanks  
11120 Glacier Highway  
Juneau, Alaska 99801

(907) 789-4441 Office  
(907) 789-4447 FAX

### WORKSHOP ON THE BIOLOGICAL INTERACTIONS OF NATURAL AND ENHANCED STOCKS OF SALMON IN ALASKA

#### History and Background

Hatchery operations of salmon and trout have been in progress for more than a century in Europe, North American and North Asia. For a long time little impact was felt on the natural stocks because the operations were small in scale and generally unsuccessful due to lacking biological understanding of the reproductive process and survival mechanisms in salmonid species. This has changed in Alaska, especially during the last couple of decades. Some enhancement project involving artificial propagations have produced startling results and the scope of operations are now large enough to profoundly affect natural stocks, the economic aspects of fishing and processing, and marketing.

However, no statements have been written to evaluate biological impacts which is one of the basic tasks of the proposed workshop. It is also a reflection on Alaska's present concern to preserve the natural heritage with which the State is endowed and that changes, some of an irreversible nature, must have the approval of all segments of the population.

Plans for a workshop on the biological interactions of natural and enhanced fish stocks in Alaska was initiated a year ago. It follows international meetings on this topic in Norway (1990, Institute of Nature Conservation), in Canada (1991, Department of Fisheries and Oceans), in Moscow, Idaho and Pullman Washington (1991, NATO), and in Hakodate (1991, University of Hokkaido). The impact of enhanced salmon on natural stocks was identified as one of five most important natural resources issues to the Greater Prince William Sound Area in a 1990 conference sponsored by the Science Center.

During the 1991 Alaska legislative session, the high abundance of salmon and low ex-vessel prices created caused concern about salmon enhancement projects throughout the State, of which the impacts of enhanced salmon on natural stocks is an important consideration. Four hatchery research project study groups were established by the Alaska State Senator Eliason, to research various questions regarding interactions between the fisheries for natural and enhanced stocks of salmon. The mission

of these groups is to prepare background material for a full scale debate by the Alaska State Legislature next spring. This workshop is independent of these legislative study groups, but complementary because it focuses in depth on the biological questions related to salmon enhancement.

### Definitions and Constraints

1. Salmon enhancement is used synonymously with Ocean Ranching.
2. Pen farming of salmonid species will not be included.
3. Lake fertilization or other indirect enhancement measures such as habitat manipulation also fall outside the mandate.

### Purpose

Non-profit hatchery operations and ocean ranching was legalized by the Alaska State Legislature in 1972. This occurred at a time when natural production was at a low point which also coincided with a low point of ocean temperatures. The purpose was to supplement the natural production and especially to smooth out some of the existing interannual variability. But the mandate by the Legislature to the regulatory agencies was to manage for the natural stocks and this became a Public Policy.

In the beginning this was not a problem as long as the ocean ranching took place on a limited scale. In recent years with favorable survival conditions both natural and enhanced stocks have reached unprecedented magnitudes. In some areas of successful hatchery operations natural populations have declined. Thus, the major question for the workshop is to examine:

"The Biological Basis for Maintaining Strong Coexisting Stocks of Natural and Enhanced Salmon Populations in Alaska"

In this short statement is embodied all the biological problems of the Alaskan salmon populations involving behavior and straying, cross breeding and survival rates, ocean carrying capacity and harvest rates.

### Objectives

1. To examine and evaluate the relevant genetic and behavioral characteristics of natural and enhanced stocks of salmonid fishes as they relate to hatchery issues in Alaska.
2. To consider life, mortality, or survival tables for fresh water, estuarine, coastal jet, and oceanic environments, linked in space and time, for natural and enhanced stocks of salmon in Alaska.



3. To examine relevant groupings of time series case histories of interactions of natural and enhanced stocks of salmon outside Alaska.
4. To explore limits to the carrying capacity of the ocean environment in the Gulf of Alaska.

### Organization

The workshop will convene a small group of experts by invitations in Cordova, Alaska under the auspices of the Prince William Sound Science Center and the School of Fisheries and Ocean Sciences at the University of Alaska, Fairbanks. The participants fall into three categories: International experts, National experts outside Alaska, and experts from inside Alaska. Many of the participants will be asked to prepare papers on topics related to the workshops objectives.

These invited papers will be circulated for peer review, edited by the workshop chairpersons, and submitted for a special issue (workshop proceedings) publication.

In recognition of the complexity of this issue and the limited amount of synoptic information to evaluate it, unanimous conclusions and recommendations are not anticipated so the underlying risk functions of different courses of action must be considered.

The workshop will be organized around 5 separate Sessions:

1. The basic genetic structures of salmon stocks.
2. Time series of hatchery data and experiments from non-Alaskan sources.
3. Interactions Issues in Alaska

This session will be organized by three species groupings (pink-chum, sockeye, chinook-coho) or by two geographic areas, Prince William Sound and Southeast Alaska. Kodiak and Cook Inlet information will be used if appropriate. This latter alternative might be advantageous due to the interaction between grouping of species.

4. Carrying Capacity of the Ocean
5. Summary of Results and Conclusions with some Recommendations for Future High Priority Directed Research.

A Discussant will be appointed for each Session with the assignment of drafting a Report to be presented in the final session.

Following the Workshop these reports will be polished off and assembled whereafter a small Review and Editorial Group will meet in Juneau or elsewhere for completion of the final Group Report. The individual session reports or final report will be treated as the invited papers: circulated for peer review, edited, and submitted with the invited papers as a special issue (workshop proceedings) publication. A scientific journal will be sought as the publisher, pending quality of the papers.

### Methods

The workshop will be convened on November 10 and run continuously through the 15th. Expenses will be provided to all international guests and to those North American participants that require it.

### Products

December 1991: A final report on the Workshop sessions.

June 1992: Submission of the Workshop Proceedings as an issue of a scientific journal.

### Sponsorship

This workshop is sponsored by the Prince William Sound Science Center (PWSSC) and the School of Fisheries and Ocean Sciences (SFOS) University of Alaska, Fairbanks.

Co-chairpersons are Dr. A. Ole Mathisen, SFOS, and Dr. G.L. Thomas, PWSSC. The list of contributors include: Alaska Department of Fish and Game, Pacific Seafood Processors Association, Pew Charitable Trust, Prince William Sound Aquaculture Association, Sealaska Corporation, and University of Alaska Fairbanks.



P.O. Box 705  
Cordova, AK 99574  
(907) 424-5800 FAX: (907) 424-5820

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**Workshop on the  
"Biological Interactions of Natural and Enhanced  
Stocks of Salmon in Alaska"**

**DATES:** Sunday, Nov. 10 - Friday, Nov. 15, 1991

**AT:** Masonic Hall and the Prince William Sound Science Center  
Cordova, Alaska

**ORGANISERS:** Prince William Sound Science Center and the  
School of Fisheries and Ocean Sciences,  
University of Alaska

**OBJECTIVES:**

1. To examine and evaluate the relevant genetic and behavioral characteristics of natural and enhanced stocks of salmonid fishes as they relate to hatchery issues in Alaska.
2. To consider life, mortality, or survival tables for fresh water, estuarine, coastal jet, and oceanic environments, linked in space and time, for natural and enhanced stocks of salmon in Alaska.
3. To examine relevant groups of time series case histories of interactions of natural and enhanced stocks of salmon outside Alaska.
4. To explore limits to the carrying capacity of the ocean environment in the Gulf of Alaska.

The major question for this workshop is to examine:

"The biological basis for maintaining strong coexisting stocks of natural and enhanced salmon populations in Alaska."

**AGENDA**

The workshop will convene a small group of experts from the international community, from elsewhere in North America and from inside Alaska. During the first two days of the workshop, which are open to the general public, papers will be presented on topics related to the workshop's objectives. A tentative list of the speakers and their topics is attached.

The latter days of the workshop will involve the experts in small group work sessions and a writing session. A summary of the

results and any conclusions reached will be approved at the final workshop session Friday morning, Nov. 15.

A final report on the workshop will be completed in December 1991. The papers presented will be circulated for peer review, edited by the workshop chairpersons and submitted for publication in June 1992.

**WORKSHOP**

**CHAIRPERSONS:** Ole Mathisen, *School of Fisheries, University of Alaska, Juneau, Alaska*  
G.L. (Gary) Thomas, *Director, Prince William Sound Science Center, Cordova, Alaska*

The list of contributors includes:

The Pew Charitable Trusts  
Alaska Department of Fish & Game  
Pacific Seafood Processors Association  
Prince William Sound Aquaculture Corporation  
Sealaska Corporation  
School of Fisheries and Ocean Science, University of Alaska  
Prince William Sound Science Center

For further information: Nancy Bird, (907) 424-5800 or  
FAX 424-5820



**Tentative list of Workshop Participants and their Topics**

**Conservation of genetic diversity in salmonid fishes: why, what and how.**

W.W. Allendorf, Division of Biological Sciences, Missoula, Montana

**An Overview of the Pink, Chum and Coho Enhancement programs in Southeast Alaska.**

Don Amend, Southern Southeast Regional Aquaculture Association, Ketchikan, Alaska

**The status of the Snake River chinook.**

Ernest Brannon, University of Idaho, Moscow, Idaho

**A theoretical evaluation of the carrying capacity of Prince William Sound, Alaska for juvenile Pacific salmon.**

Ted Cooney, School of Fisheries & Ocean Sciences, University of Alaska, Fairbanks, Alaska

~~Ewen Ebbesson, Institute of Marine Science, University of Alaska, Seward, Alaska - unable to attend~~

**Trends in abundance of hatchery and wild stocks of pink salmon in Cook Inlet, Prince William Sound and Kodiak, Alaska.**

Doug Eggers, Chief Fisheries Scientist, Alaska Dept. of Fish & Game, Juneau, Alaska

**Torleif Eriksson, Swedish Univ. of Agricultural Sciences, Department of Aquaculture, Umea, Sweden**

**The importance of fine genetic structures in natural populations.**

Tony Gharrett, School of Fisheries, University of Alaska, Juneau, Alaska

**The Soviet experience in the field of salmon interactions.**

Mikhail Glubokovsky, Institute of Marine Biology, Far East Branch, Vladivostok, USSR

**Chinook Enhancement in Southeast Alaska.**

Bill Heard, National Marine Fisheries Service, Juneau, Alaska

**Interactions between wild and cultured Atlantic salmon --**

**A review of the experience in Norway.**

Tor Heggberget, NINA, Norsk Institutt for Naturforskning, Trondheim, Norway

**Density dependent changes in chum salmon, *Oncorhynchus keta*, returning to Iwate Prefecture, Japan.**

Hiroshi Ida, Kitasato University School of Fisheries Sciences, Sanriku-cho, Kesen-gun, Japan

Ole Mathisen, Director, Fisheries School, University of Alaska,  
Juneau, Alaska

John McMullen, President, Prince William Sound Aquaculture  
Corporation, Cordova, Alaska

*Homing, straying and the interaction between wild and enhanced  
stocks of salmon.*

T.P. Quinn, Fisheries Research Institute, University of  
Washington, Seattle, Washington

~~Management of mixed enhanced and wild salmonids in British  
Columbia.~~

~~B. E. Riddell, Dept. of Fisheries and Ocean, Biological Sciences  
Branch, Nanaimo, British Columbia, Canada~~ *replacement  
being  
sought*

*Factors affecting marine growth of Bristol Bay sockeye salmon.*

Don Rogers, Fisheries Research Institute, University of  
Washington, Seattle, Washington

*Gene frequencies and the management of Pacific Salmon:*

*Identification of wild and hatchery fish in mixed fisheries.*

Jim Seeb, Alaska Dept. of Fish & Game, Anchorage, Alaska

*Population Structure of Chum Salmon*

Lisa Seeb, Alaska Dept. of Fish & Game, Anchorage, Alaska

Sam Sharr, Research Biologist, Alaska Dept. of Fish & Game,  
Cordova, Alaska

Bill Smoker, School of Fisheries, University of Alaska,  
Juneau, Alaska

Gary Thomas, Director, Prince William Sound Science Center,  
Cordova, Alaska

*The productive value of stream distances for estimating genetic  
relationship in salmonid species.*

Fred M. Utter, National Oceanic and Atmospheric Administration  
(NOAA), Seattle, Washington

Percy Washington, GAIA NW Inc., Seattle, Washington

Additions

Rebecca Everett, USFWS

Richard Wilmot USFWS

**TENTATIVE AGENDA**  
**Workshop on the**  
**"Biological Interactions of Natural and Enhanced**  
**Stocks of Salmon in Alaska"**

**Saturday, November 9**

Participants arrive during the day.

6:00-7:30 pm Welcoming reception, at the Powder House  
(transportation provided).

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**Sunday, November 10**

First Morning Session - 8:30-10:00 a.m.

Opening remarks:

1. G.L. Thomas, Director Prince William Sound Science Center
2. Goals of the Conference - Ole Mathisen, Univ. of Alaska-Juneau
3. Prince William Sound Aquaculture Corporation - John McMullen, President
4. State Genetic Policy - Jim Seeb, Alaska Dept. of Fish & Game

Session 1 -- Ocean carrying capacity  
10:30-12:00

1. A theoretical evaluation of the carrying capacity of Prince William Sound, Alaska for juvenile Pacific salmon.  
R. Ted Cooney
2. Density dependent changes in chum salmon, *Oncorhynchus Keta*, returning to Iwate Prefecture, Japan. Hitoshi Ida
3. Factors affecting marine growth of Bristol Bay sockeye salmon.  
Don Rogers

**Agenda - Page 2**

4. *Interaction in natural carrying capacity limitations for natural and enhanced stocks of salmon.* Percy Washington

**Session 2 -- Management of mixed stocks  
1:30-3:00 p.m.**

1. *Trends in abundance of hatchery and wild stocks of pink salmon in Cook Inlet, Prince William Sound and Kodiak, Alaska.* Doug Eggers
2. *Management of mixed enhanced and wild salmonids in British Columbia.* (B.E. Riddell unable to attend - replacement???)
3. *Gene frequencies and the management of Pacific Salmon: Identification of wild and hatchery fish in mixed fisheries.* Jim Seeb

**Session 3 -- Summary and general discussion  
3:30-4:30 p.m.**

**Evening**                      Seafood dinner at the Reluctant Fisherman  
Social hour, 6:30 p.m.; Dinner, 7 p.m.

**Monday, November 11**

**Session 4  
8:30-10 am -- Basic Genetic Structure**

1. *Conservation of genetic diversity in salmonid fishes: why, what and how.* F.W. Allendorf
2. *The productive value of stream distances for estimating genetic relationship in salmonid species.* Fred Utter
3. *Population structure of chum salmon.* Lisa Seeb
4. *The importance of fine genetic structures in natural populations.* Tony Garrettt

**Session 4 continued  
10:30-12:00**

5. *Quantitative genetic variation of life history traits in pink salmon.* William Smoker
6. *Genetic stock identification of Yukon River chum and chinook salmon.* Richard Wilmot



## Agenda - Page 3

7. *Genetic stock identification of Bristol Bay area salmon.* Rebecca Everett.

**Session 5 -- Straying**

1:30 - 2:00 pm

1. *Homing, straying and the interaction between wild and enhanced stocks of salmon.* T.P. Quinn
2. (TBA) Ewan Ebbesson (unable to attend -- paper to be distributed?)

**Session 6 -- Long Term Case Histories**

2:00-3:00 pm

1. *Interactions between wild and cultured Atlantic salmon -- A review of the experience in Norway.* Tor Heggberget
2. *The status of wild and hatchery propagated Swedish salmon stocks after 40 years of hatchery releases in the Baltic rivers.* Torleif Eriksson

**Session 6 continued**

3:30-5 pm

3. *The status of the Snake River chinook.* Ernest Brannon
4. *The Soviet experience in the field of salmon interactions.* Mikhail Glubokovsky
5. General discussion

**Tuesday, November 12**

Field trip to Wally Norenberg Hatchery at Esther Island (western Prince William Sound) -- Weather dependant, this may be delayed until Wednesday.

**Wednesday, November 13****Session 7 -- Interactions in Prince William Sound**

8:30-10 am

1. *Historical production of wild and enhanced stocks of pink salmon in Prince William Sound.* Sam Sharr

**Agenda - Page 4**

**Session 7 continued**

**10:30-12 noon -- Interactions in Prince William Sound**

**Session 8 -- Interactions in Southeast Alaska**

**1:30-3 pm**

- 1. Chinook Enhancement in Southeast Alaska. Bill Heard**
- 2. An Overview of the Pink, Chum and Coho Enhancement programs in Southeast Alaska. Don Amend**

**Session 8 continued**

**3:30-5 pm -- Interactions - General discussion**

**Thursday, November 14**

**Session 9 -- Interactions regarding other species, especially  
sockeye**

**8:30-10 am**

**Session 9 continued**

**10:30-12 Noon**

**Session 10 -- The Working Party: Writing sessions divided into  
sub-groups**

**1:30-5:00 pm**

**Friday, November 15**

**Session 11 -- Approval of document**

**8:30-12 Noon**

**Afternoon**

**Departures**

# ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
RESOURCES COMMITTEE  
RULES COMMITTEE  
CHAIRMAN, SPECIAL COMMITTEE ON  
DOMESTIC & INTERNATIONAL  
COMMERCIAL FISHERIES



P.O. BOX 143  
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JUNEAU, ALASKA 99811  
(907) 485-4916

FAX (907) 485-4928

November 12, 1991

Commissioner Glenn Olds  
Alaska Department of Commerce and Economic Development  
P.O. Box D  
Juneau, AK 99811

Dear Commissioner Olds:

As you know, in May the Senate Special Committee on International and Domestic Fisheries initiated an extensive review of the Alaska salmon enhancement program. The purpose of the study is to review the program's history and legislative intent, current status, and future direction. As part of the Legislative Hatchery Research Project, an Economics and Marketing study group was developed to provide information to the legislature on the economic impacts of enhanced salmon production. The group is to help determine

- if the current levels of Alaska salmon harvests are over-or under-supplied from a world-market perspective and
- if increased hatchery production of salmon will lower prices, fishing and processing revenues, and the total net value of Alaska's salmon fisheries.

The initial task of the economics and marketing group was to review completed research and identify specific topics requiring additional research, a portion of which would be completed through contracts. Based on this review, the economics and marketing group proposed five principal research components as follows:

- 1) a hatchery production and cost model,
- 2) a fish population model linked to fishing effort and harvests,
- 3) a demand model for Alaska salmon in world markets,
- 4) a fishing cost model, and
- 5) a computer software system to combine the four models.

Commissioner Olds  
November 12, 1991  
Page 2

This proposal was based also, in part, on discussions between legislative staff working on the Legislative Hatchery Research Project and members of your staff working with the Salmon Strategy Task Force. In order to avoid duplication in research efforts, it was agreed that the legislative study would focus on economic analyses while the Salmon Strategy Task Force, through the Department of Commerce and Economic Development, would focus on marketing analyses.

To date, it appears that the efforts have succeeded in being complimentary. To continue to avoid duplication, I would like to inform you that on November 1 the Legislative Council approved funding for the proposed legislative research contracts. We expect to award the contracts by November 15. The results of these analyses will provide valuable information on worldwide markets and demand for Alaska salmon as well as an assessment of the Alaska salmon enhancement program. Preliminary results of the research will be available in April 1992. We will keep you informed on the progress of the research.

Thank you for your cooperation in these important research efforts.

Sincerely,



Senator Dick Eliason, Chairman  
Senate Special Committee on Domestic and International Fisheries



NORTHERN



SOUTHEAST REGIONAL AQUACULTURE ASSOCIATION, INC.

(907) 747-6850

1308 SAWMILL CREEK ROAD

SITKA, ALASKA 99835

FAX (907) 747-1470

December 3, 1991

Mr. Clem Tillion  
Special Assistant to  
the Governor on Fisheries  
P O Box A  
Juneau, AK 99811-0101

Dear Mr. Tillion:

Last year the Alaska Board of Fisheries charged the two Regional Aquaculture Associations in Southeast Alaska (NSRAA & SSRAA) with the task of developing an allocation plan for enhanced salmon on a Southeast-wide basis. In response to the Board of Fisheries charge, both NSRAA and SSRAA appointed a troller, gillnetter, and a seiner from our Boards to serve on a Southeast-wide Allocation-Task Force.

In the process of assembling the data and facts pertinent to formulating an allocation plan it became painfully evident that the existing data is subject to a high degree of variability because we, as a State, have not required marking of all hatchery stocks, nor has the State maintained an adequate mark recovery program. It is our understanding that much of the mark recovery effort for Southeast is financed by the U.S./Canada Treaty Commission. Things would be even worse if U.S./Canada funding were not available.

We would like to recommend that the State of Alaska make a commitment to a mark recovery program for Southeast Alaska. Real numbers of fish cannot be established without a marking and recovery program. The cornerstone of any plan we come up with, is the accuracy and consistency of catch data.

Thank you in advance for your consideration.

Sincerely,

Dave Pitcher, Chairman  
Southeast Allocation Task Force

NORTHERN



SOUTHEAST REGIONAL AQUACULTURE ASSOCIATION, INC.

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Thank you in advance for your consideration.

Sincerely,

Dave Pitcher, Chairman  
Southeast Allocation Task Force

NORTHERN



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December 3, 1991

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Special Assistant to  
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P O Box A  
Juneau, AK 99811-0101

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Thank you in advance for your consideration.

Sincerely,

Dave Pitcher, Chairman  
Southeast Allocation Task Force



# Alaska State Legislature

SENATOR RICHARD I. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

## MEMORANDUM

TO: Gordon Harrison, Director  
Legislative Research Agency

FROM: Senator Dick Eliason   
President of the Senate

DATE: December 9, 1991

SUBJECT: Legislative Review of the Alaska Salmon Enhancement Program

Thank you for your agency's work on the Legislative Review of the Alaska Salmon Enhancement Program. As you probably know, the Legislative Council approved funding for the review's economic studies. The economic portion of the research is being conducted by the University of Alaska Fairbanks (UAF), Department of Economics. Part of this research includes a survey of hatchery operation.

My staff contacted you earlier this year regarding the hatchery survey with which we would like your assistance. We hope to have the survey to you for mailing early the week of December 9.

In addition, Linda Snow of your staff provided us with information regarding sources of economic data for the salmon demand analysis. Dr. Mark Herrmann of UAF has asked us if he could contact Ms. Snow with additional follow-up questions. We have referred him to your agency for assistance.

Thank you again for your continued cooperation.





# Alaska State Legislature

SENATOR RICHARD L. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

December 9, 1991

Dr. Keith Criddle, Chair  
Department of Economics  
University of Alaska, Fairbanks  
Fairbanks, AK 99775-0580

Dear Dr. Criddle:

Thank you for submitting a proposal for an economic analysis of the Alaska Salmon Enhancement Program. As you know, the Senate Special Committee on Domestic and International Commercial Fisheries received proposals from the University of Alaska - Anchorage (UAA), Institute of Social and Economic Research, and the University of Alaska - Fairbanks (UAF), Department of Economics. A team of economists including: Kurt Schelle and Dr. Ben Muse with the Alaska Commercial Fisheries Entry Commission; Jeff Hartman with the Alaska Department of Fish and Game - F.R.E.D. Division; Dr. Gardner Brown with the University of Washington; Dr. James Hastie with National Marine Fisheries Service (NMFS); and Ginny Fay a Legislative Analyst for the Senate Fisheries Committee, reviewed and ranked the proposals.

While both of the sets of proposals were strong, the decision was made to award the contracts to the University of Alaska, Fairbanks (UAF). Two major factors contributed to this decision. The first is Dr. Mark Herrmann's more extensive experience and expertise in salmon demand modeling. The second is the UAF, School of Management's waiver of the administrative overhead; this waiver will allow almost three additional months of research time devoted to the project.

Both fishing cost model proposals received relatively "low marks" by most of the reviewers. This is largely attributable to the higher level of risk to obtaining reliable results from relatively "novel" empirical approaches to estimating marginal fishing costs. As a result, as terms of this contract, we would like additional information on your default research approach and your researcher to keep committee staff fully apprised on research progress.

Dr. Keith Criddle  
December 9, 1991  
Page Two  
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Thank you again for submitting a proposal and we look forward to working with you as the research progresses.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dick Eliason".

Senator Dick Eliason



# Alaska State Legislature

SENATOR RICHARD L. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 463-3755

December 9, 1991

Dr. Lee Gorsuch  
University of Alaska, Anchorage  
Institute of Social and Economic Research  
3211 Providence Drive  
Anchorage, AK 99508

Dear Dr. Gorsuch:

Thank you for submitting a proposal for an economic analysis of the Alaska Salmon Enhancement Program. As you know, the Senate Special Committee on Domestic and International Commercial Fisheries received proposals from the University of Alaska - Anchorage (UAA), Institute of Social and Economic Research, and the University of Alaska - Fairbanks (UAF), Department of Economics. A team of economists including: Kurt Schelle and Dr. Ben Muse with the Alaska Commercial Fisheries Entry Commission; Jeff Hartman with the Alaska Department of Fish and Game - F.R.E.D. Division; Dr. Gardner Brown with the University of Washington; Dr. James Hastie with National Marine Fisheries Service (NMFS); and Ginny Fay a Legislative Analyst for the Senate Fisheries Committee, reviewed and ranked the proposals.

While both of the sets of proposals were strong, the decision was made to award the contracts to the University of Alaska, Fairbanks (UAF). Two major factors contributed to this decision. The first is Dr. Mark Herrmann's more extensive experience and expertise in salmon demand modeling. The second is the UAF, School of Management's waiver of the administrative overhead; this waiver will allow almost three additional months of research time devoted to the project.

Thank you again for your interest in the Committee's research and submitting a proposal. A special thanks to Dr. Terry Smith for his assistance coordinating the proposal submission.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dick Eliason", is written over the word "Sincerely,".

Senator Dick Eliason



# Alaska State Legislature

## SENATE

Official Business

December 9, 1991

P.O. Box V  
State Capitol  
Juneau, Alaska 99811

To: Tamara Cook, Director  
Division of Legal Services

From: Senator Dick Eliason, Chairman   
Senate Special Committee on Domestic and International Commercial Fisheries

RE.: Reimbursable Services Agreements with the Alaska Commercial Fisheries Entry Commission and the University of Alaska Fairbanks

Per your conversation with committee staff on December 6, I am providing more detailed information regarding the contractual language required for the data transfer between the Commercial Fisheries Entry Commission (CFEC) and the University of Alaska Fairbanks, Department of Economics (UAF). The Senate Special Committee on Domestic and International Fisheries is contracting for economic analyses of the Alaska salmon enhancement program. The research to be conducted requires access to CFEC data files.

State CFEC confidentiality statutes (AS 16.05.815) specify that access to confidential data files is restricted to employees of the Alaska Department of Fish and Game (ADF&G) and CFEC, or contractors of ADF&G or CFEC. In addition, a portion of the economic research to be done by UAF requires some preliminary computer analysis by CFEC staff. Therefore, the Senate Committee, through the Legislative Affairs Agency (LAA), is entering into an RSA with the CFEC for the data analysis and a subcontract for the economic studies (attachments).

As terms of this agreement with CFEC, we have agree to provide contractual language specifying confidentiality requirements. The points to include in this agreement are:

- researchers must abide by confidentiality requirements as specified in AS 16.05.815;
- confidentiality compliance must be to the standards set by the Commercial Fisheries Entry Commission;
- reports to the legislature, as well as any other publications including professional journals, must comply with confidentiality statutes and standards; and
- all CFEC data must be returned to CFEC when the project is completed.

Thank you for your assistance.

Attachments



ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
RESOURCES COMMITTEE  
RULES COMMITTEE  
CHAIRMAN, SPECIAL COMMITTEE ON  
DOMESTIC & INTERNATIONAL  
COMMERCIAL FISHERIES



P.O. BOX 143  
SITKA, ALASKA 99835

P.O. BOX V  
JUNEAU, ALASKA 99811  
(907) 485-4918

FAX (907) 485-4928

Oct. 2, 1992

Mr. Ken Roberson  
Gulkana Hatchery  
P. O. Box 47  
Glenallen, Alaska 99588-0047

Dear Mr. Roberson:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

Thank you again for your significant time and cooperation.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dick", written in dark ink.

Senator Dick Eliason, Chairman  
Special Committee on Domestic and  
International Commercial Fisheries

ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

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FAX (907) 465-4928

Oct. 2, 1992

Mr. Gary Wall  
Fort Richardson Hatchery  
P. O. Box 5-337  
Fort Richardson, Alaska 99505-0337

Dear Mr. Wall:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

Thank you again for your significant time and cooperation.

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Senator Dick Eliason, Chairman  
Special Committee on Domestic and  
International Commercial Fisheries

ALASKA STATE LEGISLATURE SENATE

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(907) 465-4916

FAX (907) 465-4928

Oct. 2, 1992

Mr. Darrell Keifer  
Elmendorf Hatchery  
716 Steel Street  
Anchorage, Alaska 99501

Dear Mr. Keifer:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

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ALASKA STATE LEGISLATURE SENATE

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FAX (907) 465-4928

---

Oct. 2, 1992

Mr. David Bright  
Deer Mountain Hatchery  
2030 Sea Level Drive, Suite 205  
Ketchikan, Alaska 99901

Dear Mr. Bright:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

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Senator Dick Eliason, Chairman  
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Oct. 2, 1992

Mr. Jim Billi  
Crystal Lake Hatchery  
P. O. Box 1088  
Petersburg, Alaska 99833-1088

Dear Mr. Billi:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

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(907) 465-4916

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Oct. 2, 1992

Mr. Tim Joyce  
Kitoi Bay Hatchery  
211 Mission Road  
Kodiak, Alaska 99615-6399

Dear Mr. Joyce:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

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Senator Dick Eliason, Chairman  
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ALASKA STATE LEGISLATURE SENATE

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(907) 485-4916

FAX (907) 485-4928

Oct. 2, 1992

Mr. Steve Hansen  
Klawock Hatchery  
P. O. Box 101  
Klawock, Alaska 99925-0101

Dear Mr. Hansen:

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Senator Dick Eliason, Chairman  
Special Committee on Domestic and  
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ALASKA STATE LEGISLATURE SENATE

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FAX (907) 465-4928

Oct. 2, 1992

Mr. Chris Clevenger  
Pillar Creek Hatchery  
211 Mission Road  
Kodiak, Alaska 99615-6399

Dear Mr. Clevenger:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

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Senator Dick Eliason, Chairman  
Special Committee on Domestic and  
International Commercial Fisheries



ALASKA STATE LEGISLATURE SENATE

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JUNEAU, ALASKA 99811  
(907) 585-4918

FAX (907) 465-4928

Oct. 2, 1992

Mr. Peter Rob  
Sikusuilag Springs Hatchery  
P. O. Box 1030  
Kotzebue, Alaska 99572-1030

Dear Mr. Rob:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

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Senator Dick Eliason, Chairman  
Special Committee on Domestic and  
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ALASKA STATE LEGISLATURE SENATE

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FAX (907) 465-4928

Oct. 2, 1992

Mr. John McNair  
Snettisham Hatchery  
P. O. Box 20  
Douglas, Alaska 99824

Dear Mr. McNair:

I would like to thank you and your staff for the considerable time and effort you have devoted to completing the salmon enhancement production and costs surveys. These surveys were sent to you over the last few months as part of the legislative review of the Alaska salmon enhancement program. The economic benefit-cost analysis of the program is nearing completion as a result of your assistance and cooperation. The members of the Senate Special Committee on Domestic and International Commercial Fisheries are looking forward to reviewing these results and sharing them with you. The information from this economic review will help the legislature in the development of public policy considerations to ensure that the salmon enhancement program can continue to be a successful program.

Thank you again for your significant time and cooperation.

Sincerely,

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Senator Dick Eliason, Chairman  
Special Committee on Domestic and  
International Commercial Fisheries



# Alaska State Legislature

SENATOR RICHARD I. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

September 30, 1992

Representative David Finkelstein, Chair  
Select Committee on Legislative Ethics  
3111 "C" Street, Suite 465  
Anchorage, AK 99503

Re: **DISCLOSURE STATEMENT**

Dear Representative Finkelstein:

Pursuant to AS 24.60.080(d), I am disclosing a gift of travel in excess of \$100 while attending the NCSL Leadership Staff Conference in Anchorage, September 13 - 16, 1992.

BP Exploration provided transportation from Anchorage to Deadhorse, Alaska, to view their facilities and the surrounding areas on September 13. The approximate value of this trip was \$250.

Sincerely,

A handwritten signature in cursive script that reads "Jo-Eve R. Benedict".

Jo-Eve R. Benedict  
Legislative Assistant for  
Senator Dick Eliason

ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
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(907) 465-4916

FAX (907) 465-4928

September 16, 1992

Mr. Carl Rosier, Commissioner  
Dept. of Fish and Game  
P. O. Box 25526  
Juneau, Alaska 99802-5526

Dear Commissioner Rosier:

As you know the trollers in Southeast are attempting to come up with a proposal for next year's chinook season. I would like to know the Dept. of Fish and Game's best estimate on how long the summer chinook troll season in Southeast would be if we did not have a winter fishery. For the purpose of this exercise, last year's catch statistics might be used.

It is of great concern to me that the individual(s) computing the length of this hypothetical extended summer season take into account not only the amount of fish available for harvest, but also the fact that **success in harvesting diminishes relative to the length of the season.** The differences in the catch per unit effort (CPUE) between winter and summer should be taken into account. If one does not take this into account, and merely divides the average daily catch by the number of fish available, the answer will not be accurate.

I would be most interested in receiving a letter from you with the answer to this question as soon as you can conveniently manage it, and I greatly appreciate your assistance. Any questions regarding this correspondence may be directed to Laura Fleming of my staff (465-4916 in Juneau.)

Sincerely,

A handwritten signature in dark ink, appearing to read "Dick Eliason".  
Senator Dick Eliason



ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
RESOURCES COMMITTEE  
RULES COMMITTEE  
CHAIRMAN, SPECIAL COMMITTEE ON  
DOMESTIC & INTERNATIONAL  
COMMERCIAL FISHERIES



P.O. BOX 143  
SITKA, ALASKA 99835

P.O. BOX V  
JUNEAU, ALASKA 99811  
(907) 465-4916

FAX (907) 465-4928

MEMORANDUM

TO: Vanessa Fleming  
Municipal Grants  
Dept. of Administration

FROM: Senator Dick Eliason 

DATE: September 16, 1992

RE: FY 93 Municipal grant to City of Hydaburg for road  
improvements

The expressed desire of the City of Hydaburg to use some of the FY 93 municipal grant funding designated for "Hydaburg Street Improvements" for equipment maintenance and repair is consistent with legislative intent in making this appropriation. If you would like any additional information, please contact my office.

cc: Rep. Jerry Mackie

# ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
RESOURCES COMMITTEE  
RULES COMMITTEE  
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December 23, 1991

Kenneth J. Kiffer  
630 North Point Higgins Road  
Ketchikan, AK 99901

Dear Mr. Kiffer:

Thank you for your letter regarding the problems facing the troll fishery. I am a troller myself, and have been one for most of my life, so I certainly share your frustrations and concerns about the direction the troll fishery is heading.

I fully agree that the U.S./Canada Salmon Treaty is one of the most crucial elements in the determination of the future of the troll fishery. Trollers have good reason to be nervous about the Treaty and the ongoing negotiation process. Provisions in the Treaty, particularly the requirement for consensus agreement and the fact that it deals with a number of interception fisheries, make it very difficult to implement substantial changes. But we are all tired of the troll fishery making all the required sacrifices in the name of rebuilding the stocks, and then continuously losing ground with quota and fishing time.

I do recognize the growing charter boat problem, and the unfairness of quota share being lost to that burgeoning industry. The availability of chinook is up because of the dedication and sacrifice of trollers, and the benefits are being syphoned off by this sport charter growth. There needs to be a firm allocation for both charter and commercial use. I am hopeful that the Board of Fish will find a way to get a handle on this. We might also consider some legislative/statutory measures aimed at slowing down the volume of the fish taken by charter operations.

While allocation and other management decisions can help resolve some problems, a better shake for Alaskans in the Treaty itself is really the crucial bottom line. Clearly, Alaska needs to take a more aggressive stance in the negotiations. I believe that our negotiators need better legal and other support, and that they need to get strong direction from the Administration to stiffen their stand.

I have formally requested that the Attorney General either provide one of his assistant attorneys, or contract with a private attorney to ensure that Alaska's negotiating team has legal support at the negotiating table with them. We should not risk being outmaneuvered by the other treaty parties who have always had lawyers, and more lawyers, at the talks. I am encouraged that the Attorney General seems very receptive to the idea and hopefully will provide for adequate legal counsel at the upcoming negotiations in January and February.

In addition, I have met several times with Governor Hickel to try to educate him about the importance and seriousness of the Treaty. While he does agree that Alaskan fishermen should have a larger share of the quota, he has not yet taken as strong a stand on this as we'd like. I'm continuing to work on him.

Like you, I am distressed about the current status of the troll fishery and the challenges it is facing. There are no simple answers or quick-fixes, but my office is working hard to try to find some solutions and to gain support for trollers and all commercial fisheries. Please feel free to keep in touch with my staff and with me to share your ideas and concerns. Hopefully if we all work together we can find a way to brighten up future prospects for our fishery.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dick Eliason", written in a cursive style.

Senator Dick Eliason



# Alaska State Legislature

SENATOR RICHARD I. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

December 9, 1991

Dr. Keith Criddle, Chair  
Department of Economics  
University of Alaska, Fairbanks  
Fairbanks, AK 99775-0580

Dear Dr. Criddle:

Thank you for submitting a proposal for an economic analysis of the Alaska Salmon Enhancement Program. As you know, the Senate Special Committee on Domestic and International Commercial Fisheries received proposals from the University of Alaska - Anchorage (UAA), Institute of Social and Economic Research, and the University of Alaska - Fairbanks (UAF), Department of Economics. A team of economists including: Kurt Schelle and Dr. Ben Muse with the Alaska Commercial Fisheries Entry Commission; Jeff Hartman with the Alaska Department of Fish and Game - F.R.E.D. Division; Dr. Gardner Brown with the University of Washington; Dr. James Hastie with National Marine Fisheries Service (NMFS); and Ginny Fay a Legislative Analyst for the Senate Fisheries Committee, reviewed and ranked the proposals.

While both of the sets of proposals were strong, the decision was made to award the contracts to the University of Alaska, Fairbanks (UAF). Two major factors contributed to this decision. The first is Dr. Mark Herrmann's more extensive experience and expertise in salmon demand modeling. The second is the UAF, School of Management's waiver of the administrative overhead; this waiver will allow almost three additional months of research time devoted to the project.

Both fishing cost model proposals received relatively "low marks" by most of the reviewers. This is largely attributable to the higher level of risk to obtaining reliable results from relatively "novel" empirical approaches to estimating marginal fishing costs. As a result, as terms of this contract, we would like additional information on your default research approach and your researcher to keep committee staff fully apprised on research progress.



Dr. Keith Criddle  
December 9, 1991  
Page Two  
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Thank you again for submitting a proposal and we look forward to working with you as the research progresses.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dick Ellason", written in dark ink.

Senator Dick Ellason



# Alaska State Legislature

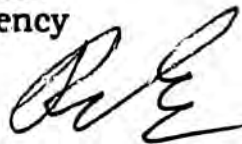
SENATOR RICHARD I. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

## MEMORANDUM

TO: Gordon Harrison, Director  
Legislative Research Agency

FROM: Senator Dick Eliason  
President of the Senate 

DATE: December 9, 1991

SUBJECT: Legislative Review of the Alaska Salmon Enhancement Program

Thank you for your agency's work on the Legislative Review of the Alaska Salmon Enhancement Program. As you probably know, the Legislative Council approved funding for the review's economic studies. The economic portion of the research is being conducted by the University of Alaska Fairbanks (UAF), Department of Economics. Part of this research includes a survey of hatchery operation.

My staff contacted you earlier this year regarding the hatchery survey with which we would like your assistance. We hope to have the survey to you for mailing early the week of December 9.

In addition, Linda Snow of your staff provided us with information regarding sources of economic data for the salmon demand analysis. Dr. Mark Herrmann of UAF has asked us if he could contact Ms. Snow with additional follow-up questions. We have referred him to your agency for assistance.

Thank you again for your continued cooperation.



# Alaska State Legislature

SENATOR RICHARD I. ELIASON

*President of the Senate*

P.O. Box V  
Juneau, Alaska 99811  
(907) 465-3755

December 9, 1991

Dr. Lee Gorsuch  
University of Alaska, Anchorage  
Institute of Social and Economic Research  
3211 Providence Drive  
Anchorage, AK 99508

Dear Dr. Gorsuch:

Thank you for submitting a proposal for an economic analysis of the Alaska Salmon Enhancement Program. As you know, the Senate Special Committee on Domestic and International Commercial Fisheries received proposals from the University of Alaska - Anchorage (UAA), Institute of Social and Economic Research, and the University of Alaska - Fairbanks (UAF), Department of Economics. A team of economists including: Kurt Schelle and Dr. Ben Muse with the Alaska Commercial Fisheries Entry Commission; Jeff Hartman with the Alaska Department of Fish and Game - F.R.E.D. Division; Dr. Gardner Brown with the University of Washington; Dr. James Hastie with National Marine Fisheries Service (NMFS); and Ginny Fay a Legislative Analyst for the Senate Fisheries Committee, reviewed and ranked the proposals.

While both of the sets of proposals were strong, the decision was made to award the contracts to the University of Alaska, Fairbanks (UAF). Two major factors contributed to this decision. The first is Dr. Mark Herrmann's more extensive experience and expertise in salmon demand modeling. The second is the UAF, School of Management's waiver of the administrative overhead; this waiver will allow almost three additional months of research time devoted to the project.

Thank you again for your interest in the Committee's research and submitting a proposal. A special thanks to Dr. Terry Smith for his assistance coordinating the proposal submission.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dick Eliason", is written over the "Sincerely," text.

Senator Dick Eliason



# Alaska State Legislature

## SENATE

Official Business

P.O. Box V  
State Capitol  
Juneau, Alaska 99811

December 9, 1991

To: Tamara Cook, Director  
Division of Legal Services

From: Senator Dick Eliason, Chairman   
Senate Special Committee on Domestic and International Commercial Fisheries

RE.: Reimbursable Services Agreements with the Alaska Commercial Fisheries Entry Commission and the University of Alaska Fairbanks

Per your conversation with committee staff on December 6, I am providing more detailed information regarding the contractual language required for the data transfer between the Commercial Fisheries Entry Commission (CFEC) and the University of Alaska Fairbanks, Department of Economics (UAF). The Senate Special Committee on Domestic and International Fisheries is contracting for economic analyses of the Alaska salmon enhancement program. The research to be conducted requires access to CFEC data files.

State CFEC confidentiality statutes (AS 16.05.815) specify that access to confidential data files is restricted to employees of the Alaska Department of Fish and Game (ADF&G) and CFEC, or contractors of ADF&G or CFEC. In addition, a portion of the economic research to be done by UAF requires some preliminary computer analysis by CFEC staff. Therefore, the Senate Committee, through the Legislative Affairs Agency (LAA), is entering into an RSA with the CFEC for the data analysis and a subcontract for the economic studies (attachments).

As terms of this agreement with CFEC, we have agree to provide contractual language specifying confidentiality requirements. The points to include in this agreement are:

- researchers must abide by confidentiality requirements as specified in AS 16.05.815;
- confidentiality compliance must be to the standards set by the Commercial Fisheries Entry Commission;
- reports to the legislature, as well as any other publications including professional journals, must comply with confidentiality statutes and standards; and
- all CFEC data must be returned to CFEC when the project is completed.

Thank you for your assistance.

Attachments





# Alaska State Legislature

## SENATE

Official Business

P.O. Box V  
State Capitol  
Juneau, Alaska 99811

December 10, 1991

To: Jeff Koenings, Director  
FRED Division  
Alaska Department of Fish and Game

From: Ginny Fay *Ginny Fay*  
Legislative Analyst  
Senate Special Committee on Domestic and International Commercial Fisheries

RE.: Survey of Private Nonprofit Hatchery Operators

This memorandum is to confirm our conversation of December 6 regarding the mailing of the enhancement project survey to PNP operators under your and Senator Eliason's signatures. In addition, Jeff Hartman, Steve McGee and I have agreed that the most expedient method for reviewing survey results is to have the surveys returned to Steve McGee at the FRED Division. Based on Steve's professional knowledge of the enhancement program, he will review the survey responses. Steve will also provide a copy of survey responses when they arrive to the Division of Commercial Fisheries for their review. Given time constraints, this review process will need to be as quick as possible. The reviewed surveys should then be provided to Jeremy Collie. He can be reached at 789-6319.

Per our agreement, the FRED Division will also distribute and collect the surveys of state enhancement projects and coordinate the review of the results. These survey forms have been provided to Jeff Hartman and Steve McGee.

If either the FRED or Commercial Fisheries Divisions disagree with the operators responses, an alternative number or response, and an explanation for the change will need to be provided. Any changes should be agreed upon by both the FRED and Commercial Fisheries Divisions and Jeremy Collie.

I hope this methodology is agreeable to you. Thank you for your continued assistance with this project.

C.C.  
Senator Eliason  
Molly McCammon  
Denby Lloyd  
Bob Clasby  
Jeff Hartman  
Steve McGee

suggested people to describe section.

Draft

## LEGISLATIVE REVIEW OF ALASKA'S FISHERIES ENHANCEMENT PROGRAM

- I Executive Summary - Molly
- II Introduction - Why a Need for this Review
- III History & Development of Hatcheries in Alaska - Mary
- IV Production Policies and Trends in Alaska and Worldwide - Mary
- V Planning and Permitting Process - Molly
- VI Enhancement Funding - Ginny
- VII Biological/Genetic Issues - Molly
- VIII Major Fisheries Management Issues - Molly
  - A. Wild Stock Priority Policy
  - B. Providing for PNP Broodstock
  - C. Providing for Cost Recovery
  - D. Allocation Conflicts
  - E. Challenges of In-Season Management
  - F. Tagging Needs and Requirements
- IX Other Issues — blank
  - A. Use of Hatcheries as Environmental Mitigation
  - B. Role of Hatcheries in International Treaties
  - C. Conflicts and Coordination with Federal Policies
  - D. Use of Hatcheries as Tool for Economic Development
  - E. Environmental Regulations
- X Economics - Ginny
- XI Marketing - Ginny
- XII Conclusion and recommendations.

ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
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**SENATE SPECIAL COMMITTEE ON DOMESTIC AND  
INTERNATIONAL COMMERCIAL FISHERIES**

Teleconference Work Session on Hatchery Review Project  
December 6, 1991

**AGENDA**

1. Report on Status of **LEGISLATIVE REVIEW OF ALASKA'S FISHERIES ENHANCEMENT PROGRAM.**
  - Work done to date
  - Work in progress
  - Direction to staff on further work to be done
2. Discussion of conclusions and recommendations to be included in project report.
3. Decision on public involvement process. Discuss possible options:
  - a. Draft report to be reviewed and approved by staff and/or by committee
  - b. Draft report distributed to mailing list before hearings. Redraft following receipt of comments?
  - c. Hearings to be held before session starts, after session starts, in Juneau and/or outside of Juneau?
  - d. Other

## **LEGISLATIVE REVIEW OF ALASKA'S FISHERIES ENHANCEMENT PROGRAM**

*Summary of Project Progress as of Dec. 5, 1991*

### **Executive Summary**

*In draft available for review.*

#### **I. Introduction - Why a Need for this Review**

*Completed.*

#### **II. History & Development of Hatcheries in Alaska**

*Completed report done by Legislative Research Agency.*

#### **III. Production Policies and Trends in Alaska and Worldwide**

*Completed report done by Legislative Research Agency.*

#### **IV. Planning and Permitting Process**

*Draft still undergoing agency review and further revision. This chapter is one of the key sections of the report since many of the problems are that the hatchery program is experiencing can be minimized or avoided with planning. This chapter was written by Molly McCamr focusing on how to and improve the current planning permitting process.*

#### **V. Enhancement Funding**

*Draft is still being reviewed and revised by Ginny Fay.*

#### **VI. Biological/genetic issues**

*A summary report of the major issues has been completed by the Legislative Research Agency. We are still expecting a summary report and recommendations from Dr. Ole Mathisen following a University of Alaska/Prince William Sound Science Center workshop*



*held in Cordova in November, 1991 which focused on the interaction between wild and hatchery salmon stocks. That report will contain recommendations on state policies.*

## **VII. Major Fisheries Management Issues**

- A. Wild Stock Priority Policy
- B. Providing for PNP Broodstock
- C. Providing for Cost Recovery

*The legal issues raised by the Board of Fisheries concerning the above three topics have been reviewed by Doug Rickey, staff to Representative Ben Grussendorf. That review is completed.*

### **D. Allocation Conflicts**

*Minimizing or reducing allocation conflicts can and should be done through the planning and permitting process. The Board of Fisheries has twice now (in Prince William Sound and in Southeast) directed the regional aquaculture associations to develop their own allocation plan for hatchery-produced fish. The Prince William Sound plan has been incorporated into the Comprehensive Regional Salmon Plan. Molly McCammon is still working on this section.*

### **E Challenges of In-Season Management**

*More information about run timing and quality, as well as how to fund marking and tag recovery programs are the key here. Molly McCammon is still working on this section.*

### **F. Tagging Needs and Requirements**

*Dale Staley in Senator Duncan's office is writing this section and it is not yet completed.*

## **VIII. Other issues**

- A. Use of Hatcheries as Environmental Mitigation
- B. Role of Hatcheries in International Treaties
- C. Conflicts and Coordination with Federal Policies
- D. Use of Hatcheries as Tool for Economic Development
- E. Environmental Regulations

*This section deals with less pressing issues. A draft is not yet completed.*

## **IX. Economics**

*This section was written by Ginny Fay and describes the various cost/benefit, economic studies that the Senate is funding. We are expecting a preliminary report from the University of Alaska - Fairbanks researchers on those studies in April, 1992, with a final report expected in June, 1992.*

## **X. Marketing**

*After Governor Hickel announced formation of his Salmon Marketing Strategy Task Force, the review group basically decided to leave this topic to this group since it was felt that they would be giving it more attention. This section, written by Ginny Fay, describes what the Alaska Seafood Marketing Institute (ASMI) does, its funding and constraints, the recommendations of the Governor's Task Force, and alternatives to the ASMI marketing approach that are being discussed within the seafood industry.*

## **XI. Conclusions and Recommendations**

*Portions of this section are being drafted from the information in each of the above chapters. Actual recommendations will require close review of the committee members.*

Dec. 5, 1991

**DRAFT DRAFT DRAFT DRAFT DRAFT DRAFT DRAFT DRAFT**

**LEGISLATIVE REVIEW  
OF STATEWIDE FISHERIES ENHANCEMENT PROGRAM  
EXECUTIVE SUMMARY**

**I. INTRODUCTION**

In the late spring of 1991, the Alaska Senate's Special Committee on Domestic and International Commercial Fisheries initiated a review of fisheries enhancement in Alaska. The committee recognized that while hatchery and other enhancement programs in Alaska have been highly successful, the statutes that regulate them and the role that they play in the overall fisheries picture in the state have not been seriously reviewed since the program's inception nearly 20 years ago. Since the program was initiated by the Alaska Legislature, it is only appropriate that the Legislature be the entity to conduct this review.

The committee did not begin its work with any pre-conceived notion of what its eventual findings and conclusions might be. Rather, legislative staff were directed first to compile all the known information, question all the various interest groups, and then develop a series of recommendations or options for action that might be taken to improve the state's entire fisheries program. It is our hope that this review will serve as a starting point for a process of scrutiny and fine-tuning that will become an established part of the enhancement program itself.

**II. HISTORY AND DEVELOPMENT OF HATCHERIES IN ALASKA**

The development of Alaska's hatchery program has been an evolutionary process. Beginning as early as the late 1800s, attempts at hatchery production of salmon were undertaken by the federal government and private industry. As harvests of salmon declined, interest in efforts to mitigate the economic impacts through enhancement and hatchery production increased. However,

enhancement efforts were relatively low until a dramatic drop in salmon harvests in the 1960s and 1970s prompted state action.

**The expressed goal of the state hatchery program was to produce more fish to supplement the existing wild salmon stocks.** The Legislature acknowledged concern about the potential for detrimental biological affects of large-scale hatchery development on wild stocks, particularly from the interaction between wild and hatchery fish. However, program development was primarily driven by concern about the economic decline of the fishing industry.

In 1969 the state began receiving large sums of revenue from oil and gas leases on the North Slope. The Legislature decided to channel some of the future public income from such nonrenewable resources into development of renewable resources for long-term economic stability. The salmon resource was an obvious candidate for this sort of investment.

Throughout the 1970s, laws were enacted to facilitate development of a major fisheries enhancement program in Alaska. Program components included:

- creation of the Division of Fisheries Rehabilitation, Enhancement and Development (FRED) within the Alaska Department of Fish and Game,
- passage of a number of bond issues authorizing tens of millions of dollars for capital improvements for state hatchery facilities,
- authorization of private nonprofit (PNP) corporation hatcheries, and
- creation of regional aquaculture associations responsible for the regional planning and coordination of salmon enhancement activities.

After the initial start, it became increasingly apparent that a successful hatchery program was going to be more expensive than originally anticipated. New methods of financing were sought. The Legislature made funds available to PNP hatcheries through the Renewable Resources Development Fund, and by expanding the commercial fisheries loan program to include hatcheries. A separate fisheries enhancement loan program was later established. Statutes were also amended to allow proceeds from PNP sales of salmon or eggs to be applied to debt retirement, as well as operating costs.



Authority was granted to regional aquaculture associations to assess a fisheries enhancement tax to limited entry permit holders who are members of the association. Tax rates can be set for one, two or three percent of the ex-vessel value of a salmon catch, subject to the vote of the membership. Law provided for the establishment and funding of PNP operations, sometimes called "Mom and Pop" hatcheries, run by private nonprofit corporations independent of regional associations.

Legislation was passed creating a Fisheries Enhancement Revolving Loan Fund within the Department of Commerce and Economic Development. Over the years a variety of other provisions were passed to assist in the construction and operation of hatcheries including such things as property tax exemptions, a matching grant program, the granting of special harvest area entry permits to PNP hatchery operators for harvesting of their own brood stock and cost recovery fish, allowing the state to contract the operation of state hatcheries to regional associations, an exemption for broodstock and cost recovery fish from salmon enhancement taxes, and an allowance for an additional one percent salmon enhancement tax to be levied under certain circumstances.

Currently the state operates 16 hatcheries throughout the state, and PNPs operate 21 hatcheries. Hatchery fish represented 24 percent of Alaska's commercial fish harvest in 1990. The FRED Division also maintains two pathology labs, one genetics lab, one limnology lab, and a coded-wire tag processing lab. The Division also provides technical and management assistance to the PNP hatcheries. While PNPs tend to focus narrowly on production for the commercial fishery, FRED hatcheries tend to emphasize research, some production of sport fish species, and experimental farming of shellfish and aquatic plants.

A review of legislative history reveals that many facets of the hatchery program which have evolved over the past two decades, such as financing, related fisheries management issues, and biological concerns, were not foreseen or were only briefly acknowledged or discussed by the Legislature during the initial stages of development of the program. The record does reveal legislative intent in some broad areas, but it appears that many current questions and concerns regarding the role and future of hatcheries will have to be addressed without benefit of clear statutory or historical direction.

### **III. PRODUCTION POLICIES AND TRENDS IN ALASKA AND WORLDWIDE**

In 1980, Alaska salmon harvests accounted for 41 percent of world salmon supply. By the end of 1990, wild and enhanced Alaska salmon accounted for just 31 percent of the world supply. This occurred despite the 50 percent increase in Alaska's production during the same period, as a result of the dramatic increase in farmed-salmon production. Farmed-salmon production nearly doubled between 1988 and 1990, increasing from about 310 million pounds to over 600 million pounds. In 1990, farmed salmon composed about 30 percent of world salmon production, up from a mere one percent in 1980. The increased supply of salmon on the world market lowered prices. Lower salmon prices and rising operating costs have brought economic hardship to salmon-farming operations worldwide, although many farms remain competitive. Recent trends indicate a slight reduction in farmed salmon production. Lower prices have also adversely impacted commercial salmon-fishing operations worldwide.

One interesting development in the salmon-farming industry is that the glut of salmon on the world market has forced many salmon farmers to freeze their product for later resale. This trend could increase the competitiveness of Alaska fish since it eliminates the "fresh versus frozen" advantage of farmed fish.

The countries and regions which commercially harvest the largest quantities of **wild and hatchery** salmon are the United States (Oregon, Washington and Alaska), Canada (British Columbia), Japan and the U.S.S.R. Other areas have experimented with salmon ranching, but as yet produce few fish. Major salmon-farming industries are located in Norway, Scotland, Chile, U.S. and Japan. Iceland, the Faroe Islands, Ireland, Australia, New Zealand and France also farm salmon but are not considered major producers.

### **IV. PLANNING AND PERMITTING PROCESS**

The planning and permitting process holds the key to reducing many of the conflicts and problems that have developed with the state's hatchery program over the years. Alaska is considered by other

states and countries to have a "model" process. However, it doesn't appear to be working in many respects.

- **Lack of statewide goals and objectives.** The original goal of the enhancement program was to produce more salmon. In the beginning, no one really knew if it could be achieved. We now know our hatcheries can be successful, perhaps even too successful when combined with the vast increase in Alaska's wild stocks. The old goal no longer seems to fit, yet it has not been replaced by any other statewide goals and objectives that more accurately reflect the current desires and needs of the seafood industry.

- **Regional versus statewide planning.** All salmon management and production planning is done on a regional basis. Regions operate with little contact with other areas of the state. Today however, hatchery produced fish are having an increasing impact on fisheries management and on overall market conditions. Many fisheries managers argue in favor of a statewide planning process to take into account the potential impacts of one region on another. Others involved in the industry argue that regional differences are so unique and often contentious, that such a statewide process would be futile.

- **Funding and support for planning.** State support for planning has been declining since the early 1980s. Members of the Regional Planning Teams complain that they aren't able to adequately review all the permit applications and hatchery production plans in order to resolve the issues and potential conflicts they may generate. FRED Division has less than two full-time staff devoted to assisting current enhancement efforts and planning others.

- **Fisheries management and allocation issues.** These issues have not been allowed as part of the planning process because ADF&G personnel are a major part of that process, and they are supposed to remain aloof from allocation decisions. By not allowing these issues to be considered in the permit review process, the state may be approving - at least on paper - a project that can create allocation conflicts in the future. By the time the Board of Fisheries begins to consider these issues, millions of dollars have been invested, and many of them through state loans and grants which give the state a vested interest.



A management feasibility analysis is required of a proposed hatchery or project. *This process is described and analyzed here.*

- **Uniform review.** State run hatcheries and enhancement projects are not required to go through many of the regulations and public review required of the private non-profits. Many fishermen and hatchery operators have complained about this lack of uniform treatment and would like to ensure that state projects receive the maximum public scrutiny possible.

- **Canadian planning model.** Canada requires a broad review of the biological and economic aspects of its entire enhancement program on a five-year basis. *This model is still being researched for its possible applicability in Alaska.*

- **Permitting requirements.** *Reviewing such items as criteria to show public benefit, proof of marketability, cost/benefit analysis, ongoing genetic monitoring.*

- **Performance reviews.** Present regulations allow the regional planning teams to review a hatchery's compliance with statutes and regulations, and to recommend the suspension, alteration or revocation of a permit if certain performance standards are not met. However, revocation of a permit must go through the Administrative Procedures Act, a very lengthy and time-consuming process. Some fisheries managers and RPT members advocate for a more timely process and stricter performance standards.

## **V. ENHANCEMENT FUNDING**

Sources of funds for the Alaska salmon enhancement program and projects include bond issuances, state general fund appropriations, salmon enhancement tax assessments paid by fishermen, state enhancement loans, and cost recovery sales of fish.

### **State Project Funding**

Funding for the operation of the state salmon enhancement program and state project construction, operation, and maintenance has been



primarily through state bonds and general fund appropriations to ADF&G, FRED Division. From FY 73 - 92, funding for the FRED Division totalled \$\_\_\_\_\_ million, the majority of which is for salmon enhancement. Bond issues totalling \$56.17 million were authorized by the 1976 and 1978 Legislatures, and overwhelmingly endorsed by voters, to fund the construction and operation of hatchery production and other enhancement projects in each region of the state. Of the \$56.17 million in bond issues for FRED enhancement projects, \$50.3 million was spent on hatcheries, while the remainder was used for other enhancement projects. State funding for FRED Division, the construction and operation of state facilities and indirect support of the PNP hatchery program totals \$\_\_\_\_\_ million through FY 92.

### **Funding for Private Non-Profit Hatcheries**

Funding for PNP hatcheries is primarily through state loans, the salmon enhancement tax, and cost recovery sales of fish. To a lesser extent, the state has provided grants to some facilities and fishing organizations; these have totalled approximately \$12.3 million.

Since 1977, a significant portion of the funding necessary for the implementation of salmon rehabilitation and enhancement activities by PNP corporations has been provided through the Fisheries Enhancement Revolving Loan Fund administered by the Alaska Department of Commerce and Economic Development (DCED), Division of Investments (AS 16.10.500-620). The loan program has gone through several modifications by the legislature, the most recent occurring in 1987. The maximum loan amount available for an individual project is \$10 million at approximately 9.5 percent interest, with a payback period of up to 30 years. According to state statute (AS 16.10.525), payments and accrual of interest on these loans must be deferred for six to ten years. Loans for non-regional aquaculture association projects have these same terms with the exception that the loan maximum is limited to \$1 million. Loans are available for the purpose of planning, construction, and operation of salmon rehabilitation and enhancement projects, primarily salmon hatcheries.

To obtain an enhancement loan, a corporation must first receive a permit from FRED Division based on biological considerations. After a permit is obtained, a loan can be applied for and approved by the

Division of Investments if the project is financially feasible. Financial feasibility, however, is based upon whether the biological production characteristics are sufficient to provide adequate annual income for repayment of state loans. It does not necessarily mean that the project makes economic sense (benefits are greater than costs).

The **Salmon Enhancement Tax** (AS 43.76.010-.015) is charged to limited entry permit holders who are members of qualified regional aquaculture associations. state law allows the associations to set enhancement tax rates from 1 to 3 percent of the ex-vessel value of the salmon catch, subject to the vote of the membership.

Through November, 1991, \$71.0 million has been borrowed by PNP corporations. Approximately \$67.7 million (95 percent) of the \$71.0 million principal balance is currently outstanding. Including state appropriations (\$12.3 million), approximately \$83.3 million has been provided in state loans and grants to PNPs. Another \$46.2 million has been generated through enhancement tax assessments. To date, PNP operators have sold approximately \$70.9 million worth of cost recovery fish to help pay for hatchery operations. The amount and percentage of funding by category is shown below.

|                 |                                        |
|-----------------|----------------------------------------|
| \$71.0 million  | 35 percent State Loans                 |
| \$12.3 million  | 7 percent General Fund Grants          |
| \$46.2 million  | 23 percent Enhancement Tax Assessments |
| \$70.9 million  | 35 percent Cost Recovery Sales of Fish |
| <hr/>           |                                        |
| \$200.4 million | Total                                  |

As can be seen, the private sector has provided over 58 percent of the direct funding for PNP operation and construction through self-imposed taxes and cost recovery sales of fish.

## **VI. BIOLOGICAL/GENETIC ISSUES**

In November, 1991, in Cordova, Alaska, the Prince William Sound Science Center (PWSSC) and the School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, convened a group of world-renowned experts to examine "The Biological Basis for Maintaining Strong Co-existing Stocks of Natural and Enhanced Salmon

Populations in Alaska." This workshop followed a series of international symposiums on this topic during the past two years in Norway, Canada, Idaho, Washington, and Japan. Top fisheries biologists, ecologists and geneticists from the United States, Norway, Sweden, the Soviet Union and Japan were present at this workshop. As a follow-up to the workshop, the group intends to produce a summary report and list of recommended policies and procedures to be considered by the state of Alaska in managing its wild and enhanced salmon stocks.

The cumulative effect of hydroelectric dams, habitat destruction, over-fishing and large-scale hatcheries has lead to the decimation of many wild salmon stocks in Pacific Northwest states. Biologists in states with a long history of hatchery programs are generally less enthusiastic about these programs than biologists in areas such as Alaska and British Columbia with comparatively more recent programs. Although poor hatchery practices can clearly endanger wild salmon populations, scientists do not agree on the extent to which hatcheries with sound practices can co-exist with sustained healthy runs of wild salmon.

The lack of consensus among scientists results from insufficient data and research. Even where information exists, however, it is often subject to conflicting interpretations. To complicate matters, results of specific studies may not be transferable to other areas or salmon species, and year-to-year environmental changes may affect the results of studies.

### **The Genetic Effects of Hatcheries**

**Most scientists agree that it is essential to have healthy wild stocks in order to maintain the health and genetic diversity of both wild and hatchery stocks. Genetic diversity must be preserved.** Scientific knowledge about the genetic impact on wild stocks of hatchery fish, however, is still incomplete. Reduction in the fitness of salmon stocks, to the extent it has been documented, may involve numerous factors. Most scientists agree that hatcheries can complicate mixed-stock fisheries and affect the genetic composition of wild fish stocks. Scientists do not agree on the degree to which genetic changes affect the short- or long-run fitness of wild stocks.



**Straying and intermingling of stocks is a major concern to scientists.** The extent of straying, the mechanism causing imprinting, and the success of crossbreeding are largely unknown. Large-scale ocean ranching appears to set the stage for straying of wild stocks in the harvest areas of enhanced stocks and also for hatchery fish to stray into the natural streams. What impact this has on the genetic diversity of salmon stocks in a given region is a question that remains to be answered.

It is known that the greater the distance between the donor stream or hatchery and the release site, the greater the amount of straying. **Many scientists are concerned about the extensive releases at remote sites practiced by many hatchery operations today,** with many more planned for the future. They fear that such straying could potentially, in time, destroy genetic diversity - resulting in a permanent, irreversible loss. Some scientists believe remote releases should be banned altogether. Others believe they should be permitted with stringent controls and careful monitoring.

### **Ocean Carrying Capacity**

Some scientists suspect that the carrying capacity of freshwater rearing areas, nearshore waters, and on the high seas for salmon may be exceeded by the large-scale releases of hatchery salmon. A reduction in the average size of salmon has been reported throughout the Pacific in 1991, but various factors may be responsible. Some researchers believe ocean conditions affect the size of salmon more than competition. Much evidence, however, supports the theory of density-dependent growth for some salmon species, although there is considerable debate regarding its occurrence.

### **Disease**

Few studies document the transmittal of diseases between hatchery and wild salmon and there is no documentation of such transmittal in Alaska. Where transmittal of a disease by hatchery salmon has been documented, it occurred after fish were transplanted long distances. Hatchery fish appear to be more vulnerable to disease than wild fish



because of the stress of hatchery conditions and large concentrations of eggs and fry.

### **State Genetics Policy**

*Describe here the current state policy and the process of reviewing Fish Transport Permits.*

## **VII. MAJOR FISHERIES MANAGEMENT ISSUES**

### **Over-harvest of Wild Stocks**

The fundamental issue facing fisheries managers is how to control fishing efforts on stocks in mixed-stock fisheries when you don't know which stocks are being fished. The fear is that the weakest stocks will get fished out of extinction. Since hatchery productivity is much greater than natural stock productivity, wild stocks face the greater risk in being eliminated. Smaller stocks are always in danger of depletion in mixed-stock fisheries because there is a tendency to optimally harvest the larger stocks before quality declines in terminal fisheries.

The problems posed by mixed-stock fisheries are not new. Almost all Alaska salmon fisheries had some degree of mixed stocks prior to the development of current hatcheries. However, hatchery-produced fish further complicate management. An adequate program of tagging, recovery and analysis is essential for most mixed-stock fisheries comprised of large numbers of hatchery fish.

### **Tagging Needs and Requirements**

*This section will describe current tagging technology, its usefulness, cost, and the question of who should pay.*

## **Wild Stock Priority Policy**

Concern has been expressed by ADF&G managers and by the Board of Fisheries that the state does not have a strong enough wild stock priority policy in statute. In addition, Fisheries Board members have asked for further legal direction on their responsibilities to provide for **hatchery broodstock** and for **cost recovery fisheries**, especially when they appear to compete or reduce fishing opportunities in traditional fisheries. Staff is nearly finished with the legal analysis of this issue. *The Legislature will definitely want to consider whether or not to put a stronger wild stock priority into law.*

## **Allocation Conflicts**

Minimizing or reducing allocation conflicts can and should be done through the planning and permitting process. However, this is not a perfect process, and it is inevitable that conflicts develop over who gets which fish. The Board of Fisheries has twice now (in Prince William Sound and in Southeast) directed the regional aquaculture associations to develop their own allocation plan for hatchery-produced fish. The Prince William Sound plan was approved by the Board of Fisheries in January, 1991, and has now been incorporated into the area's Comprehensive Regional Salmon Plan. Development of a Southeast allocation plan is currently underway, with a final product due in \_\_\_\_\_.

## **Challenges of In-Season Management**

More information about run timing and quality, as well as how to fund marking and tag recovery programs are the key here. ADF&G Commercial Fisheries Division has suggested a research project be funded for this year to analyze salmon quality at various distances from their terminal streams in an effort to determine how best to manage fishing effort to produce top-quality and marketable product.

## **VIII. OTHER ISSUES**

*This section deals with more minor "side" issues such as the use of hatcheries as a form of environmental mitigation, the role of hatcheries in international treaties, environmental regulations, conflicts and coordination with federal policies, and the use of hatcheries as a tool for economic development. This section still remains to be drafted.*

## **IX. ECONOMICS**

The main focus of the review of the economic impacts of salmon hatchery production was to study

- whether current levels of Alaska salmon harvest are over- or under-supplied from a world-market perspective, and
- whether increased hatchery production of salmon will lower prices, fishing and processing revenues, and the total net value of Alaska's salmon fisheries.

Such a study requires a complete benefit-cost analysis. To begin, the study group reviewed current research and then identified specific issues that need additional economic research. Review of available data revealed that there are considerable gaps and insufficiencies in information compiled to date. A proposal was then developed to let contracts for additional research by professional researchers. The proposal was designed with assistance from the Alaska Department of Fish and Game. Funding for the research contracts was approved by the Legislative Council on November 1, 1991.

Due to time constraints, rather than using a competitive bid process, the research contracts were awarded on a "request for proposal" basis, and funded through reimburseable service agreements (RSAs) between the Legislature and the University of Alaska.

The research is divided into five principal components, and is aimed at providing information on Alaska's salmon enhancement programs, and developing models that can be used for evaluating salmon management policy questions.

## Research Components

The five principal research components are:

- Hatchery Production and Cost Model  
Principal Investigators: Economics Group, Legislative Research Agency, and the ADF&G FRED Division staff  
Anticipated Cost: \$0
- Biological Population Model  
Principal Investigators: Dr. Jeremy Collie, Juneau Center for Fisheries and Ocean Sciences, Univ. of Alaska, Fairbanks  
Anticipated cost: \$10,000
- Salmon Demand Model  
Principal Investigators: Dr. Mark Herrmann, Dept. of Economics, Dr. Joshua Greenberg, School of Land Resources Management, Univ. of Alaska Fairbanks  
Anticipated cost: \$18,000
- Fishing Cost Model  
Principal Investigator: Dr. John Boyce, Dept. of Economics, Univ. of Alaska Fairbanks  
Anticipated cost: \$20,000
- Combining of Models for Policy Analysis  
Principal Investigators: Drs. John Boyce and Mark Herrmann, Dept. of Economics, and Dr. Diance Bischak, School of Management, University of Alaska Fairbanks  
Anticipated cost: \$10,000

P  
J  
Preliminary reports on the research being conducted under these contracts are to be submitted to the Legislature in April, 1992, and the final reports in June, 1992. This The rest of the Legislature's hatchery review project can move forward in the meantime. Information-gathering and the formation of some conclusions, options and courses of action, regarding the other portions of the project can be accomplished independent of these economic studies.

It is hoped that research currently being conducted by the Alaska Department of Commerce and Economic Development and the Alaska Seafood Marketing Institute on developing new markets and products for Alaska salmon will also be available and useful to the Legislature in its



look at the overall economic picture of Alaska salmon and salmon enhancement.

## **X. MARKETING**

### **Governor Hickel's Salmon Marketing Strategy Task Force**

*In this section we will describe the recommendations of the Governor's Task Force, which are in the final phase of development.*

As a result of the precipitous decline in Alaska salmon prices in 1991, Governor Walter J. Hickel formed the Salmon Strategy Task Force. The purpose of the group is to identify the problems facing Alaska's salmon fishing industry and recommend state actions to address these problems. A primary focus of the task force is salmon marketing. The task force is currently finalizing its recommendations. To avoid duplication with this on-going effort, it was decided that the Legislative review of the Alaska salmon enhancement program would analyze the economic costs and benefits of the enhancement program and review past state salmon marketing efforts. In addition, as part of the legislative review, the Salmon Strategy Task Force's final recommendations will also be reviewed.

### **The Alaska Seafood Marketing Institute**

#### **Structure and statutory responsibilities**

The Alaska Seafood Marketing Institute (ASMI) was established in 1981 as a quasi-state corporation within the Alaska Department of Commerce and Economic Development. By statute, ASMI is mandated to conduct educational, marketing and research programs relating to Alaska seafood and its by-products. ASMI also develops quality specifications and recommendations for the handling of seafood.

State statute prohibits ASMI from favoring any region, product, or processor. Therefore, ASMI uses "generic" marketing campaigns aimed at enhancing the sales of particular "species" of fish or broad product categories (e.g. canned or frozen), rather than specific products. As a result, ASMI does not promote new products.

Policy and program direction is set by an 18 member board of directors. Membership consists of 12 fish processors, 5 commercial fishermen, and 1 public citizen. There are also three non-voting ex-officio members: the DCED Commissioner, and a legislator appointed from each chamber.

In addition to the board of directors, there is an extensive committee system, consisting of marketing committees, individual species committees, and quality and export committees.

Funding for ASMI is provided by three separate mechanisms. The first is a self-imposed seafood marketing assessment. All fish processors, who annually purchase \$50,000 or more ex-vessel value of seafood pay an assessment of 0.03 percent of their total purchases. The assessments are deposited in the general fund and appropriated annually to ASMI. The balance of ASMI's funding is derived from state general fund and federal appropriations.

Federal funding is restricted to **international** marketing efforts and has increased in recent years. State general fund appropriations and industry contributions are used primarily to fund **domestic** marketing efforts. State funding has decreased in recent years. In addition, the industry assessment will decline approximately \$600,000 in FY 92 as a result of lower salmon prices. **As a result, ASMI will have fewer resources for domestic marketing at a time when the domestic market has been identified as having the greatest potential for increasing sales of Alaska salmon.**

#### ASMI's Effectiveness

A recent legislative audit concludes that ASMI has increased consumer perception of Alaska seafood. **However, Alaska has lost a significant share of both the domestic and international salmon markets due to the tremendous growth in world farmed-salmon production.**

#### Other factors for consideration:

- Norway, a large farmed-salmon producer, spends about five cents per pound for marketing whereas only one cent per pound is spent marketing Alaska salmon.

- Canned salmon consumption in the U.S. declined 60 percent from 1980 to 1989 at the same time that harvests of pink salmon, which is usually canned, increased approximately 50 percent.

- Some analysts see problems with ASMI's "generic" approach which promotes all salmon and does not specifically identify Alaskan products.

#### Alternative Marketing Strategies and Options

- Legislation to expand ASMI's marketing efforts to include new product development.

- Legislation, such as that proposed by Representative Kubina, to create an Alaska State Salmon Marketing Association wherein product development would not be restricted and the association could focus on specific geographic areas.

- Legislation to expand ASMI statutes to allow for targeting development of Alaska salmon markets and product development (proposed by Representative Dave Choquette).

- Development of a national Salmon Marketing Council.

- Privatization of ASMI.



- ASMI Salmon Recovery Proposal. The goal would be to increase the annual per capita U.S. salmon consumption from 1 to 1.5 pounds v which would absorb annually an additional 119 million pounds of salmon. Cost of this proposal is \$50 million over 5 years. Several sources of funding have been identified, including state general fund appropriations.

## **Efforts of Other Organizations**

Recognizing the need to develop markets for their highly successful salmon hatchery production, the Prince William Sound Aquaculture Corporation (PWSAC) has initiated its own Product Development Strategy. In the short-run, PWSAC would like to pre-sell all 1992 cost-recovery fish by January 1992, ensure the utilization of all cost-recovery fish, and negotiate on to three year contracts for the sale of fish. In the long-term, PWSAC would like to facilitate pink salmon product development to provide price and supply stability and continuity, and to facilitate state research on new product forms. The primary marketing obstacle identified by PWSAC is finding sufficient freezer processing capacity.

## **XI. CONCLUSIONS AND RECOMMENDATIONS**

### **Planning and Permitting**

### **Funding Concerns**

- A more thorough cost-benefit analysis should be required of hatcheries and projects seeking state funding.

### **Biological Concerns**

- A study should be conducted to evaluate how well the current hatchery program protects wild salmon from possible negative effects of hatchery salmon. Such a review would help policy makers determine the risk of various alternatives for the future of Alaska's hatchery program.
- Hatchery operators should be required to provide more adequate genetic monitoring on an on-going basis and ADF&G should be continuously reviewing and analyzing that data statewide.
- A major challenge will be to obtain a consensus about research priorities concerning the interaction of hatchery and wild fish in Alaska, coordinate future studies, and decide how and when to apply the results of those studies to current management practices.



**Management Concerns**

**Other**

ALASKA STATE LEGISLATURE SENATE

SENATOR RICHARD I. ELIASON

PRESIDENT OF THE SENATE  
LABOR & COMMERCE COMMITTEE  
RESOURCES COMMITTEE  
RULES COMMITTEE  
CHAIRMAN, SPECIAL COMMITTEE ON  
DOMESTIC & INTERNATIONAL  
COMMERCIAL FISHERIES



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December 23, 1991

Don Kenoyer  
6167 South Tongass Hwy.  
Ketchikan, AK 99901

Dear Mr. Kenoyer:

Thank you for your letter regarding the problems facing the troll fishery. I am a troller myself, and have been one for most of my life, so I certainly share your frustrations and concerns about the direction the troll fishery is heading.

I fully agree that the U.S./Canada Salmon Treaty is one of the most crucial elements in the determination of the future of the troll fishery. Trollers have good reason to be nervous about the Treaty and the ongoing negotiation process. Provisions in the Treaty, particularly the requirement for consensus agreement and the fact that it deals with a number of interception fisheries, make it very difficult to implement substantial changes. But we are all tired of the troll fishery making all the required sacrifices in the name of rebuilding the stocks, and then continuously losing ground with quota and fishing time.

I do recognize the growing charter boat problem, and the unfairness of quota share being lost to that burgeoning industry. The availability of chinook is up because of the dedication and sacrifice of trollers, and the benefits are being syphoned off by this sport charter growth. There needs to be a firm allocation for both charter and commercial use. I am hopeful that the Board of Fish will find a way to get a handle on this. We might also consider some legislative/statutory measures aimed at slowing down the volume of the fish taken by charter operations.

While allocation and other management decisions can help resolve some problems, a better shake for Alaskans in the Treaty itself is really the crucial bottom line. Clearly, Alaska needs to take a more aggressive stance in the negotiations. I believe that our negotiators need better legal and other support, and that they need to get strong direction from the Administration to stiffen their stand.

I have formally requested that the Attorney General either provide one of his assistant attorneys, or contract with a private attorney to ensure that Alaska's negotiating team has legal support at the negotiating table with them. We should not risk being out-manuevered by the other treaty parties who have always had lawyers, and more lawyers, at the talks. I am encouraged that the Attorney General seems very receptive to the idea and hopefully will provide for adequate legal counsel at the upcoming negotiations in January and February.

In addition, I have met several times with Governor Hickel to try to educate him about the importance and seriousness of the Treaty. While he does agree that Alaskan fishermen should have a larger share of the quota, he has not yet taken as strong a stand on this as we'd like. I'm continuing to work on him.

Like you, I am distressed about the current status of the troll fishery and the challenges it is facing. There are no simple answers or quick-fixes, but my office is working hard to try to find some solutions and to gain support for trollers and all commercial fisheries. Please feel free to keep in touch with my staff and with me to share your ideas and concerns. Hopefully if we all work together we can find a way to brighten up future prospects for our fishery.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dick Eliason", with a stylized flourish at the end.

Senator Dick Eliason

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BRUCE B. WEYHRAUCH

January 7, 1991

Senator John Binkley  
Box 80447  
Fairbanks, Alaska 99708

RE: Potential regulation of hatchery  
brood stock  
Our File No. 1559-6802

Dear Senator Binkley:

I appreciated talking with you on the telephone last week about our concerns regarding potential regulation of hatchery brood stock by the Alaska Department of Environmental Conservation (ADEC) and the federal Food & Drug Administration (FDA). As you requested, I am sending you a copy of a letter we sent to Mr. Doug Donegan, director of the Division of Environmental Health at ADEC. This letter sets forth Valdez Fisheries Development Association's (VFDA) concerns regarding potential regulation of hatchery brood stock by ADEC and the FDA.

VFDA, a private non-profit (PNP) salmon hatchery in Prince William Sound, is very concerned, along with several other PNP hatcheries in the state, that the state or federal government will regulate brood stock or prevent its sale because they deem brood stock "unwholesome" and not fit for "processing". Yet neither of these terms are adequately defined.

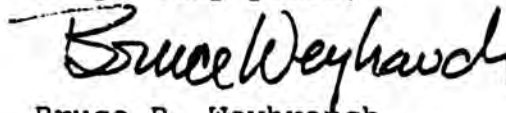
For example, as we discussed on the telephone, upriver salmon fisheries in the Alaska interior could be negatively affected by this regulation because brood stock, like upriver salmon, have ripened roe and a darker color than ocean-caught fish. FDA and ADEC do not seem to realize that roe from brood stock is of suitable quality for human consumption regardless of whether the flesh of the salmon is appropriate for canning. In addition, there are other product forms of salmon which brood stock can be used for without marketing the fish as a fresh, bright, ocean-caught fish. Other salmon products include paté, roe, fishmeal, and fish oil, not to mention sale as an adequately and truthfully advertised brood stock product.



Senator John Binkley  
January 7, 1991  
PAGE 2

As you suggested, I am sending copies of this letter to those individuals listed below, along with a copy of our letter to Mr. Donegan. If you have any questions on this matter or if I can assist you in any way, please do not hesitate to contact me in Juneau at 586-2210 or Mr. Jason Wells, the executive director of VFDA in Valdez at 835-4874.

Very truly yours,



Bruce B. Weyhrauch

BBW\lsk  
encls.

cc/Senator-elect Lyman Hoffman (w/encls.)  
Representative-elect Georgianne Lincoln (w/encls.)  
Ms. Molly McCammon (w/encls.)  
Mr. Harry Wilde (w/encls.)  
Mr. Virgil Upnauer (w/encls.)  
Ms. Sandra Borbridge (w/encls.)

Binkley.ltr

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**BRUCE B. WEYHRAUCH**

December 21, 1990

Mr. Doug Donegan  
Director  
Division of Environmental Health  
Alaska Department of  
Environmental Conservation  
P. O. Box 0  
Juneau, Alaska 99811-1800

RE: Hatchery brood stock fish  
Our File No. 1559-5799

Dear Doug:

Thank you for your letter of December 7, 1990 in which you discuss brood stock fisheries and the Alaska Department of Environmental Conservation's (ADEC) and the Food & Drug Administration's (FDA) determinations of the wholesomeness of brood stock fish. We represent Valdez Fisheries Development Association (VFDA) which is concerned about ADEC's statements regarding "brood stock".

We are concerned that ADEC's statements regarding brood stock lack definition, and reflect an unclear understanding of what brood stock are. From your statements, we believe that your actions relating to brood stock will affect other upriver salmon fisheries, not just hatcheries, and that you are singling out hatchery brood stock for discriminatory regulation. Further, we are very concerned that ADEC's statements about brood stock will not only have a negative impact on the operations of PNP hatcheries, but will severely affect PNP hatcheries' ability to compete with other farmed salmon products in the Lower 48 and Canada, and will hurt Alaska's ability to market and export fisheries to third world countries. ADEC's misguided regulation of brood stock will have other negative consequences on regional and local economies of the state which depend almost entirely on fisheries for their economic health and welfare.

We offer several specific observations and concerns. First, in your letter of December 7th (copy enclosed), you indicate that "hatchery brood stock, as defined in the Canned Salmon Control Plan . . . are not wholesome . . . ."

Mr. Doug Donegan  
December 21, 1990  
PAGE 2

We note that the Canned Salmon Control Plan is prepared with input from the canned salmon industry. There are other product forms of salmon, such as paté, which are not canned, and where salmon muscle structure is purposefully broken down. If salmon canners do not want to process hatchery brood stock, they have the freedom to make that business decision. However, canners of salmon should not, independently or in conjunction with and approval from government regulatory agencies, prevent others from purchasing a product if another processor has a viable market.

It should be noted that canners have made a practice of integrating brood stock into the Prince William Sound canned salmon pack since the hatchery program started, and as recently as 1989. Further, the canners have made no such determination as to fishermen-caught dark fish.

The portion of the "Canned Salmon Control Plan" attached to your letter states: "Hatchery brood stock, which either has been stripped for roe or milt, or has reached maturity and has been held to be used for roe or milt, shall not be processed." Is it ADEC's position that this sentence defines brood stock as not wholesome? We do not see in the portion of the Plan provided to us a definition of wholesome or unwholesome, or a definition of hatchery brood stock. Nor do we read the Canned Salmon Control Plan as defining hatchery brood stock as "not wholesome". Moreover, neither of the terms "wholesome" or "unwholesome" are defined in Alaska's statutes or regulations. What, for instance, separates a mature fish caught by a commercial fisherman from a creek mouth from a mature fish taken from a hatchery?

In addition, the "Canned Salmon Control Plan" does not define "process". Therefore, since the Canned Salmon Control Plan presumably only addresses the canning of salmon, sale or consumption of frozen hatchery brood stocks should fall outside the purview of the salmon canning industry's plan.

We are also concerned that ADEC participated in meetings that were not announced or open to the public and that policy decisions were made in these meetings. You state that ADEC and FDA met and agreed in principle on three things affecting hatcheries' brood stock. Were the public or hatcheries informed of the time, place, and substance of all the meetings? If not, why not? We are aware of only one such meeting held in Anchorage. At this meeting, ADEC and FDA had already made up their minds about brood stock. This meeting emphasized the canning of salmon, not other product forms.



Mr. Doug Donegan  
December 21, 1990  
PAGE 3

ADEC and FDA have already concluded that hatchery "brood stock" are not "wholesome", without adequately defining these terms and without any public participation or notice to salmon hatcheries that ADEC deems brood stock "unwholesome". In your December 7th letter you state on page 1 that hatchery brood stock are not wholesome. Yet you also state on the same page that "if the Center for Food Safety concludes that these [hatchery brood stock] fish are unwholesome, then FDA and DEC will . . . [prohibit] these fish from entering commerce as human food." In the same letter, you take the position that hatchery brood stock are not wholesome and that hatchery brood stock are not yet deemed to be unwholesome. Which is it?

This uncertainty within ADEC creates a chilling effect on Alaska's commercial fisheries. It also creates the appearance that you have already reached a conclusion on the wholesomeness of brood stock and are now searching for data to support that conclusion. In other words, your agency has already arrived at a conclusion to ban hatchery brood stock sales before knowing anything about the subject.

ADEC's statements on brood stock indicate that ADEC is headed down a road which would entirely prohibit brood stock from entering commerce as human food. We understand ADEC's concern in keeping fisheries products safe for consumers. Indeed we understand that the law requires you to do this. However, you throw the baby out with the bathwater by entirely prohibiting brood stock from entering commerce as human food. If brood stock can be handled and sold in a form acceptable for human consumption, why prohibit persons who know what they are buying from buying it? You also put Alaska at a competitive disadvantage in relation to our closest competitors. We understand Washington processors are already processing hatchery brood stock from both Canadian and Washington hatcheries.

We plan to work vigorously with other groups in the State of Alaska and in the courts if necessary to oppose regulation of brood stock by ADEC until we are satisfied that the following have taken place:

1. That ADEC is adequately apprised of the concerns about brood stock from private and public hatcheries in the state and incorporates those concerns into any discussion, policy, regulation, or meeting on brood stock;



Mr. Doug Donegan  
December 21, 1990  
PAGE 4

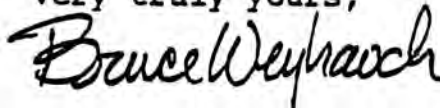
2. That ADEC's intentions to regulate brood stock be publicly announced now so that others in the state's salmon industry have a chance to respond and give input to ADEC;
3. That "brood stock" be adequately defined;
4. That "processing" be adequately defined;
5. That ADEC adequately balance the needs of PNP hatcheries to sell brood stock fisheries against ADEC's need to regulate fisheries in the state for consumer purposes, and that both of these needs be observed in light of the growing world demand for fish protein.
6. That "wholesome" be adequately and technically defined;
7. That we have an opportunity to participate in all studies regarding brood stock;
8. That we and the public receive adequate notice of meetings between FDA and ADEC in which brood stock or hatchery fish are discussed, and that these meetings be open to us;
9. That we be provided with the minutes and notes of all meetings in which ADEC participated in which regulation or uses of hatchery brood stock were discussed, including past discussions with the board for the canned salmon controller;
10. That we be given information on what studies are now being conducted concerning brood stock and be allowed to participate in the selection of contractors; and
11. That a process or criterion for making determinations of fisheries wholesomeness or unwholesomeness be set forth in specific detail after we have an opportunity to review and comment on those details.

Mr. Doug Donegan  
December 21, 1990  
PAGE 5

The bottom line is that VFDA offered our brood carcasses to the canned industry in 1990. They chose not to purchase those fish. We have now established markets outside the canning industry and we expect to sell those carcasses in 1991.

We plan to pursue our concerns along every avenue available to us. We look forward to working with you in the future on resolving these very important issues. Thank you again for your consideration. If you have any questions or require additional information, please give me a call.

Very truly yours,



Bruce B. Weyhrauch

BBW\lsk  
encls.

cc/Jason Wells (w/encls.)

- Ladd Macaulay, DIPAC (w/encls.)
- Bruce Suzumoto, PWSAC (w/encls.)
- Peter Esquiro, NSEFAA (w/encls.)
- Commissioner John Sandor (w/encls.)
- Representative Gene Kubina (w/encls.)
- Senator Jay Kertula (w/encls.)
- Representative Fran Ulmer (w/encls.)
- Representative Bill Hudson (w/encls.)
- Senator Jim Duncan (w/encls.)
- Senator Richard Eliason (w/encls.)
- Representative Ben Grussendorf (w/encls.)
- Senator Ted Stevens (w/encls.)
- Senator Frank Murkowski (w/encls.)
- Representative Donald Young (w/encls.)

Donegan.ltr

# STATE OF ALASKA

STEVE COWPER, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION  
DIVISION OF ENVIRONMENTAL HEALTH  
P. O. BOX 0, JUNEAU, ALASKA 99801

TELEPHONE:  
(907) 465-2609

RECEIVED  
JUNEAU OFFICE  
DEC 10 AM 8 36

December 7, 1990

Mr. Bruce B. Weyhrauch  
FAULKNER, BANFIELD, DOOGAN & HOLMES  
302 Gold Street  
Juneau, Alaska 99801

Dear Mr. Weyhrauch:

Thank you for your letter of November 15, regarding brood stock fisheries wholesomeness as a human food.

Last week, the Food and Drug Administration (FDA) and the Department of Environmental Conservation (DEC) met to further discuss the uses of hatchery brood stock fish.

The agencies agreed in principle on the following:

- 1) That hatchery brood stock, as defined in the Canned Salmon Control Plan (attached) are not wholesome:
- 2) That the two agencies would assemble pertinent studies, documentation, and samples for review and examination by the FDA's Center for Food Safety; and
- 3) That if the Center for Food Safety concludes that these fish are unwholesome, then FDA and DEC will most likely enter into a Memorandum of Agreement (MOA) that will explain each agency's role in prohibiting these fish from entering commerce as human food.

We anticipate that it will probably be a year before this process is completed. When the package of material is prepared for the FDA Center for Food Safety, we will provide you with a copy.

In regards to your question about the DEC and FDA meeting with hatchery operators earlier this year, Manny Soares has told me that the meeting was definitely not focused solely on canned fish. At the time of the meeting, the processors and FDA had already prohibited the use of these fish in canned products.

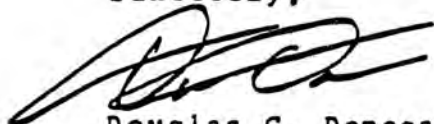
Mr. Weyhrauch

-2-

December 7, 1990

Manny also said that it was clearly stated that the agencies were investigating the possibility of a total prohibition against the use of these fish as a human food product. If you need any additional information about the meeting, please contact Mr. Soares at 563-0318.

Sincerely,

A handwritten signature in dark ink, appearing to read 'D. Donegan', with a stylized flourish extending from the end.

Douglas C. Donegan  
Director

Enc: Canned Salmon Control Plan

cc: Manny Soares, I.H., Anchorage



b. Water Supply and Ice

(1) Fresh water or sea water used in the plant shall be effectively sanitized at the plant unless the water is currently approved by a federal, state or local agency.

(2) Water for unloading, fluming or refrigerated holding of round fish may come from a natural water supply if it has been effectively sanitized, or if it has been approved by a federal, state or local agency, or if the fish are rinsed with effectively sanitized plant water before they enter the plant.

(3) The intake for natural water sources shall be located with the intent of avoiding pollution from shore facilities, marine vessels or processing effluents.

(4) Water used to cool cans after retorting shall be chlorinated or otherwise sanitized. There shall be a measurable residual of the sanitizer employed, when checked at the discharge end of the cooling system. Sanitizer checks shall be conducted at least two times per day during production. Records showing the times, locations and results of these checks shall be maintained. The can cooling water shall be of acceptable microbiological quality.

(5) Ice should be made from a supply of potable water. It should be manufactured, handled, stored and used in a sanitary manner.

c. Raw Material

(1) Wholesomeness of the fish shall be monitored by qualified plant personnel designated by the plant superintendent. Raw fish (fresh or frozen) shall be rejected by the packer if they are decomposed or in such a condition that a sound, wholesome product cannot be produced. This shall include, but not be limited to, bacterial spoilage and "freezer burn." Fish judged as not wholesome at the plant shall be disposed of in such a manner that they will not be processed. Hatchery brood stock, which either has been stripped for roe or milt, or has reached maturity and has been held to be used for roe or milt, shall not be processed.

(2) Occasionally, the packer may desire further assurance of the in-plant quality control program, concerning certain lots. Such lots shall be packed, coded, handled and sampled separately from the normal production. Such lots shall be sampled in bookkeeping code lots using twice the bookkeeping code sample size. The Association shall be notified of such lots when the samples are submitted and the Association shall promptly notify the Administration.

(3) The practice of punching fish in the body shall not be permitted.

(4) Fish parts used for salmon oil shall be handled in a sanitary manner. Salmon oil for edible purposes shall be packed in clean sanitary food grade containers.

(5) Raw materials such as salt and cans shall be handled and stored in a sanitary manner and be free from adulteration. Salt used in canned salmon shall meet the specifications for food grade salt as listed in the Food Chemicals Codex and otherwise be free from contamination.

d. Containers

(1) Examinations shall be made to assure that tin stocks, including side seams and ends, or pre-formed cans are essentially free from defects. Records shall be prepared



PACIFIC SEAFOOD PROCESSORS ASSOCIATION  
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Seattle, WA 98199  
(206) 281-1667  
FAX (206) 283-2387

102-10633  
1714  
358128

1300 MAR 32

March 25, 1991

The Honorable Governor Walter J. Hickel  
State of Alaska  
PO Box A  
Juneau, Alaska 99811

Dear Governor Hickel:

The Alaska Salmon Industry has been an integral part of Alaska's economic structure for over one hundred years. Processors have been important participants in the industry and the state has benefited from this association in many ways.

We are writing to you to express our concern with developments taking place with state approved salmonid enhancement facilities. The maintenance and protection of the genetic integrity of the wild stocks is of paramount importance to the continued long-term viability of the resource. Serious industry related problems have arisen as a result of production and harvesting matters arising from these facilities. In addition, we have concern with research proposals directed at producing altered sex ratio runs and the management problems related to these actions if implemented on a large scale.

We believe that there should be an immediate review of the status of the state's rehabilitation efforts and an examination of its possible long-term impact on the fishing industry.

Respectfully yours,

Charles H. Bundrant  
Chairman

cc: Senator Frank Murkowski  
Senator Ted Stevens  
Congressman Don Young  
Rick Lauber

M012

**SOUTHEAST ALASKA SEINERS ASSOCIATION**  
**P.O. BOX 9579**  
**KETCHIKAN, ALASKA 99901**  
**(907) 225-5156**

April 2, 1991

Senator Lloyd Jones  
Alaska State Senate  
P.O. Box V  
Juneau, Alaska 99811

Dear Senator Jones,

At the last Board of Fisheries meeting in Juneau there was a lot of discussion regarding the proper role of private non-profit in relation to the management of wild salmon stocks. As you know, some of the concerns even emerged in the Senate Fisheries/Finance Committee meeting on Thursday, March 7th.

*This winter,* Southeast Alaska Seiners (SEAS) submitted several proposals (copy enclosed) relating to the fishermen's understanding of the intended role of the private non-profit hatcheries. At the time we submitted these proposals, ~~we were aware of an Attorney General's opinion that "clouded" the issue. It was the AG's opinion that prevented the Board of Fisheries from taking definitive action on our proposals and requesting legislative clarification (letter from the Board should be forthcoming). In any event, the discussion from the Board was worthwhile as they did not accept the AG opinion carte blanche and instead raised very relevant questions.~~

I am making you aware of these developments in hopes that you would initiate some legislative hearings on the issue this year. The private non-profit hatchery program was intended to operate in a manner that would not adversely affect natural stocks, but does this mean not adversely affecting management of wild stocks? The hatchery fish released are "subject to regulation under applicable law in the same as fish occurring in their natural state" (AS 16.10.440), but does this mean the State manages for broodstock the same way they manage for escapement? In Southeast, hatchery fish are a minor component of the overall fishery (about 5%) yet in Prince William Sound the situation is reversed. Should wild stocks have a management priority nonetheless? Some hatcheries owe the State large sums of money, does this give them the right to put pressure on management to close down fishing opportunities on wild stock? The State is the banker and the regulator of the resource which repays the loans. Shouldn't there be some protection for the fishermen caught in this potential conflict of interest? This year pink salmon production is expected to exceed processing and market capacity. Are we producing too many fish? Should Prince William Sound proceed at doubling their pink production to the detriment of Southeast and Kodiak fishermen? Is anyone looking at the Statewide picture of hatchery production? These are just some of the questions that the legislature needs to begin asking now, in hopes of formulating a more enlightened hatchery policy for Alaska's fishery.

*Is this  
what is  
the mark  
impact of  
this prod*

*DRAFT*

*OK*

*hatcheries*

*Joint Bd. of Fisheries*

*AG Assistant  
AG White*



While the Board of Fisheries certainly will be pursuing these concerns, many of these concerns will undoubtedly end up in the legislative arena. Enclosed is a legal opinion I solicited in response to the AG opinion's that "clouded" this issue for the Board of Fisheries. The opinion from our lawyer examines constitutional history and legislative intent on the private non-profit hatchery program. If you read it you will realize all the more that the legislature must ultimately revisit the hatchery issue. As such, I think it would be prudent to have some hearings on the hatchery program this year. Hearings this year will help focus any legislative action for next year. *as soon as possible. would allow give some direction for interim work and research and*

Hatcheries will always have a role to play in Alaska's fisheries. Nonetheless, given all the developments in the hatchery program statewide it is time to review exactly what role hatcheries are to have. I hope you concur.

Please call if you have any questions regarding this request.

Sincerely yours,

Kathryn Troll  
Executive Director

Enclosures

c.c. Senator Eliason  
Representative Ben Grussendorf  
Representative Cliff Davidson  
Commissioner Carl Rosier

} OK

as these need  
statutory clarification



**SOUTHEAST ALASKA SEINERS**

**P.O. Box 9579**

**Ketchikan, Alaska 99901**

\*\*\*\*\*

TO: Mary McDowell

DATE: 4/2/91

FROM: Kate Troll

TALK: (907) 225-5156

FAX: (907) 225-5258

RE: \_\_\_\_\_

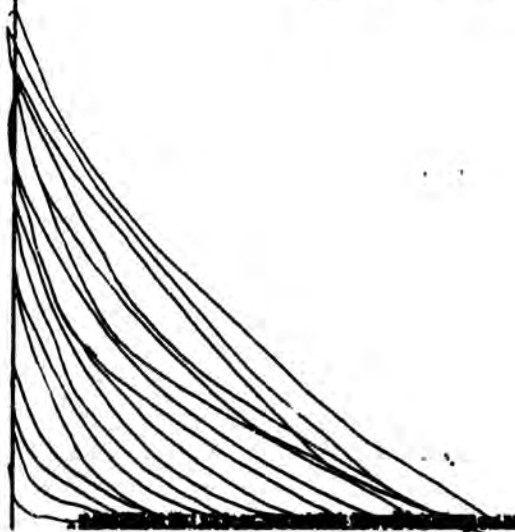
PAGES FOLLOWING COVER SHEET 2 PLEASE ADVISE IF ALL PAGES  
ARE NOT RECEIVED

Mary,

Your comments on content  
and process i.e. cc's would be appreciated.

Thanks,

Kate



**SOUTHEAST ALASKA SEINERS ASSOCIATION**  
**P.O. BOX 9579**  
**KETCHIKAN, ALASKA 99901**  
**(907) 225-5156**

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April 9 1991

Senator Lloyd Jones  
Alaska State Senate  
P O Box V  
Juneau Alaska 99811

**COPY**

Dear Senator Jones:

At the last Board of Fisheries meeting in Juneau (Feb. 26- March 10) there was a lot of discussion regarding the proper role of private non-profit hatcheries in relation to the management of wild salmon stocks. As you know, some of the concerns even emerged in the Joint Senate Fisheries & Finance Committee meeting on Thursday March 7th.

Southeast Alaska Seiners (SEAS) submitted several proposals to the Board of Fisheries relating to the fishermen's understanding of the intended role of the private non-profit hatcheries. At the time we submitted these proposals, we were aware of an Assistant Attorney General White's opinion that "clouded" the issue. It was Mr. White's opinion that prevented the Board of Fisheries from taking definitive action on our proposals and instead prompting them to request legislative clarification (letter from the Board should be forthcoming). In any event, the discussion from the Board was worthwhile as they did not accept the Mr. White's opinion carte blanche and instead raised very relevant questions.

~~the private non-profit hatchery~~  
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While the Board of Fisheries certainly will be pursuing these concerns, many of these concerns will undoubtedly end up in the legislative arena for statutory changes.

[REDACTED] the opinion from our lawyer examines constitutional history and legislative intent on the private non-profit hatchery program.

[REDACTED] have some hearings on [REDACTED] [REDACTED] would [REDACTED] for internal work that could lead to legislative action for next year.

Hatcheries will always have a role to play in Alaska's fisheries. Nonetheless, given all the developments in the hatchery program statewide it is time to review exactly what role hatcheries are to have. I hope you concur.

Please call if you have any questions regarding this request.

Sincerely yours,



Kathryn Troll  
Executive Director

Enclosures

[REDACTED]  
[REDACTED]  
Representative Ben Grussendorf  
Representative Cliff Davidson  
Commissioner Carl Rosier  
Mike Martin, Board of Fisheries Chair

A W. BRINDLE  
H A. BRINDLE

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Night Fax (206) 323-3204

May 1, 1991

The Honorable Dick Eliason  
Alaska State Senate  
P.O. Box V  
Juneau, Alaska 99811

Dear Senator Eliason:

I thought you might be interested to see that the issue of salmon hatcheries and their impact on wild stocks is also of concern on the east coast. The enclosed article came from a magazine called COUNTRY LIFE which is published in Charlotte, Vermont.

Sincerely,



Alec W. Brindle

AWB:kmh  
Enclosure



# Taming T·H·E Wild Salmon

*As natural stocks dwindle, aquatic farming holds new promise—and problems—for fish production*

BY JON VARA

**T**HE STELLWAGEN BANK SEASCAPE is representative of most views of this watery planet: an unbroken sweep of ocean water and sky. On this October morning, however, the view is not a distant one. There are 3-to-6-foot seas running, and a thick mist, leaking cold drizzle, hangs close to the water.

"It's not much of a day," Captain Frank Mirarchi had said as the *Christopher Andrew* eased out of Scituate Harbor, two hours before dawn. Mirarchi has a bad cold. A little more wind and rain, he says, and he could have stayed at home in bed with a clear conscience. Unprepossessing as it is, however, the day is too valuable to squander. Once winter sets in, Mirarchi knows, he'll be doing well to fish two or three days a week.

Stellwagen Bank—or Middle Bank, as it is better known to fishermen—is a submerged shoal that trends north from the northern terminus of Cape Cod. Mirarchi has been steering a course along the eastern slope of the bank for three hours, the funnel-shaped trawl net bumping unseen over the seabed, 120 feet below.

Long enough, he decides. He throttles back the engine—an action that instantly brings crewman Peter Downes scrambling from a bunk below—and climbs into his foul-weather gear. Mirarchi operates the winches and Downes manipulates heavy cables, chains and ropes through a practiced series of steps that culminates 15 minutes later as the overhead winch on the gallows frame winds in the last of the netting and brings the cod end—the baglike closed end of the funnel-shaped bottom trawl—up the steep stern ramp and onto the deck.

The trawl contains about 600 pounds of mixed fish. A third of it consists of skates, sea robins and undersized market species. They reset the trawl. Fish picks in hand—implements that resemble a policeman's nightstick with a 20-penny nail driven crosswise through the end—Mirarchi and Downes wade into the flopping mound of fish and begin sorting it by size and species.

ILLUSTRATION BY BRYAN LEISTER

In the process, some surprising objects come to light. There's a tangled 50-pound wad of gill netting, loaded with the limp, bone-white skins of long-dead dogfish. There are several aluminum beer cans and a clear-plastic soda bottle. From deeper in the pile, Mirarchi brings up an upholstered boat seat, an air-filter element from a diesel engine and a swatch of heavy nylon netting torn from a snagged trawl. The latter, he notes, is of a type no longer in general use.

"That's the old fine mesh," he says. "Just about everything that went into it stayed in the bag until you brought it up."

The net Mirarchi is using today, by contrast, is tied with 5½-inch "conservation mesh," which enables many undersized fish to escape. Large ones—unable to wriggle through the mesh—remain behind.

Relatively large ones, that is. Most of the yellowtail flounder, dab and gray sole in this bag weigh well under a pound. The largest of the cod looks as if it might go 8 or 10. There are no haddock in the net, and virtually none on Middle Bank.

It hasn't always been that way. It was not so long ago, Mirarchi says, that you could catch haddock with a hook and line just outside the harbor. Fifty-pound cod were not uncommon.

"Twenty years ago," he says, "we used to get 100-pound halibut out here. I've only seen two halibut this year, and neither one of them was over 10 pounds."

There are observers who say that fishermen like Frank Mirarchi may be going the way of the great schools of wild fish they once hunted. With cod and haddock in a steady decline over the past decade, fishermen are now harvesting species that for generations were considered unmarketable garbage—an assortment of bottom dwellers formerly considered too ugly to eat, including cusk, wolffish, hake and ocean

pout. While American consumers learn to accept these new offerings, Japanese seafood buyers have already established outposts up and down the coast to pay premium prices for fresh fish as well as such exotica as sea urchins and monkfish livers.

"Remember those old Tarzan movies?" Mirarchi asks. "Sometimes I feel like we're the guys with the spears. We're the guys who carry the ivory out of the jungle on our heads."

**A** FEW HUNDRED MILES UP THE COAST, Dan Marshall is scraping the bottom of a plastic feed bin with a hand scoop. He tosses a cup or two of pelleted feed to the salmon milling about the cage at his feet. They flash bright silver in the late-morning sun. There's an occasional splash as a foot-long salmon breaks the surface and skips across the water for a few feet, leaving a creamy trail of foam.

He squints, studying the speed at which they gobble the pellets. Another scoop of feed, more commotion in the water. Another pause.

"I don't know, Howie," Marshall says, finally. "They look awful good to me. I think you can push it up a third, you know, a third of a bag, this afternoon."

It's another day on the farm at Sea Farm Maine, in Lubec, Maine. Sea Farm Maine's acreage is a 25-acre plot of salt water in Johnson Bay, and its crop consists of about 200,000 Atlantic salmon.

The young salmon flashing in the sun at our feet began life at an inland hatchery, where fertilized eggs from carefully selected brood fish are hatched and nurtured in tanks of specially purified water for about a year, until the onset of smoltification—a physical change that indicates their readiness to move to salt water. The young fish—typically about 8 inches in length—lose the distinctive barred markings characteristic of their freshwater phase and assume a silvery color. They also exhibit a change in behavior: instead of facing into the pumped current of water that swirls through the circular tanks, they turn and begin to swim with the current—a course, instinct tells them, that will lead to the sea.

The modern hatchery smolt, however, has a much quicker seaward trip than its wild counterpart—in the back of a truck equipped with an oxygen-injection system to keep the fish alive and healthy along the way.

If all goes well, Marshall explains as he patrols the steel catwalk running down the center of the floating pens, the year-old smolts, weighing an average of 3 ounces or so, will reach market size of 8 to 10 pounds within 18 months of entering seawater.

Several times a year, each pen of fish must be "split," a laborious process in which the fish are sorted by hand to separate them into groups of uniform size. Splitting is necessary, Marshall explains, because the salmon don't grow at the same rate.

"If you leave the bigger ones and the smaller ones together," he says, "you end up with a runt problem." For the same reason, it's essential to start with smolts of uniform size from the hatchery. "They establish a pecking order right from the beginning, and fish that start out small never have a chance to catch up."

Day in and day out, however, feeding the fish is the most time-consuming job—a delicate chore that calls for care and experience. If feed is distributed too slowly, the most aggressive, dominant fish will get more than their share. If feed pellets are simply shoveled into the cages, however, much of it will sink through the mesh bottom of the cage before the

*Wild fish are cleaned at sea, but the boat may not dock for a week. Farmed fish get to market in less than a day.*







fish have a chance to eat it. Consequently, every ounce of the day's allotment of feed pellets must be broadcast, scoop by scoop, across the entire surface of each cage. When done properly, it's a fluid, graceful movement, reminiscent of sowing seed grain by hand on a prepared field.

"You've got to be careful with feed," Marshall says. "Feed makes up almost half our operating cost."

As he explains, however, each unit of feed goes a long way. "When we started here, our feed conversion was around 2 to 1. But we've managed to fine-tune that down to less than 1.5 to 1."

Figures like these are enough to make a landlocked agronomist sit bolt upright and blink hard. Broiler chickens, for example, typically convert feed at an efficiency of around 5.5 to 1, meaning that 5.5 pounds of feed are required to produce each pound of edible poultry. Pigs convert feed at a ratio of 7 to 1. Beef cattle clock in at about 15 to 1.

As thrifty as salmon are, some farmed fish do even better. Mahimahi, for example – a pelagic fish native to the Pacific, now being cultured in Hawaii – seems to be the current champion. Under controlled conditions, researchers have achieved the apparently supernatural feed-conversion rate 0.62 to 1 – equivalent to making 10 pounds of fish from 6.2 pounds of fish food.

**F**ISH OF VARIOUS KINDS have been raised in farm ponds in Europe and Asia for centuries. In North America, aquaculture is a relatively new phenomenon, with rapidly expanding production of farmed shrimp, trout, catfish, striped bass, mussels and coho and chinook salmon, two species native to the West Coast.

The Atlantic salmon industry, however – the first such enterprise to reach a worldwide market – got its start during the mid-1960s, when Norwegian researchers began to experiment with raising fish in dammed saltwater estuaries, and later in shore-based tanks through which seawater could be circulated with pumps. By the mid-'70s, these early efforts

*Broadcasting feed over the pens at Sea Farm Maine, a salmon farm whose "fields" are the waters off the coast of Maine.*

had been superseded by the floating-cage-culture system used today.

The demand for salmon has traditionally been strong in northern Europe, and the industry grew rapidly. In 1976, Norwegian growers produced about 2,000 metric tons of salmon; by 1989, the figure had increased to more than 120,000 tons. Along the way, a strong export market developed – thanks to the Norwegian Salmon Marketing Council, which spawned promotional literature by the ton – and fresh salmon began flowing to the rest of Europe, North America and the Far East, especially Japan.

By the early 1980s, the Norwegians were exporting not only salmon, but the technology to grow them. Norwegian-financed salmon farms began to proliferate in Scotland, Ireland, the Pacific Northwest, Atlantic Canada and – most recently – Maine. Sea Farm Maine, in fact, is a subsidiary of Sea Farm Inc., a corporation whose ownership is 50 percent Norwegian.

The industry's rapid growth has not been entirely smooth. During the early- and mid-1980s, many Norwegian farms suffered heavy stock losses from disease. To combat such problems – which were associated with the buildup of fish wastes and uneaten feed in the surrounding water – limits were placed on farm size and stocking density. (Those limitations, in fact, had much to do with the diaspora of Norwegian capital that led to the opening of salmon farms in North America.)

Norway's water-quality problems also served as an object lesson on the importance of good site selection. Today's salmon farmers recognize the importance of a strong tidal flow – an attribute often described, with unintended irony, as "flushing action" – in maintaining healthy fish.

Sea Farm Maine – like those elsewhere in the region – is

admirably sited in this respect. A pair of 20-foot tides—the highest in the nation—scrub out its cages each day. It's conceivable that water pollution will someday become a problem on this side of the Atlantic, as some critics charge. For the time being, however, it's a problem that remains mostly theoretical.

The potential for longer-term—and much more far-reaching—environmental effects has received far less attention. Foremost among them is the question of feed. Ironically, the growth of aquaculture—long looked to as the best hope for increasing the world's supply of protein—may actually reduce the amount of protein available to the world's hungry.

That is because farmed carnivorous fish, such as salmon, require large amounts of high-quality protein in their diets. And for the foreseeable future, at least, that protein is going to continue to come from the ocean, in the form of ground, dehydrated fish, known as fish meal. When the issue of protein is examined closely under a strong light, in fact, the impressive feed-conversion numbers typical of aquaculture assume a different perspective.

A beef steer, for example, feeds on grass for most of its life, converting lignocellulose—undigestible to humans—into usable protein. Even during the last four to six weeks before slaughter, when fed corn, soybeans or other higher-quality feed, the protein content of a beef animal's feed is relatively low.

**S**ALMON, BY CONTRAST—in common with shrimp, trout, striped bass and other highly profitable farmed species—require a large proportion of high-quality protein throughout the entire 18 months it takes them to reach market size. By weight, salmon feed is typically about half protein, of which three-fourths or more is derived from fish meal. And since the dry, pelleted feed contains very little water—much less than the fish themselves—the cultured fish receive the protein in a highly concentrated form.

To express that another way, each pound of farmed salmon, shrimp or other carnivorous fish represents roughly three pounds of wild ocean fish as feed. Cheap fish meal is to modern aquaculture what cheap chemical fertilizer is to a land-based corn or soybean farm: the essential input that makes all the wheels turn.

At present, most of the world's fish meal comes from small plankton feeders, such as herring and menhaden, although some meal is also produced from cannery waste and other fishing industry by-products. In accordance with the basic laws of biology, plankton-feeding fish are far more abundant than the larger predaceous fish that feed on them.

That is not the same thing as saying that they will always be abundant. Given their habit of gathering in huge, dense schools, in fact, the sardinelike species that serve as the raw material for fish meal are highly susceptible to overfishing.

One of the first species to be exploited for large-scale fish-meal production, for example, was the abundant North Sea herring. Herring had long been heavily fished for human consumption, but with the additional pressure of the meal industry—which began operation in the early 1900s—stocks declined steadily until the mid-1950s, when they collapsed altogether. They have yet to recover fully, although limited fishing has resumed.

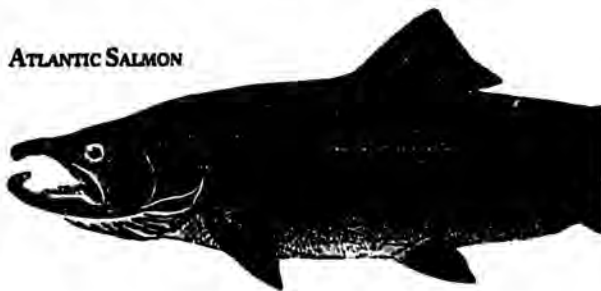
The loss of the North Sea herring fishery was instrumental in luring European factory ships across the Atlantic—beginning in the 1960s—to harvest the rich herring grounds

## Fresh From the Farm

*Crawfish and mussels, alive-alive-o!*

**M**AN HAS BEEN RAISING EDIBLE FISH for at least four millennia, but one of the first records of what might be called a truly modern approach to aquaculture comes from the Roman historian Pliny. According to Pliny, the nobleman Lucius Murena excavated a series of "fish reservoirs" on his summer estate during the first cen-

ATLANTIC SALMON



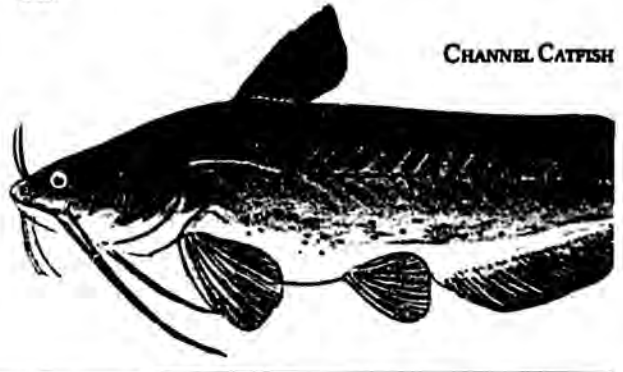
tury B.C., at a cost exceeding that of his house. It apparently proved to be a worthwhile investment, however; Pliny noted that the fish the ponds eventually produced were sold for four million sesterces.

The same forces that nudged Lucius Murena into the fish-farming business—the desire to produce and sell a farm product at a profit, and the willingness to make a heavy capital investment in order to do so—are identical to those driving the burgeoning aquaculture industry today. While small-scale subsistence fish farming is still the rule in much of Africa and Asia, modern, large-scale aquafarms are ultimately more concerned with cash than with fish.

As a result, recent research and development efforts have tended to focus on species that fetch a high price in the marketplace. Atlantic salmon is the most familiar example, but certainly not the only one. The following list is by no means all-inclusive, but it does mention those aquaculturally produced species that the American consumer is increasingly likely to encounter at the supermarket:

**Catfish** accounts for half of all United States aquacultural production. Last year's total catfish harvest came to nearly 350 million pounds, with three-fourths of it coming from the state of Mississippi. (Catfish, in fact, is now the state's single most valuable agricultural export.) Mild, white, grain-fed catfish fillets can be found fresh in supermarkets all over the United States and well into Canada. Prices are generally comparable to that of cod or other white fish.

CHANNEL CATFISH





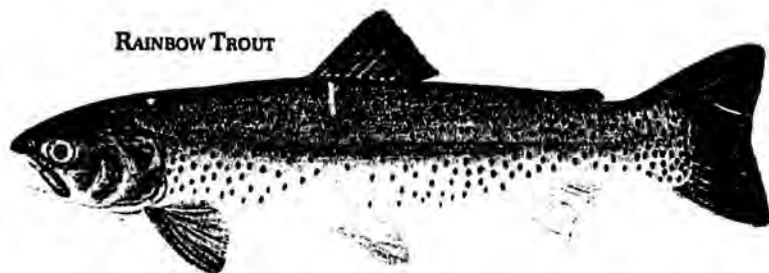
**Tilapia:** One of the few commercially farmed fish that thrives on an all-vegetable diet, tilapia are extraordinarily efficient protein producers. Long a favorite in the Third World, they have often – if unfairly – been regarded as trash fish elsewhere.

That appears to be changing, however. The mild, white-meat fillets of farm-raised tilapia, like catfish, are good-tasting and versatile, fitting into many types of recipes. Several large-scale aquafarms are now producing tilapia in quantity. One of the largest is Solar Aquafarms, Inc., which cultures, processes and markets its "Golden Tilapia" line in Sun City, California. Its passive-solar-heated tanks maintain optimum temperatures year-round. By mid-1991, Solar Aquafarms expects to produce 8 million pounds of tilapia, marketed mostly as skinless, boneless fillets.

**Trout:** Rainbow trout – a close relative of the Atlantic salmon – is one of the mainstays of the U.S. aquaculture industry, with about 57 million pounds produced annually. Idaho accounts for nearly two-thirds of the total, with most of the remainder coming from North Carolina, California and Wisconsin.

Trout farming has been an established business for the better part of a century, but trout farmers have been quick to take advantage of recent advances in biotechnology. Many growers now treat their

RAINBOW TROUT



breeding stock (although not the market fish themselves) with hormones to produce a strain of all-female progeny, which grow faster and yield better-quality flesh.

**Crawfish** – or, if you prefer, crayfish – are native to much of the United States, but only two species are currently raised for food on a significant scale. Louisiana provided at least three-fourths of 95 million pounds harvested last year – and consumed about the same proportion. As those figures suggest, crawfish is largely a regional specialty. About half of the total farmed yield comes from small, semicultivated ponds, and in rotation with rice farming, where the crawfish graze the stubble remaining in the fields after the rice harvest.

**Shrimp:** Shrimp is America's favorite seafood. Demand has been growing steadily for years, although the wild harvest worldwide has been static for the past decade or so. Farmed shrimp – which accounts for about a fourth of the world's total shrimp consumption – has made up the balance, and will continue to do so for the foreseeable future.

That has led to a worldwide boom in farmed shrimp, led by China, Taiwan, Ecuador and Indonesia. Ecuador, with its close proximity to the U.S. market, is our biggest supplier. Shrimp exports now account for about a fifth of that country's export income – more than bananas and cacao combined, and twice as much as coffee.

The rapid growth of the shrimp industry has had some unpleasant side effects, however. In Ecuador, thousands of acres of coastal mangroves have been destroyed to furnish land for shrimp ponds – an ironic development, given that most of the "seed" shrimp used

to stock the ponds are captured from the wild and that the wild shrimp rely on the coastal mangrove forest for breeding habitat.

**Mussels, clams and oysters:** The United States is the world's largest consumer of oysters, and as the environmental conditions in the Delaware and Chesapeake Bays – traditionally the major sources of wild oysters – continue to deteriorate, farmed oysters will capture an increasing share of the market. In 1987, domestic production of clam, oyster and mussel meats totaled at least 30 million pounds.



SCALLOP

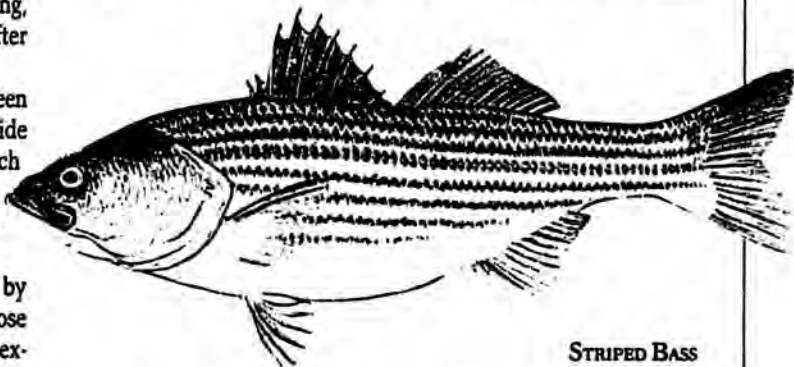


MUSSEL

The biggest obstacle to expansion of the shellfish farming industry is the availability of lease sites with acceptable water quality, since shellfish will absorb any contaminants present in the water in which they are raised. As a result, closed-tank systems will probably become increasingly important in the years to come.

**M**ANY OTHER SPECIES will be added to this list in the near future. Norwegian and Canadian researchers, for example, are working furiously to develop economical culture systems for Atlantic halibut. Given the current retail price for halibut – which routinely fetches \$6 to \$7 a pound, when it is available at all – they have considerable incentive to succeed. The Norwegians are already marketing modest quantities of farm-raised halibut, and it may be available in quantity by the end of the decade. Cod culture lies further in the future, but research is already well under way on both sides of the Atlantic.

Hybrid striped bass show promise, as well, with a number of producers successfully raising them in landlocked freshwater tanks.



STRIPED BASS

A strong market already exists for striped bass – one which has gone increasingly unsatisfied in recent years, with the closure of the commercial striped-bass fishery.

Other species to watch include the troutlike arctic char, sea scallops, American lobsters and sablefish, or blackcod.

–J.V.

# Lethal Liaisons

*When the wild meet the tame, genetic disaster may occur*

**I**F FISH MARKETERS ARE REJOICING in the success of aquaculture, marine biologists have some deep concerns about the rapid growth of fish farming, fearing that the relationship between wild and farmed salmon may prove disastrous to the untamed strains. The problem, in essence, is one of intermingling—a process biologists call genetic introgression—between wild and domesticated strains of fish.

According to Dr. John M. Anderson of the Atlantic Salmon Federation in St. Andrews, New Brunswick—an organization that works with the breeding of domestic strains, as well as conservation of wild salmon—the process through which Atlantic salmon find their way from their home rivers to their winter feeding grounds and back is not completely understood. Current thinking, however, suggests that it is a two-part process that combines instinct and learning. The ability to navigate in the open ocean is almost certainly genetically transmitted. It could hardly be otherwise, since salmon unerringly find their way across hundreds or thousands of miles of ocean to a place they have never known.

The same genetic mechanism works in reverse when it leads the fish back to the right stretch of coastline generation after generation. But a salmon does not instinctively know its home river when it gets there; it has to learn to recognize it through a process described as "imprinting."

During the year or more that they spend in the fresh water of their home rivers, before entering the sea for the first time, the young salmon develop a permanent memory of the composition of the tributary where they hatched—its mineral content, the organic matter it contains, and perhaps other chemical markers. After smoltifying, the immature salmon head for the sea. On that downstream journey, it is believed, their last taste of fresh water provides the clue that enables them to find the same river mouth again when they return—a year or two later—to spawn.

Farmed salmon smolts, by contrast—which travel from the hatchery to the sea by truck—never imprint on a particular river system. As a result, those that escape into the ocean, as some inevitably do, behave erratically. Many may find their way to the same offshore winter feeding grounds used by wild salmon, and come back on shore during the spring spawning run. Lacking home rivers of their own, however, they may enter any river system in the area to spawn, more or less randomly.

By reproducing in the "wrong" river system, these homeless salmon tend to muddy the genetic waters. Although their progeny will imprint on the river system in which they hatch, they may lack

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*Farmed salmon have some genetic traits that are good for the market, but they lack others needed for survival in the wild.*



the inherited ability to find their way from the winter feeding grounds to within "tasting range" of their adopted home river. The plight of such fish is analogous to that of a motorist who knows which exit to look for but can't find the correct highway.

Even wild salmon are not perfect navigators, of course. There has always been a certain amount of genetic exchange between



river systems through the medium of stray fish. Salmon farming, however, has increased the number of strays—and potential strays—exponentially. That is a particular cause for concern where wild salmon populations are sparse to begin with—as is the case in all of the Northeastern U.S. In the event of a major “spill” at a farm—which might involve thousands of fish—the relatively small wild population might find itself genetically overwhelmed.

All of that would be cause for alarm even if it were a matter of large-scale intermingling between populations of thoroughly wild fish. What causes fisheries biologists even greater concern, however, is that many farmed fish are by now several generations from the wild, having been selectively bred for certain characteristics.

One trait that salmon farmers seek to avoid, for example, is “gril-sification,” in which the salmon mature sexually at the end of their first year in salt water, at an average weight of 4 to 6 pounds. Because the market wants 8-to-10-pound fish, and because salmon gain weight very slowly after sexual maturity—when most of their energy goes into gonadal development—that costs the grower money. As a result, concerted efforts are being made to eliminate the trait from hatchery brood stock.

In the wild, however, early-maturing strains apparently have an advantage in some areas. In parts of Newfoundland, 90 percent or more of the wild fish mature after one winter at sea. If that naturally selected trait were diluted through contact with domesticated strains, the survival rate of the wild salmon in those areas could be compromised.

Those are more than theoretical possibilities. At a meeting held in Loen, Norway, in April 1990—attended by scientists and managers from most North Atlantic countries with salmon interests—it was established that escaped farmed salmon are indeed breeding successfully in the wild. In some Norwegian rivers, in fact, over half of the adults present during the spawning season are farmed fish. There is also evidence that suggests that farmed fish construct their gravel nests—or “redds”—somewhat later than the wild fish, disturbing preexisting redds in the process.

At the Loen conference, a number of possible countermeasures were considered. The designation of aquaculture-free zones in the vicinity of threatened wild stocks is one possibility, as is the sterilization of farmed stock at the hatchery. The establishment of gene banks—thus retaining the genetic diversity of wild fish for the future—was also supported. Finally, researchers stressed the importance of controlling the transportation of farmed stock from one region to another, to prevent the spread of disease or parasites. (It is generally agreed that the disappearance of wild salmon from 33 Norwegian rivers can be attributed to a species of freshwater parasite, *Gyrodactylus salaris*, transmitted

from imported Swedish hatchery stock.) As William Hershberger—a fisheries biologist at the University of Washington—states, “We just don’t know much about the kinds of problems genetic mixing can lead to, since most farmed animals are already extinct in the wild.” It would be ironic if *Salmo salar*’s comeback at the market heralded its disappearance from the wild.

—J.V.

in the Gulf of Maine, on Georges Bank, and as far south as Cape Hatteras. That influx quickly reduced the Gulf of Maine stocks by half—nearly killing off the Maine sardine industry—and devastated the stocks of Georges Bank, where catch totals fell from nearly 400,000 tons in 1967 to 40,000 tons in less than 10 years.

None of those past excesses—or many others not mentioned—can be blamed on the aquaculture industry. By far the largest share of the world’s fish-meal supply is used in poultry feed. By most estimates, aquacultural feeds now account for about 10 percent of the total. As world aquaculture continues to grow, however, so will the demand for feed. The U.S. Department of Agriculture estimates that at least a quarter of the world seafood production will be farmed by the end of the decade, better than doubling its current contribution. No one knows what that will mean to the world’s oceans.



Farm-raised salmon are netted, then dropped in the “knock out tank,” where they are immobilized with carbon dioxide.

“It makes me a little nervous,” says Susan Goldhor, a zoologist who serves as a consultant to the fish and shellfish processing industry. “You have to question the wisdom of putting so much pressure on the bottom of the food chain.”

An alternative, of course, is to cultivate that end of the food chain directly. Raising plankton-feeding fish—or fish that feed on larger aquatic plants—does away with the need for such intensive protein mining. Shellfish like clams, mussels, and oysters feed on microorganisms filtered directly from seawater, as do some finfish, such as tilapia. Carp—one of the most heavily produced fish, which has been raised in ponds in Europe and Asia for centuries—thrives on an all-vegetable diet.

The economics of aquaculture, however, are such that the products with the highest cash value are those like shrimp, salmon and other species with very high protein demands. Predictably, that is where development has been most rapid (see “Fresh From the Farm,” page 34).

THREE CENTURIES AGO, when Atlantic salmon ran up Northeastern rivers by the hundreds of thousands, they were sometimes used to fertilize corn. Indentured servants often insisted on contract clauses limiting

# Let Them Eat Dogfish

"Fish" no longer means cod or haddock

**W**ATCH OUT FOR THIS ONE," fisherman Frank Mirarchi says. He tosses a writhing, snapping, 3-foot long wolffish into a sorting bin.

A decade ago, wolffish were routinely thrown back over the side or converted into fish meal. This one, however, will be eaten, probably by a restaurant patron who orders fish chowder, a fish fillet sandwich or the generic deep-fried fish dinner. Cod or haddock—which is what the unqualified word "fish" used to mean in the Northeast—are almost always marketed by name these days. That has left the generic white fish category to former trash species, such as hake, cusk, ocean pout and wolffish. Before long, in fact, the category may be broadened even further, to include several species of small sharks known collectively as dogfish.

A sizable portion of the dogfish catch is destined for Europe, where, Mirarchi explains, it will become a salty, smoked snack food called *schillelocken*—or "golden curls"—that is a popular beer-hall treat in Germany. Most, however, will be served as just plain fish. English fish-and-chips establishments have been big users of dogfish for many years. To encourage the opening of a domestic market, the U.S. Department of Commerce—which determines which names may legally be attached to fish species in the marketplace—recently



Today's catch may include many species formerly considered trash fish.

ly gave the okay for retailers to present dogfish under the more appealing name "cape shark."

"I won't tell you it's the best fish in the world," Mirarchi says, "but if it's handled right, it can taste pretty good."

But even if cape shark catches on in a big way, it may prove impossible to keep the market supplied for long. Dogfish are abundant today because fishermen on this side of the Atlantic have worked hard at not catching them for the better part of 500 years. They have extremely low reproductive rates, take many years to attain sexual maturity, and school by sex for much of the year. As a result, large mature females—the preferred raw material for *schillelocken*—are easily harvested in bulk. Until they're gone, at least; that's why the Europeans are buying them here. —J.V.

the amount of salmon in their diets.

That is hardly the case today, when most of the Atlantic salmon raised in Maine—as in most North American salmon farms—ends up at white-tablecloth eating establishments. Restaurateurs have embraced it—along with shrimp, striped bass, rainbow trout, oysters, mussels and a lengthening list of other aquacultural products—for a number of reasons. Unlike many wild species, which are highly seasonal, farm-raised seafood is available throughout the year. While wild-caught seafood may be less expensive than its farm-raised counterparts during seasons of abundance, year in and year out the farmed product often comes out ahead.

Even more important, from the standpoint of the restaurant trade especially, farmed fish tend to be consistent in both size and quality. That tends to reduce preparation time, simplify menu planning and increase the number of satisfied patrons.

In the traditional seafood industry, by contrast, quality is spotty, at best. At the wholesale level, most fish and other seafood is marketed in about the same manner as corn, soybeans or other nonperishable commodities. Under the current system, most fish is bought and sold sight unseen. The fish at the bottom of the iced fishhold—which may be a week old or more by the time a boat ties up at the dock—commands the same price as the fish on top of the pile, which may have been caught that morning.

That system made a certain amount of sense 20 years ago, when fish was regarded as a cheap substitute for chicken wings or hamburger. But today, with fresh cod often selling for almost as much as sirloin steak, it has become a liability. Frank Mirarchi feels that it is costing the traditional fisheries customers.

"You stand at the dock in New Bedford," he says, "and plenty of times you'll see baskets of fish sitting in the sun in the middle of a cloud of flies. The fisherman doesn't get any more for quality fish than he does for garbage, so quality doesn't matter to him. That kind of attitude goes right down the line. The supermarket starts out with fish that's a week old; they don't want to get stuck with it. They rinse it in brine every night to keep it from smelling too bad. A week later somebody buys it, and they wonder why it tastes awful."

**T**he salmon in Sea Farm Maine's cages, by contrast, follow an express, straight-line path to market. In October, Sea Farm Maine will begin harvesting the 8-to-10-pound salmon that have been putting on weight in its floating cages for the past year and a half. The big silvery fish are netted and quickly transferred to the "knockout tank"—a 4-foot square plastic box filled with seawater that has been saturated with carbon dioxide gas—which quickly immobilizes them. The veins that supply blood to their gills are severed, and they are dropped into a second tank filled with water and crushed ice to "bleed out," a process that improves the texture and flavor of the flesh.

Those initial steps occur at the cages in Johnson Bay. The slaughtered fish will then be loaded onto one of two converted mackerel schooners—the *Grayling*, built in 1917, or the *Medrick*, three years older—for transfer to the R.J. Peacock Canning Company plant, a mile away. There they will be gutted, washed and packed in ice-filled waxed cartons for shipment. Twelve to 16 hours after emerging from the water, Sea Farm Maine's salmon—marketed under the Sterling Brand label—will be ready for early-morning



buyers at the Boston fish market.

If the fishmongers and restaurateurs are eager to see aquaculture flourish, they are not alone. Economists see a potential boost to our balance of trade. (The United States currently imports 60 percent of its seafood, which accounts for a trade deficit of \$3.3 billion.) Politicians see jobs. Cooks and consumers see cheaper, better-quality seafood. The traditional fishing service and supply industries—purveyors of rope, foul-weather gear, floats, netting and similar products—have experienced little difficulty in adjusting to the needs of aquaculturists.

All but forgotten in this feast of economic development are the commercial fishermen themselves, to whom aquaculture represents the same sort of enclosure of the commons that occurred on land centuries ago. Sea Farm Maine, for example, pays the state of Maine about \$1,000 a year for the exclusive right to a 25-acre column of seawater and the underlying seabed in Johnson Bay. Assuming that all the conditions are met, the lease will remain in effect for 10 years.

Ron Smolowitz is a fishing-industry consultant and columnist for the trade publication *Commercial Fisheries News*. He worries that the increasing emphasis on aquaculture will imply, to some, that the ocean itself is expendable.

"That's wrong," he says. "We still haven't begun to manage the ocean for food production."

A potential long-term solution, Smolowitz feels, is to start thinking of the continental shelves as range or pastureland, rather than hunting grounds. That might mean trying to eliminate some species, while fostering or introducing others.

"People say, 'No, you can't do that, you'll alter the ecological balance.'" He pauses. "What do they think is happening out there right now?"

**F**ROM THE BEGINNING, people have wanted to see wild Atlantic salmon as one of the main beneficiaries of salmon farming. The reasoning was simple: it should be cheaper to grow salmon than to catch it. According to Economics 101, wild-caught salmon should be wholly unable to compete with its farm-raised counterpart, and the heavy fishing pressure on this species would be relieved.

Unfortunately, it hasn't worked out that way. The world's wild harvest has hovered at somewhere between 5,000 and 8,000 metric tons annually for the past few years (farmed Atlantic, by way of comparison, accounted for 170,000 metric tons), and the wild salmon has no trouble finding buyers.

Because the word "wild" plays so well in the marketplace, in fact, wild salmon commands a premium price—often two or three times that of farmed fish. That is ironic, since the farmed product—thanks to more careful handling and faster shipment to market—usually is equal to or better than wild salmon, as blind taste tests have repeatedly shown.

"At first glance," says a State of Maine development publication, "the advantages of aquaculture would appear to be disadvantages for wild product. Closer inspection of seafood markets, however, indicates a probable favorable effect—at least in the longer term—on wild-product markets."

Perhaps. In the shorter term, though, traditional fishermen are not lining up to become fish farmers. That does not surprise Dan Marshall.

"Fishermen are basically hunters," he observes. "They know more about the ocean than you or I ever will, but they don't know much about raising animals." The bottom line, according to Marshall, is that it's easier to teach a farmer to run a skiff and an outboard motor than it is to teach a fisherman the finer points of feed conversion and disease control.

Marshall himself is the proof of that. Before he took the job managing Sea Farm Maine's operation, he spent a number of years as a farm manager for DeCoster Farms, Maine's largest producer of eggs and broiler chickens. Burton Blanch, the president of the Cobscook Bay Finfish Association, is a former dairy farmer who turned to salmon farming in 1985.

Like their landlocked brethren, fish farmers have one overriding worry: overproduction and low prices. The price of salmon, Dan Marshall observes, has been dropping for several years. "The days of \$2-a-pound profits are over," he says. "If we make 50 cents a pound this year, I'll be happy."

Still, he is optimistic about the future. A vigorous secondary processing industry, he says, will do much to stimulate demand.

"I saw that happen in the poultry business," he says. "Sales were flat for years, and then someone came up with the idea of chicken nuggets, and business took off."

Last year, Marshall and young Bobby Peacock of the R.J. Peacock Canning Company experimentally sliced some smaller salmon—too small for normal market outlets—into steaks with a bandsaw and packed them in sardine cans. Marshall gave me a can to try, and it was good.

"I think you're going to see a lot more of that kind of thing," he says. "You'll see salmon in microwave packages, and I think you'll see it in Weight Watchers' meals. The whole industry is still at the caveman stage."

Jon Vara is a regular HARROWSMITH COUNTRY LIFE contributor who lives in Marshfield, Vermont.



As the price of farm-raised salmon drops—and profits decrease—canneries like the R.J. Peacock Co. in Maine are experimenting with marketing strategies to stimulate demand.



**SOUTHEAST ALASKA SEINERS ASSOCIATION**  
**P.O. BOX 9579**  
**KETCHIKAN, ALASKA 99901**  
**(907) 225-5156**

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May 2, 1991

James Brooks  
National Marine Fisheries Service  
P.O. Box 21668  
Juneau, Alaska 99802

Dear Mr. Brooks

As we discussed over the phone, I am interested in understanding the history behind the Private Non-Profit Hatchery program which was established in 1974 when you were at the helm as Commissioner of Fish and Game. Since 1974, hatcheries have made their mark throughout Alaska's fisheries. The expanding roles of hatcheries in the different regions of the State has prompted a renewed interest in the original vision and intent of hatcheries in relation to management of Alaska's fisheries. To this extent, I would appreciate your timely response to these questions:

1. Wasn't the primary intent of the PNP Hatchery legislation to assist in the rehabilitation of the state's depleted salmon fishery?
2. Were there apprehensions about this program at the time it was considered? If yes, what were they?
3. In discussing the requirement of hatchery fish being available for common use when ever they occur in their common state (exception being recognized terminal harvest areas) was there any discussion of who owned these fish?
4. For management purposes, was it a given that there would be a management priority on wild stocks of salmon whenever hatchery and wild stocks co-mingled in harvest areas?
5. What was the prevailing understanding on how hatchery broodstocks were to be managed outside of the terminal special harvest areas?
6. What was the prevailing understanding on how hatchery cost recovery needs were to be managed outside of the terminal special harvest areas?
7. What was the goal for hatchery contribution to the common property fisheries?
8. When hearings were held with the fishermen regarding private non-profit hatcheries what did the Department communicate in regards to wild stock and hatchery management?

Written responses would be most appreciated but in the interest of your remaining time at NMFS, oral responses can be accommodated. Please call if you have any questions? I look forward to hearing from you.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'Kathryn Troll', written in dark ink.

Kathryn Troll  
Executive Director



May 6, 1991

The Honorable Richard Eliason  
President  
Alaska State Senate  
P.O. Box V  
Juneau, AK 99811

Dear President Eliason:

This letter is in response to a request by the Senate Resources Committee and the Special Senate Fisheries Committee when Board of Fisheries members appeared before the committee in March. We appreciated the opportunity to sit down with the committee and discuss items which will improve the board's ability to serve the people of Alaska.

In managing fisheries that involve hatchery raised salmon, the Board of Fisheries has encountered problems due to ambiguities in the current Alaska statutes. These problems commonly arise when the management of hatchery stocks conflicts with either the health of wild stocks or with the opportunity of fishermen to harvest wild stocks. Essentially, the statutes are not clear on the status of wild stock management.

State statutes also are not clear about the state's duty to provide fish for hatchery broodstock and cost recovery, and about the hatcheries' obligations to contribute to the common property fisheries. We perceive that the development of state policy toward hatcheries may have created a conflict of interest. On one hand, the state manages fisheries as a common property resource for the benefit of all user groups. On the other hand, the state loans money to hatcheries with the expectation that the hatcheries will receive enough fish to be able to repay these loans.

The board has the following comments on the existing statutes:

1. AS 16.10.375 Regional Salmon Plan. Should new language require a review or synthesis of the regional plans to give a statewide perspective on hatchery production?

President Richard Eliason

May 6, 1991

Page Two

2. AS 16.10.380 Regional Associations. One of the great strengths of the regional associations is the representation of all user groups on their boards of director. However, the PNP's have no such requirement. Should all hatcheries and enhancement activities in a region be under the control of the regional associations?

Should state laws apply to all hatcheries and enhancement activities in Alaska and not just private non-profit hatcheries? Other activities that might be covered include state-owned hatcheries, regional hatcheries, and the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the National Marine Fisheries Service. Should all these activities be included in the Regional Comprehensive Plan?

Should the role of the regional associations be to coordinate region wide production and allocation subject to biological review by the Regional Planning Team and allocative review by the Board of Fisheries?

Given an expanded role for the regional associations, should their means and levels of funding be re-examined by the legislature?

3. AS 16.10.400 Permits for Salmon Hatcheries. The legislature should re-examine (g) of this section: "During the development of a comprehensive plan for a region no permit may be issued for a hatchery unless the commissioner determines that such an action would result in substantial public benefits and would not jeopardize natural stocks."

The first ten words of this section, "During. . . region . . .", suggest that once the plan is completed, the prohibited actions could be allowed. Perhaps this wording should be deleted. Also, we believe that there should be more specific grounds and procedures for terminating hatchery permits after they have been issued.

President Richard Eliason  
May 6, 1991  
Page Three

Legislators should note that 5 AAC 40.860 provides generic standards for performance review of hatchery success in producing smolt from broodstock. There are no statutory standards, however, for performance review of hatchery contribution to common property fisheries. If a hatchery cannot demonstrate that it is providing "substantial public benefit", is the state required to continue to provide for returns to the hatchery for broodstock or cost recovery purposes?

In this subsection, "substantial public benefit" is not clearly defined. The board recommends that the legislature consider linking the number of eggs taken as broodstock or the number of smolt released by a hatchery to that hatchery's required contribution to the common property fisheries.

The board may contribute to clarifying "substantial public benefit" by requiring the marking of hatchery fish. While we believe that the board has the authority to require this, it would be helpful to have this authority specifically provided by statute. Should the cost of implementing a marking program be borne by the producers of hatchery fish or by the state?

The last five words of this subsection, ". . . would not jeopardize natural stocks", is one of only two places (the other is AS 16.10.420(10)) which declares that it is the legislature's intent that the conduct of the entire state hatchery system is conditional on the protection of natural stocks. Perhaps because our hatcheries have flourished over time, and given some of the intense debate occurring in Oregon, Washington and Canada on how hatchery stocks have impacted natural systems, it is especially timely for the legislature to review the treatment natural stocks receive.

4. The necessity of protecting Alaska's vigorous natural stock populations is recognized by Department of Fish and Game regulations and policies. The regulations are in 5 AAC 40. For example, some of the strongest language exists in 5 AAC 40.220(b)(1), "the proposed hatchery returns may not unreasonably or adversely affect management of natural stocks. . .". Additional language exists in 5 AAC 40.005(a), (c), and (e), 5 AAC 40.007(b), 5 AAC 40.170 (2), 5 AAC 40.220 (b)(1), (3) and (7), and 5 AAC 40.860 (b)(2) and (4). As this issue of natural stock protection is examined by the legislature, the board recommends that the legislature seek input from the Commissioner of the Department of Fish and Game.

President Richard Eliason  
May 6, 1991  
Page Four

5. The legislature may wish to further clarify their intent in additional and more concise definitions of terms used in Title 16. For example, the following terms should be clarified: "escapement", "brood stock", "cost recovery", "substantial public benefit", and "private non-profit."

Should escapement apply strictly to natural stocks returning to natural systems?

Should broodstock be defined as the number of eggs authorized by permit to meet the production levels of the hatchery and to contribute to the common property fisheries? Some wording to this effect would be valuable in light of AS 16.10.420 and AS 16.10.450 which allow for the sale of salmon and salmon eggs for cost recovery. Fish which return to the hatchery for broodstock should be differentiated from fish which return and may be taken for cost recovery.

Does the legislature wish to rank or prioritize escapement to natural systems compared to return of broodstock to hatcheries?

"Cost recovery" is another term which warrants some further clarification. However, a clear definition of broodstock, coupled with a definition of substantial public benefits in terms of what is contributed to common property fisheries from broodstock, would provide a de facto identification of fish available for cost recovery as long as identification of hatchery stocks can be achieved.

These concerns of the Board of Fisheries are presented for your consideration. Your interest, and past support, in these resource issues has been greatly appreciated.

Should you have further questions, please feel free to call me.

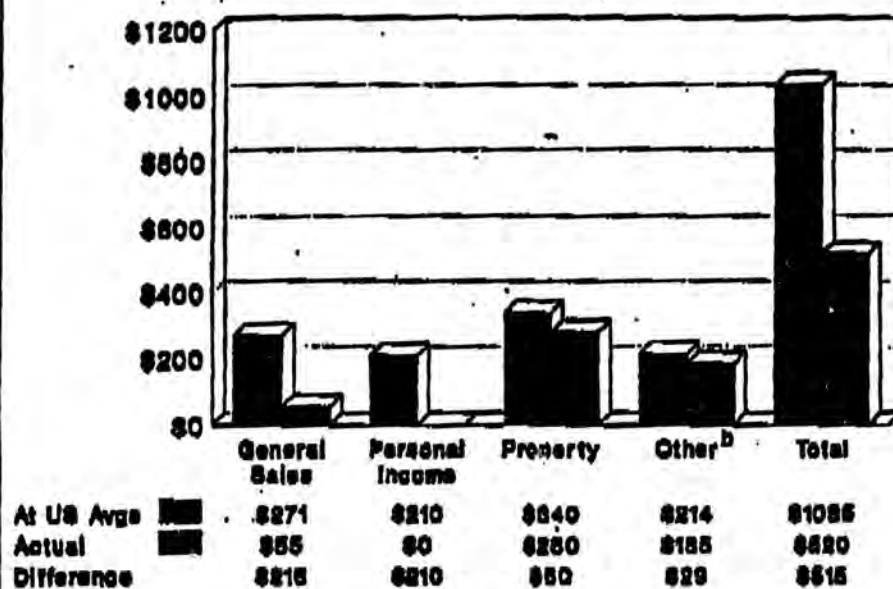
Sincerely,

Michael R. Martin  
Chair  
Alaska Board of Fisheries

cc: Board of Fisheries members  
Carl Rosier, Commissioner, ADF&G



**Figure 8. Alaska State and Local Taxes  
Paid by Individuals and Businesses  
Actual and at Estimated U.S. Average Rates<sup>a</sup>**  
(In Millions of 1988 Dollars)



<sup>a</sup> Based on 1985 tax base calculations. Excludes taxes paid by petroleum and other resource producers.

<sup>b</sup> Other taxes include selective sales taxes and non-petroleum corporate income tax.

double current tax collections. (We don't include charges and user fees here because those kinds of charges support different services in different locations, making comparisons meaningless. Also excluded are the potential net proceeds of a state lottery, which we estimate could be \$10 million annually.)

**Resource Production Revenues:** Alaska collects both taxes on and ownership payments from resource extraction. In this section we compare the rate of taxation of the resource base across states and specifically exclude ownership payments. Our estimates are necessarily rough approximations, given the difficulties in valuing each resource base.

Figure 9 compares tax rates on resource industries in Alaska and nationwide in 1987 (the most recent year for which we have figures) by showing the approximate percentage of their value added (the industry contribution to gross national product) paid in taxes, excluding income

taxes. (The box on page 14 provides further discussion of our tax base calculations.)

Figure 9 shows that some resources are taxed at much higher rates than others nationwide. For instance, mining (which is primarily coal mining) nationally paid about 14 percent of its value added in taxes in 1987. The oil and gas industry paid the next highest rate nationally, or about 12 percent of its value added. The other industries paid in the neighborhood of 4 to 5 percent of their value added in taxes nationally.

In Alaska, petroleum, far and away our most important resource, paid just about the same percentage of its Alaska

value added in taxes as it did nationally — about 12 percent. (The Alaska Legislature in 1989 changed the formula for calculating severance taxes on petroleum — the Economic Limit Factor, or ELF. Although the change increased 1989 tax collections by about \$150 million over what they would have been, the legislature essentially restored 1989 tax rates to their 1987 levels. So the tax percentage we show is still a valid approximation.)

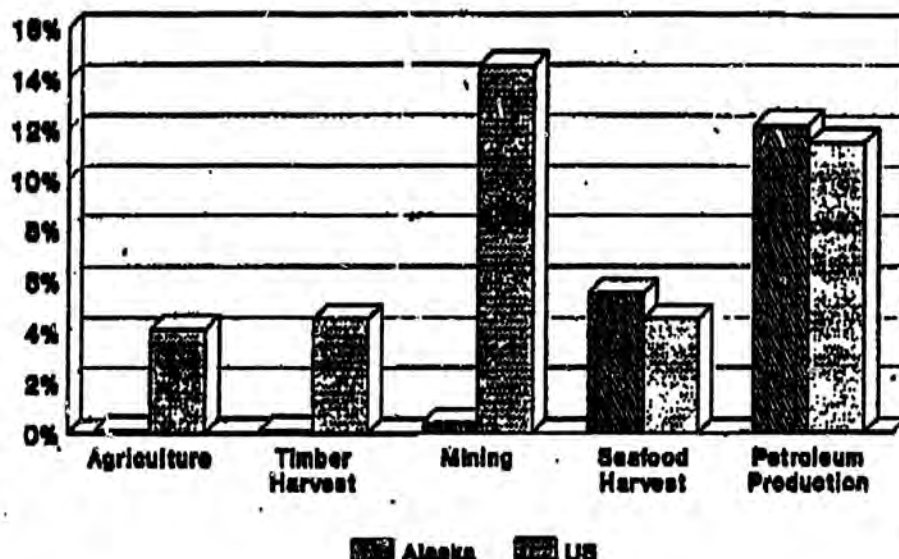
Alaska's next most important resource, commercial fishing, also was taxed roughly as much in Alaska as nationally in 1987 — around 5 percent of its value added. Other resource industries in Alaska paid little tax. Mining in Alaska paid less than 1 percent of its value added in taxes in 1987, as compared with 14 percent nationally. Agriculture and forestry in Alaska paid much less than 1 percent in taxes, as compared with about 4 percent nationally. (We weren't able to make comparisons for tourism because of the difficulties in identifying taxes paid and tax base.)

Figure 10 shows actual taxes paid by Alaska's resource industries in the late 1980s and estimates of what taxes would be at U.S. average rates. Modest changes in the national rates have an insignificant effect on collections, except of course for petroleum.

At national average rates, the petroleum industry in Alaska would pay about \$1.2 billion in taxes. (We make that estimate by applying the national average rate for petroleum in Figure 9 to the industry's Alaska tax base). The seafood harvesting industry would pay about \$31 million at the national average rate for that industry.

The severance tax, property tax, and special income tax on petroleum, and the raw fish tax, are the primary resource taxes in Alaska. Resource taxes collected from these industries in Alaska are consistent with national rates.

Figure 9. Alaska and U.S. Resource Industries Taxes as Percent of Value Added (1987)

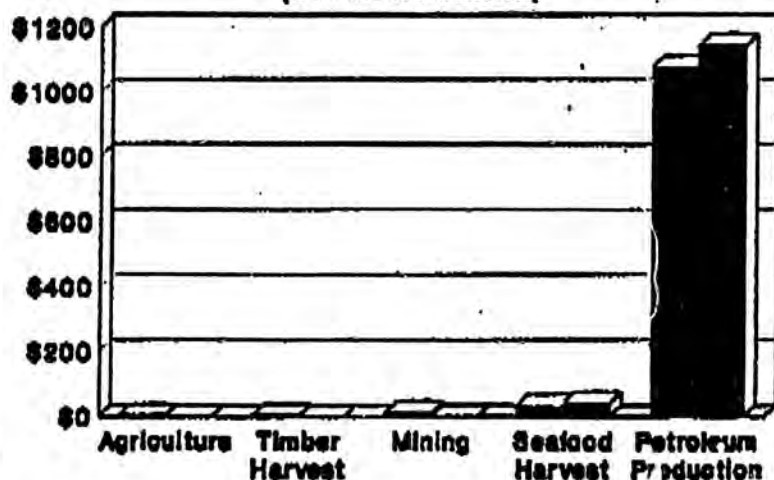


Alaska's mining, timber harvesting, and agriculture industries have much smaller tax bases than petroleum and fishing, and those smaller tax bases are taxed at rates considerably below the national averages. Alaska has no production tax on timber harvesting. Instead of a production tax on mineral extraction, Alaska has a mining license tax on net operating income. Were these industries to pay taxes at national average rates, the state would collect (at current

production levels) approximately \$10 million more annually.

As an owner of resources (as distinct from a tax collector), Alaska receives considerable revenues—again, mostly from the sale of oil and gas, but also smaller amounts from timber, minerals, and land sales. These payments to the state are

Figure 10. Alaska State and Local Taxes Paid by Resource Production Industries Actual and at Estimated U.S. Average Rates (in Millions of 1988 Dollars)



Note: Excludes revenue from ownership of resources.

■ At US Avg ■ Actual

*Alaska Seafood***Alaska Seafood Marketing Institute  
Facsimile Message**

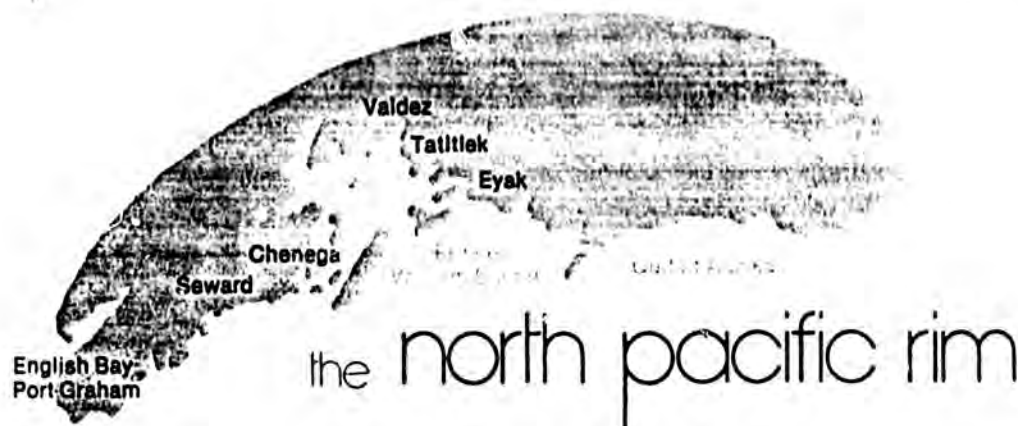
Date: 5/8/91 Time: 3:50 # Pages (including this one) 3  
To: Mary McDowell From: Kim  
Gen. Eliason's Office Alaska Seafood Marketing Institute  
P.O. Box D  
Juneau, AK 99811-0800  
FAX #: 467-4728 PH: (907)586-2902  
FX: (907)463-3273

Mary -

Here are the pages of the ISER report. Unfortunately, I copied only those two pages for my files and did not copy the cover page. My guess is that this was a 1990 special report.



DEC 9 1991



December 2, 1991

The Honorable Walter J. Hickel, Governor  
State of Alaska  
Box 110001  
Juneau, AK 99811

Dear Governor Hickel:

I am writing to urge your support of a \$1.8 million capital project in the Fish & Game budget for the construction of a mariculture technology development center. The existence of this center is vital to the survival of the mariculture industry in Alaska.

The potential for mariculture in coastal Alaska is very promising and several Native villages in the Chugach region are looking to this industry as a means for developing a long-term economic base. Our investigations into mariculture development have revealed that several support structures will be needed if this industry is to survive. One is a shellfish hatchery producing seed stock in sufficient quantity to make Alaska independent of outside suppliers, and the other is a technical development center that will develop technology for producing various mariculture products efficiently as well as procedures for ensuring that these products are safe to use.

We have made the commitment to build Alaska's first shellfish hatchery and are currently putting together a \$1 million financial package to underwrite hatchery construction and initial operation. We plan to construct the hatchery on the University of Alaska, Institute of Marine Science grounds in Seward. We are hopeful that the state will underwrite the construction and operation of the technology development center and also locate it at IMS. We believe that a hatchery built and operated by private industry combined with a technology development center that involves the university as well as state agencies, will form a powerful engine for driving the mariculture industry in Alaska. With this type of support it is quite possible that Alaska could become one of the nation's major mariculture centers.

3300 "C" Street / Anchorage, Alaska 99503-3920 / Ph. (907) 562-4155 / Fax (907) 563-2891

*The Non-Profit Corporation Serving The People Of The Chugach Native Region*





The economic vitality of Alaska's rural communities is a major concern for all Alaskans. Mariculture has great economic potential for Alaska's coastal communities if this industry can get the basic support it needs to develop. The Native villages in the Chugach region are rapidly becoming involved in mariculture, mainly oyster culture. I am also aware of similar activity in Native villages on Kodiak and in southeastern. The potential for economic development in these villages is very limited. We cannot afford to pass this opportunity by. I hope we can count on your support.

Sincerely,  
The North Pacific Rim



Richard A. Rolland  
Executive Director

cc: Clem Tillion  
Commissioners ADF&G, DCRA and DCED  
State Senate and House members

# ALASKA STATE LEGISLATURE · SENATE

SENATOR RICHARD I. ELIASON

LABOR & COMMERCE COMMITTEE, CHAIRMAN

RESOURCES COMMITTEE

RULES COMMITTEE

SPECIAL COMMITTEE ON HIGH SEAS  
SALMON INTERCEPTION

SELECT COMMITTEE ON  
LEGISLATIVE ETHICS



P.O. BOX 143  
SITKA, ALASKA 99835

P.O. BOX V  
JUNEAU, ALASKA 99811  
907) 465-4916

FAX (907) 465-4928

February 8, 1990

Don Collinsworth, Commissioner  
Alaska Department of Fish and Game  
Box 3-2000  
Juneau, Alaska 99802-2000

Dear Commissioner Collinsworth:

I would like to express some serious concerns that I have about the Private Non-profit Hatchery program and its public image, and enlist your help in exploring ways to alleviate some of these concerns.

I have always been a big supporter of hatcheries in Alaska, including the state-run hatcheries, those run by the regional aquaculture associations, and the other private non-profits. I believe that they have been crucial in the building and rebuilding of strong salmon stocks in the state, and have generally been endorsed and supported by the commercial fishing industry. But there is a new, and unfortunate sentiment growing in the state, a suspicion and mistrust of the PNPs. Fishermen are concerned that perhaps some of these hatcheries have lost sight of their intended purpose to produce fish for the common property resource, and may be operating on their own agenda without much direction and oversight. Indeed, we are seeing a growing perception that PNPs are becoming adversaries of commercial fishing, almost a "competing gear group" when it comes to fisheries management decisions.

I am still convinced that overall the PNP program has been, and continues to be, a great benefit to the fisheries. But there are several examples of mismanagement, permit violations, and so on which have come to light which give the whole program a bad image. These make the public skeptical about the motivations of PNP operators, about what kind of oversight exists to ensure that these operations are indeed sticking to their intended missions, and whether the net impact of these hatcheries on fishermen is positive or negative.

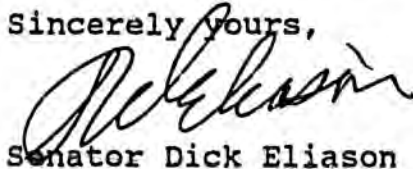
I have met with Brian Allee and Jerry Madden and discussed particular concerns that have surfaced regarding PNP operations at Meyers Chuck, Burnette Inlet, and Juneau. There are questions of egg-takes exceeding permitted levels without punitive action, "absentee" hatchery management that infuriates neighboring residents, and the specter of commercial fisheries being managed to ensure hatchery returns. Fishermen and community members are understandably distressed about these problems and we are facing the dilemma of growing mistrust. What I don't want to see develop is a situation where we end up "throwing the baby out with the bath water." That is, lets not let the bad PR generated by a few hatcheries polarize those affected to the point where fishermen are calling for the end of the PNP program. If something is not done, I think that could be where we are headed.

Evidently state law and departmental policy do not adequately provide for oversight of the PNPs. We need to develop a more "wholistic" approach to monitoring of the goals, budgets, salaries, production, management practices, problems and successes of the PNP hatcheries. There needs to be more coordination between the FRED Division, Commercial Fisheries Division, the Department of Commerce. And there needs to be a way of including fishermen in the process of monitoring and assessing whether the programs being permitted meet the goals and objectives spelled out in statute.

There needs to be a complete review of the PNP program, how it is functioning, where the shortcomings are in the management and oversight of it, how the bad operators can be weeded out and the good ones encouraged, how the doubts and concerns of the public and the fishing industry can be allayed, how we can maximize the contribution of PNPs to the common property resource. I request that you direct the appropriate people in your department to initiate such a review. While this will involve calling upon other departments, fishermen, and others for input, it seems appropriate that the FRED Division spearhead this effort to improve the performance and accountability of the PNP program.

I think that this review process is extremely important and ought to be undertaken right away. I hope that it results in some recommendations for specific action. If the review concludes that statutory changes or other legislative action is needed, please feel free to contact me. I look forward to working with you in tackling these problems.

Sincerely yours,



Senator Dick Eliason

| Alaska Department of Fish and Game- FRED Division                            |                  |         |         |       |        |       |         |
|------------------------------------------------------------------------------|------------------|---------|---------|-------|--------|-------|---------|
| Alaskan Enhancement- Common property harvest of enhanced fish (in thousands) |                  |         |         |       |        |       |         |
| 4/12/90: M McKean                                                            |                  |         |         |       |        |       |         |
| Year Area                                                                    | Harvest          | Chinook | Sockeye | Coho  | Pink   | Chum  | Total   |
| 1990 Southeast                                                               | Total Commercial | 332     | 2,186   | 2,864 | 51,195 | 1,884 | 38,201  |
|                                                                              | -Cost Recovery   | 22      | 0       | 117   | 888    | 837   | 1,485   |
|                                                                              | Adj. Comm total  | 310     | 2,186   | 2,548 | 50,198 | 1,547 | 36,738  |
|                                                                              | Enhanced         | 38      | 110     | 344   | 499    | 408   | 1,399   |
|                                                                              | % Enhanced       | 12.8%   | 5.2%    | 13.5% | 1.7%   | 26.4% | 3.8%    |
| Prince William Sound                                                         | Total Commercial | 22      | 912     | 524   | 44,165 | 967   | 46,591  |
|                                                                              | -Cost Recovery   |         |         | 17    | 8,858  | 32    | 8,907   |
|                                                                              | Adj. Comm total  | 22      | 912     | 507   | 35,307 | 935   | 37,684  |
|                                                                              | Enhanced         | 0       | 160     | 201   | 28,195 | 612   | 29,158  |
|                                                                              | % Enhanced       | 1.1%    | 16.4%   | 39.7% | 79.9%  | 65.9% | 77.4%   |
| Cook Inlet                                                                   | Total Commercial | 18      | 3,807   | 503   | 988    | 358   | 6,870   |
|                                                                              | -Cost Recovery   |         | 9       | 6     |        | 1     | 16      |
|                                                                              | Adj. Comm total  | 18      | 3,799   | 497   | 988    | 357   | 6,853   |
|                                                                              | Enhanced         | 2       | 404     | 9     | 167    | 48    | 630     |
|                                                                              | % Enhanced       | 8.8%    | 10.6%   | 1.8%  | 17.0%  | 13.4% | 9.2%    |
| Kodiak/ Chignik/ Aleut<br>AK Peninsula                                       | Total Commercial | 54      | 12,093  | 875   | 10,124 | 2,177 | 25,323  |
|                                                                              | -Cost Recovery   |         |         |       |        |       | 0       |
|                                                                              | Adj. Comm total  | 54      | 12,093  | 875   | 10,124 | 2,177 | 25,323  |
|                                                                              | Enhanced         |         | 2,291   | 7     | 592    | 4     | 2,895   |
|                                                                              | % Enhanced       | 0.0%    | 18.9%   | 0.8%  | 5.9%   | 0.2%  | 11.4%   |
| Bristol Bay                                                                  | Total Commercial | 33      | 33,165  | 100   | 517    | 1,008 | 34,822  |
|                                                                              | Enhanced         | 0       | 0       | 0     | 0      | 0     | 0       |
|                                                                              | % Enhanced       | 0.0%    | 0.0%    | 0.0%  | 0.0%   | 0.0%  | 0.0%    |
| Arctic/Yukon/Kuskokwim                                                       | Total Commercial | 189     | 205     | 532   | 17     | 1,136 | 2,078   |
|                                                                              | Enhanced         | 0       | 0       | 0     | 0      | 5     | 5       |
|                                                                              | % Enhanced       | 0.0%    | 0.0%    | 0.0%  | 0.0%   | 0.4%  | 0.2%    |
| 1990 Total                                                                   | Total Commercial | 647     | 52,317  | 5,199 | 86,994 | 7,531 | 152,687 |
|                                                                              | -Cost Recovery   | 22      | 9       | 141   | 9,848  | 970   | 10,988  |
|                                                                              | Adj. Comm total  | 625     | 52,308  | 5,058 | 77,146 | 7,161 | 142,299 |
|                                                                              | Enhanced         | 40      | 2,855   | 562   | 28,484 | 1,077 | 34,087  |
|                                                                              | % Enhanced       | 6.4%    | 5.8%    | 11.1% | 38.2%  | 18.0% | 24.0%   |

Note: Cost recovery numbers have been subtracted out to provide a common-property harvest figure.



*JSF*

May 14, 1974

The Honorable William A. Egan  
Governor  
State of Alaska  
Juneau, Alaska 99801

Re: CSHB 830 am S

Dear Governor Egan:

At your request, we have reviewed CSHB 830 am S.

This bill would authorize private ownership of salmon hatcheries by nonprofit corporations in order to assist in the rehabilitation of the state's depleted salmon fishery. The Commissioner of Fish and Game would be authorized to issue permits for operation of salmon hatcheries subject to such conditions as he deems appropriate. Hearings would be held prior to the granting of any permit. Permit holders would have to meet certain requirements in the operation of salmon hatcheries. If the Commissioner finds that a permit holder is violating such requirements or is otherwise conducting an operation not in the best interests of the public, he would be authorized to alter, suspend, or revoke the permit. Salmon produced by the hatcheries would be available to the public for common use while in open waters. Certain other specifications are made with respect to sale of fish or fish eggs by hatchery operators.

There is a possible problem with this bill stemming from proposed Section 16.10.450, providing that funds which exceed operating costs shall be used by hatchery operators for "fisheries research, salmon rehabilitation projects, and other fisheries activities". This language is sufficiently broad that it suggests that hatchery operators could lawfully engage in activities which are properly within the purview of the Department of Fish and Game. We do not consider this to be a serious problem, however, since the Commissioner is authorized to control the activities of hatchery operators generally through the permit process, and would thus be in a position to prevent any conflicts or overlaps.

We also note that salmon hatcheries are fully consistent with Sections 4 and 5 of Article VIII of the Alaska Constitution, providing that natural resources are to be developed and utilized

The Honorable William A. Egan  
Governor

May 14, 1974

- 2 -

on a sustained yield basis and that measures may be taken to increase utilization and yield. However, with respect to the provision in Section 16.10.440 of the bill, stating that released hatchery fish are subject to common use until they return to a specific location designated by the Department for harvest by the hatchery operator, care must be taken to achieve consistency with Section 3 of Article VIII (requiring common use of natural resources wherever they occur in their common state) and Section 15 of Article VIII (providing that there shall be created no exclusive right of fishery). The discretion allowed the Department in this section appears to be comprehensive enough to permit constitutional application of this authority.

It is our opinion that this bill is constitutional and in proper form.

Sincerely,

Norman C. Gorsuch  
Attorney General

NCG:fw:JH

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1973 - 1974

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Fischer, Wingrove

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Meland, Rader

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Groh (Vice Chairman),  
Butrovich, Thomas,  
Ziegler

### State Affairs

K. Miller (Chairman),  
Harris (Vice Chairman),  
Rettig, Kerttula,  
Ray





## IN SEARCH OF THE SIMPLE LIFE

by Roger Fitzgerald

# The Pink Plague

I've been thinking about all those pinks coming back to Prince William Sound this year. It used to be (back in the mid-1970s) that there weren't so many of them. In fact fishermen and processors got together and created the Prince William Sound Aquaculture Corporation to enhance the runs. I even contributed a few pennies myself. The success of PSWAC is one of the great stories of modern aquaculture.

Not only is Prince William Sound due to hit this year, but Kodiak and Southeast, which will be the first time all three came in at once. Usually it's boom here, bust there—but three booms at once is a lot of humpies. About 110 million, they're saying.

What with all these salmon coming back, you'd think everyone in Alaska

Department of Fish & Game doesn't want to forecast them, repudiating their predictions even as they make them—so no one will blame them for the plethora of pinks!

If fishermen don't catch pinks and processors don't process them—what will they do? Maybe they're expecting another oil spill. I don't know.

The problem is all that canned pink salmon (going back to 1985) still stacked up in the warehouses. Processors can't sell it fast enough to keep up with the harvests. The government (as I'm sure you've heard) may try to help them out by allowing foreign processors to ease the pain of all that salmon.

But surely we needn't bring the government into it. A more logical solution is to close the season every

address this excessive return of salmon to our waters. I've yet to hear them.

PSWAC, therefore, must be put under a moratorium not to produce any more salmon. In fact, they are. Not only are there "homeless" fishermen in Prince William Sound this year—fishermen without a market (about 60 boats, I hear)—but a homeless aquaculture corporation as well. Processors don't want to buy PSWAC's surplus pinks to keep them operating (to produce more damn salmon!). Fishermen are looking the other way because they don't want the competition. "It's real ugly up here right now," said a friend in Cordova.

Real "ugly" maybe—but nothing new. Here's part of a letter addressed to Governor Hammond by Rodger Painter of the United Fishermen of Alaska in 1981. (Italics are mine.)

Dear Governor Hammond:

"The news that the 1982 salmon season may produce the largest harvest in history has not been greeted with the enthusiasm one might expect from the fishing industry. Indeed, the Alaska Department of Fish and Game's pre-season forecast calling for the third consecutive catch topping 100 million salmon has caused more alarm than celebration.

"Processors are sitting on huge packs of canned salmon and it appears unlikely markets will improve significantly in the near future. The situation spells big trouble for the fishing industry, since roughly two-thirds of the 1982 salmon pack is expected to be pinks and all but a tiny fraction of that pack is canned.

"Most fishermen don't think the state's seafood processors have reacted yet to the unmistakable signs that there are going to be a lot of salmon available in Alaska over the long term... and there have been no efforts to forge major new markets in the U.S. . . . Massive quantities of fish were dumped four years ago in Southeast.

"The UFA thinks it is in the best interests of the State of Alaska to attempt to fully utilize our great salmon resources. The State of Alaska should play a lead role in deciding how Alaska's salmon resources are utilized. If the state chooses to do nothing, the same companies who have been making those decisions since early Territorial Days again will be calling the shots."  
—November 5, 1981

One thing you'd expect to come out of all of this is a lower price for a can of pink salmon. If you don't develop new markets or new products, at least you can reduce the price to move the product. Most industries, I believe, do this when they can't sell something after a year or two. And I was encouraged to read in the *Homer*

*News* (March 14) that the Alaska Seafood Marketing Institute was "pushing canned salmon hard" and (according to marketing director Jerry Skene) the price of a one-pound can that cost \$3.29 in 1980 are now selling for \$1.70, which should pick up consumers who had turned to cheaper sources of protein.

For some reason, though, I can't find any of this bargain pink salmon in Seattle, although I admit my research has been limited to a handful of markets. The average price I found for a 7-1/2 oz. can of pink salmon was over \$2. At Ballard Market, for example, it was \$2.42 for a 7-1/2 oz. can of Bumble Bee Pink Salmon; you can buy the same size can of Chunk White Albacore for \$1.76. At QFC, it was \$2.44 a can, at the market at Fishermen's Terminal, \$2.99—and so on. Where were the \$1.70 cans? The cheapest pink salmon I found was at Safeway, where 7-1/2 oz. cans were on sale for \$1.99 (against albacore for \$1.49 and Chunk Light Tuna for 99 cents). I bought a can of Bumble Bee Pink Salmon and brought it back to my office for lunch.

Before opening the can, I asked Rick Lauber, vice president of the Pacific Seafood Processors Association, and reported my price findings. He told me I was mistaken: "that canned pinks were a bargain, and I wasn't shopping in the right places. He also pointed out that the prices at the supermarket shelves were not necessarily a reflection of what processors were selling it for. (True, it's possible that supermarkets were making a killing on it.)

My curiosity was piqued as to why pink salmon was so expensive compared to a Cadillac product like Chunk White Albacore Tuna. So I called up the Western Fishboat Owners' Association in California, and asked them what they were getting for a pound of albacore tuna. The price had just dropped to 75 cents, they told me (FOB Samoa). I asked for the recovery rate: 55 percent they said (the same as pink salmon). I still couldn't figure out why it was cheaper. Was it because fishermen got paid two-and-a-half times more for it than pink salmon? I'll leave it to the mathematicians to figure out.

This left only one thing to do: Eat the can of pink salmon. I opened it up and peered into the can. Not a pretty sight, to tell you the truth: it had bones and skin in it and dissolved as much as I probed it with my plastic fork. I had forgotten how bad the product really was. (I say this honestly, with all due respect.) It hasn't changed in 50 years. The people who used to eat it are all old dead. I think it's time to try something different with pink salmon. Maybe dye the cans a different color—or put dolphin-safe labels on them. Anything new would be welcome. □



Worker contemplates one of many pen loads of pinks harvested at the Armin Koernig hatchery.

would be dancing a jig. Down here in Washington they get excited if even one salmon returns. I refer to the one sockeye that made it back to the Snake River last year.

But in Alaska 110 million returning humpies is not a happy occasion; in fact (from what I read in the newspapers), the industry would just as soon the salmon stayed at sea. Fish processors don't want to process them, fishermen don't want to catch them (at 20 cents a pound), the Alaska

other year—to make it easier for processors. That way they'd have two years to market the pack instead of one. Or every three years—whatever is comfortable.

In the meantime, we need to enforce stricter measures against salmon enhancement—the root of Alaska's marketing problems. Any reasonable person would agree that if we reduced production by 50 percent, our marketing problems would be cut in half. If there are better ways to



# For Grey.

## ASMI FACT SHEET

### THE SEAFOOD INDUSTRY AND ALASKA

-- About 5.5 billion pounds of fish are harvested annually off Alaska's 34,000 miles of shoreline. This includes the new offshore groundfish fishery. (NMFS)

-- There were more than 550 seafood processors in Alaska in 1989. (DEC)

-- Alaska leads all states in volume of seafood harvested with 2.6 billion pounds in 1988 (not counting the large offshore pollock and other groundfish fishery)--far surpassing Louisiana, a distant second with 1.4 billion pounds harvested. (NMFS)

-- The ex-vessel value of Alaska's seafood harvest (the price paid to fishermen by the processors), exclusive of the offshore groundfish fishery, was \$1.3 billion in 1988--more than four times the value of runner-up Louisiana with \$317 million. (NMFS)

-- Of the top ten seafood ports in 1988, six were Alaskan (#1 Kodiak, #3 Dutch Harbor/Unalaska, #4 Kenai, #6 Petersburg, #8 Cordova, and #10 Ketchikan). (NMFS)

-- Alaska produces 46% of all U.S. seafood, 24% of all North and Central America seafood, and 2% of the world production of seafood. (1989 McDowell study)

-- If Alaska were an independent nation, the state would rank in the top five in the world if seafood production were measured according to value of the harvest. Alaska would rank 11th in the world in seafood production--ahead of fishing nations like Norway, Iceland, Canada and Denmark. (1989 McDowell study)

-- Alaska's traditional commercial finfish fisheries (salmon, halibut, herring) accounted for 12% of the U.S. seafood production and 25% of the value of U.S. production in 1987. (1989 McDowell study)

Alaska Seafood Marketing Institu  
P.O. Box C  
Juneau, Alaska 99811-08  
(907) 586-29



-- Alaska's offshore groundfish fishery accounted for 34% of the nation's volume but just 7% of the value of U.S. production in 1987. (1989 McDowell study)

-- Alaska's commercial fishermen caught 85% of the U.S. production of Pacific salmon in 1988. (U.S. Dept. of Commerce)

#### SEAFOOD AND ALASKA JOBS

-- Alaska's seafood industry directly accounted for 16.4% of the state's economic base and payroll in 1987. (1989 McDowell study)

-- The seafood payroll in Alaska was more than \$1 billion in 1988--more than oil and gas, tourism, timber products and mining combined. (1989 McDowell methodology, NMFS information)

-- Alaska's seafood industry in 1987 provided the equivalent of 19,232 year around jobs in the state (not counting the offshore groundfish fishery). That is more than oil and gas and tourism combined. (1989 McDowell study)

-- Another 13,800-18,950 induced and indirect jobs are created because of the Alaska seafood industry, not counting the offshore groundfish fishery. Induced jobs include employees in grocery stores, clothing stores, gas stations, banks, doctors' offices. Indirect jobs include employees of shipyards, marine hardware stores, marine fuel sales, and marine equipment and repair services. (1989 McDowell study)

-- Another 1,100 Alaskans are employed in state and federal agencies, regional aquaculture associations or nonprofits directly connected to the seafood industry. These additional non-private sector jobs have a payroll of \$40 million and operating budgets of \$82 million. (1989 McDowell study)

-- More than 30% of Alaska's 1987 employment base of 117,000 jobs were dependent upon the seafood industry when direct employment, indirect and induced employment and government and nonprofit employment are added together. (1989 McDowell study methodology and figures)

-- The average monthly wage for seafood industry employees is \$2,582 per month compared to the Alaska basic industry average of \$2,578. (1989 McDowell study)

-- The average monthly wage in the tourism industry is \$1,354 per month. (1989 McDowell study)

-- The average monthly wage in the oil and gas extraction industry is \$5,273 per month. (1989 McDowell study)

- 77.6% of all permits  
are held by Alaska residents

-- In 1987, Alaska residents held 80% of all entry permits, comprised 66% of the harvesting crews and held 47% of the processing jobs. (1989 McDowell study)

-- In the salmon fleet, there are about 12,000 limited entry salmon permits and 25,000 skippers and crew. The halibut fishery has 3,200 vessels and 10,200 skippers and crew. There are 500 seiners and 1,400 gillnetters with skippers and crew totaling about 7,000 involved in the herring fishery. About 1,200 vessels harvest shellfish with 3,800 skippers and crew. In 1987, there were 42 factory trawlers with 4,000 workers and about 100 trawlers and 1,000 workers harvesting groundfish off Alaska. (1989 McDowell study)

-- Alaska's basic industries--defined as employment created by demand from outside the state--include, in descending order: national defense, 27% of basic employment; seafood, 16.4%; tourism, 8.4%; federal government exclusive of national defense, 8.2%; oil and gas, 7.1%; forest products, 2.6%; and mining, 0.5%. (1989 McDowell study)

-- Local government employment accounts for 16.3% of the employment in Alaska and state government accounts for 13.4%. (1989 McDowell study)

#### SEAFOOD AND THE ALASKA ECONOMY

-- Total investment by the seafood industry in Alaska is about \$4 billion (half in vessels, one-quarter in permits and one-quarter in processing plants and equipment). (1989 McDowell study)

-- Processors spend about \$90 million per year in Alaska to support their activity. (1989 McDowell study)

-- Harvesters spend about \$190 million per year in Alaska to support their activity. (1989 McDowell study)

-- The seafood industry's economic benefits spill across all parts of the state--rural and urban.

-- The seafood industry is the largest private employer in Southeast, Kodiak, Bristol Bay, the Aleutians, and Northwest Alaska. (1989 McDowell study)

-- Well over half of all private sector employment in Kodiak, the Aleutians and Bristol Bay is provided by the seafood industry. (1989 McDowell study)

-- Even though no significant commercial fisheries exist in interior and northern Alaska, 242 residents of those regions hold entry permits for other areas of Alaska and earned nearly \$4 million in 1987. (1989 McDowell study)



-- In Fairbanks, there are 101 entry permit holders who earned \$2.1 million in 1987. (1989 McDowell study)

-- In Anchorage, there are 873 permit holders who, in 1987, earned nearly \$31 million commercial fishing. (1989 McDowell study)

-- Anchorage fishermen in 1986 ranked third as a group (behind Kodiak and Dillingham fishermen) in gross earnings. Anchorage fishermen as a group earned more than Petersburg fishermen and were well ahead of the fishermen in Cordova, Homer, Ketchikan and other coastal communities. (1989 McDowell study)

-- Prince William Sound limited entry permits were selling for an average \$244,500 early in 1990 while a seat on the American Stock Exchange cost \$160,000. (CFEC and AMEX)

#### ALASKA SEAFOOD AND STATE TAXES

-- The severance tax, property tax and special income tax on petroleum and the raw fish tax are the primary revenue taxes in Alaska. (ISER)

-- In FY 89, the seafood industry paid nearly \$27 million in raw fish taxes. (Dept. of Revenue)

-- Fish taxes on the seafood industry in Alaska are consistent with the taxes on the seafood industry in other states--about 5% of value added. (ISER)

-- Mining paid less than 1% of its value added in Alaska taxes in 1987 compared with an average of 14% in other states. Agriculture and forestry tax receipts in Alaska are negligible, much less than 1% of its value added compared with a national average of about 4%. (ISER)

-- The \$27 million in raw fish taxes is many times the amount of state revenue generated by mining, timber harvesting and agriculture. If the timber harvesting, agriculture and mining industries were taxed at levels comparable to the national average, an additional \$10 million would be collected in taxes by Alaska. (ISER)

-- In addition to the \$27 million the seafood industry paid in fish taxes, the industry was also assessed by the state \$9.5 million for salmon enhancement (aquaculture) in FY 89 and \$3.3 million for Alaska Seafood Marketing Institute generic promotion campaigns. (Dept. of Revenue)

-- The seafood industry also paid a substantial portion of the \$7.2 million that was collected in FY 89 through the marine fuel tax. (Dept. of Revenue)

-- In addition to the direct tax revenues through the raw fish



tax and the marine fuel tax, the seafood industry provides millions more in local taxes (sales taxes and property taxes). This is a very important source of revenue for many cities and communities. (1989 McDowell study)

#### ALASKA SEAFOOD EXPORTS

-- One third of all U.S. seafood exports are exported directly from Alaska. This does not include seafood shipped from Alaska to Washington state before shipment overseas because Customs does not track origination. (1989 McDowell study)

-- Over \$550 million worth of seafood was shipped directly from Alaska to foreign nations in 1987. (1989 McDowell study and U.S. Dept. of Commerce)

-- The value of direct seafood exports from Alaska in 1987 (\$550 million) was double the value of direct seafood exports from Alaska in 1984. The value of direct seafood exports in 1989 (\$1 billion) was nearly double the value of direct seafood exports in 1987. (1989 McDowell study, U.S. Dept. of Commerce, and Center for International Business)

-- Japan accounts for over 95% of all exports from Alaska (\$999 million in 1989). (Center for International Business)

-- The major overseas fresh-frozen salmon markets in 1987 were Japan (\$457 million), France (\$57 million), Canada (\$38 million) and the United Kingdom (\$15 million). (1989 McDowell study and U.S. Dept. of Commerce)

-- The primary market for Alaska's herring products is Japan. In 1987, 60.2 million pounds of herring valued at \$41.2 million and 2.7 million pounds of herring roe valued at \$8.5 million were shipped to Japan. Korea, China and Canada took smaller amounts of Alaska herring. (1989 McDowell study and International Trade Administration)

-- Japan also was the principal export market for Alaska crab in 1987 taking 7.2 million pounds of king crab and 36.6 million pounds of snow crab in 1987. (1989 McDowell study and U.S. Dept. of Commerce)

#### THE ALASKA SEAFOOD INDUSTRY NOW

-- Groundfish harvesting off the coast of Alaska is the fastest growing U.S. fishery and ranks as the nation's largest in terms of volume (in 1978, the domestic pollock harvest was 9.2 million pounds, in 1988, the domestic pollock harvest was 1.3 billion pounds). (1989 McDowell study and NMFS)

-- Growth in the groundfish fishery primarily is the result of the Magnuson Act which "Americanized" the fishery by enabling Americans to first displace foreign catchers and then to replace foreign processors. (1989 McDowell study)

-- The McDowell Group believes the potential economic impact of the groundfish fishery on Alaska is limited at this time because of a lack of in-state organizational and support infrastructure. Inducements and incentives, the McDowell Group noted, could help establish an Alaska-based trawl fleet and on-shore processing for trawl catches. (1989 McDowell study)

-- Each factory trawler fishing pollock spends an estimated \$1 million per year in Alaska--45 percent of that is for fuel. (1989 McDowell study and Alaska Factory Trawlers Association)

-- There were 80 at-sea processors (including 26 longliner/processors, 4 pot/processors and 50 factory trawlers) and eight mother ships in 1989. In 1990, it is anticipated there will be 62 factory trawlers, 30 longliner/processors, 6 pot/processors and 15 mother ships involved in the offshore groundfish fishery. (NMFS)

-- The volume of groundfish processed in Alaska increased dramatically from 1986 to 1987 (44.7 million net pounds worth \$49 million in 1986 to 150.6 million net pounds valued at \$146.5 million in 1987). Pollock production, mostly in the form of surimi, jumped from 15.4 million net pounds in 1986 to 117.4 million net pounds in 1987. (1989 McDowell study)

-- The herring fishery dates back to the 1890s in Alaska. It became a highly profitable industry in the 1970s when a strong market for herring roe was developed in Japan. The volume of herring in Alaska increased from 20 million pounds in 1976 to 113.8 million pounds (valued at \$60 million) in 1988. (1989 McDowell study and NMFS)

-- The total Pacific halibut harvest climbed to 75 million pounds in 1962 but declined in the mid-70s to a point where the harvests never exceeded 30 million pounds. More than 81 million pounds were harvested in 1988. (1989 McDowell study and U.S. Dept. of Commerce)

-- In the 1970s, ADF&G drastically reduced salmon harvests to restore salmon production to historical highs. Beginning in 1980, salmon harvests began exceeding 100 million fish (up from a low of 22 million fish in 1974). (1989 McDowell study)

-- Canned salmon has declined from 70% of the salmon pack ten years ago to less than 40% in recent years. (1989 McDowell study)

#### THE ALASKA SEAFOOD INDUSTRY AND THE FUTURE

-- U.S. consumers spent an estimated \$28.8 billion for fish

products in 1988 (\$19.7 billion of that was spent in restaurants, on caterers and on take-outs indicating potential growth in the retail markets). (NMFS)

-- For the first 70 years of this century, seafood consumption in the U.S. hovered around 10 pounds per person per year. Since 1972, seafood consumption in the U.S. has grown to 15 pounds per person per year. (1989 McDowell study)

-- The world consumption of seafood is 26.7 pounds per person per year and is expected to rise to 34 pounds per person per year by the turn of the century.

#### HOWEVER

-- Alaska has been the world's salmon supplier but some now estimate production of pen-reared salmon will outstrip production of Alaska wild salmon by the year 2000. (1989 McDowell study)

-- A marketplace confrontation is building between fresh and frozen wild Alaska salmon and pen-reared salmon from Scandinavia, Chile, British Columbia, Washington state and other jurisdictions. (1989 McDowell study)

-- Pen-reared salmon have consistent quality, are reasonably priced, are available year-around and the product is closer to the marketplace. (McDowell study)

-- The manager of seafood marketing for a chainstore with 160 outlets in Texas was recently quoted as saying "I'm very sold on aquaculture product. For consistency in price, consistency in quality, consistency in availability, nothing touches the fresh product out of the Northeast. . .I don't even consider Alaska product anymore." (Alaska Fishermen's Journal, March, 1990)

-- "It's 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." (seafood buyer for a 148-store Washington, D.C., chain that carries fresh salmon, mostly from Scotland, as quoted in the Alaska Fishermen's Journal, March, 1990)

-- Salmon accounts for over half of the value of Alaska's fisheries (\$745 million ex-vessel value in 1988) and an even higher percentage of Alaska's fisheries employment. Market erosion due to competition from farmed salmon will hurt the Alaska fishing industry. (1989 McDowell study)

-- Japanese fish imports will remain at current levels. (Yoshihide Uchimura, president of Japanese Fisheries Association as quoted in Quick Frozen Foods International, January, 1990)

-- Traditional cooking patterns in Japan--such as grilling fish--are becoming less popular as more Japanese women pursue careers.



Demand in Japan is growing for processed foods (processed products now account for 60% of the Japanese fish and seafood markets). (Quick Frozen Foods International, January, 1990)

-- Norway and Denmark had trouble selling pen-reared salmon in Japan because the flesh wasn't pink enough so they developed a strain with pinker flesh. (Quick Frozen Foods International, January, 1990)

#### ALASKA SEAFOOD MARKETING

-- The Alaska Seafood Marketing Institute is a joint state-industry marketing agency formed in 1981 to promote Alaska seafood in the marketplace and encourage quality through proper handling of Alaska seafood. The promotion is generic and not brand-oriented. (ASMI)

-- The budget for ASMI in FY 89 was \$10.6 million (\$2.1 million in state funds, \$3.3 million in industry funds and \$5.2 million in federal export funds). (ASMI)

-- That portion of ASMI's FY 89 budget devoted to "overhead" and not marketing is less than 8%.

-- Seafood industry contributions to ASMI are the result of an assessment. Processors who buy more than \$50,000 worth of seafood product each year are taxed at a rate of .03% on the ex vessel value of the seafood they buy. The assessment is collected by the state based on fish ticket data.

-- In FY 82, the state paid 90% of ASMI's budget.

-- In FY 89, the state paid 21% of ASMI's budget.

-- For every \$1.00 the state is paying in FY 90 to market Alaska seafood, the Alaska seafood industry contributed \$1.55. (Dept. of Commerce operating budget)

-- For every \$1.00 the state is paying to market Alaska as a tourist destination in FY 90, the Alaska tourism industry pays 15 cents. (Dept. of Commerce operating budget)

-- In addition to the money the seafood industry commits to marketing 'generic' Alaska seafood through ASMI, the seafood industry, according to a recent survey, spent \$6 million in 1987 promoting their branded seafood products. (1989 McDowell study)

-- In addition to the \$3.3 million the seafood industry donated to ASMI in FY 89, industry also contributed an additional \$1.7 million in in-kind services, including time donated to serving on ASMI advisory committees.

-- In 1988, ASMI mailed 1,236,000 pieces of information.



-- In May, 1989, ASMI mailed in 207,980 pieces of promotional material as a result of inquiries to the agency (these include recipes, cookbooks, quality materials, posters, retail promotion materials, etc.).

-- Examples of ASMI product promotions include: "The All-American (Halibut) Steak--Hottest Steak on the Range"; "All-American Cod"; "Alaska Pollock: Lite, Economical, No Bones About It"; "Think Pink"; "Soup Up Your Sales With Alaska Canned Salmon" (joint promotion with Campbell's Soup Co.); "Go for the Big Red Bonus"; "Cooking Fish Is Easy"; "Legs You Win, Tails You Lose" (crab legs are tastier and less expensive than lobster tails); "Put the Squeeze on the King" (joint promotion with Sunkist Lemons); "Fresher Frozen"; and "Marine Cowboy".



**I**t's been 20 years since the Alaska legislature approved construction of the state's first salmon hatcheries. In the opinion of Brian Allee, head of the Alaska Division of Fisheries Research, Enhancement, and Development (FRED), "there's probably no better success story anywhere."

Hatchery-raised fish have constituted up to 20% of the statewide salmon catch in recent years, and as much as 90% in some areas. Hatcheries have been called the state's answer to salmon farming, to lost spawning habitat and to severe autumn flooding. Hatchery fish are also used to settle allocation disputes, populate barren lakes, and rebuild fished-out streams. If Allee has his way, the future will see even more enhancement—not only of salmon, but black cod, herring, and king crab.

Not everyone shares Allee's enthusiasm, however. Bristol Bay permit holders recently shot down a proposed enhancement tax, and many Southeastern fishermen want to quit paying theirs. Alaska's declining budget threatens to close a number of hatcheries, but local fishermen have been reluctant to take over operations because the facilities aren't making money. And some scientists are voicing fears that hatchery programs may, in the long run, be detrimental to the very industry they are supposed to protect.

Alaska began its hatchery programs in the early 1970s, just as natural runs hit their lowest levels in more than 50 years. "I call that the 'Valley of

spring. Virtually anybody could start a so-called Mom-and-Pop hatchery if they could prove their viability beforehand; and the communities of Valdez in Prince William Sound and Douglas in Southeast have jumped in with their own operations. In all, 35 hatcheries have been built, Allee said, including 19 by the state.

Ownership and management of these facilities is a hodgepodge these days. Budget cuts forced the FRED division to give the reins of some hatcheries to regional associations, while other regionals are doing the opposite—paying FRED to operate them. Kodiak actually gave a complete hatchery over to the state. But no matter who owns or operates them, the hatcheries all serve the same function.

"They're a kind of life insurance policy," Allee said, to ensure the supply of fish when natural runs go bust. They were meant to rebuild dwindling runs, start new ones, and to even out the cyclical peaks and valleys inherent in salmon populations. Their very success, however, has made hatcheries a tough sell these days, according to Allee. "Now we're in a boom cycle. 1990 was the second best return in history, and no one wants to hear about hatcheries."

Bristol Bay fishermen apparently didn't when they voted down a proposed 1% enhancement tax last year—even though hatcheries weren't part of the plan, said Paula Cullenberg, who was the Sea Grant Marine Advisory Program agent in Dillingham at the time.

# GROWING FISH

## THE FUTURE OF ALASKA'S HATCHERIES



Despair," Allee said. In 1974, for example, Prince William Sound seiners never got to fish and the statewide total was less than 22 million salmon (compared to 151 million in 1990).

Help was already on the way, though. The Alaska legislature in 1971 made it legal for the state to build fish hatcheries. A few years later it paved the way for fishermen to start their own, by creating regional aquaculture associations and collecting an enhancement tax of up to 3% of fishing settlements. So far, five areas have followed that route—Prince William Sound, Cook Inlet, Kodiak, and northern and southern Southeast. Chignik fishermen will vote this

"There was no organized opposition," she said, just a general feeling that enhancement was unnecessary. "Things are going pretty well out there—last year was the second best year ever. So why worry?" Some fishermen may have balked at the idea of yet another tax from any quarter, and organizers may not have done enough to educate the 2,600 permit holders as to the benefits of an enhancement program, she said.

But Cullenberg and other supporters saw it as a missed opportunity. The tax money would have been used for natural enhancement activities—everything from lake fertilization to blowing up beaver dams

ADFG circumvented a 30-foot waterfall in Cook Inlet by stocking Kirschner Lake above it with sockeye smolt.

to building fish passes—as well as research. Cullenberg said it would have been “a kind of insurance to permit holders that would keep the runs healthy... It seemed like a real good way for fishermen to insure a hand in the future, a stake in the control of where the management dollars are going.”

Southeast Alaska fishermen opted to have a hand in their fish returns when they voted in a 3% tax for enhancement back in 1979. But many now say that if the election were held tomorrow, the outcome might be different. The vote probably would break along gear types, with trollers likely to vote “yes,” while seiners and gillnetters leaned toward “no.”

While it's hard to argue with successful hatchery programs, there can be a negative side, too. In Alaska it's most evident in Southeast, where enhancement programs have been com-

plicated by geography, economics, biology and politics.

By state law, every hatchery must contribute to the common property fishery. The hatchery determines where to release the fish, but because virtually every salmon run in Alaska “belongs” to a certain gear type, either by tradition or state regulation, the question of where to release the fish also determines who will get them. And if one group of fishermen is paying tax to create fish in a hatchery, they won't be happy if they aren't catching any of them.

In Southeast, a permit holder can fish in any open district from north to south. But instead of creating one aquaculture association to serve their needs, fishermen in 1979 created two; one for the north, one for the south. Enhancement tax goes north or south depending on where the fish are sold.

Although state law also requires aquaculture associations to serve all the permit holders in its area, some hatchery runs have failed to materialize. Consequently, seiners are

relatively happy with the Northern Southeast Regional Aquaculture Association (NSRAA), but are disgusted with Southern Southeast (SSRAA). Gillnetters favor the south, not the north.

Seiners, in fact, are so angry about SSRAA that they want to explore the legal ramifications of pulling out, said Jim Bacon, president of Southeast Alaska Seinners. Bacon notes that seiners contribute a majority of the enhancement tax—55% according to the association—but from 1980 to 1989 the average return on their investment in SSRAA was only 1% per year. Over the same time period, the seiners' association estimates that Southeast gillnetters averaged 18% per year and trollers 9%.

“An increasing number of our members want [SSRAA] to start directing its energies to make things worthwhile for us,” Bacon said. “If we don't see that, we want to get the hell out.”

An aquaculture association gets its operating money in two ways: the



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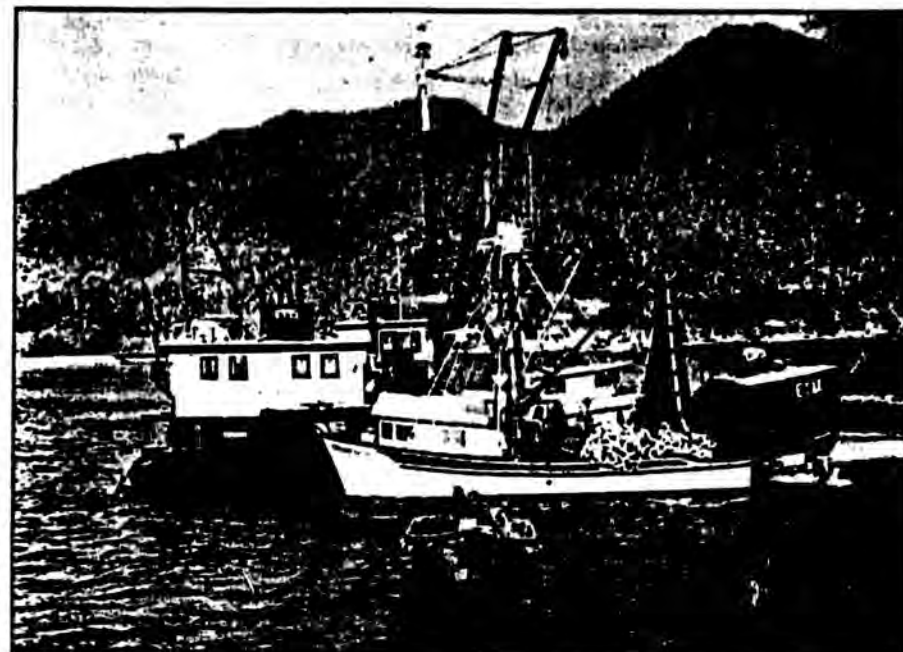
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enhancement tax, which is collected from fishermen's settlements by the canneries, turned over to the state and then returned to the association; and cost recovery, in which the hatchery catches and sells a percentage of the returning fish. Cost recovery is a sensitive issue at every hatchery. It is essential to raise money if the operation wants to produce more fish. Unfortunately, every fish that hatchery catches is one less available to fishermen, and the bigger the association's budget, the more fish it must catch to pay the bills.

And that's what sticks in the seiners' craw about SSRAA, Bacon said. The association has racked up \$10 million in construction debt, plus annual operations of \$2.5 million. But the only SSRAA fish available to seiners are at Neets Bay, and last year, every fish returning there went for cost recovery, leaving the seiners with nothing.

"It's like one of our board members



Seiners in southern Southeast Alaska have seen few hatchery fish for their dollars.

said: We have this pet alligator and we've kept feeding it, but now it wants to eat us," Bacon said. "We're just about in direct competition with them

[SSRAA]."

Seiners haven't benefited enough, said SSRAA general manager Don Amend, but it's not because the as-



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sociation hasn't tried. Poor survival rates in recent years have drastically reduced the association's contribution to the common property fishery, he said.

"The board recognizes the need to put new fish into the seiners' holds," Amend said, "and that's the direction we're going." But the first project aimed toward them, on Prince of Wales Island, won't see returns until 1994. And then the anticipated catch is just 300,000 chums. Though seiners are unhappy, Amend notes that drifters and trollers have benefited from SSRAA's work. Last year saw the best coho catches in years, and the future looks good as well.

The only enhancement program in Southeast that really benefits seiners, Bacon said, is the chum harvest at Hidden Falls Hatchery. This operation has been under the jurisdiction of NSRAA since 1988. Gillnet-

ters, on the other hand, are displeased with NSRAA, said Jim Becker, who holds one of the gillnet seats on the association's board. As with seiners' complaints of hatcheries in the southern district, economics and allocation are the sticky issues, according to Becker: gillnetters are paying too much in enhancement tax in the northern district and not getting enough back. Only a handful of programs are geared specifically toward them in the north, he said, whereas the southern association is doing a much better job. A few years ago drifters even talked about pulling out of NSRAA, but voted it down.

According to NSRAA general manager Pete Esquiro, "It's not that we've had a goal of not providing fish for gillnetters. We're doing everything we can to address those shortcomings. But working with fish, you can't do it overnight."

Gillnetters are also served by another hatchery in the north, one of the so-called Mom-and-Pop operations. Douglas Island Pink and Chum,

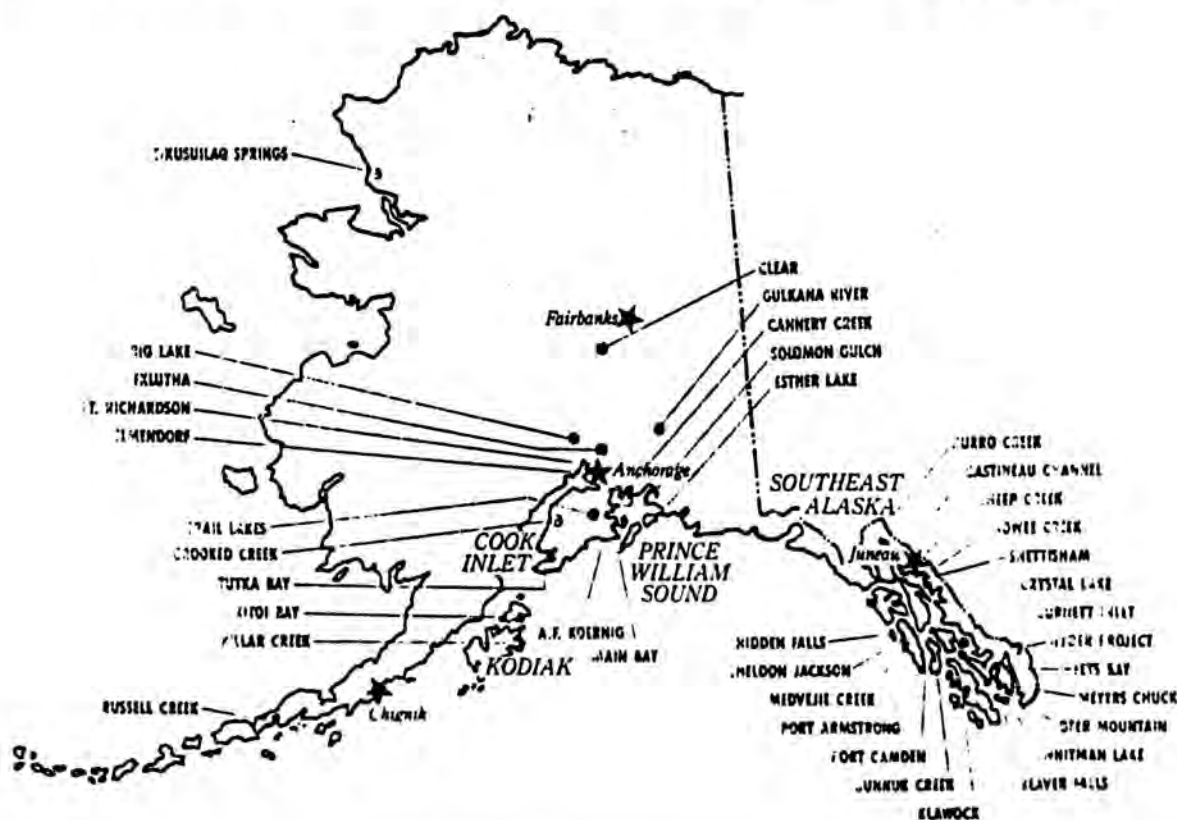
better known as DIPAC, works closely with NSRAA but is an independent facility, said director Ladd Macaulay.

It was started by a group of local fishermen who wanted to rebuild nearly-dead pink and chum runs in the Juneau area. Over the last 10 years, the tiny community-based operation has grown steadily, Macaulay said, creating fish for gillnetters, trollers and anglers. It now operates two hatcheries and is raising nearly 200 million chum, pink, coho, and chinook eggs and fry.

As DIPAC's returns have grown, however, so have demands for the fish. It's only natural, Macaulay said: "You see these fish and you want to catch them." That's fine, he said, to a point. DIPAC is bound by law to put 60% to 70% of its production into the common property fishery; the rest can be used for cost recovery. DIPAC relies solely on cost recovery to pay its bills.

But in 1988, no pinks returned to DIPAC's Gastineau Channel Hatchery. Macaulay thinks seiners caught them when Hawk Inlet shoreline on

## STATE AND PRIVATE NONPROFIT HATCHERIES IN ALASKA



Admiralty Island opened briefly, targeting excess Taku River pinks. There was no way to identify those fish, though, so no one knows whether they were bound for DIPAC or not.

**T**hat interception created a furor, according to ADFG's regional commercial fisheries supervisor Scott Marshall. Five proposals to eliminate the seiners' Hawk Inlet fishery will come to the Board of Fisheries this winter. "It's a very, very contentious issue," he said.

DIPAC says shutting down Hawk Inlet will protect its returning fish, and therefore ensure cost recovery. The move would also benefit gillnetters and trollers, because of the complex migratory routes.

But seiners see it as another example of hatcheries not doing what they were meant to. "There's a fear that Fish and Game will start managing for the hatcheries, not the wild stocks," said Angoon seiner Dennis Eames. "I think that would be a bad precedent. Wild stocks should be the priority. If we hammer on hatchery stocks, so be it." Eames holds this opinion despite the fact that he sits on the NSRAA board of directors.

Allocation squabbles are not unique to Southeast. Prince William Sound fishermen were embroiled in a similar dispute several years ago and asked the Board of Fisheries to settle it. But the board turned to the local aquaculture corporation (PWSAC) and said, "You created the fish, you solve the problem."

It took time, money and lots of talk, according to corporation spokeswoman Heather McCarty; but the job is almost complete and everybody is pleased—so far.

PWSAC was the first regional association, formed by a group of Cordova seiners in 1974, McCarty said. "They got tired of being broke and said, 'Hey, we're going to make some fish.'" They turned an old cannery at Port San Juan into a hatchery, stocked it with 7 million pink eggs, and were in business. This year, PWSAC has 600 million eggs in three hatcheries, with plans to take over two state facilities in the near future.

The allocation plan says seiners and gillnetters should each get half the

value of PWSAC's enhancement fish. A production plan is being written that will ensure enough fish are created to fulfill the allocation quota.

But equally important is a new area-wide management plan that puts the allocation scheme into practical terms—it says who gets to fish when and where. It was written by the association, local fisheries groups and ADFG.

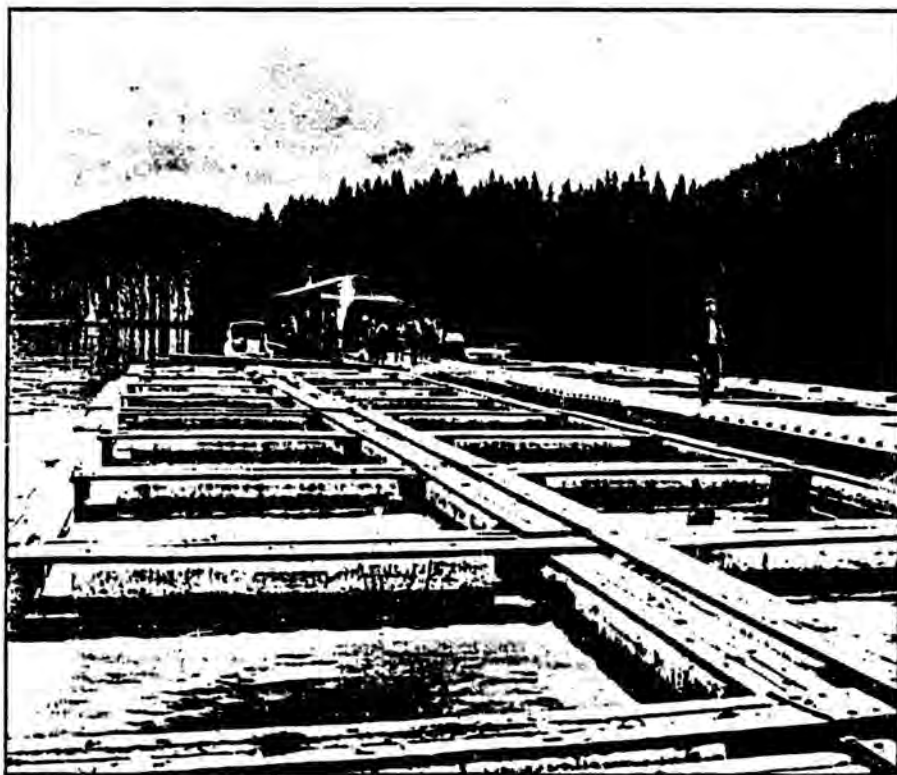
The whole process has been historic, McCarty said. "It's the first time the state and a private, non-profit association have worked so closely on allocation, production, and management," she said.

Southeast Alaska may be next in line for such a plan. NSRAA has been pushing for several years to develop a Southeast-wide allocation plan, said Pete Esquiro, and last fall SSRAA's board agreed to start talking about it. The Board of Fisheries could add fuel to the fire if the Hawk squabble between gillnetters and seiners turns ugly. Esquiro said the divisiveness over hatchery programs in Southeast might diminish if fishermen looked at enhancement results as a whole rather than North vs. South; as if there were one, not two, aquaculture associations

fishermen were paying into. "These production gaps we have probably become very narrow if we look at it Southeast-wide," he said.

The Kodiak Regional Aquaculture Association (KRAA) has worked around some of those allocation difficulties, said spokeswoman Norma Holt. The association has a pink hatchery on Kitoi Bay, which primarily benefits seiners, and its operations are funded solely through cost recovery, she said. Kodiak's other aquaculture operation, however, located on Pillar Creek, is a central incubation facility—fish are raised to the fry or smolt stage, then transported to a release site. Because the island's setnetters and beach seiners cannot move to the fish, KRAA is effectively moving these fish to them. And because all gear groups will benefit, everyone pays a 2% assessment to fund the program.

**T**echnology will soon play a larger role in solving allocation disputes. Researchers have found an inexpensive way to mark large numbers of hatchery salmon, and to "read" those marks when the fish return as adults.



The Tutus Lagoon Hatchery in Kachemak Bay raises 50 million pink salmon eggs, and hopes to raise chums and sockeyes as well.

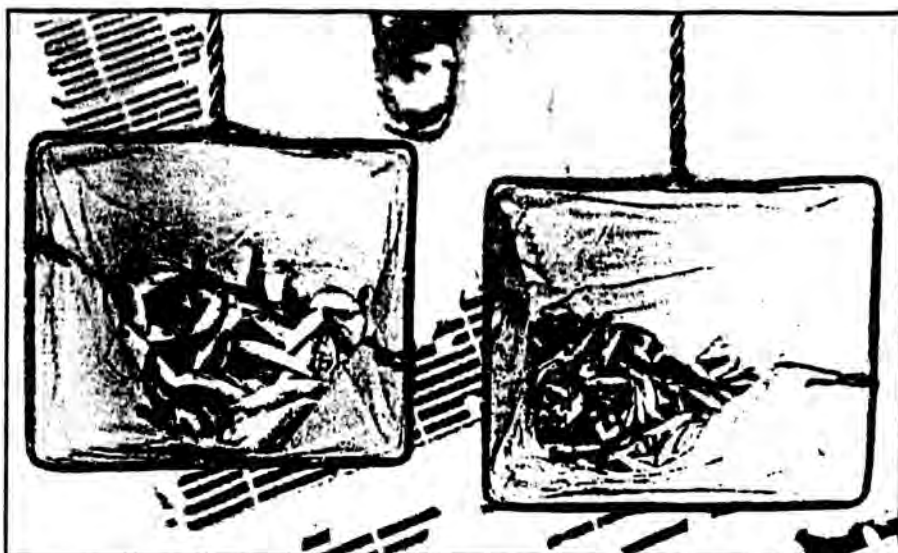


Such a program will make it easier to determine the composition of mixed stock fisheries.

The "thermal marking" process is simple. According to DIPAC's Macaulay, raising the water temperature 4 degrees for a certain period makes a distinctive mark on the otolith, or inner-ear bone, of a salmon fry. If different hatcheries coordinate their efforts, he said, researchers can tell one hatchery, or even batch of fish, from another.

"It's just like reading the bar code on a potato chip bag," Macaulay said.

Tracing the fish from egg to adult is just one of many ways in which ocean ranchers hope to improve their results, said Bob Burkett, chief of technology and development for the FRED division. But the big question for Burkett and his peers is that of survival: What



"Zero-check" sockeye fry (left) raised in warmer water than normal fry grow twice as fast in the hatchery and are released into the ocean sooner.

causes such extreme variation in the rate of return for hatchery fish? Pink survival, for example, can range from 25% to 16%.

Survival in the hatchery is rarely a problem. Even sockeyes, which are ex-

tremely disease-prone, have been raised by the millions by segregating them in discrete batches and paying meticulous attention to cleanliness. But when the fry or smolts are released into the ocean, Mother Nature

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takes over.

Ocean survival may depend largely on the near-shore environmental conditions when fry are released, Burkett said; but no one knows for sure. No one knows whether there is a specific "carrying capacity" in, say, Prince William Sound every spring. Is there enough food for 600 million fry? For 1.6 billion?

"Evidence from the [Exxon] oil spill studies shows there isn't any significant near-shore carrying capacity being over-exceeded," Burkett said. "But then someone else comes in and says that spring was an exceptional year" for plankton, the microorganisms that fry and smolt feed on.

Burkett said the question of near-shore carrying capacity is the hottest one in his business these days, and the one he would attack first if he had the money. "It's something we can't afford not to pay attention to." But with state budget cuts looming, the money may not be forthcoming.

That's unnerving to biologists in the field, said ADFG's Sam Sharr, area

research biologist for PWS. He is concerned that hatchery production is outpacing the ability to understand it. "Enhancement can be a very good thing, as long as we understand what we're doing," he said.

He, too, wants to know more about near-shore carrying capacity; but also about whether hatchery releases increase the number of predators, and the effect of building up salmon stocks that have never before been numerous. Another big fear is that Prince William Sound will lose some genetic diversity if wild stocks are fished out.

"My only concern is that evaluation programs go hand in hand with hatchery expansion," he said. "I don't care who funds them, but someone has to. If they're not done, we are in a dangerous situation. We have no idea if we are over-harvesting the wild stocks in the process of maximizing the harvest of hatchery fish."

University of Washington fisheries professor Ray Hilborn goes a step

further—he says hatcheries are harmful to wild stocks, no matter what. A review of enhancement programs anywhere in the world, Hilborn said, shows an initial period of success followed by failure.

"All you end up doing is replacing wild fish with hatchery fish," he said. High survival rates the first five or 10 years lead to high exploitation of all stocks, and that jeopardizes natural runs. Then the facilities get old, diseases increase, the personnel lose interest. Survival rates drop and there is little left.

"My attitude is that hatcheries constitute the biggest single threat to commercial fishermen," Hilborn said. This is especially true on the dammed rivers of Washington and Oregon, but it holds for Alaska as well, he said.

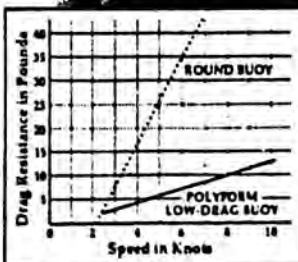
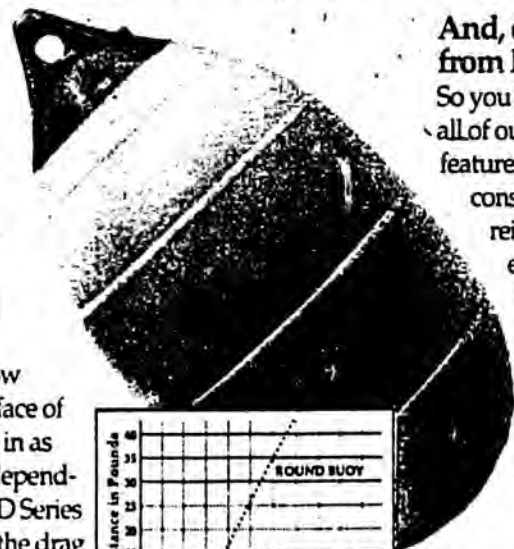
Brian Allee, head of Alaska's hatchery program, disagrees, saying Hilborn doesn't take into account the tremendous leaps in knowledge and technology over the past 10 years. "We've benefited from the history" of successes and failures all along the

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Pacific Coast, Allee said. Alaska has a broad-based program that doesn't rely on any one technique or species or area, unlike hatcheries in the Lower 48 which often rely on a few salmon species to seed many different rivers.

But it all takes money, and on that front the future looks dim. Governor Wally Hickel has vowed to cut state spending and his fisheries assistant, Clem Tillion, said fishermen should expect to shoulder more of the burden.

"I don't think the administration is going to abandon [the state's hatcheries]. But it's pretty hard to justify hatcheries for commercial fishermen that don't pay their way. The emphasis is going to be toward raising more sport fish unless commercial fishermen are willing to pay more of the share," Tillion said. The people who receive the benefits are going to have to be willing to pay for it." **PF**

## THE SKUNKER



My bottom trawl fishes too hard on the bottom and has an excessive by-catch of mud shellfish and crabs. I suspect that my twin bridles are incorrectly rigged. What could be wrong with them?

Answers should be addressed to: The Skunker, Pacific Fishing, 1515 N.W. 51st, Seattle, WA 98107. The first five correct submissions will earn a PF T-shirt proving you haven't been skunked. Correct answers will be published the following month.

Answer to February's Skunker: The more dense cold winter air is actually packing a larger quantity of air into your engine cylinders which will mix with a larger quantity of fuel to produce more horsepower. This is the basic principle of operation of the intercooler on diesel engines.



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JUNEAU CENTER FOR FISHERIES & OCEAN SCIENCES

# FISHERIES NEWSLETTER

Vol. X No. 7 3 June 1991

## PROFESSORSHIP IN FISHERIES

Dr. Douglas M. Eggers, currently Chief Scientist with Commercial Fisheries Division, Alaska Department of Fish & Game, is among finalists for the new professorship in Fisheries in The School of Fisheries and Ocean Sciences. On 4 June he will present a seminar at The Juneau Center for Fisheries and Ocean Sciences entitled: The stock composition of the catches of sockeye and chum salmon in June fishery in the South Alaska Peninsula area. On 5 June he will meet with faculty members at the Center.

## NEW FRED DIRECTOR

The former director of the FRED Division of the Alaska Department of Fish & Game, Dr. Brian Allee, recently accepted a position with Coastal Oysters in Washington state. The new director is Dr. Jeffery P. Koenings, previously in charge of the Limnology Laboratory of the FRED Division in Soldotna. Dr. Koenings has on many previous occasions collaborated with faculty members from the SFOS in various research projects.

## THE LAST HURRAH FOR APPRISE

The Association of Primary

Production and Recruitment in a Subarctic Ecosystem (APPRISE) was a five year research program conducted in Auke Bay outside The Juneau Center for Fisheries and Ocean Sciences. The programmatic goals and objectives were to relate variations in primary productivity to variability in local climatic patterns, and to relate the energy transferred to herbivorous zooplankton to the spring phytoplankton bloom. Finally, meiofaunal recruitment was related to the input of organic matter via sedimentation of phytoplankton.

All the findings have been assembled in a 416 page book published by The School of Fisheries and Ocean Sciences, Fairbanks, AK and The Oceanic Institute, Honolulu, HI. In order to produce a smaller and conceptual description of the studied relationship a workshop was held in Kent, WA 16-17 May, which will result in a final APPRISE document.

## INTERACTION OF WILD AND ENHANCED STOCKS OF SALMON

A public discussion on this topic was initiated at a Symposium in Norway in April 1990 on "Interaction between Cultured and Wild Atlantic Salmon." It is being followed by another Symposium in Nanaimo, B. C. called



"International Symposium on Biological Interactions of Enhanced and Wild Salmon" 17-20 June 1991. A few days later there will be a NATO sponsored Symposium on "Genetic Conservation of Salmonid Fishes" from 24 June through 5 July 1991 in Moscow, Idaho and Pullman, WA. An important goal of the meeting is to identify scientific advances that are required to preserve the populations and germplasm of salmonid stocks. Concerns for preserving wild stocks of salmonid fishes are being expressed around the world.

Because of this great interest in the scientific community and public inquiries, Senate President Dick Eliason, of the Alaska State Legislature, called a meeting of the Senate Special Committee on Fisheries and considered questions and topics from legislative review and research such as: What are the goals and purposes of hatcheries in Alaska? What should the State's role be in hatcheries from now on? There were fisheries management questions, others on private non profit hatcheries operations, and those related to market/economic problems.

A second meeting was held 25 May at which committees were established to prepare an action plan for preparing background material which the next Legislature will need in their deliberations.

#### VISITORS

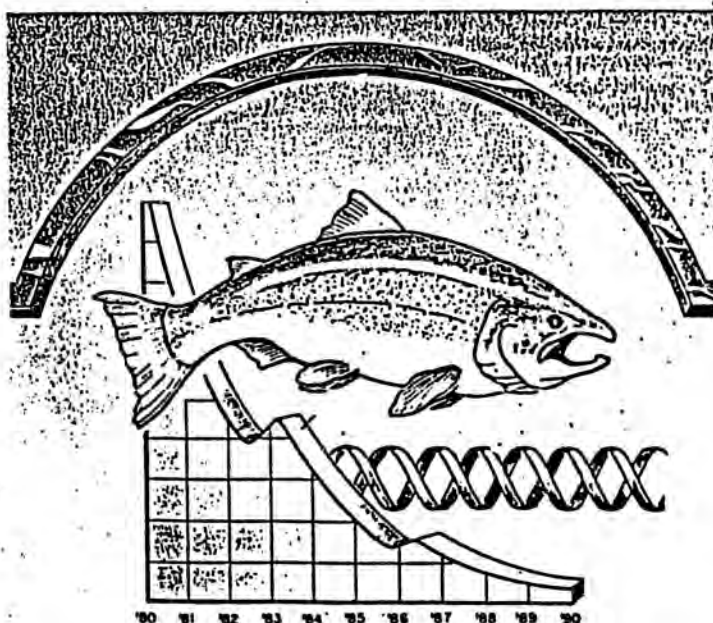
Dr. D. G. Chapman, former Dean of College of Fisheries, University of Washington and founder and first Director of

The Center for Quantitative Studies in Forestry and Fisheries visited the Juneau Center Friday, 31 May.

#### TRAVEL

O. A. Mathisen recently returned from a week's visit to the Faculty of Fisheries, Hokkaido University in Hakodate where he worked on papers with Drs. Hatano, Yamauchi and Takahashi related to the maturation process of sockeye salmon. Part of the material came from Steep Creek near the Mendenhall Glacier. Other samples were taken from the Gulf of Alaska during a survey by T/V Oshoro Maru.

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# ***Alaska Seafood Industry Study***

*A Summary*

March 1989



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*Harbor Lights*, by John Fehringer, Juneau.

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Contents, early morning seiners, John Hyde, Alaska Department of Fish and Game (ADF&G); p. 3, clockwise from top left: ADF&G technicians taking scale samples, J. Hyde, ADF&G; woman handling salmon net, Marion Stirrup; two women, man holding salmon, and two men with iced salmon, all from Alaska Seafood Marketing Institute (ASMI); p. 5, salmon cannery, J.E. Thwaites collection, Alaska State Library; p. 6, halibut on dock, p. 7, herring eggs and herring fleet, and p. 8, groundfish in net bag, all by J. Hyde, ADF&G; p. 8, sablefish, Alaska Sea Grant College Program; p. 9, purse seiner, Donald Kramer, Alaska Sea Grant Marine Advisory Program (MAP); p. 10, offloading halibut, ASMI; p. 12, shrimp, Deborah Mercy, MAP; p. 12, crab, J. Hyde, ADF&G; p. 13, container vessel, and p. 14, Kodiak Harbor, both by M. Stirrup; p. 17, woman in salmon cannery, D. Mercy, MAP; p. 19, Sitka Harbor, J. Hyde, ADF&G; p. 20, crab pots, Craig Wiese, MAP; p. 21, chum salmon and salmon fry, both by J. Hyde, ADF&G; p. 22, stacking seine web, ADF&G.

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# **Alaska Seafood Industry Study**

*A Summary*

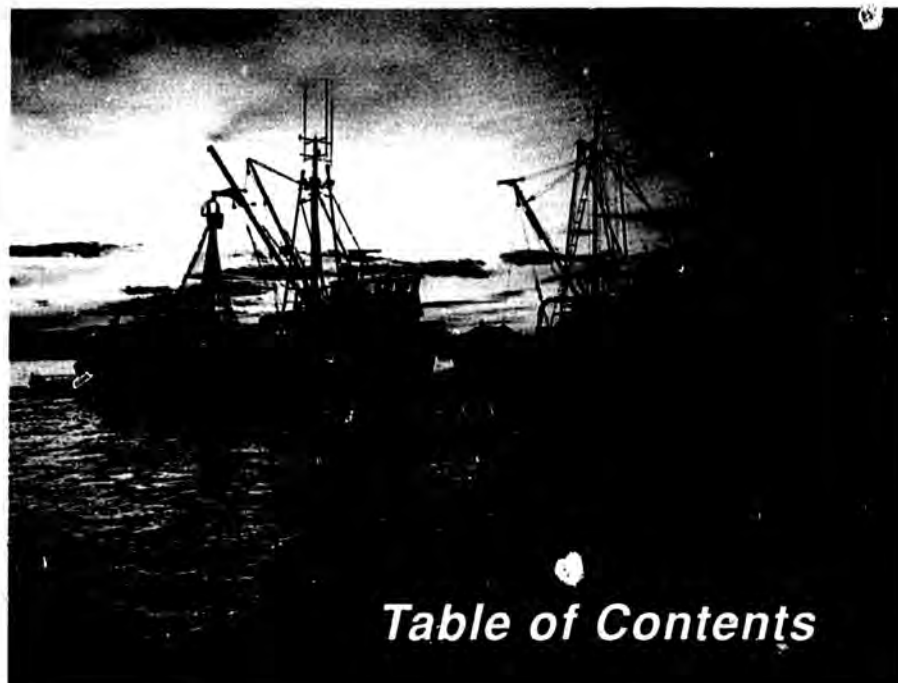
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Anchorage, Alaska**

*by*

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Juneau, Alaska**

**March 1989**



|           |                                                             |
|-----------|-------------------------------------------------------------|
| <b>1</b>  | <b><i>Introduction</i></b>                                  |
| <b>2</b>  | <b><i>Summary</i></b>                                       |
| <b>5</b>  | <b><i>History of Alaska's Fisheries</i></b>                 |
| 5         | Salmon                                                      |
| 6         | Halibut                                                     |
| 7         | Herring                                                     |
| 7         | Shellfish                                                   |
| 8         | Groundfish                                                  |
| <b>9</b>  | <b><i>Overview of Alaska's Seafood Industry</i></b>         |
| 10        | Residency                                                   |
| 10        | Management of the Fisheries                                 |
| 11        | Markets for Alaska's Seafood                                |
| 12        | Selected Trends                                             |
| 13        | Alaska's Role in the U.S. and World Seafood Industries      |
| <b>15</b> | <b><i>Economic Contribution of the Seafood Industry</i></b> |
| 15        | Importance to Alaska's Economy                              |
| 17        | Importance to Regional Economies                            |
| 20        | Capital Investment                                          |
| 20        | Expenditures in Alaska                                      |
| 21        | Seafood-Related Agencies and Organizations                  |
| <b>22</b> | <b><i>Conclusion</i></b>                                    |

# Introduction

The *Alaska Seafood Industry Study: A Summary\** has two purposes. The first is to highlight the effects of the state's largest private basic industry on the economy of Alaska. There is a general lack of standard economic data for the seafood industry, and research and analysis performed for this study fills that void.

The second purpose is to describe this complex and diverse industry to the Alaskan public. Most of Alaska's population and economy is concentrated in a few urban areas. In contrast, most of the seafood industry is conducted in coastal areas well away from the population centers. As a result, Alaskans are uninformed about the seafood industry. This document is designed to increase awareness and knowledge.

The Alaska Seafood Industry Study Commission is a cooperative organization formed to produce this study. Selected to conduct the study was The McDowell Group of Juneau, Alaskan economic and market consultants who have conducted 300 studies of the economy, industries and businesses of Alaska over the past 17 years. A comprehensive (technical) document supporting this summary, the *Alaska Seafood Industry Study: A Technical Report*, was also produced by the study team. Both documents are available from the University of Alaska Sea Grant College Program.

The study, conducted from July to December of 1988, included surveys of processors, factory trawlers and seafood organizations and agencies. Volumes of existing data from state, federal, international and private sources were collected and analyzed, the most important data being provided by the Commercial Fisheries Entry Commission. Finally, methods were developed for measuring harvest, employment and payroll and the role of the industry in the economy.

## Commission Members

Alaska Commercial Fishing and  
Agriculture Bank  
Alaska Department of Commerce and  
Economic Development  
Alaska Department of Fish and Game  
Alaska Department of Labor  
Alaska Driggers Association  
Alaska Factory Trawlers Association  
Alaska Fisheries Development Foundation  
Alaska Longline Fishermen's Association  
Alaska Seafood Marketing Institute  
Alaska Setnetters Association  
Alaska Trollers Association  
Bering Sea Fishermen's Association  
Bristol Bay Driftnetters Association  
Commercial Fisheries Entry Commission

Copper River Fishermen's Cooperative  
Cordova District Fishermen United  
Kenai Peninsula Fishermen's Association  
Northern Southeast Regional Aquaculture Association  
Pacific Seafood Processors Association  
Petersburg Vessel Owners Association  
Prince William Sound Aquaculture Corporation  
Seafood Producers Cooperative  
Southeast Alaska Seiners Association  
United Fishermen of Alaska  
United Fishermen's Marketing Association  
United Southeast Alaska Gillnetters  
University of Alaska Institute for Social  
and Economic Research  
University of Alaska Marine Advisory Program  
University of Alaska Sea Grant College Program

\* Sources of data in this document, Alaska Sea Grant Education Publication No. 2, can be found in the complete report, *Alaska Seafood Industry Study: A Technical Report*. This summary and the full report are available from the Alaska Sea Grant College Program, Communications Office, 138 Irving II, Fairbanks, AK 99775-5040. Telephone (907) 474-7086.



## **Summary**

**Jobs:** The seafood industry is Alaska's largest private basic industry employer, providing nearly 70,000 seasonal jobs which translates to 33,000 direct, indirect and induced year-round jobs.

**Payroll:** The total seafood industry payroll in 1987 was the largest among private basic industries, estimated at \$596 million.

**Revenue:** The seafood industry is the second largest revenue generator in the state. The industry paid \$27 million in fish taxes during 1987 and is the major contributor to the \$5 million marine fuel tax.

**Expenditures:** Expenditures in Alaska on goods and services in support of processing and harvesting are nearly \$300 million.

**Harvest Value:** Alaska leads the nation in value of commercial seafood landings. The 1987 Alaska seafood harvest was worth \$1.1 billion, and the estimate for 1988 is a record \$1.8 billion. The salmon fishery is the most important, bringing in 42% of all harvest income.

**Wholesale Value:** The 1987 Alaska seafood harvest was worth \$1.9 billion at the first wholesale level, after primary processing. It rose to \$3 billion in 1988.

**Exports:** Alaska exported \$561 million in seafood during 1987, a third of all U.S. seafood exports. Japan received 95%.

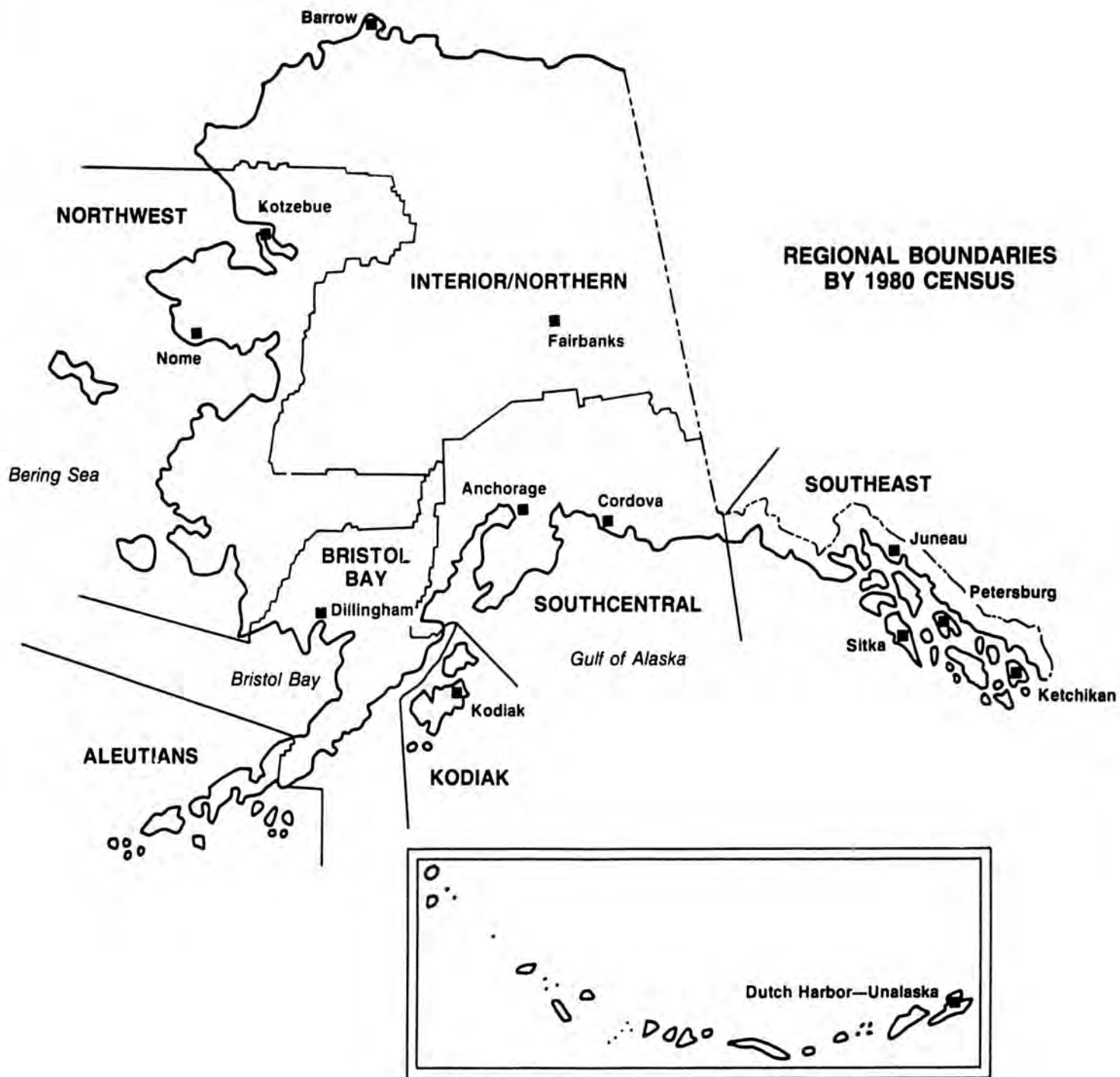
**Capital Assets:** Total investment by the Alaska seafood industry is estimated at \$4 billion.

- The salmon fleet has a capital investment of \$800 million in vessels and onboard equipment, and \$900 million in permits.
- The offshore groundfish industry accounts for \$500 million, and crabbers account for \$400 million in capital investment.
- The value of processing plants and tenders is estimated at \$1 billion.

**Regional Impacts:** The Alaska seafood industry is the most important employer in five regions of the state — Southeast, Kodiak, Aleutians, Bristol Bay and Northwest Alaska.

**Community Impacts:** The leading beneficiaries of seafood harvesting are Kodiak, where residents earned \$86 million in 1986; Dillingham, \$46 million; and Anchorage, \$31 million.





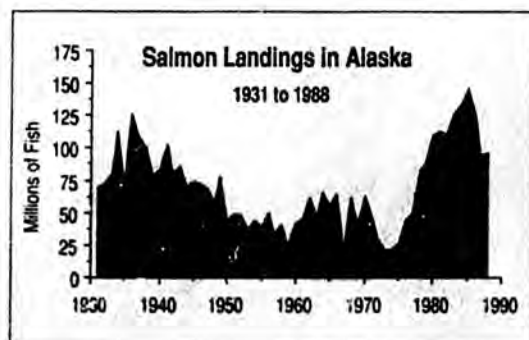
# History of Alaska's Fisheries



Alaska's history as a commercial seafood producer can be divided into three phases: Alaska's territorial phase, statehood, and most recently, extended jurisdiction in U.S. waters. The territorial days were characterized by fish traps, canneries, resource over-exploitation, long distance federal management and political conflict. With statehood in 1959, Alaskans assumed responsibility for management of their nearshore seafood resources. This period was marked by responsible biological management, limited entry for the salmon fishery, and full recovery of the once-depleted salmon resource. Alaska recently entered a third phase with the 1976 enactment of the Magnuson Act. This act transferred to the U.S. government jurisdiction of the fisheries in the Exclusive Economic Zone (EEZ), which extends from 3 to 200 miles offshore. This area includes the vast groundfish resource of the Gulf of Alaska and Bering Sea.

## Salmon

Exploitation of Alaska's salmon resource dates back to the first canneries in Alaska in 1878. Over the next 50 years the Seattle-based salmon canneries developed into the dominant force in Alaska's seafood industry. By 1929, there were 159 canneries operating in Alaska. When Alaska became a state, it took over management of the salmon fishery. Under state management, Alaska's salmon





*The 1987 halibut catch from Alaska waters totaled 57 million pounds and earned an estimated \$70 million for harvesters.*



*Halibut on dock awaiting transport to processor. Over 10,000 fishermen earned \$70 million for their 1987 halibut catch.*

harvest fell to an all-time low of 22 million fish in 1974 and climbed to a high of 147 million fish in 1985.

The Alaska salmon fishery, conducted from Ketchikan to Kotzebue, harvests five species of salmon — king (chinook), red (sockeye), silver (coho), chum (dog) and pink (humpy). The fishery employs about 25,000 skippers and crew members. Four types of gear are used — seine, gillnet, set-net and troll — depending on the area and species targeted.

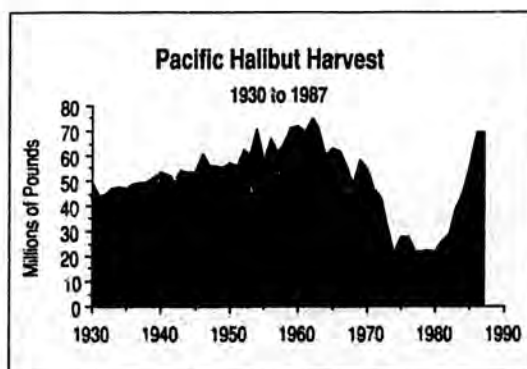
The salmon fishery is Alaska's most valuable. The 1988 harvest was worth an all-time high of \$742 million ex-vessel, a 50% increase over the 1987 total of \$478 million (fish sales by harvesters are expressed as ex-vessel values). About 65% of Alaska's salmon harvest was marketed fresh or frozen (and a small amount salted) in 1987, continuing a trend away from canned salmon.

Sockeye accounted for about 50% of Alaska's fresh, frozen and salted production weight in 1987, at just under 123 million pounds. Chum salmon was next at 44 million pounds. Coho production was 16 million pounds, pink salmon 35 million pounds, and king salmon 10 million pounds.

## Halibut

Commercial harvest of Alaska's halibut began about 1910 when the Puget Sound schooner fleet ventured into northern waters. The total Pacific halibut harvest peaked at 75 million pounds in 1962 but declined to 21 million pounds between 1974 and 1978. The halibut harvest has since climbed back to near-record levels, though the 24-hour halibut derbies bear little resemblance to the longer fishing seasons of years past.

With 10,200 skippers and crew, the halibut fishery attracts more participants than any fishery except salmon. Halibut fishermen use longline gear with baited hooks.



The 1987 halibut catch from Alaska waters totaled 57 million pounds and earned an estimated \$70 million for harvesters. The 1987 catch was down slightly from 1986 in pounds harvested but up about 10% in ex-vessel value.

## Herring

The Alaska herring fishery dates back to the saltery days of the 1890s. The fishery was reborn in the mid-1970s with development of a Japanese market for herring sac roe (eggs), valued highly as a holiday delicacy. When herring eggs are ripe for spawning in spring, the allowable quota is usually caught in a matter of hours with seine and gillnet gear.



Skippers and crew number nearly 7,000.

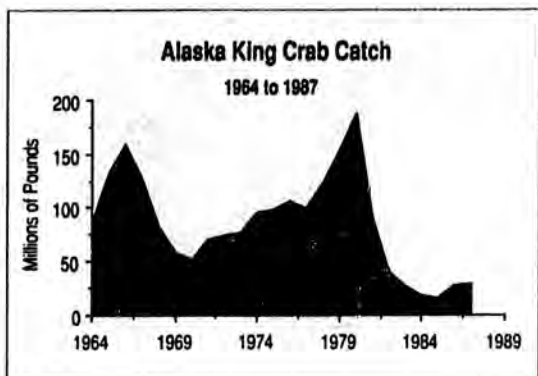
In 1987, sac roe, food and bait herring harvested from Alaska waters were worth an estimated \$43 million ex-vessel. Alaska sac roe herring harvest peaked in 1985, but the value of the harvest is still on the rise. The value of the 1988 harvest reached an estimated \$56 million, the highest ever.

## Shellfish

The shellfish fisheries — king, tanner and Dungeness crab, shrimp and scallops — are conducted along most of the Alaska coast by 3,800 skippers and crew. Baited wire mesh pots are set along the bottom, trapping the crab inside. Shrimp are usually caught by dragging trawls along the bottom.

The king crab fishery evolved from a primarily Japanese and Soviet fishery in the 1930s and 1940s into an important domestic fishery in the 1950s. The domestic Alaska king crab harvest increased from just 5 million pounds in 1953 to 188 million pounds in 1980, with a value greater than the Alaska salmon harvest. But the king crab harvest collapsed to 15 million pounds only 5 years later. Now the king crab fishery may be on the rebound.





The 1987 shellfish harvest was worth an estimated \$214 million ex-vessel. The tanner (snow) crab harvest accounted for about two-thirds of the total Alaska shellfish catch. The king crab harvest represented about one-fifth of the total. Alaska's shellfish harvest has increased over 80% since the industry's low in 1984, but is still well below the peak years of the early 1980s.

## Groundfish

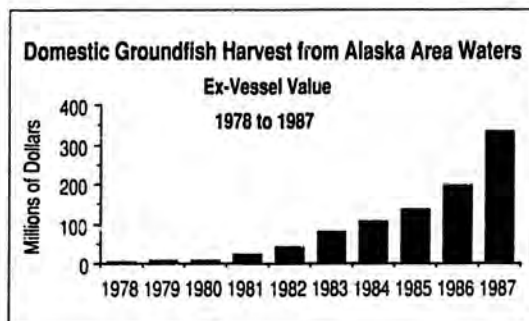
Today, only a small fraction of the groundfish taken off Alaska is harvested by foreign operators. Joint venture (JV) operations, where American catchers sell to foreign processors at sea, accounted for the majority of the offshore groundfish harvest in 1988, while domestic operations will account for the majority in 1989.

In order of value, groundfish species are pollock, Pacific cod, sablefish (black cod)

and rockfish. Most groundfish are taken in the Bering Sea using trawl gear, open-ended sock-shaped nets. In 1988, the groundfish fleet consisted of 100 trawlers with about 5,000 workers.

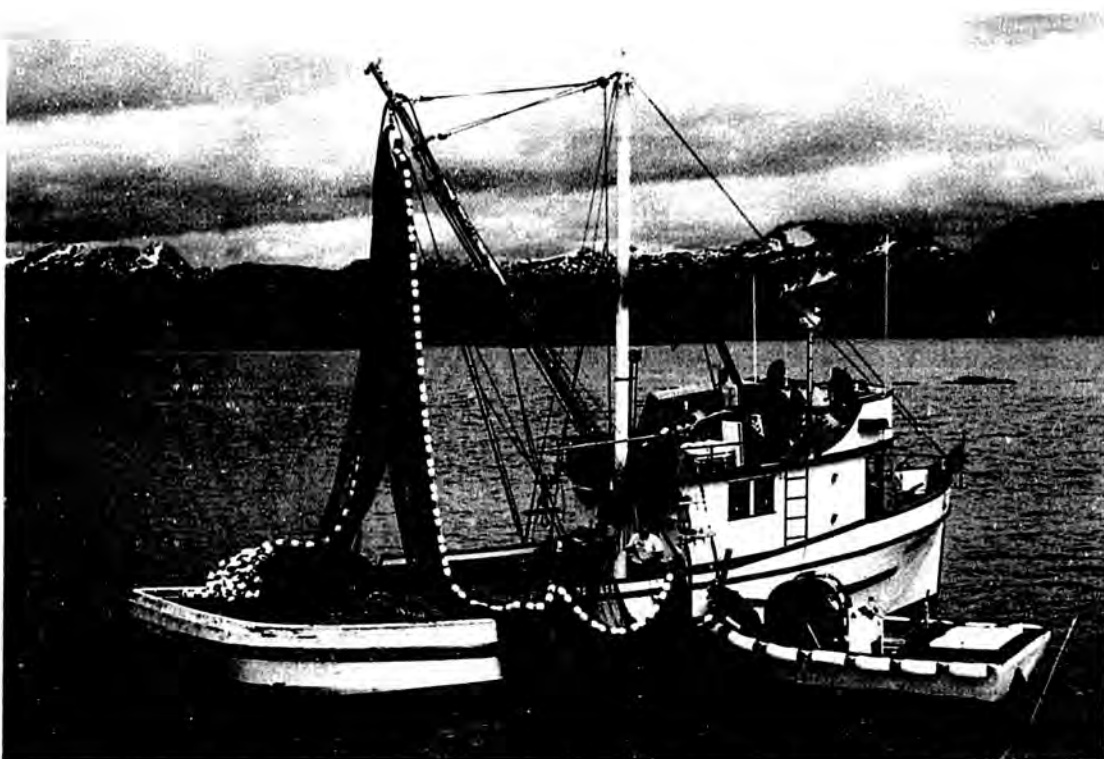
For the 1987 Bering Sea and Gulf of Alaska groundfish harvest, JV operators accounted for about 78% of the total catch. The value of the 1987 domestic and JV groundfish harvest reached an estimated \$331 million ex-vessel, 67% higher than the value of the 1986 harvest.

Though three-fourths of the 1987 groundfish harvest was foreign processed, an increasing share is being processed by domestic seafood producers. In 1987, the total domestic groundfish production value at the first wholesale level was estimated at \$472 million, 50 times that in 1980. The value of groundfish processed on shore in Alaska has increased remarkably from \$49 million in 1986 to \$147 million in 1987.



Left— Groundfish, mostly rockfish, in net bag. Above— Sablefish. Groundfish include pollock, Pacific cod, sablefish (black cod), rockfish, flatfish, Atka mackerel, and Pacific ocean perch. As a result of "Americanization" of the Bering Sea and Gulf of Alaska fishery, the 1987 domestic groundfish wholesale production value was 50 times greater than in 1980.

# Overview of Alaska's Seafood Industry



*A salmon seiner in Prince William Sound. Most of the owner-operators and crews for small boats like this are Alaska residents. Overall, Alaskans hold 70% of Alaska's seafood harvesting jobs.*

*The Alaska seafood industry is based on a natural resource that is the common property of the people.*

The Alaska fishing industry can be divided into two parts — the small boat, near-shore fisheries and the offshore highly capitalized fisheries. The small boat, nearshore fleets concentrate on seasonal salmon, herring, halibut, black cod and to a lesser extent on Dungeness, king and tanner crab. Vessels are mostly 30 to 45 feet long and valued under \$500,000. Participants in these fisheries tend to be resident Alaskans, and the majority of these fisheries are managed by the State of Alaska. Time, areas, and gear fished are regulated in nearly all of these fisheries. The historical and regulatory patterns in these nearshore fisheries have cre-

ated a climate suited almost exclusively to owner-operated fishing businesses.

The highly capitalized groundfish fishery and most of the king and tanner crab harvests are conducted well offshore in the Bering Sea and western Gulf of Alaska and are subject to federal management. These fisheries demand much larger vessels, substantial capital investments and large crews. Vessel values range from less than \$1 million to \$40 million for large factory trawlers. Nonresidents dominate these fisheries, and ownership tends to be corporate. Time, areas, gear, harvests and participation are far less limited than in the nearshore fisheries.



*Resident harvesters concentrate in the traditional fisheries, especially salmon, where they hold nearly 80% of the permits.*

## Residency

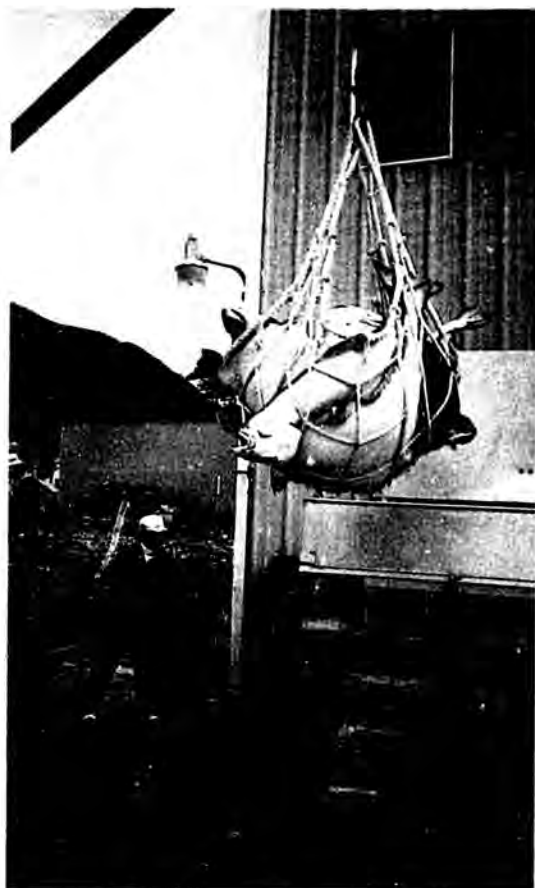
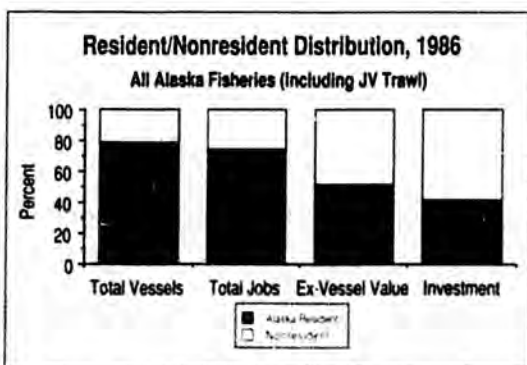
Both residents and nonresidents participate in the Alaska seafood industry. In seafood harvesting, where most of the employment occurs, 70% of the participants are Alaskans, compared to the 77% average resident composition for all Alaska private industry. In seafood processing, 47% of the participants are Alaskans.

Resident harvesters concentrate in the traditional fisheries, especially salmon, where they hold nearly 80% of the permits. Residents also are concentrated in the small boat and subsistence-oriented fisheries.

Nonresident harvesters are more likely to dominate the heavily capitalized and large boat fisheries. Thus, while Alaskans own most of the vessels and permits and hold most of the harvesting jobs, nonresidents have a higher level of investment and, on average, produce more than residents.

Obviously, the more resident participation and catch value, the greater the benefits to the Alaska economy because residents spend their take-home pay in the state. However, the process by which Alaskans might acquire more permits and make greater investments in vessels and equipment is not apparent, especially in the highly capitalized offshore fisheries.

Apart from the JV and factory trawl fisheries, nonresidents hold 21% of the permits and captured 40% of the gross harvest earnings in 1986. Alaska permit holders participate in more fisheries than nonresidents, but nonresidents net greater yield per fishery.



*Offloading chilled halibut. This popular species is managed by a joint U.S./Canadian commission. Overharvest seriously reduced halibut stocks in the 1970s, but strict controls have helped return halibut harvests to near record levels.*

## Management of the Fisheries

The Alaska seafood industry is based on a natural resource (fish and shellfish) that is the common property of the people. The management responsibilities of the state government are defined by the state constitution and statutes. The fisheries management responsibilities of the federal government are primarily defined by the Magnuson Act which gave the United States authority over the living resources in the EEZ and on the continental shelf.

Management of Alaska's fisheries is a complex, sometimes fragmented process with responsibility sprinkled among state, national and international bodies. Alaska Department of Fish and Game (ADFG) manages most fisheries up to three miles off-

shore. A lay Board of Fisheries sets regulations for fisheries in state waters. The EEZ is managed by the National Marine Fisheries Service (NMFS) which is directed by the North Pacific Fishery Management Council (NPFMC). NMFS manages the emerging groundfish fishery. Halibut decisions are made by the International Pacific Halibut Commission which includes representatives from Canada, Alaska and Washington. For all king salmon and minor amounts of sockeye in southeast Alaska, decisions are made by the International Pacific Salmon Fisheries Commission, which administers the terms of the U.S./Canada Pacific Salmon Treaty. Other bodies such as the International North Pacific Fisheries Commission deal with concerns of nations that use North Pacific resources, including Japan, Canada and the United States.

### Markets for Alaska's Seafood

Alaska's seafood industry is enjoying the benefits of unprecedented increases in per capita seafood consumption by health conscious consumers worldwide, and of a declining U.S. dollar that has made Alaska products very attractive. But changing con-

sumer preferences combined with new products from competing producers are challenging Alaska seafood in the marketplace. However, the Alaska seafood industry is now producing many bottomfish products that once were only foreign produced. Examples of new products include frozen cod and pollock fillets, frozen headed and gutted cod and pollock, pollock roe, frozen flatfish fillets, and pollock surimi, used to make foods such as imitation crab.

Alaska's seafood processors and the state of Alaska are responding to change in the seafood market with aggressive private and public/private cooperative efforts to promote seafood products. Indeed, Alaska seafood processors spent an estimated \$6 million on promotion and advertising in 1987. These efforts have been directed at maintaining existing markets and developing new markets for Alaska's variety of seafood products.

One-third of all U.S. seafood exports is shipped directly from Alaska. Over half a billion dollars worth of seafood was exported from Alaska to foreign nations in 1987, twice the value of direct exports in 1984. In addition, a significant portion of Alaska's seafood is shipped to the state of

*One-third of all U.S. seafood exports is shipped directly from Alaska.*



Left— Broiled pollock. Pollock, a member of the cod family, is harvested extensively in the Bering Sea and Gulf of Alaska. Right— Japan is Alaska's leading seafood customer, buying from Alaska nearly \$530 million in seafood in 1987.



Left— Shrimp. Right— Dungeness crab. Alaska's 1987 shrimp harvest totaled almost 3 million pounds. The 1987 shellfish harvest produced over \$213 million in gross income for fishermen.

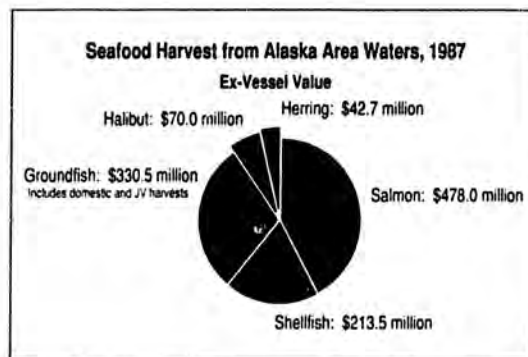
Washington before being exported. Overall, the United States exported 783 million pounds of seafood products in 1987, valued at \$1.58 billion.

Alaska's leading export customer is Japan, which in 1987 received about 95% of Alaska's direct seafood exports, valued at \$530 million. The second largest direct customer is Korea, purchaser of \$20 million in Alaska seafood products in 1987. Canada is third with \$9 million in purchases of Alaska seafood.

## Selected Trends

### Harvest Value

The late 1970s and 1980s have been a period of dramatic change in Alaska's commercial fisheries. Salmon production recovered from the all-time lows of the early and mid-1970s to the sustained highs of the 1980s. Both the herring and halibut fisheries saw a steady growth in value, while Alaska shellfish production collapsed in the 1982-1985 period and then started to recover. Finally, the dramatic events surrounding the increase in U.S. fisheries operations in the EEZ has seen groundfish production become the largest component of total U.S. harvest. Total harvest value rose from \$493 million to \$1.1 billion, including the offshore groundfish fishery, over the 1978-1987 period.



### Diversification

In 1978, salmon and shellfish accounted for 92% of the total Alaska fisheries harvest by value. With halibut, this percentage rises to 98%, leaving a meager 2% for herring and groundfish combined. The dependence on salmon and shellfish in 1978 left the Alaska fisheries vulnerable to biological and economic fluctuations. Fortunately, herring and groundfish development diversified the industry to partially offset the 1984 shellfish failure.

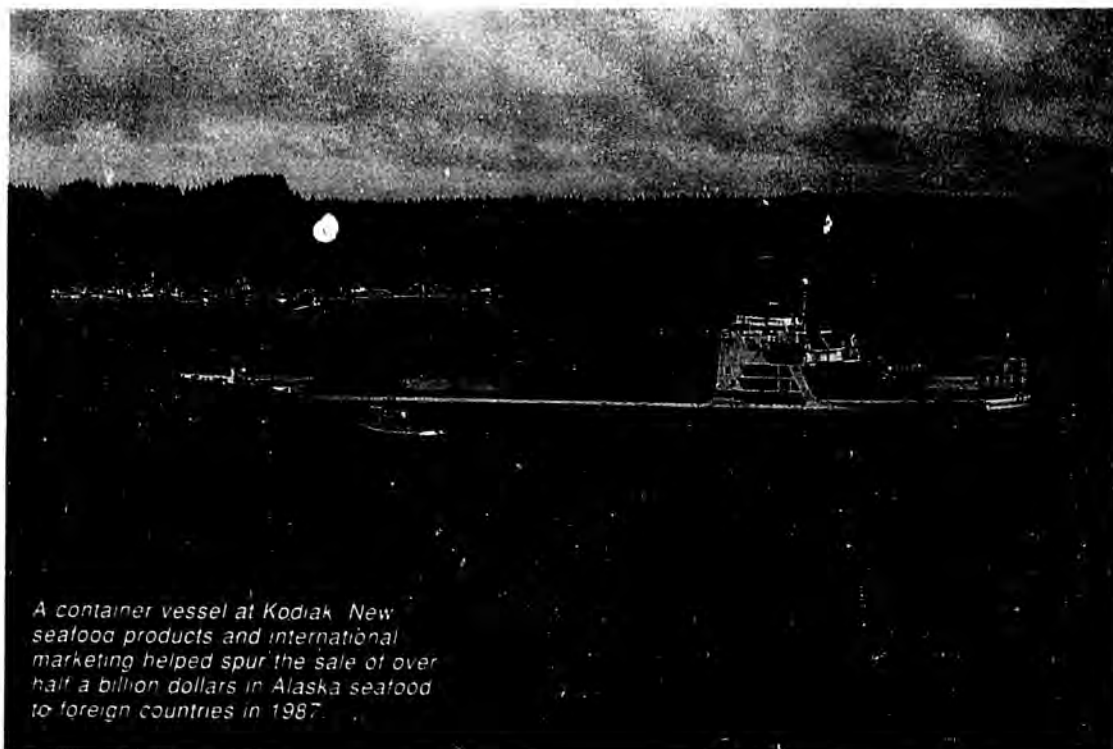
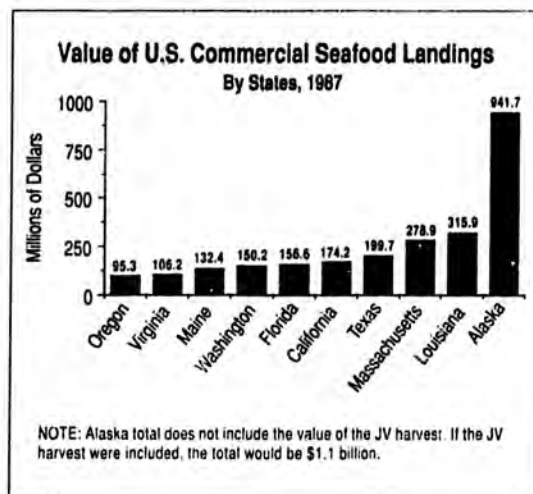
Though salmon was still the most important income source in 1987 at \$478 million, groundfish (\$331 million), shellfish (\$213 million) and halibut (\$70 million) all contributed heavily. Even herring, the least significant of the five major fisheries, brought \$43 million in gross earnings to harvesters.

## Alaska's Role in the U.S. and World Seafood Industries

Had Alaska been an independent nation in 1986, it would have ranked eleventh in world fisheries production by volume, and probably much higher in value. While it lagged far behind such giants as Japan and the Soviet Union, whose distant water fleets roam the oceans of the world, Alaska out-produced such well known fishing nations as Norway, Denmark, Iceland and Canada. Although Alaska harvests accounted for only 2% of the world's total catch by volume, they represented 24% of North and Central American seafood production, and 46% of total U.S. production.

The 1987 total value of Alaska's commercial seafood landings at \$942 million is over three times that of Louisiana, which ranks second. Alaska accounted for over 30% of the total value of U.S. seafood landings in 1987. If the value of the harvest rises at the current rate, Alaska will soon account for over 50% of the total U.S. production by volume, and 40% of the total value of U.S. commercial fisheries.

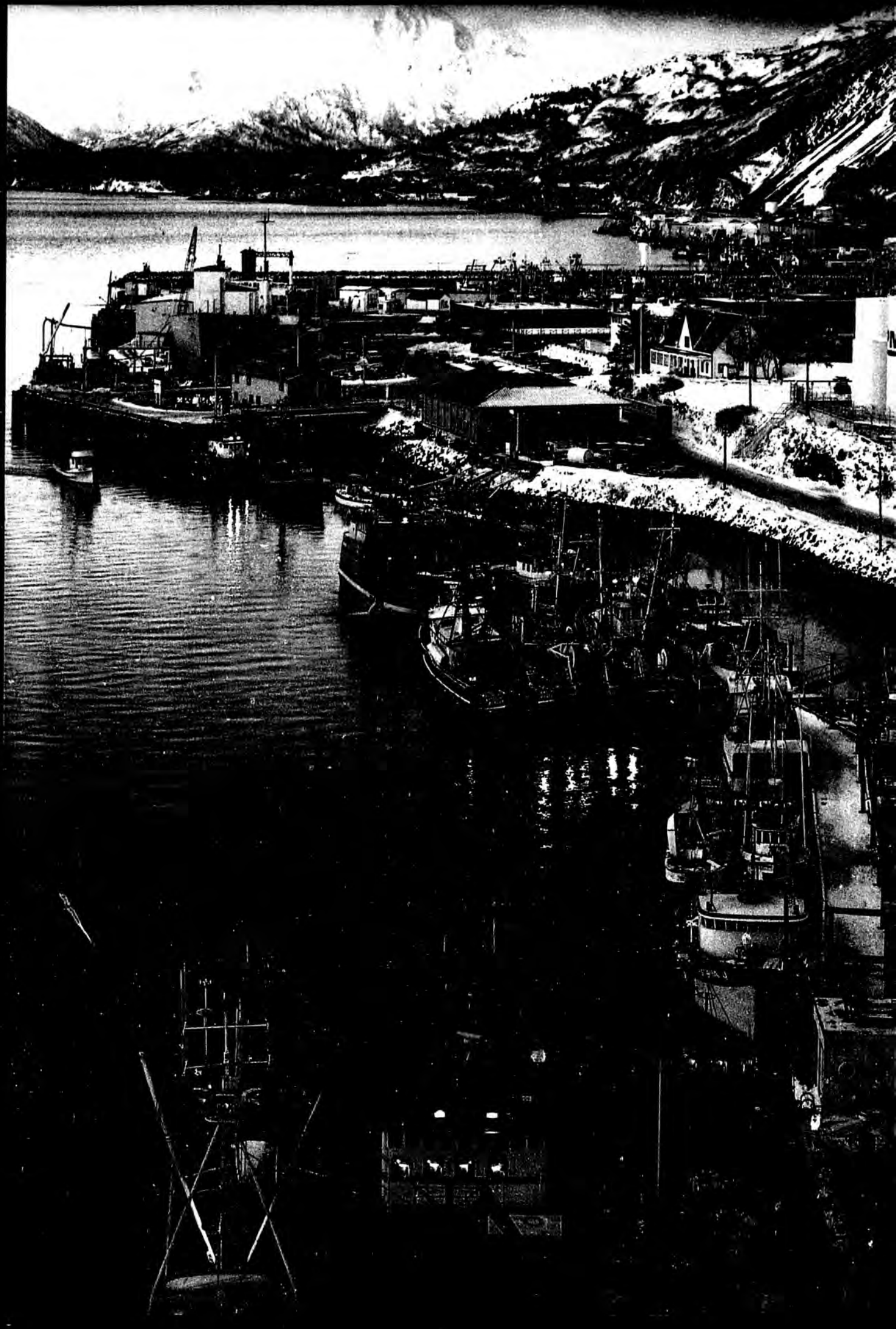
Measured in value of seafood landings, four Alaska communities were among the nation's top ten commercial fishing ports in 1987: Kodiak (ranked 2), with \$132 million in landings, Dutch Harbor-Unalaska (4), Cordova (9) and Petersburg (10). Sitka (15) and Ketchikan (24) also recorded multi-million dollar seafood landings. In 1988, Kodiak led the nation with \$166 million in seafood landings.



*A container vessel at Kodiak. New seafood products and international marketing helped spur the sale of over half a billion dollars in Alaska seafood to foreign countries in 1987.*

*Had Alaska been an independent nation in 1986, it would have ranked eleventh in world fisheries production by volume....*





# Economic Contribution of the Seafood Industry

## Importance to Alaska's Economy

The seafood industry is Alaska's largest private basic industry employer and ranks second to defense among Alaska basic industries. Nearly one-sixth of all Alaska basic industry employment and payroll is in the seafood industry.

Alaska's basic economy produces goods and services for export, meeting demand originating outside the state. Alaska's basic industries are — in order of average annual employment — national defense, seafood, the portions of local and state government that result from oil and gas tax revenue, tourism, civilian federal government serving national interests other than defense, oil and gas, forest products and non-petroleum mining.

The seafood harvesting average monthly wage is higher than average at an estimated \$3,135. Seafood processing is lower at \$1,572. The highest paying industry is oil and gas extraction at \$5,273 per month, double the basic industry average, while tourism pays least at \$1,354 per month.

### Indirect and Induced Employment

Thousands of jobs are created in Alaska's service and supply sector in support of seafood industry activities. For example, the



seafood industry indirectly generates jobs in Alaska's transportation industry, which handles nearly \$2 billion in seafood products each year. Coastal communities see employment created in marine hardware stores, shipyards, fuel suppliers, equipment repair and service businesses, and in many other sectors of the economy.

One step removed from the harvester and processor, but still the result of the seafood industry's presence in Alaska, is the employment created in support of seafood industry workers and their families. These jobs, which in economic jargon are termed "induced," are in grocery stores, clothing stores, schools, gas stations, doctors' offices, banks and local and state government — virtually all across the economy. Together, indirect and induced jobs comprise support industry employment. Alaska's 1987 basic

### Estimates of Alaska Seafood Industry Employment, 1987

|                                                                                                                 |                         |
|-----------------------------------------------------------------------------------------------------------------|-------------------------|
| Average Annual Employment in Harvesting and Processing                                                          | 19,232                  |
| Indirect and Induced Employment                                                                                 | 13,800 to 18,950        |
| <b>Total Average Annual Direct, Indirect and Induced Employment Attributable to the Alaska Seafood Industry</b> | <b>33,032 to 38,182</b> |

Nearly 48,000 people participate in Alaska's billion dollar seafood harvest....

industry employment of 117,284 generated support employment of 126,700, for a total employment of 243,984, including seafood harvesting.

### Seafood Harvesting Employment and Payroll

Nearly 48,000 people participate in Alaska's billion dollar seafood harvest, not counting the decreasing number of foreign operators in the offshore groundfish harvest. Included in the total are 13,310 active permit holders, 31,159 crew members, and an estimated 3,000 participants in the domestic and JV groundfish industries.

Estimated employment and payroll for Alaska's seafood harvesting industry is presented in the accompanying table. The salmon fisheries provide most of the employment in Alaska's seafood harvesting industry, employing over 20,000 people.

However, most of these 20,000 people do not work year-round in seafood harvesting. Thus, spread over one year, their total months worked are equal to 6,836 full-time

jobs. Economists call this the *average annual equivalent*.

Of the various gear groups involved in salmon fishing, drift gillnetters account for the annual equivalent of 2,502 jobs, seiners 1,690 jobs, setnetters 847 jobs, power trollers 655 jobs, hand trollers 198 jobs. Other salmon fisheries account for an annual equivalent of 944 jobs.

Significant growth in employment is occurring in Alaska's offshore groundfish fisheries. Employment on catcher/processors increased about 50% in 1988, and a similar increase is expected between 1988 and 1989.

### Seafood Processing Employment and Payroll

Employment in Alaska's seafood processing industry reached a 6-year high in 1987 with an annual equivalent employment level of 6,611 jobs. Peak seasonal employment was 14,970 workers. Total seasonal participation in seafood processing in Alaska probably exceeded 21,000 workers earning \$125 million, the highest processing payroll to date.

**Employment and Payroll in Alaska's Seafood Harvesting Industry, 1986**

| Fishery                      | Permits Fished | People Employed | Annual Equivalent Employment | Estimated Payroll (\$ million) |
|------------------------------|----------------|-----------------|------------------------------|--------------------------------|
| Salmon                       | 10,228         | 24,979          | 6,836                        | 185.0                          |
| Herring                      | 1,855          | 6,844           | 571                          | 22.2                           |
| Halibut, Black Cod and other | 4,013          | 13,516          | 1,357                        | 80.6                           |
| Shellfish                    | 1,174          | 3,794           | 1,857                        | 84.7                           |
| SUBTOTAL <sup>1</sup>        | 17,270         | 47,469          | 10,621                       | 372.5                          |
| Groundfish (Offshore, 1987)  |                |                 |                              |                                |
| Domestic & JV Trawl          | 110 vessels    | 900             | 600                          | 56.2                           |
| Catcher/Processors           | 35 vessels     | 2,100           | 1,400                        | 42.4                           |
| Total                        |                | 3,000           | 2,000                        | 98.6                           |
| <b>GRAND TOTAL</b>           |                | <b>49,569</b>   | <b>12,621</b>                | <b>\$471.1</b>                 |

<sup>1</sup>Totals eliminate double counting of harvesters active in more than one salmon fishery. Therefore, totals are not sums.



*Woman in salmon cannery. The number of seasonal jobs in canneries is decreasing, but increased shore-based groundfish processing is creating more year-round employment and higher average salaries.*

*Employment in Alaska's seafood processing industry reached a 6-year high in 1987....*

Seafood processing employment in Alaska peaked in 1981 at 7,065 jobs. Employment declined to a low of 5,417 in 1984. The crash of the king crab stocks accounted for some of the decline, but a major factor was the shift from canned to fresh/frozen product, which requires less labor. The increase in shore-based groundfish production in Alaska is partly responsible for a trend toward greater year-round employment even as peak season employment declines. More year-round business in the seafood processing industry means greater stability, more resident participation and higher average salaries.

Kodiak led Alaska communities in seafood processing employment in 1987 with 1,996 jobs and an annual average of 1,495 jobs. Dutch Harbor recorded 1,063 with an annual average of 880 seafood processing jobs, an indication of year-round stability. Petersburg led Southeast in seafood processing employment with a summer peak of 806 jobs and an annual average of 330, reflecting a dependence on the seasonal salmon fisheries.

Among all basic industries in Alaska, seafood processing has the largest component of nonresidents in its workforce. In 1987, an estimated 46.5% of the 23,676 food processing workers in Alaska were nonre-

sidents. Though most seafood processing companies operating in Alaska actively recruit resident workers, the seasonal nature of processing jobs and the low wages discourage some residents. Further, many processing operations are remote and local labor cannot meet demand. The Department of Labor states that the processing industry places more job orders than can be filled by the Alaska labor force.

### **Importance to Regional Economies**

The seafood industry is the largest private sector employer in five of the seven Alaska regions discussed below. In the Kodiak, Bristol Bay and Aleutian regions, seafood is the dominant basic industry. In southcentral Alaska, which contains over half the state's economy, seafood employs three-fourths as many people as the oil and gas industry and nearly half as many as state government.

The following table shows the distribution of permit ownership and earnings in Alaska. Residents of southcentral Alaska earned the most in 1986, \$131 million before expenses and boat and permit payments. Residents of the city of Kodiak grossed \$86 million, highest of any community.



*Anchorage... is  
Alaska's third  
largest seafood  
harvesting  
money earner.*

**Southeast:** The seafood industry, with average annual employment of 3,993, is southeast Alaska's largest private industry. Southeast is the state's largest seafood region in employment, just ahead of Southcentral. Twenty-one percent of the state's seafood jobs are in southeast Alaska. Based on 1986 gross harvest earnings Southeast ranks second with \$109 million, compared to \$131 million earned by Southcentral residents.

**Southcentral:** This region is the economic heart of Alaska with over half of the state's employment. Anchorage serves as the transportation, finance and trade center for most of Alaska and alone is Alaska's third largest seafood harvesting money earner.

The seafood industry employs 3,735 in Southcentral. Residents earn more from seafood harvesting (\$131 million) than any other Alaska region. Another \$30 million in net income is earned by seafood processing workers. Southcentral residents earn 28% of all resident seafood harvesting gross income and 24% of all processing wages.

**Kodiak:** Kodiak is one of three Alaska regions in which the seafood industry is the dominant economic activity. With an aver-

age annual employment of nearly 2,600, Kodiak's seafood industry accounts for 55% of private sector employment and 38% of total employment. The Kodiak region accounts for nearly one in four of the state's seafood processing jobs and 14% of all seafood employment.

**Aleutians:** The Aleutian region has a very sparse population and an economy dominated by the seafood industry, which employs 64% of all private sector workers. The Aleutian seafood industry has an annual average employment of 2,989, 36% of the total regional employment.

The Aleutian share of the Alaska seafood industry accounts for 16% of all seafood employment and 17% of the processing workforce. In 1986 Aleutian residents captured \$47 million in gross harvesting earnings. These harvesters are the state's most productive.

**Bristol Bay:** This region of the legendary salmon runs is more dependent on the seafood industry than any other. Over 70% of the region's private industry employment is in seafood with an annual average of 2,550 people employed in 1987. Seafood domi-

**Seafood Harvesting Participation and Earnings, 1986**  
by Region of Residence

| Region              | Permit Holders | Permits Fished | Pounds Harvested (millions) | Gross Earnings (\$ million) |
|---------------------|----------------|----------------|-----------------------------|-----------------------------|
| Southeast           | 2,724          | 4,725          | 162.5                       | 109.3                       |
| Southcentral        | 2,977          | 4,125          | 172.7                       | 130.6                       |
| Anchorage           | 873            | 1,015          | 36.1                        | 30.8                        |
| Kodiak (region)     | 811            | 1,563          | 161.2                       | 95.2                        |
| Aleutians           | 326            | 556            | 57.2                        | 46.7                        |
| Bristol Bay         | 1,178          | 1,431          | 49.1                        | 55.9                        |
| Northwest           | 2,251          | 2,460          | 33.7                        | 19.2                        |
| Other Alaska        | 242            | 261            | 3.4                         | 3.5                         |
| Fairbanks           | 101            | 112            | 2.0                         | 2.1                         |
| <b>TOTAL ALASKA</b> | <b>10,496</b>  | <b>15,121</b>  | <b>639.8</b>                | <b>\$460.6</b>              |



*Sitka Harbor. In 1987, 34 million pounds of seafood were landed in this southeast Alaska community.*

*...101 Fairbanks resident permit holders grossed \$2.1 million in 1986 fishing elsewhere in the state.*

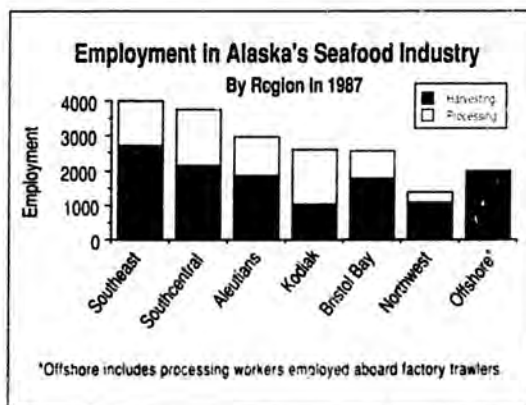
nates the Bristol Bay economy with 51% of all employment. Residents earned \$56 million in harvesting gross income in 1986, or about 12% of the Alaska total.

**Northwest:** In the Northwest region, one of four private sector jobs is in seafood harvesting or processing. The seafood industry directly accounts for 13% of the nearly 11,000 average annual total employment.

The seafood harvesting industry in the Northwest region is very labor intensive. Residents earned \$19 million in harvesting gross income in 1986, and processing workers took home paychecks totaling over \$5 million in 1987.

**Interior/Northern:** This region has no significant commercial fishery. However, the 242 residents who earned nearly \$4 million in harvesting gross income (about 1% of the Alaska total) hold permits for fisheries located in other areas of the state. For example, 101 Fairbanks resident permit holders grossed \$2.1 million in 1986 fishing elsewhere in the state.

**Offshore and Undetermined:** This category consists of the estimated 2,000 average annual employment in the offshore and domestic trawl fisheries, which account for about 10% of Alaska's seafood industry employment. These jobs have little effect on Alaska's economy because workers are mostly non-residents and spend little or no time ashore in Alaska. There are also 2,037 other jobs that have no specifically determined geographic location in Alaska.





Stacked king crab pots and floats. Alaska crabbers have a capital investment of about \$400 million.

### Capital Investment

Investment in Alaska's seafood industry is estimated at \$4 billion. Investment in fishing vessels in Alaska's nearshore and offshore fisheries is between \$1.8 billion and \$2.0 billion, plus an additional \$200 million to \$300 million in onboard equipment. The salmon fisheries account for an estimated \$800 million of this total, and the offshore groundfish industry accounts for \$500 million. Harvesters have invested another \$900 million in permits for Alaska's limited entry salmon fisheries. Investment in other types of permits adds another \$100 million to the total. Investment in seafood processing plants and equipment may approach \$1 billion, measured in insured or assessed value.

### Expenditures in Alaska

In-state expenditures by processors exceeded \$90 million in 1987, not including fish purchases or payroll. This spending is on such goods and services as fuel, electrical power,

transportation, hardware, repair services, supplies and food.

An estimate of expenditures by harvesters places in-state spending on goods and services in support of Alaska's harvesting fleets at about \$190 million, including \$33 million from the factory trawl fleet. Fleet support expenditures are spread throughout the economy and include repair and maintenance services, insurance, food, gear, equipment, fuel, crew transportation, bait, ice, professional services and many other items.

In total, spending on goods and services in support of harvesting and processing may reach \$300 million or more.

The industry paid raw fish taxes of \$27 million in 1987 and is the major contributor to the \$5 million marine fuel tax. Harvesters also tax themselves in excess of \$4 million annually for support of regional aquaculture programs. License fees and local sales and property taxes generate millions from seafood industry activities.

#### Estimated Capital Investment in Alaska's Seafood Industry, 1988

|                                                              |                                       |
|--------------------------------------------------------------|---------------------------------------|
| Investment in Harvesting Vessels and Onboard Equipment       | \$2.0 billion to \$2.3 billion        |
| Investment in Commercial Fishery Permits                     | \$900 million to \$1.0 billion        |
| Investment in Seafood Processing Plants and Equipment        | \$800 million to \$1.0 billion        |
| <b>Total Capital Investment in Alaska's Seafood Industry</b> | <b>\$3.7 billion to \$4.3 billion</b> |

## Seafood-Related Agencies and Organizations

Important to any major industry are the support organizations and government agencies which regulate and serve that industry. In Alaska, these entities make a substantial contribution to the state's economy in general, and to the seafood industry in particular.

For example, among government agencies the Alaska Department of Fish and Game operates hatcheries that contribute to common property fisheries. The University of Alaska offers education, training, basic and applied research, and field advisory services in support of the industry. The National Marine Fisheries Service performs biological and technical research, as well as enforcement services to protect Alaska's fisheries. One unique and beneficial program is the cooperative marketing program financed jointly by the State of Alaska, the federal government and the industry through

the Alaska Seafood Marketing Institute.

Both state-run hatcheries and private non-profit hatcheries produce fish for the common property fishery. These fish are worth many times the costs of hatchery production.

Other groups, such as harvester and processor organizations, lobby for programs and legislation on behalf of the entire industry.

While these industry benefits are great, the economic benefits to the state are also significant. The agencies and organizations are both support sector (education, research, lobbying) and basic sector (fish production) contributors to the economy. Agencies and organizations directly related to the seafood industry in Alaska contribute a minimum of 1,100 jobs in average annual employment; an annual payroll of at least \$40 million; and a total annual budget in support of the seafood industry of \$82 million, the majority of it State of Alaska money.

*Agencies and organizations directly related to the seafood industry in Alaska contribute... an annual payroll of at least \$40 million....*



*Hatchery-spawned chum salmon. In 1988, 24% of the total Alaska commercial and sport fishing salmon harvest originated in Alaska's state-run and private non-profit hatcheries. Inset— Pink salmon yolk fry. At this early development stage, salmon rely on nutrients stored in their yolk sacs, and are especially vulnerable to environmental contaminants. Cooperative state and federal research programs are developing more productive ways to ensure a consistent supply of healthy hatchery salmon.*



## Conclusion

The Alaska seafood industry is a diverse and evolving giant in the Alaska economy and its rhythms underlie the lifestyles of communities throughout the state. It provides jobs and income for more Alaskans and in more locations than any other private industry. Economic benefits of this multi-billion dollar industry are distributed from Ketchikan to Kotzebue, in urban and remote areas.

The industry's politics and management span Juneau, Anchorage, Washington, D.C. and other states and countries, and its markets are widespread. The sometimes exasperating political web often helps (and sometimes hinders) the industry's growth.

Extending U.S. fishing efforts into the Exclusive Economic Zone is a national success, and it is now Alaska's challenge to make it a state success. Marketing can be an effective means of improving the appeal of the industry's products. Hatchery production, limited entry, rejuvenated salmon runs, a bank devoted to seafood industry finance, and reductions in foreign interception are other examples of political and regulatory successes.

Finally, the lifeblood is the individual drive of the men and women who harvest, process, distribute, transport, market, and support Alaska's renewable resource.





A P-I  
SPECIAL  
REPORT

FIRST  
OF  
THREE  
PARTS

# Hatching Trouble

## Wild salmon in upstream fight for life

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By Rob Taylor  
P-I Reporter

In the century since the first one opened, the Northwest's fish hatcheries have come to be seen as the solution to a host of problems wiping out wild salmon.

In recent years, however, a disturbing irony has become increasingly apparent: Hatcheries themselves are part of the problem.

Hatcheries are helping to push wild salmon toward extinction across the region, scientists say. Furthermore, they say, the resulting loss of genetic diversity may sow the seeds of the hatcheries' own decline.

"Promotion of the hatcheries has been at a major cost to wild fish in this state," says Roland Schmitt, regional director of the National Marine Fisheries Service.

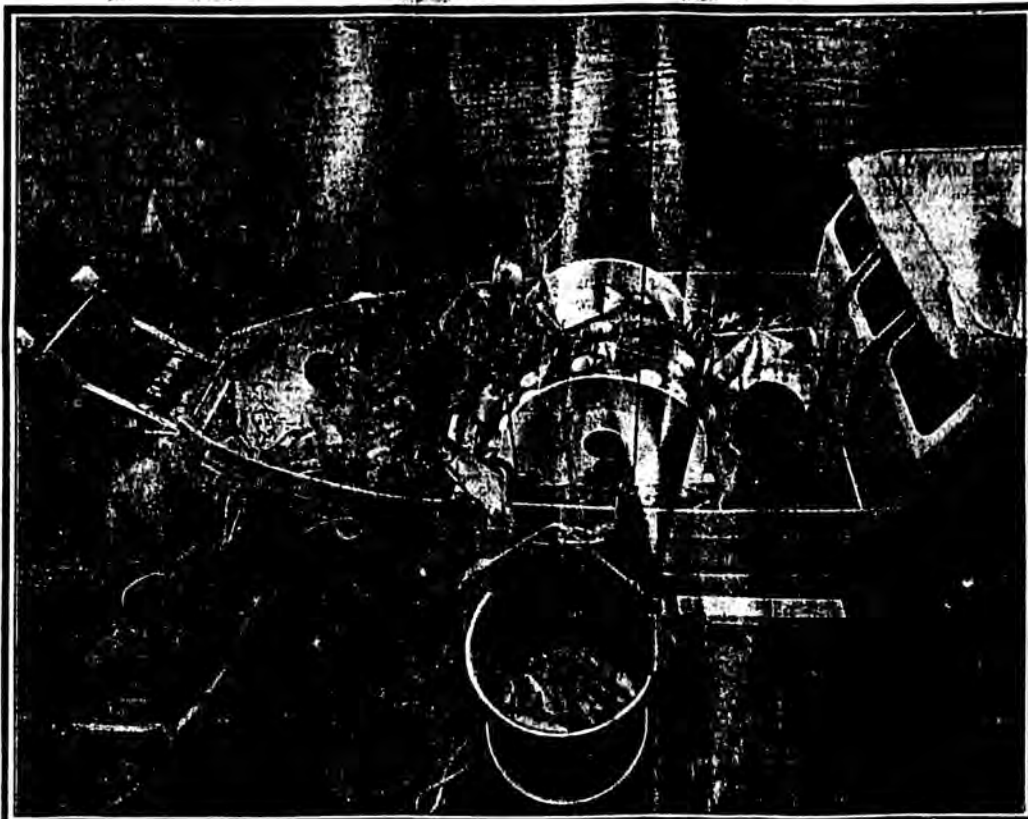
Genetic diversity enables fish to adapt to environmental change, so the range of genes present in wild fish is crucial to the long-term health of fisheries, says Anne Kapuscinski, a geneticist retained by the Northwest Power Planning Council. As they are depleted, she cautions, "we run the risk that the hatchery runs will not be able to adjust in the future, and they'll start crashing on us."

While that dire forecast is not universally accepted, its influence is growing. And with the Endangered Species Act amplifying such concerns, hatcheries may never be the same.

"At this point," Schmitt says, "we need to focus our energies on putting wild-fish needs ahead of the hatcheries."

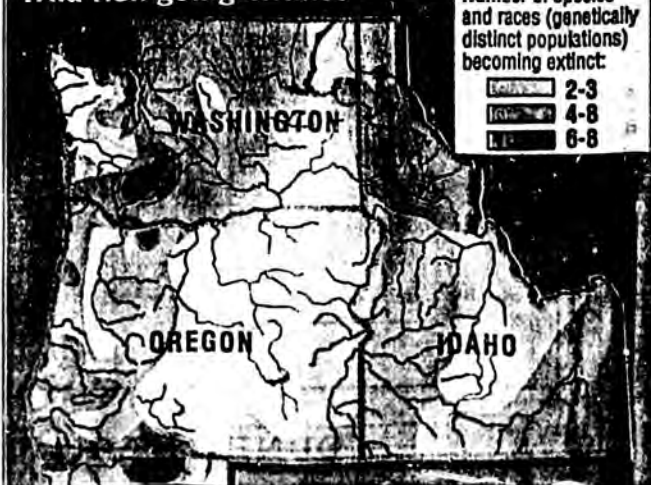
The evolving shift threatens a big enterprise. Since Washington's Lower Kalama Hatchery was dedicated in 1895, Washington and Oregon alone have sprouted more than 100 state and tribal hatcheries. They cost about \$50 million a year and provide some 70 percent of the region's coho, chinook and steelhead catch.

Hatcheries have increasing



Salmon are unloaded from the gillnetter *Jupilar* after a good night of fishing out of Bellingham. From left are Francisco Mata, Monty McIntyre and Josue Plata. Hatchery spawned fish have increased the catch but may be threatening its future.

### Wild fish going extinct



■ **Today:** Hatcheries have helped fill fishermen's nets but are pushing wild salmon and steelhead runs toward extinction — and causing a genetic loss that may lead to the hatcheries' own decline.

■ **Tomorrow:** Hatchery fish are often less hardy than their wild cousins but can push the wild fish out or breed ill-suited genes into their runs. Some recreational fishermen revere wild fish.

■ **Friday:** Spurred by endangered-species concerns, fishery managers are considering changes to boost wild runs. This could cut harvests but fend off greater losses.



A P-I  
SPECIAL  
REPORT

## HATCHING TROUBLE

## Hatcheries: 'Good way to augment wild fish' or pacifying 'narcotic'?

From Page 1

ly propped up fish harvests as logging, development, dams and diversions have devastated streams and rivers. From Prince William Sound in Alaska to Oregon's Rogue River, fishermen want salmon they can sell on the docks or take home to their families. Hatcheries remain the quickest way to get them.

Steve Arbaugh, president of the Puget Sound Gillnetters Association, presses for more hatchery construction.

"We've lost a lot of habitat, and we're not going to get it back," Arbaugh says. He calls hatcheries "a good way to augment wild fish."

But developments in recent years have bolstered arguments against hatcheries, particularly the maximum-production methods critics say have caused most of the problems.

Studies show wild fish are dying out at an alarming rate. More and more scientists say that strong fish catches can't be sustained without them.

Critics say hatchery fish can harm their wild cousins in a variety of ways. Besides narrowing genetic diversity, the hatchery fish push wild ones off feeding stations, compete for food, attract predators and fishermen and spread disease.

By helping to prop up fish production, the critics add, hatcheries have blinded people to widespread destruction of river and stream habitat for fish and other creatures.

Hatcheries "have become a narcotic served to pacify society, to block society's awareness of what is really going on in our coastal ecosystem," writes Bob Francis, head of the University of Washington's Fisheries Research Institute.

Take the Nooksack River near Bellingham, for example. Biologists say decades of heavy fishing geared to hatchery production have pushed the river's wild coho to the brink of extinction.

Every spring, the state hatchery on Kendall Creek and the Lummi Tribe's Skookum Hatchery on the South Fork spew out about 4 million coho.

When the fish return after six to 18 months at sea, they typically face a seven-day-a-week gantlet of nets that one biologist calls "almost a wipe-out" fishery. Non-Indian fishermen prowling Bellingham Bay, Lummi stakenets and skiffs cut off fish along the shoreline. More Lummi fish the first few miles of the river, and Nooksack Indians wait upstream.

The state and tribes set the allowable catch to maximize harvest while letting through enough spawners to rear the next hatchery generation. Hatcheries sharply cut mortality in the first months of life, so only about 5 percent of the run is needed.

But hatchery and wild fish get scooped up together in fishermen's nets. So the 5 percent survival rate applies to the wild run, too — a mere 500 wild spawners.

There is no mystery about what this does: It gradually exterminates the wild stocks, which biologists say generally cannot sustain harvest rates above 60 percent or 70 percent.

The 5 percent survival rate for wild fish is "ludicrous," concedes Larry Peck, director of salmon culture for the state Department of Fisheries. "It ought to be much higher."

"The assumption is you're overharvesting the wild fish," says Tim Flint, a department biologist. "You'd expect to see a long-term decline."

Fishermen haven't complained. They say hatcheries have kept local catches from falling due to habitat loss, mostly from logging.

For harvest managers, "the pressure is intense to overharvest," says Bill Graeber, another of the department's biologists. They seldom hear complaints that too few wild fish reached their spawning beds. But when hatcheries get back more spawners than they need, "all the user groups jump up and down and say, 'Why are you letting all these fish go to waste?'" Graeber says.

This year, however, the Nooksack hatchery run stumbled. Only a trickle of returning coho slipped past Lummi Island and up the river. Fishermen were lucky to get their gas money back.

No one is certain why; biology isn't that precise. But the drop offered a glimpse of what some scientists and fishery managers warn could someday be common if wild runs die out and genetically uniform hatchery fish can't adjust to change.

In Washington, harvest for 36 of 101 managed stocks are currently geared to meet the needs of hatcheries rather than wild fish.

Given the demand for fish and the decline of

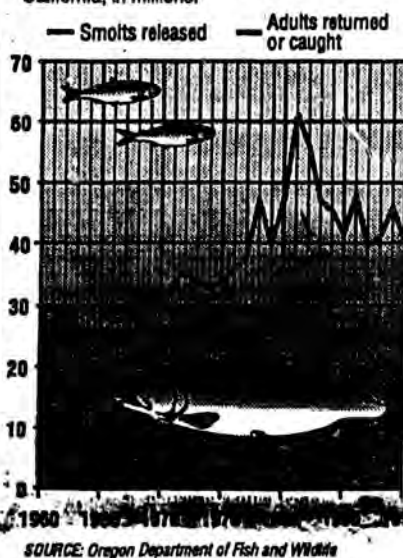


Cruising the Nooksack, members of the Lummi Tribe hunt for a place to net salmon for hatchery breeding. The normal return wasn't enough.

GRANT M. HALLER-P-I

## Diminishing returns

■ Output of coho smolts from hatcheries in the Columbia Basin and rivers feeding the Pacific Ocean from the Columbia River to northern California, in millions.



SOURCE: Oregon Department of Fish and Wildlife

DUANE HOFF MAN/P-I

natural habitat, "it's about the appropriate mix," says Joseph Blum, Department of Fisheries director. Jim Lichtowich, former research chief of Oregon's Department of Fish and Wildlife, strongly disagrees. "There has never been any scientific proof that that is the right mix," he says.

Oregon, in fact, has already stopped gearing management toward hatcheries' needs along coastal streams and plans to protect all wild runs there.

The threat in hatchery-management areas is not only to the numbers of wild fish but to their genetic integrity, as well. The wild Nooksack coho may already have been genetically altered by interbreeding with hatchery fish, which have been imported from other watersheds as recently as two years ago.

The Nooksack run has plenty of company under this genetic cloud.

British Columbia is "all but annihilating" wild

chinook in some areas with overfishing geared to hatcheries, says Brian Riddell, a biologist for Canada's Department of Fisheries and Oceans.

The lower Columbia coho may have disappeared, federal officials say. Though it lived below the dams, it has been caught between tens of millions of hatchery fish and intense fishing for them.

Along the Pacific Coast, 160 native wild salmon, steelhead and cutthroat trout runs face a moderate to high risk of extinction, according to the American Fisheries Society, the leading fishery biologists' professional group. More than 100 of those runs face high risk of being mongrelized by interbreeding with hatchery fish, the group says.

Europe and Asia, too, have seen wild runs disappear, and many areas have reported declines in hatchery productivity.

Hatcheries, of course, are only one of many threats to wild fish; dams and urbanization outweigh their impact. But many scientists argue that hatcheries bear major complicity. "Their role is so intertwined with all the other factors that it is impossible to pull out," Lichtowich says.

Concern about wild stocks stems from the belief that genetic diversity is crucial to survival of all species and particularly to salmon.

Over millennia, wild salmon have evolved many genetically distinct races, or stocks, many of them uniquely suited to a native lake, river or stream.

That diversity is valuable in fish runs for the same reason it is valuable in a stock portfolio: for stability. One strain of coho may be vulnerable to a disease, a change in ocean currents, or global warming. But with many fish stocks, scientists say, chances are good that some will continue to prosper.

The demise of wild runs and careless hatchery breeding have already narrowed this genetic diversity. Continued over time, some scientists say, that could leave wild and hatchery runs with too narrow a genetic base to survive changing conditions.

Some managers scoff at gloomy forecasts. Bill Hopley, assistant director of salmon culture for Washington's Department of Fisheries, dismisses

the threat of a crash as "theoretical" and far off even if it were to happen. He notes that Northwest hatcheries have operated for almost a century without a genetic catastrophe.

Fred Allendorf takes little comfort from that fact. The University of Montana geneticist likes to show slides of native Montana cherry trees prospering while a nearby orchard of imported cherry trees is cut into firewood. The non-native trees survived for 80 years but all died in a 1989 cold snap.

"Just because something has survived in that environment for 50 years or so," Allendorf says, "doesn't mean they can survive long term."

A dearth of scientific information and public debate clouds the issue.

Federal and state officials admit they have no genetic information on the wild Nooksack coho, for example. They don't know if it has valuable genetic traits or even if its original genes have survived. There is talk of broad surveys of fish populations.

Fishery managers have been "knowingly causing extinction of wild populations" without scientific justification or public discussion, charges Bill Bakke, director of Oregon Trout, a leading advocacy group for wild salmon.

"If they're going to continue that policy," Bakke says, "it should at least be a public process."

Any major policy shift could be painful and face stiff resistance.

Managing the Nooksack harvest to protect wild fish, for example, would require sharp cutbacks in fishing and create big surpluses of spawners at hatcheries, says Flint, the Department of Fisheries biologist.

Fishermen regard them as waste because they are too near death to be sold for human food.

"It would defeat the purpose of the hatchery system," Flint says.

Even G.I. James, fishery manager of the Lummi Tribe, who reveres wild salmon, defends the high harvests that depress wild fish. His people can ill afford to forgo any income, he says.

"There are needs of the fish," James says, "but there are also needs of the people."

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MEMO: A P-I SPECIAL REPORT: Hatching Trouble -- SECOND OF THREE PARTS  
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SALMON HATCHERIES SPAWNING DANGER FOR STATE'S WILD FISH

Tiny wild salmon waited patiently, dispersed under logs and behind boulders, facing upstream as they watched for food to float by.

Hatchery fry burst in like a mob. Milling about in dense packs, they shunned the natives' time-tested technique. They raced after drifting debris, mistaking it for food. They let the current carry them downstream. And in what some call the "Pied Piper effect," about half the wild chinook joined the stampede.

The scene, watched by snorkeling scientists, followed the Leavenworth Hatchery's release of young spring chinook into Icicle Creek and the Wenatchee River a few years ago. It illustrates two problems with hatchery fish: Compared with their wild cousins, they are ill-suited for survival, and yet by sheer strength of numbers, they often displace wild fish.

Hatcheries "take eggs and make schmucks out of them," grumbles one fishery biologist. "Their behavior is completely different from wild fish."

Hatcheries are, to be sure, usually a substitute for habitat trashed by dams, logging and urban growth. They greatly expand fish survival through the early months of life. That has helped to meet a rising demand for fish, but at a cost.

Hatchery programs contribute to the decline of wild fish and often provide poor substitutes. Scientists worry that the decline of wild runs could lead to a kind of genetic bottleneck that could depress entire fisheries. This year, as the Endangered Species Act has been invoked to protect three wild salmon runs on the Snake River, agencies are taking a new look at hatcheries' benefits and costs.

Ray Hilborn, a University of Washington professor of fishery biology, claims the costs are high - in dollars and lost wild fish - and that the benefits have been overstated.

Many hatcheries' adult survival rates are abysmal, Hilborn says. The Leavenworth Hatchery produces only about three adult fish - caught or returned to spawn - for each 1,000 released.

Low returns can drive the cost of fish far above their market value. A UW study of four British Columbia hatcheries found that the adult catch from one, the Fraser River's Quesnel Hatchery, cost about \$500 per fish, Hilborn says. The cheapest, he asserts, cost about \$5 a pound even without counting the costs of catching, cleaning and selling the fish.

Some justify the costs as the price of urbanization or cheap hydroelectricity. But Hilborn contends the money would be better spent on improving habitat.

The Leavenworth Hatchery, he says, "is not doing anybody any good. It's just driving the wild fish into the ground."

In the wild, superiority of wild fish is well-documented. Studies have



shown they produce two to nine times more returning adults than hatchery fish mating in the wild. Wild fish survive better at sea and return more surely to their native spawning grounds.

At the extreme, hatcheries can even cause a net loss of fish. A multiyear Oregon study compared coastal streams seeded with hatchery fry with those that were not. The seeded streams suffered a 40 percent drop in wild fish. And despite a slight increase in the initial adult returns, seeded streams contained 32 percent fewer fish overall in the second generation.

That study shook Oregon's fishery programs. They cut back seeding of coastal streams and capped hatcheries and harvests there to protect wild fish.

Where hatcheries do succeed, Hilborn contends, they usually drive out wild fish but have trouble sustaining their initial production. "Ten years down the road, they get half or a quarter of what they initially got."

Since the early 1960s, for instance, hatcheries from southern Washington to northern California have doubled their output of coho smolts, but their returning adults have dropped since the mid-1970s.

Scientists are divided on the cause of such declines. Some blame factors such as ocean conditions rather than hatchery shortcomings.

Not all areas are seeing production fall. Bill Koss, assistant director of the Washington Department of Fisheries salmon program, says the state's total salmon production has grown, thanks largely to hatcheries, to an average of about 8 million salmon in the late 1980s from 5 million in the early 1960s.

"We can have coexistence of wild fisheries and hatchery fisheries, without having one negatively affecting the other," Koss asserts.

Hilborn calls that claim "one of the great lies."

Despite their differences, both sides agree that in many places more hatcheries would bring diminishing added returns, if any. The Columbia River system, for example, now receives more juvenile fish each year than ever by Hilborn's count. Its returning adults, however, have dropped to between one-fifth and one-eighth of their historic abundance.

Bob Francis, head of the UW's Fisheries Research Institute, argues that hatcheries may have bumped against the limit of the Columbia's present capacity.

For hatchery fish, low survival stems partly from conditioning. Fed pellets in crowded pools, they fail to recognize predators and know little about scavenging in the wild. They charge food, wasting valuable energy.

Genetically, non-native hatchery stocks tend to be less adapted to local conditions than natives. Human management may exacerbate the problem. And narrow genetic heritage may reduce their ability to adapt to future change.

Selective breeding can backfire. A state Department of Wildlife effort to breed bigger steelhead produced a lot of albino fish. Taking eggs and sperm from the first fish to return, once a common cost-cutting move, has reduced survival rates of hatchery fish in the wild; their eggs hatched during winter floods.

Another harmful practice has been the transfer of eggs and fish from one watershed to another. The Columbia River's Bonneville Hatchery has received chinook eggs from as far away as Eastern Washington, Southern Oregon and even Alaska.

Such exchanges are now more tightly controlled, but throughout the Northwest they have eroded genetic differences among both hatchery and wild stocks.

Agricultural science has demonstrated the costs of such uniformity, as new hybrids gave farmers higher yields but new vulnerability. The National Academy of Sciences blamed genetic similarity for an epidemic of corn blight in 1970

and 1971. Corn plants "had become as alike as identical twins," the academy said. "Whatever made one plant susceptible made them all susceptible."

The Lyons Ferry Hatchery provides an unusually clear example of how hatcheries can promote such uniformity. Built by the Washington Department of Fisheries to compensate for the toll dams had taken on the Snake River fall chinook, Lyons Ferry, instead, may have helped push the run into extinction.

The Snake River's fall chinook run once was one of the most productive in the Northwest, but it dwindled in the 1960s and '70s as seven huge dams converted pools and rapids to a chain of tepid lakes. By last year, the late-summer flood of quicksilver had tailed off to a trickle of 78 fish.

For several years, even as the run declined, the hatchery steadily culled almost one-third of the wild spawners in a vain effort to meet its assigned production goal: replacing 18,300 returning fall chinook lost to the dams. It never came close.

"They've been taking way too many of the wild fish," says Rolland Schmitt, regional administrator of the National Marine Fisheries Service.

If the Lyons Ferry managers erred, Oregon officials did worse. They flooded the Snake River with genetic outsiders: strays from a mismanaged effort to restore runs in the Umatilla River.

Adult fish returned to find irrigators had left only a trickle of water in the Umatilla. Spawners didn't have a chance of staying there, says Larry Peck, director of salmon culture for the Washington Fisheries Department.

Since the mid-1980s, countless Umatilla hatchery fish have glided past the river's parched mouth and up the Snake River, where Lyons Ferry managers unwittingly mixed them with the fall chinook they bred in captivity.

There are signs the same thing has happened in the wild. Stream surveys last year found that hatchery fish made up as much as three-quarters of the fish on Snake River spawning grounds.

Interbreeding "severely contaminated what we have known as wild Snake River fall chinook," Schmitt says. The incident "raises the question of whether we even have any wild chinook left."

Schmitt's agency has proposed listing the run as "threatened" under the Endangered Species Act and said in a report that hatchery operations "pose clear and immediate threats" to its genetic integrity.

Fred Allendorf, biology professor at the University of Montana, Missoula, warns that many such losses "will lead to disastrous losses of biodiversity." If remaining fish are left with a narrow range of genes, he warns, they could fail to adapt to changing conditions and collapse.

Bill Hopley, assistant chief of salmon culture at the Department of Fisheries, dismisses the threat of a crash as "theoretical."

Research is so sketchy "that nobody can claim for a fact to know" that salmon stocks will crash, he says. If it were to happen, he suggests, such a catastrophe would be far distant. "We're talking evolutionary time scales here."

Jim Lichatowich, former head of research for Oregon's Department of Fish and Wildlife, says waiting for irrefutable proof risks disaster.

"To prove it," Lichatowich says, "you would have to bring the resource close to collapse. That's not a responsible policy."

CAPTION: (1) DUANE HOFFMANN/P-I

(2) GRANT M. HALLER/P-I -- "There's just something wrong there," Pete Soverel says of hatchery fish, which rush toward men, expecting food - an unnatural behavior. He wants some hatcheries phased out and their budgets used to repair habitat.



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DATELINE: SKYKOMISH RIVER, NEAR GOLD BAR

MEMO: A P-I SPECIAL REPORT --\*HATCHING\*TROUBLE\*

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ANGLERS SEE DECLINE OF WILD FISH AS MORE THAN LOSS OF SPORT

A wall of firs and white mist looms behind the river. Three mergansers shoot past, bank left with the stream and are gone. Pete Soverel's eye returns to his fly, angling across a green ripple 80 feet downstream.

Soverel's hat brim drips with drizzle - perfect weather for a fly-fishing fanatic. And Soverel, who spends 50 days a year up to his thighs in rushing green water, is certifiable.

His target is the wild steelhead, a silvery ghost that can explode from smooth water like a bolt of lightning. One swirls by Soverel's No. 6 caddis fly. "Yeaahh," exclaims the fisherman. He gathers armloads of line to cast again.

Chairman of the steelhead committee of the Federation of Fly Fishers, Soverel worships fish that have never eaten pellet food or milled about in rearing ponds.

Wild fish "take their time" returning from the sea, he says. They disperse along the river to lie in fast-moving, streamy water. They hit a fly more aggressively and fight harder than their domesticated cousins.

Hatchery fish, Soverel figures, behave more like nervous commuters. Returning adults rush back to their hatchery site, leaving anglers crowding by the outlet pipes to catch them.

They behave unnaturally, rushing toward men, expecting food. "There's just something wrong there," he says.

Here in the Skykomish, he says, wild runs are depressed.

Soverel calls hatcheries "perhaps the worst" of the calamities that have befallen Northwest salmon and steelhead. His distaste is part science, part aesthetics and part "Pete theories," accumulated in 30 years casting lines.

Soverel wants hatcheries phased out where they conflict with wild runs and their budgets converted to repairing habitat.

His group favors making anglers release wild steelhead until studies show runs are healthy. Anglers could keep hatchery fish, which can be marked.

In a step in that direction, the Wildlife Department proposes to require the release of wild steelhead caught in Western Washington from June to November 1992.

For every Pete Soverel, there appear to be plenty of fishermen who are glad to have hatchery fish. The fact is that about 80 percent of steelhead caught in the Northwest come from hatcheries, and the proportions for coho and chinook are almost as high.

Hatchery fish "are just as big and fight just as hard as natural-spawning fish," says John Kelly of the King County Outdoors Sportsman Council.

"We need hatcheries," agrees Geoff Lebon, president of the Washington Trollers Association, an ocean-fishing group.

"We've ruined our habitat," Lebon says, "especially in the middle of the

Puget Sound. Without hatcheries, we wouldn't have much of a fishery.'

But many anglers take Soverel's approach, revering wild fish and viewing their peril as an index of environmental damage.

Bruce McNae, president of Washington Steelhead Flyfishermen, says, 'They're the coal miner's canary.'





A P-I  
SPECIAL  
REPORT

# Hatching Trouble

LAST OF  
THREE  
PARTS

## Pressure grows for correction in hatchery course

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By Rob Taylor  
P-I Reporter

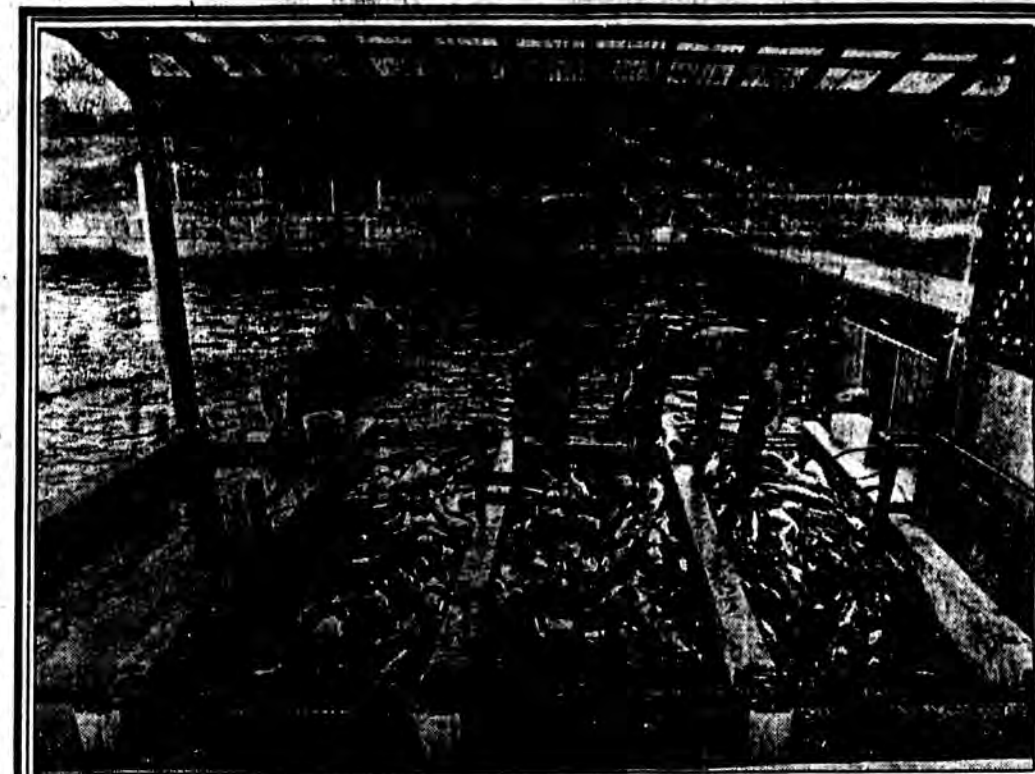
Northwest fishery managers shaken by recent moves to protect endangered salmon runs are reconsidering long-accepted conflicts between hatcheries and wild fish.

Managers have been learning a lot, says Anne Kapuscinski, a University of Minnesota fishery geneticist who has studied the region. They have "finally realized" in their gut that they have to think about the long-term prospects of these fish populations.

Yet it remains to be seen whether their gut can override their ears. Politicians, fishermen and Indian tribes still clamor for larger catches and more hatchery production. Scores of new projects are planned for the Columbia Basin alone, despite concerns that they may do genetic mischief.

The next few years will see sharp debate over how far the region will go to protect its wild salmon and steelhead runs. There is growing pressure for a course correction that redesigns hatchery programs, controls their expansion and selectively reduces their output. And while managers are searching for easy solutions, significant change threatens to be both contentious and painful.

Biologists have long complained that hatcheries take a toll on wild fish. Until recently, fishery managers have brushed aside such concerns in their pursuit of ever-larger harvests. If that pattern doesn't change,



GRANT M. HALLER/P-I

Department of Fisheries employees take eggs from chinook salmon at the George Adams Hatchery. Debate over hatcheries has intensified, but almost no one expects sweeping closures. Instead, some fishery managers are considering changes.

Kapuscinski warns, it will further deplete wild stocks, narrow the species' genetic diversity and raise the risk of eventual decline in the total catch.

Spurring fishery managers is a fear that environmentalists will barrage them with demands to protect specific runs under the Endangered Species Act. Already, the act is expected to force major change on hatcheries in the Columbia-Snake Basin, where protection was extended Nov. 14 to one run and has been proposed for two others. With an estimated 211 other wild runs reportedly in trouble across the Pacific Coast, agencies are re-examining entire programs.

"We're going to see these

See **HATCHERIES**, Page A4

■ **Today:** Fishery managers are considering changes to boost wild runs.

■ **Yesterday:** Some recreational fishermen revere wild fish.

■ **Wednesday:** Hatcheries help fishermen but are pushing wild fish toward extinction.

# Hatcheries: Casting about for a model that harmonizes with nature

From Previous Page

would displace wild fish without increasing harvests.

Lawmakers also keep demanding more. Both the state Legislature and the Northwest Power Planning Council have called for doubling fish runs. The Columbia Basin System Plan, prepared by all agencies and tribes in the basin, calls for more than 60 new hatchery production projects.

Hilborn, the UW biologist, calls the doubling goal "the most dangerous thing I've ever seen."

"We've got to be weaned from the attitude that when you have a problem the solution is a hatch-

ery," he says. "It's fantasy to believe we can have a lot more fish by relying on hatcheries."

Kapuscinski worries that a willy-nilly hatchery boom would only "further erode the genetic resources and deplete wild populations."

Ironically, some managers offer special hatchery programs as the best hope for restoring threatened wild runs. Though controversial, the idea has won support from some critics of traditional hatcheries.

Hatchery mismanagement contributed to the decline of the Snake River fall chinook, for instance, but Larry Peck, head of

Salmon Culture for the Department of Fisheries, says hatchery breeding is crucial to that run's recovery. He notes hatcheries' success at preserving a White River spring chinook run that was nearly wiped out by urbanization.

Hatchery proponents are casting about for a new model that harmonizes with wild-fish runs.

The Bonneville Power Administration plans a massive test of such a concept. Its \$40 million Yakima Project seeks to harness hatcheries to rebuild wild runs, rather than just churn out more fish.

The Yakima Project plans to incorporate the best science and

make hatchery conditions more natural. Plans call for releasing fry from many remote ponds to improve homing and disperse their impact. Biologists say the project would use only wild-fish eggs, release fish early and perhaps wean them on insects and expose them to a few predators.

Some fishery managers view the project as a "possible panacea," says Lars Moberg, a consultant on the project. And similar proposals to supplement wild fish are multiplying.

Private groups are trying the same thing. Long Live the Kings, a non-profit group, has been rearing threatened Olympic Peninsula

salmon for five years.

"We're not trying to create new hatchery runs," says John Sayre, head of the group. "We're trying to get naturally spawning fish to where they can sustain themselves, and then we'll get out of there."

The Northwest Power Planning Council is talking of seeding streams with many more hatchery fish where wild runs have declined, says council spokesman Ed Sheets.

Many biologists are skeptical, noting that such projects have often failed to help wild populations.

"If not done properly, it can

have an adverse effect on the genetic diversity of wild stocks," Sheets concedes.

The Yakima plan "seems like a kinder, gentler way to run a hatchery," says Craig Busack, a Department of Fisheries geneticist. "If it doesn't work, that says something serious about hatchery options for boosting natural production."

Kapuscinski warns against sweeping generalizations. While hatcheries "may have been part of the problem, they can be part of the solution in the future."

But she urges caution.

"I'm leery of having your cake and eating it, too."



# Hatcheries: Some fishery managers look at stressing production quality

From Page 1

petitions come in whether we like it or not," says one state Department of Fisheries official. "We want to be ready to be either doing something already or to have policies to deal with wild-fish problems."

Fishery managers want to avoid the fate of their counterparts at the U.S. Forest Service, whose reluctance to protect the northern spotted owl led federal courts to seize control of their timber harvest.

The only sure way to avoid harm to wild fish from hatcheries is to "just say no" to hatcheries, says Robin Waples, a National Marine Fisheries Service geneticist. Calling that position unrealistic, however, he says agencies should try "to minimize (hatcheries') adverse genetic consequences."

Almost no one expects sweeping hatchery closures. Joseph Blum, director of the Department of Fisheries, states flatly, "Hatcheries will be part of the mix in the state of Washington forever."

Instead, some fishery managers are talking about stressing quality: producing fewer hatchery fish with better survival rates and less effect on their wild cousins.

"Fisheries managers have focused for three decades on getting the maximum number of fish through hatcheries. That's what the public wanted," says Rolland Schmitt, regional administrator of the National Marine Fisheries Service and a former Department of Fisheries chief.

The challenge today, Schmitt says, "is to do what's necessary for wild stocks."

Preparing to meet that challenge, fishery managers are making plans to reduce conflicts between hatcheries and wild fish, shore up the genetics of hatchery runs, boost healthy wild runs and protect shaky ones.

For some old hands, changes already have been breathtaking. Oregon has established a policy to protect wild stocks in coastal streams and rivers. It curbs releases of genetically different hatchery fish that can overwhelm wild fish through interbreeding. Washington has tightened its breeding guidelines to avoid loss of valuable genes.

Both states have clamped down on transfers of fish and eggs round the region. Through interbreeding, such transfers can lessen the genetic distinctiveness of local stocks that gives resilience to the species as a whole.

Still, genetic safeguards in the region have a long way to go, says Kapuscinski, who reviewed them for the Northwest Power Planning Council. Her draft report said a number of policies "may be incon-



P-1/1987

**Fisheries chief Joseph Blum:** "Hatcheries will be part of the mix in the state of Washington forever."

sistent with the goal of conserving genetic resources in fish stocks."

Skeptics question if the revolution will go beyond a paper exercise.

Though Oregon is considered progressive, officials of its Department of Fish and Wildlife concede that many releases of non-native steelhead violate their own wild-fish protection policy and that the policy doesn't even apply to its portion of the Columbia Basin. Oregon also is shrugging off objections to releasing fall chinook from the Rogue River into the Columbia Basin, an entirely separate drainage.

Washington's policies are less progressive and no better enforced.

"They don't have any quality-control programs," claims Phillip Mundy, manager of fishery science for the Columbia River Inter-Tribal Fish Commission, which speaks for tribes on the Columbia. Washington's hatchery managers, he says, are "virtually autonomous."

Critics say the agencies need to avoid imposing hatcheries on rivers with viable wild populations. They talk of relieving fishing pressure temporarily in places to let wild stocks rebuild. And some want to divert money from hatcheries to repair and protect stream habitat. Kapuscinski says hatcheries should usually be temporary expedients that are closed once habitat is restored.

Others have proposed much stronger medicine. Reginald Reisenbichler, a U.S. Fish and Wildlife Service researcher who pioneered the study of hatchery impacts, has recommended that hatchery releases be kept small relative to wild populations, that harvest rates be limited to what wild runs can sustain, that hatch-

ery fish be kept genetically similar to local wild runs, and that harvests be targeted more precisely on hatchery returnees.

The ideas extend to the radical. One consultant has suggested that Columbia fishermen use live traps instead of nets, so that wild fish can be released alive. Others have even suggested sterilizing hatchery fish so they can't pass on their weaknesses.

Political and economic barriers to change are formidable. Hatcheries are a pillar of the region's fishing industry, providing about 70 percent of coho and chinook catches. Many hatchery supporters contend that no viable substitute exists.

"We've so degraded the environment that we cannot keep fish without hatcheries," says Mundy, the tribal biologist.

Protecting all wild runs would mean "that we'd have a lot less fish," says Jim Ames, one of the Department of Fisheries' biologists. "The public is just not going to accept that."

This generates strong emotions and heavy pressures. Inside fishery agencies, officials who criticize hatcheries say they have been ignored and faced reprisals. Several spoke only after they were promised anonymity.

One bitter insider charges that biologists "are making wild stocks extinct left and right, and they're afraid to say anything. They're meek, mild people, and they don't want to lose their jobs."

"I know a number who would like to do the biologically correct thing, but they're not allowed to," agrees a consultant. "It's all set on political and economic grounds. If they base their position on biological grounds, they would get fired or their boss would get fired."

A chasm separates the poles of the debate. Ames contends that in many instances, hatcheries' impact on wild fish is "very small." University of Washington Professor Ray Hilborn counters, "Anywhere you have hatchery stocks go in, you almost always see the wild stocks disappearing." Research is too sparse to prove either claim as a general rule, scientists say.

Though few Northwest hatcheries have been built in the past decade, pressure to build them continues.

Indian tribes are boosting demands for hatcheries. A tribal hatchery was dedicated last summer on the Nisqually River. Another is being built on the Umatilla River. A huge, new hatchery complex is planned for the Yakima and Klickitat rivers. And the Quinault Tribe plans two on the Olympic Peninsula, despite a state study that found one of them

See HATCHERIES, Next Page



# Anchorage Daily News

VOL. XLVI, NO. 227 108 PAGES

ANCHORAGE, ALASKA THURSDAY, AUGUST 15, 1991

PRICE 25 CENTS

## Millions of hatchery pinks waste away

### Location of Prince William Sound Salmon Hatcheries



RON ENGSTROM / Anchorage Daily News



### Glut of returns finds no takers

By HAL BERNTON  
Daily News business reporter

Several million pink salmon may rot unharvested in the dead-end bays of Prince William Sound hatcheries as weak markets, a shortage of processors, and weird fish behavior create a chaotic climax to the 1991 salmon season.

"The fish will stay around in the bays until they roll over and die," said John McMullen, president of Prince William Sound Aquaculture Corp. "I can see at least 4 million fish perishing — or more."

The aquaculture association is the nation's largest producer of hatchery fish. It normally sells a portion of the salmon returning to hatchery bays to help finance operation.

But this year the salmon run is the latest in history, 10 days behind schedule. And the pinks are darkening and taking on spawning hues as they mill-around hatchery

vs.

BILL ROTH / Anchorage Daily News

Prince William Sound pink salmon. Buyers are lacking this year.

Please see Back Page, PINKS

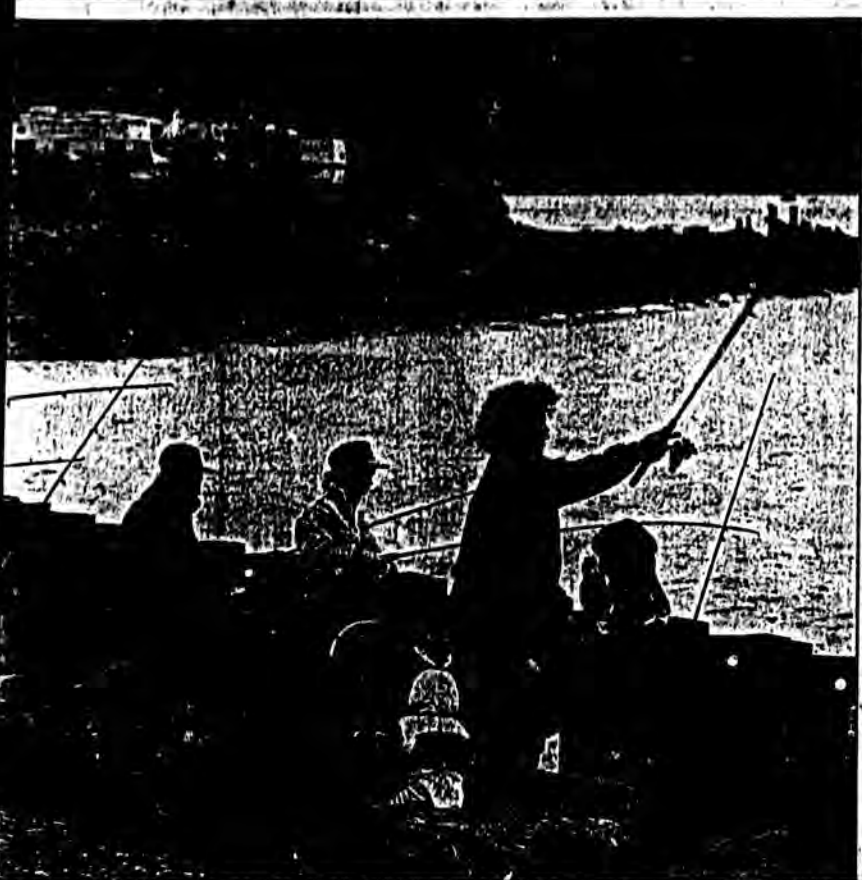
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COMING HOME WITH HIS DAUGHTERS

Weather  
curtains



# THE BACK PAGE



BILL ROTH / Anchorage Daily News

ay during the 36th Annual Seward Silver Salmon Derby. Story in Sports, C-4

## ng opens way for Native hunting

0. The animals were nearly wiped and down the West Coast by wide-ussian and American commercial in the late 1800s. d stressed in his ruling. This should not be construed as authori- for-all killing of hundreds of sea Roberts (and other Natives) who he ban say they foresee limited of the animals and want to work government to write a management protect otter populations.

e mid-1980s, the last time many hunted sea otters in Alaska, fewer animals a year were killed. The sue goes back to 1985 and a collec- teddy bears made from sea otter- ade by a Larsen Bay woman, Marina off, they and other sea otter cloth- crafts were seized by federal agents. Kodiak gift shop.

972 act, which is intended to protect seals, otters and other sea mammals. ing most commercial hunting, spe- allows Alaska Natives to continue them for subsistence and to make ic native articles of handicrafts and "Non-Natives cannot hunt marine s for any reason.

aw is vague about what "authentic" out in the case of the teddy bears. ts argued they weren't traditional. eventually also seized the sea otter

parka and hat of a Tlingit from Sitka, arguing his metal snaps and zippers weren't traditional, either. The Natives went to court.

Eventually, the Fish and Wildlife Service ruled that no sea otter handicrafts or cloth- ing could be sold by Natives and that it was illegal to hunt otters to make the items. The service argued there was no commercial use of sea otters in 1972, when the marine mammal act passed, and therefore none should be allowed now.

But Holland criticized the government's rationale, and much of his ruling centers on the question of what is traditional.

The judge noted that Native cultures thrived here before the arrival of whites in the 1700s, but that traditions began to change — including those involving sea otters.

To satisfy the Russian demand for sea otter pelts, Lord Baranoff issued an edict in 1792 forbidding Alaskan natives from hunting sea otters, the judge wrote. In their zeal to harvest sea otter pelts, the Russians enslaved the Aleuts of Alaska's coast, forcing them to harvest the species to near extinction.

The fact that Alaskan natives were prevented by circumstances beyond their control from exercising a tradition for a given period of time, Holland wrote, "does not mean that it has been lost forever or that it has become any less of a tradition."

## PINKS: Buyers lacking for fish

Continued from Page A-1

Processors are spurning them in favor of fresher fish caught further out in the Sound.

"Ours are still very acceptable. But they want the brightest fish possible," McMullen said.

Only a fraction of the returning hatchery pinks are needed for eggs and sperm. The rest, if not harvested, simply die in the bays. The bust in pink sales could be a major financial blow to the aquaculture association, a non-profit organization formed by Sound fishermen. The association hoped to sell \$7 million worth of salmon but so far has less than \$1 million in sales.

Fishermen also are having big problems finding processors willing to buy pinks. One frustrated seine crew — unable to sell its catch — began a makeshift salting operation to keep the pinks from spoiling. "We're filleting out the fish on the back of the deck," said David Hall, a crewman with the Elizabeth.

Fishermen say the hatchery runs have been building for at least a week, but that salmon have shown an unusual reluctance to migrate toward the dead-end bays where they were first released.

State fishery managers didn't want to allow a wide-open harvest for fear that fishermen would also sweep up many wild pinks, which have had extremely weak returns to the Sound, according to James.

Finally, on Monday, biologists — under intense pressure from fishermen — opened up several large areas of the Sound to the fleets. The fishermen caught 3.5 million salmon — a record catch for a single 12-hour period — and promptly flooded processors with fish. That brought the total pink catch to date to more than 15 million.

On Wednesday, the state Department of Fish and Game again opened up harvest areas, but by then many processors were refusing to buy fish. "It's in the toilet," said Floyd Hutchens, a Sound seine boat skipper. "The entire system is plugged."

Many angry, frustrated fishermen ended up sitting out Wednesday's opening, tied to docks at Chenega Bay as fish jumped all around.

Processors say they are doing the best they can to keep up with the late run of fish.

But Gary Greenwood, a senior vice president of Peter Pan Seafoods of Valdez, said his plant got all the pink salmon it could handle in Monday's opening and didn't need any fish Wednesday.

Peter Pan does plan to buy some fishermen's harvests during an opening scheduled for today, but none from the hatcheries.

Greenwood said there also is no demand for pinks outside the Sound, because processors in Kodiak and Southeast also are swamped with big pink harvests.

Prices paid fishermen remain stuck at 12 cents a pound, the lowest in more than a decade.

Prince William Sound Aquaculture Association officials have feared for months that they might be faced with a huge wave of fish that nobody wanted.

Most of the pinks wind up in cans. Canned markets have been weakening for years, as surpluses of unsold product kept building. Then last year, biologists predicted a record Alaska pink harvest of more than 100 million fish, and a Commerce Department study indicated there wouldn't be enough processors to buy all the catch.

That prompted the aquaculture association to lobby state officials to help bring in more floating processors to handle the Sound catch.

Clem Tillion, Hicken's special fisheries assistant, said the state had persuaded several new processors to enter the Sound and there would be enough capacity.

But none of those processors showed up, said McMullen, the aquaculture association's president.

Hatchery officials put more than 1 million pounds of bay pinks up for sale earlier this week, and the only two bidders ended up backing out of their deals, McMullen said.

## a cuts it short, gets praise, criticism

Alaska ended se nearly two safety of the haul in the other clean- mid. The drill, 10 a.m., should at least noon.

l, the cleanup, ued, he said. boats used in o a factor in to shut down Ed Thompson.

Coast Guard ice in Valdez, quite success- mitations. The

more than 300 fishing vessels for cleanup help. During a real spill, even during the fishing season, an estimated 50 boats of all sizes would work the clean-up, Mitchell said.

Riki Ott, a commercial fisher- woman and president of the Oil Reform Alliance, criticized Alyeska's decision to cancel a drill when conditions are bad. Norwegians go ahead with spill drills regardless of the weather, she said.

Large emergency response vessels, tug boats and barges with oil-sucking skimmers mounted aboard them weren't affected by the weather and

Alyeska's decision to hold a major exercise outside the sheltered waters of Valdez Arm was a "major access," she said. Alyeska company showed a willingness learn from the shortcomings of this drill, she said.

Provant from the DEC said one of the four Transac oil skimmers aboard cleanup barges broke down. "This (new) piece of equipment should have been de-bugged before it was sent out on drill," Provant said.

Although the skimmer mal- functioned, company crews were able to repair it on the barge during the drill, Mitchell said. Mixed with his criticism, Pro-



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## Yeltsin upstages president

### Gorbachev, Russian purge power structure

By FEN MONTAIGNE  
Knight-Ridder Newspapers

MOSCOW — Russian Republic President Boris Yeltsin, riding high after playing a pivotal role in stopping a right-wing coup, launched an all-out assault on the Communist Party on Friday and pushed Soviet President Mikhail Gorbachev to name democratic reformers to head the military, the KGB and the Interior Ministry.

Yeltsin suspended Communist Party activity on Russian territory, banned party cells in the military and KGB, sealed the

## SOVIET



## CRISIS

party's Central Committee building and temporarily closed Pravda and five other hard-line communist papers.

Gorbachev announced that he had dismissed Foreign Minister Alexander Bessmertnykh because he had not opposed the three-day coup.

## FROM FOOD FISH TO FISH FOOD



David Dominique, a crew member aboard the tender Baltic Sea, directs the hose Friday as his boat pumps 90,000 pounds of dead pink salmon out of its hold into Montague Strait in Prince William Sound.

BILL ROTH / Anchorage Daily News



# YELTSIN: Gorbachev upstaged

Continued from Page A-1

"Why don't you read it now? You read this document."

A few minutes later, Gorbachev read it.

The Soviet president's appointments of the heads of the KGB, the military and Interior Ministry show that he may be realizing that the coup has provided him with an unprecedented chance to sweep away the reactionary forces that have resisted his perestroika reforms. The former heads of those departments all participated in the plot against Gorbachev.

Yeltsin, who pushed Gorbachev to make the appointments, actually announced them first — during a speech he made to the crowd gathered around the site of the toppled statue of Felix Dzerzhinsky, founder of the Soviet secret police. The statue was pulled down Thursday night.

The new defense minister will be Gen. Yevgeny Shaposhnikov, 49, the former commander of the Soviet air force who refused to obey the orders of the so-called eight-member State of Emergency Committee, which staged the botched coup.

Gorbachev appointed as deputy defense minister Lt. Gen. Pavel Grachev, 43, a commander of airborne troops who, during the coup, ordered his troops into position to defend the Russian Parliament from the hard liners.

Shaposhnikov — who replaces Dmitri Yazov, now under arrest — called in



GENNADY GALPERIN / Reuters

Russian President Boris Yeltsin, right, instructs Soviet President Mikhail Gorbachev during Gorbachev's address to the Russian Parliament on Friday.

sion reported today that Prime Minister Valetin Pavlov has been arrested for helping to lead the coup. He reportedly was ill when the coup began and has been in a hospital under guard since Gorbachev regained power.

Former Interior Minister Boris Pugo, one of the architects of the coup, shot and killed himself Thursday as police were on their way to arrest him.

Gorbachev said that Yeltsin and leaders from eight

ti-communist charge Friday. As Gorbachev looked on and legislators stood and clapped in unison, Yeltsin signed an order suspending the activities of the Communist Party in the Russian republic. The ban is to remain in effect pending an investigation into the coup.

The scene was another humiliation for Gorbachev, who could do little but stand at the podium and watch red-faced as Yeltsin pulled out a pen and announced

# SALMON: Excess pinks taken to Montague Strait dump site

Continued from Page A-1

sea-going dump truck in the first day of a gargantuan effort to deep-six millions of pink salmon.

The darkening pinks have returned to their home waters in front of three Prince William Sound hatcheries where they were released last spring.

The bays are now crammed with more than 5 million fish, and Prince William Sound Aquaculture Corp., the non-profit association that operates the hatcheries, expects a total return of up to 10 million fish. That's enough fish to make salmon filet dinners for 20 million people.

Processors don't want to buy these pinks and have largely shut down operations throughout the Sound in a season of huge Alaska pink returns and weak markets.

Hatchery officials are working with the state to save some of the fish. But, with the aid of \$150,000 in state money, they also are moving ahead with a disposal effort that today is scheduled to dump as many as 2.5 million pinks at sea.

Hatchery officials want the fish removed as soon as possible because they are interfering with hatchery operations and, if not removed, would foul the bay as they rotted and sank.

The first dumping effort began Thursday morning at the Port San Juan hatchery in the southwest Sound. On this blue-sky day, there was a sound like heavy rain, a million and a half pink salmon jammed into the tail end of the hatchery bay, leaping out of the water and splashing back down.

"It's like having your worst nightmare, waking up and finding it's reality. But we might as well get started on the job," said Floyd Hutchens, a veteran Sound fisherman who has scrambled to set up his own processing line and hustled to find new markets to save some of his fish.

But he also had promised to aid in the hatchery clean-up. He volunteered the use of the Baltic Sea and recruited a few other fishermen to aid in the effort.

The Thursday dump began with the set of a lifetime by Jim Hutchens, Floyd's younger brother. It was a set that in better times would be the stuff of fishing legend, a tale to be savored and retold during the winter months. Jim Hutchens, skipper of the MJB, eased out a quarter of his net and a skiff quickly guided the end around a tightly packed school.

The net was partly closed, then cinched between the seine boat and the tender and left in the water.

For more than three hours, the tender boat's pump pulled fish from the net. A normal set in the Sound might have taken 12,000 pounds of fish. This net held more than seven times as much. Five skiff crews helped hold up the net corks so the web wouldn't sink and allow the fish to escape.

The pinks were pulled in to the Baltic Sea's pump, then thrust up onto a stainless steel conveyor that sent them shimmying into the hold. Females with darkened backs of green and white bellies heavy with roe, and males with the first signs of humps and snaggle teeth.

But overall the fish were of surprisingly good quality, not much different from some of the loads delivered to processors, according to several of the fishermen.

The fish kept pouring into the hold until it was full. Then they started to spill on deck, as three crewmen jumped on the slimy cargo to try to pack it down.

Finally, the Baltic Sea could take no more. The pump was shut down and Jim Hutchens lowered the corks so the remaining fish could swim free.

As the Baltic Sea headed out to the dumping site, fresh fish were jumping off the headlands, awaiting the right moment to head into the bay.

## EXXON: Company offers \$2 million to process fish destined for Soviets



**ESTONIA REJOICES:** and the country began asking all Estonians combine its top leaders symbolism with laughter. A-6 where they had stood when the hard liners seized power.

In an unprecedented development, Yeltsin and leaders of other republics played the key role in deciding who the new KGB and military heads would be.

The announcements of major government personnel changes were made at a tumultuous session of the Russian Parliament that reflected the dizzying shifts in the Soviet power structure since the failure of the coup.

Legislators shouted derisive questions at Gorbachev and Yeltsin — who now wields as much power as Gorbachev, if not more — at times literally told the Soviet president what to do.

It was a humiliating session for Gorbachev. He seemed stunned, as if he was just beginning to realize that he is far out of touch with Soviet society, now gripped by a fierce anti-communist fervor.

"I am just another human being standing before you," Gorbachev told the restive legislators when they interrupted his speech. "Don't make it hard for me. My situation isn't easy as it is."

At one point, Yeltsin brandished a document summarizing how nearly all of the Soviet president's Cabinet had supported the coup. Gorbachev said he had not seen the report, and Yeltsin — with tens of millions of viewers watching live on TV — shoved the paper at Gorbachev and said,

Please see Back Page, **YELTSIN**

# Crews push to remove pinks

## Exxon pledges \$2 million to ship pinks to Soviets

By **WESLEY LOY**

Daily News business reporter

Exxon Corp. pledged \$2 million Friday to help pay for Gov. Wally Hickel's desperation effort to salvage millions of dying, surplus pink salmon and send them to the Soviet Union.

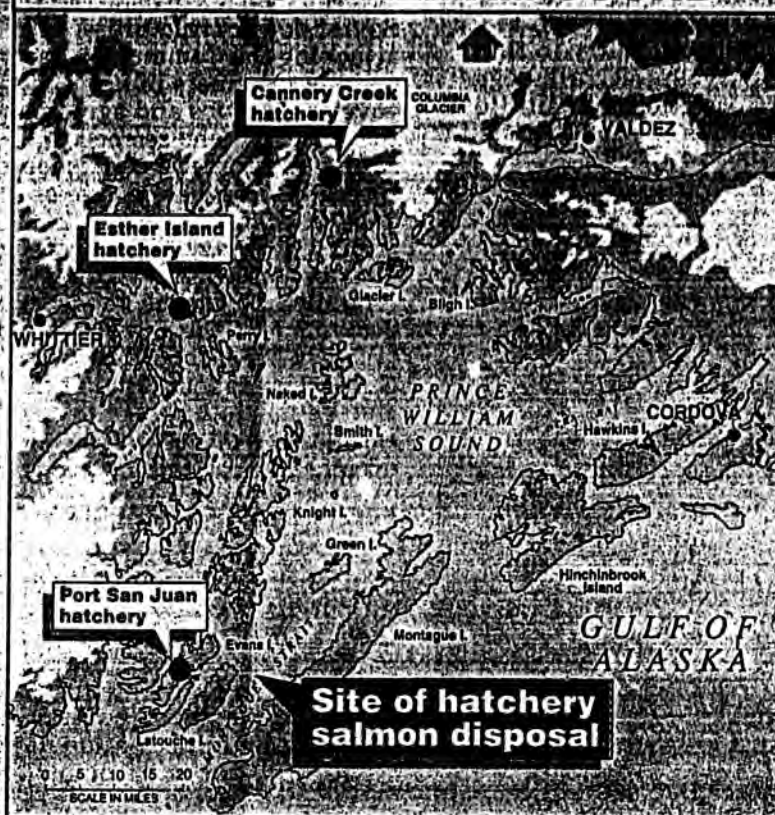
The fish, gathered in Prince William Sound, are the direct offspring of salmon that swam through the Exxon Valdez oil spill to spawn two years ago.

According to Hickel spokesman Eric Rehmann, the governor called Exxon President Lee Raymond in Texas on Friday and asked if the company would donate money for the salmon-for-Soviets effort. The \$2 million donation came almost immediately, Rehmann said.

Details were still evolving late Friday, but Rehmann

Please see Back Page, **EXXON**

## SALMON HATCHERY LOCATIONS IN PRINCE WILLIAM SOUND



KEVIN POWELL / Anchorage Daily News

## Tender carts tons of hatchery salmon to Montague Strait

By **HAL BERNTON**

Daily News business reporter

**ABOARD THE BALTIC SEA** — David Dominique braced the big gray hose on his shoulder as if were a giant bazooka and aimed it over the rail. As shipboard pumps whirled into action, hundreds of dead pink salmon shot out of the nozzle and quickly sank 1,000 feet to the bottom of Montague Strait.

The pump worked for more than two hours to suck salmon from the ship's hold and spew them into the sea. When the pumps finally stilled, 90,000 pounds of fish — at least 45,000 pounds of edible protein — had gone overboard.

"It's a lot of time and effort down the tubes," said Dominique, a 27-year-old from Massachusetts working his first season in Alaska as a crewman aboard the Baltic Sea. "It's not what I expected."

The Baltic Sea is a tender boat that normally shuttles salmon from the fishing grounds to processing plants. But on Thursday it was operating as a

Please see Back Page, **SALMON**

# Discontent dots Citizens' profitable past

Arizona, California problems are isolated, says spokesman for firm seeking to buy ATU

By **STEVE RINEHART**  
and **CHARLES WOHLFORTH**  
Daily News reporters

Citizens Utilities Co. has built a national reputation for profitability, but within its sterling financial history are complaints that the company has ignored consumers and played loose with regulators.

Citizens has about 750,000 telephone, gas, water and electric customers in 13 states.

Utility — said those are isolated cases that do not reflect the company's style of doing business.

"They are not indicative of what the other 99.5 percent of our customers experience," Citizens vice president Mike Love said.

A consumer advocate in Anchorage urged voters to scrutinize Citizens' record elsewhere before deciding on Oct. 1 whether to

parent company of Alascom. "Some of that should have been done before the evaluation committee even met," he said.

While PTI is well known in Alaska, operating telephone exchanges on the Kenai Peninsula, in Juneau and other areas, Citizens is new to the neighborhood. In the political and advertising campaign surrounding the ATU sale, the company has adopted what one of its advisers called the

## SATURDAY

### RAIN

80 percent chance of rain. High near 60; low near 52. Details, A-10. Weatherline, 278-7000

### SECTIONS

|                |           |            |           |
|----------------|-----------|------------|-----------|
| NATION & WORLD | Section A | CLASSIFIED | Section E |
| METRO          | Section B | CLASSIFIED | Section F |
| SPORTS         | Section C | HOMEFRONT  | Section G |



# Keeping tabs on Alaska's fish

## Tiny tags helping scientists unravel salmon's secrets

By SHERRY SIMPSON

THE JUNEAU EMPIRE

Fisheries biologist Kevin Brownlee held the tiny chum fry gingerly and inserted its head into a small machine called a tag injector. A needle punctured a speck of stainless steel wire marked with a code into the fry's head, which was not much more than huge eyeballs, sinus and brain.

"These are real small fish, and there's not much room for error when you tag," Brownlee said, letting the fish slide through a chute into a waiting bucket.

At a nearby table, technician Jill Robinson gently snipped off an adipose fin with surgical scissors. Several fry, each weighing less than a gram, floated in an anesthetic solution, awaiting their clip-and-tag treatment.

Outside the makeshift tagging shack, three million chum fry dimpled the waters in nylon net pens floating in Limestone Inlet, about 25 miles southeast of Juneau. As they grew last spring, the juvenile fish imprinted on the inlet's mossy green waters rather than their birthplace at nearby Snettisham Hatchery. The survivors will head for the inlet when they're mature, anywhere from two to five years from now.

For several weeks, Department of Fish and Game workers carefully tended the fish, feeding them food pellets every half hour from 7 a.m. to 7 p.m., or "fingertaking," as they called it.

"It's like working on a dairy farm. You've got to be there every day," Robinson said.

The fry were released in May when tests showed the ocean's plankton at its greatest abundance, giving the liberated fish a nutritious headstart as they embarked on their mysterious life cycle. About 30,000 of the chums carried the 0.5 millimeter tag in their snouts.

The tags eventually will help answer some of the questions biologists have about the perilous journey salmon make through Alaska waters during their lifetime.

They also produce information that allows hatcheries, fishermen, and fisheries managers to make important decisions about raising, catching and allocating valuable salmon stocks.

A few years from now, some of Limestone Inlet's tagged chum will end up, like their cousins now flooding the department's coded-wire tag processing lab in the lab is part of the state's Division of Fisheries Enhancement, Rehabilitation and Development and is headed by Karen Crandall.

There, another crew of technicians is working overtime these days to recover the minuscule tags from the heads of salmon caught all over the state. The missing adipose fin tips off field workers in ports that a fish may have been tagged. They collect the heads, attach a identifying number, record information about where and how the fish was caught, and freight frozen batches of fish heads to the lab.

A slightly fishy undertone permeates the lab, where a 42-pound mounted chinook and several fish prints by employee Detlef Butner represent the only whole fish in the place.

One at a time, the technicians grab a thawing fish head from boxes and bins, hold it with a paper towel, and wave it near a device called a field sampling detector. A red light blinks when it detects changes in a magnetic field, indicating the presence of a tag.

The workers then slice the head into successively smaller sections until the glint of a tag appears. So far this season, workers have repeated that process on about 38,000 fish heads, with more heads still to come, says lab supervisor Sam Bertoni.

This year, if we keep going on the way we're do-



BRIAN WALLACE/JUNEAU EMPIRE

**Sam Bertoni, supervisor of state tag-processing lab:** The ultimate aim is to try to understand what's going on.

ing, we will do probably 55,000 fish," he said. That's far above last year's record-setting 40,000.

Finding the tag is only the first step. The tag is bagged with its corresponding sampling number and sent to another room to be "read." There readers examine the silver of wire under a microscope. The tags are either 0.5 millimeter or 1 millimeter long, depending on the size of the fry when tagged.

"A lot of practice goes into handling that small tag," Bertoni says.

The microscope magnifies the tag up to 100 times its actual size, revealing a series of lines arranged in binary code. The reader translates the code into an ordinary number and taps it into a computer with other information.

That number is the linchpin in the entire tagging program. With it, the computer's vast data base instantly reveals the origin of a particular cohort. It was hatched at Hugh Smith Lake as part of brood 88. Information collected in the field from the fisherman tells the rest of the story: that it was taken with traditional gear during week 34 of the fishing season and landed at Petersburg. Altogether, there are several hundred bits of data that may relate to each fish.

"The ultimate aim is to try to understand what's going on," Bertoni says. "It's basically what you would call a management tool. From that information we know who is catching whose fish."

The information plays an increasingly valuable role in fisheries management in Alaska. Every week, the division sends reports to ports, hatcheries, and other Pacific states.

Alaska is the only state with such a quick turnaround that allows biologists to manage fisheries in-season. That's particularly critical for chinook troll fisheries, which are subject to an international treaty with Canada that limits the number of fish Alaska fishermen can take.

"It's pretty amazing," Bertoni says of the system.

The tag data is used in many different ways. Comparing the number of tagged salmon released to the number of fish recovered indicates how specific hatcheries or remote release sites contribute to fisher-

ies. It also reveals clues about the timing and paths of migrating salmon, as well as how many of certain stocks are intercepted by fishermen and how many escape to spawn.

Other statistics are important when negotiators set harvest levels as part of the U.S.-Canada Pacific Salmon Treaty. And the division is also collecting information for several studies examining how the Exxon Valdez oil spill in Prince William Sound may have affected salmon stocks there.

The lab is excruciatingly careful about collecting and documenting every tag. At night, workers run a magnet over floor sweepings to check for strays. A fish head that doesn't register a tag is examined with a more sensitive tubular detector. If the instrument doesn't detect a tag, the head is magnetized and checked again, in case the tag was not properly magnetized to begin with.

Also, two different readers must examine each coded tag to eliminate mistakes, reducing the error rate to tenths of a percent, Bertoni said.

The system works. This year, only 22 tags disappeared out of 38,000 heads screened, he said.

Such care is necessary because every recovered tag is precious — practically miraculous, when the odds are considered.

"We only recover a fraction of those fish that are tagged," Bertoni said.

In the Pacific Northwest, two billion salmon are produced in hatcheries each year, he said. Of that, 40 to 60 million are tagged, as well as a small number of wild fish.

Natural mortality reduces the chances of recovering fish further. About 280,000 tagged adults are recovered on the West Coast each year, about 50,000 of them in Alaska.

Aside from processing the fish and storing the mountain of data, the lab also sends a few thousand letters to the sport and commercial fishermen who caught the fish to let them know about their fish.

"They're real interested in the fish they get, where it's from. It's kind of a nice sidelight," Bertoni says.

Seattle P.I. 3-18-92

## Fishery in big trouble

**T**he salmon fishery off the coasts of Washington, Oregon and California is in trouble, and this means federal regulators must step up to the challenge of conserving the fishery for the future.

The Pacific Fishery Management Council says the salmon are so scarce that for the first time, one of the options it has under consideration is to have no commercial or sports salmon fishing season at all this year.

Ocean conditions and habitat degradation are playing a key role in the drop-off in coho and chinook salmon, according to council biologists. This unpleasant news is further

evidence of the urgent need to make systemwide improvements in river habitat and coastal management to enhance the numbers of returning salmon.

The council has fashioned a draft proposal, to be taken to public hearings this month, that narrows the choices to no fishing, or fishing at roughly half the level of last year. Whichever of those is the final decision, it will mean hard economic times in coastal fishing communities.

Council chairman Philip Anderson has set the right course in addressing this painful scenario. Says he: "We're not in the business of mortgaging our future to create fishing this year."



# Fish Ketchikan March 28-29 funding

## Options for SSRAA mulled

By NIKKI MURRAY JONES  
Daily News Staff Writer

Representatives from various sportfish-related groups will meet the week of March 30 to develop a list of fund-raising options to help pay for fish enhancement.

About 40 people met Friday afternoon at Jeremiah's to talk about raising revenue for the Southeast Regional Aquaculture Association. SSRAA must come up with \$473,000 to pay state loans this year, said Don Amend, SSRAA executive director. It has already paid more than \$600,000 on the loans, he said.

Angelo Martin had announced the meeting with an advertisement in the Ketchikan Daily News.

He said he called the meeting because he had been contacted by sportfishermen who said they would be willing to help SSRAA.

"I'm battling for you folks," he said to the audience of mostly fishermen.

SSRAA is a non-profit organization that raises and releases king, coho, chum (major production) and sockeye salmon that are caught by commercial and sport fishermen. Commercial fishermen pay a 3 percent state fish tax and revenue generated from that is returned through grants to SSRAA. That provides about 60 percent of SSRAA's funding, Amend said Friday. The other 40 percent comes from direct sales by SSRAA of its fish (called cost recovery) that return to Neets Bay after escaping commercial capture. It has used the cost recovery plan in the past two years on king salmon at Carroll Inlet and proposes to do it in 1992. It hasn't done any cost recovery at its remote sites, but that could change if revenue is needed, said Amend.

Martin serves on the SSRAA board as the Ketchikan Chamber of Commerce representative. He told the audience that the hatchery organization didn't go to him looking for funding.

"Sportfishermen contacted me saying they want to do something to enhance salmon," Martin said. "I don't want to get into trouble out there, but it was the sportfishermen that called. I put the ad in the paper because individuals were calling me." Then he went to SSRAA because of the calls he had received.

Martin said that Ketchikan area sportfishermen caught 6,000 king and 15,000 coho in 1991. Sportfishermen (residents and non-residents) bought 40,000 licenses in the area. Resident sportfish licenses cost \$10. Non-residents pay more depending on how long

See 'Fish funding,' page A-2

## Fish funding

Continued from page A-1

they plan to fish.

Amend said SSRAA's costs run about \$10 for a king and about \$5 for a coho.

### Boro funds a possibility

The borough has already designated \$100,000 (25 percent) of its raw fish tax receipts from the state for fisheries enhancement, said Ketchikan Gateway Borough Manager Dave Crow. That line item in the economic development category was set up several years ago. The Borough Assembly would have to be asked to give that money to SSRAA.

Crow threw out other ideas for funding: possibility of imposing a borough surcharge on fishing licenses; developing a borough fish tax; and boat taxes. He said all the suggestions he mentioned would need to be researched for feasibility and legality.

Suggestions proposed by the audience included a raffle to raise needed funds immediately, a dedicated tax similar to Ketchikan's bed tax, a percentage of charter profits, a \$10 flat fee when buying fishing licenses, and donations.

SSRAA would need to know soon what plan would be implemented and how much revenue it could be counted on to generate, Martin said. The organization needs a guaranteed figure for planning.

### Accountability questioned

Martin's comment raised questions from the audience about accountability. Would the money collected be guaranteed to go to enhancement? Would it guarantee coho production? How would it be used within the organization?

Charter boat owner Ed Stahl said he is willing to contribute something to

"I make my living off SSRAA fish," Stahl said. "I don't put a penny in. I just feel Ketchikan made a lot of money off hatchery fish without paying for it."

"Everyone I talk to says they're willing to help out," said Jack Lee, speaking as a sportfisherman.

"I just want to get things started," Martin said. "Where do you want to start?" He asked for volunteers to meet as a committee.

Audience members who agreed to meet to suggest ways to raise money for SSRAA were Steve Gruwell, representing Ketchikan Sports and Wildlife Club; Willi Herff, Waterfall Resort; Ed Stahl, charters; and Martin, who is a sportfisherman.

Amend said the SSRAA board meets on May 8. However, it might have an emergency board meeting because the state declined on Thursday to defer some of SSRAA's loan payments. It would be helpful to have an idea ahead of time if assistance might be coming from sportfishermen, he said.

Amend told the audience that he expected SSRAA to be out of financial difficulties by 1994. The help it needs is just for two years.

"Would that \$100,000 from the borough help?" Martin asked.

"It'll all help," Amend said.

Amend said SSRAA would look within the organization to trim, but couldn't cut \$400,000 without cutting programs. SSRAA would like to avoid cutting programs because it would have a detrimental effect on future fish enhancement.

A-4

3-31 Ketchikan

Editorial

# By the people

Two recent meetings remind us that the spirit of self-governing democracy is thriving in Ketchikan.

On Friday, a group of sportfishermen met with a Southern Southeast Regional Aquaculture Association official to consider ways in which to help the hatchery organization survive its current financial crunch.

A solution wasn't arrived at during the meeting, but participants said they felt it is fair that they contribute something to the aquaculture association that has produced king and coho salmon that they catch.

On Thursday, local people spoke at a hearing on Department of Natural Resource user fees. Again, people attending the hearing felt DNR's intent to ensure public and environmental safety, and its search for funding sources was fair. Their comments were directed to how to make a fee structure fair and workable.

Statistics show that the United States has a low voter turnout, but percentages aren't the whole story. People stay away from the voting booth for a variety of reasons, although we would prefer that they go even if they're unhappy with candidates, issues, taxation or other reasons.

Still, despite the fact that fewer than all registered or potential voters show up at the polls, the two recent meetings show that people at least are thinking about political, social and economic issues.

Concern over declining state oil revenues and wanting to watchdog public agencies and issues are two reasons that might account for residents' interest.

We believe other factors also are at work -- the right of dissent, an interest in fairness, and a belief that each individual's opinion has worth.

Both meetings were examples of all of those factors. In each, speakers were articulate, had thought about their comments, and said either directly or by implication that they want fair solutions.

The willingness of people to comment at public forums shows they believe it is important that citizens speak up. People need to let elected representatives and others in leadership positions know what they think so those leaders can represent their constituents.

In this way, government is for the people, of the people and by the people, as President Abraham Lincoln said more than 100 years ago.

It's good to know that concept is still important.

— other editors



Saturday-Sunday, March 7-8, 1992

# Hatcheries

## Legislators review enhancement programs

By BELINDA CHASE

Daily News Staff Writer

Issues running the gamut from management to marketing on the fishery enhancement programs in the state are addressed in a draft legislative report.

The document called "Draft Report of the Legislative Review of the Alaska Salmon Enhancement Program" was prepared by legislative staff for the Senate's Special Committee on Domestic and International Commercial Fisheries.

Committee Chairman Sen. Dick

Ellison, D-Juneau, said in a letter attached to the report that the draft is a starting point.

"Our goal now is to fine-tune the chapters contained in this draft report, see what conclusions can be reached with the information before us, and develop those options which we can act on right away," he said.

The draft report was released in February. A separate economic analysis being done by the University of Alaska and is expected to be finished in a few months, according to Ellison's letter.

The committee requested the study because the enhancement efforts in the state had not been reviewed since the program's inception about 20 years ago.

Started in the 1970s

In the 1970s, laws were enacted to develop enhancement programs including creation of the state Division of Fisheries Rehabilitation, Enhancement and Development; passage of bond issues authorizing capital improvements for state hatchery facilities; authorization of private, non-profit corporation hatcheries and creation of regional aquaculture associations.

The state now operates 12 hatcheries and private, non-profits operate 5 hatcheries. Hatchery fish represented 24 percent of Alaska's commercial harvest in 1990, according to the report's executive summary.

The report is separated into different sections as follows:

### Fisheries management

How to control fishing effort in mixed stock fisheries that include hatchery and wild stocks is a management issue addressed in the report. The quality of fish returning to hatcheries and tagging efforts also are reviewed.

Legislators might want to develop a state policy on managing mixed stock fisheries, according to the report. Other alternatives mostly focus on tagging efforts, such as providing funding and research for tagging programs. Clarifying the roles and uses of tagging also is suggested.

### Legal issues

The Board of Fisheries has voiced concern to the Legislature over perceived ambiguities in the statutes regarding wild stock and hatchery fish management.

"One problem is that there is no clear statutory policy for the board to follow when it must make decision that would favor wild stocks over hatchery fish or vice-versa. An additional problem is that the statutes are unclear about the state's duty to provide for hatchery broodstock and cost recovery, and about the hatcheries' obligation to contribute

## St. George raises fish

By IMRE NEMETH

Times Business Writer

Reprinted from

the Anchorage Times

A group of St. George islanders plan to release 100,000 pink salmon fry in the rocky ocean waters surrounding their volcanic home in an unprecedented attempt to start a commercial fishery from scratch.

If successful, about 1,000 adult pink salmon would return to the tiny island in the middle of the Bering Sea in two years. St. George, one of two Pribilof Islands, had its local economy nearly wiped out when the federal government banned the harvest of fur seals in the early 1980s.

"Basically, the only reason we don't have salmon runs is we don't have any streams," said Chris Mierzejek, hatchery manager for the newly established operation.

The project is the dream of local Native village corporation, Tanaq Corp., the city of St. George and the St. George Traditional Council.

Bristol Bay, Alaska's most valuable salmon region, lies 300 miles due east of St. George. Unlike Bristol, which is the confluence of the mighty Nushagak and Kvichak Rivers where many species of salmon return to spawn, St. George has only a few gurgling brooks.

"Hopefully, this salmon experiment will pan out and lead to the diversification of the island," said

See ST. G. page B-5

## On the Waterfront

### Russian ship visits

A Russian pulp ship visited Ward Cove, taking on 1,000 tons of pulp. The ship, a 6,300-gross-ton vessel, is taking the cargo to Southeast St. Petersburg, Russia, according to Southeast St. Petersburg officials. The ship is a Russian crew. This is the first Russian ship to visit Ward Cove since the early 1980s that the city had a pulp mill.

The ship is a Russian crew. This is the first Russian ship to visit Ward Cove since the early 1980s that the city had a pulp mill.

Fish and Game urges participants to review the conditions in their herring pound permits, along with the 1992 Management Plan before placing the herring in the water. For more information, contact Fish and Game.

### AG assigned to ADFG

John G. Giesberg has been named senior assistant attorney general assigned to the Department of Fish and Game by the Attorney General's office. He will concentrate on international salmon treaty negotiations and other international agreements between Fish and Game and foreign governments, according to a press release from the Office of

discussion of fishery issues, said Pat Pondleton, from the cooperative's Bell-Ingham office.

### Historic vessel honored

The U.S. Forest Service's vessel Chagach docked in Petersburg has been added to the National Register of Historic Places, the nation's catalog of significant historic properties.

Launched in 1935, the Chagach is the last of the Forest Service's wooden fleet remaining in commission in Alaska, according to an Alaska Department of Natural Resources press release.

The boat is named after southeastern Alaska's Chagach National Forest and is

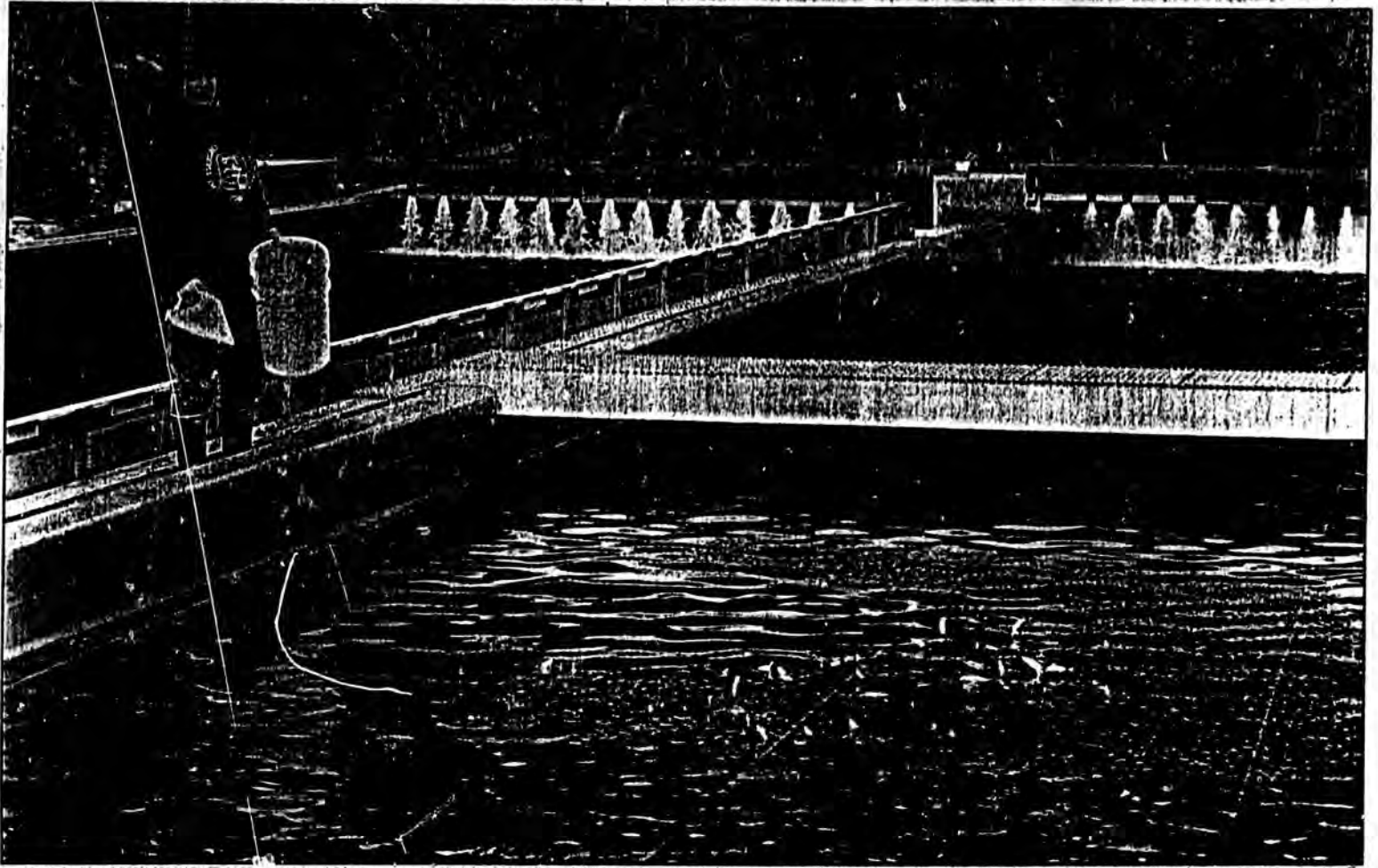
man, who use the fish for person from the federal permit and requirements.

### Young favors tax rep

A U.S. House Committee voted last week for a graduated repeal of the national boat user fee -- a tax requires boat owners to pay a fee on the size of their recreational vessels, according to a press release from Rep. Don Young's office.

Young voted in favor of repealing the boat tax during a hearing of the Committee on Merchant Marine Fisheries, of which Young is a member.





Southern Southeast Regional Aquaculture technician Michelle Lertz feeds king fry this week at the private, non-profit organization's Whitman Lake Hatchery, south of Ketchikan. SSRAA began operations in 1976. Staff photo by Hall Anderson

to the common property fisheries," according to the report's executive summary.

Options for consideration include placing a wild stock priority into state statutes or making wild and hatchery stock status of equal priority. Clarifying whether the board is required to provide for hatchery broodstock or for cost-recovery fisheries, along with clarifying the board's authority to restrict hatchery production are other items for consideration.

**Planning and permitting**  
The lack of statewide goals and objective for enhancement programs; regional v. statewide planning; funding and support for planning; composition of regional planning teams; allocation issues; management issues; uniform review; operation performance reviews; and permit revocation are issues under this section. Options for consideration touch upon on the various issues.

**Biological issues**  
According to the report, there is no scientific consensus on the effect of wild stock co-existing with hatchery stock. "Although poor hatchery practices can clearly endanger wild salmon populations, scientists do not agree on the extent to which hatcheries with sound practices can co-exist with sustained healthy runs of wild salmon," according

to the executive summary.

The report touches upon the genetic effects of hatcheries, ocean-carrying capacity, disease and the state genetics program.

**Funding**  
Funding for enhancement programs come from bonds, state general fund appropriations, salmon enhancement taxes paid by fishermen, state loans and cost-recovery sales of fish.

Don Amend told the committee in a legislative teleconference Feb. 24, that the funding chapter needs more work. Amend is the general manager of the private, non-profit Southern Southeast Regional Aquaculture Association.

When the Legislature established the enhancement program it provided a deferral on low-interest state loans of six to 10 years, he said. However, there has never been a written policy on the regulation. The state has since used the minimal time and maximum interest rates for payback of the loans.

That is a major concern by the fishermen and is causing problems for the associations, he said. The associations are incurring debt that is unnecessary and it is slowing the development of programs, he said.

The issue is not addressed in the report, he said.

The report does include options that

would require a more extensive public benefit-cost analysis before providing enhancement loans; eliminating the statutory loan repayment deferral requirement on operating loans; analyzing the enhancement tax program and analyzing an increase of the enhancement tax so fishermen who benefit from the program will pay for more of the costs.

**Economics**  
This is section is being done separately from the report and will focus on whether current levels of Alaska salmon harvests are over or under-supplied on the world market level and whether increased hatchery production will lower prices, fishing and processing revenues.

**Marketing**  
This section mainly addresses the work being done by the Alaska Seafood Marketing Institute. Options for consideration include reviewing the state's role in marketing and providing funding for ASMI's Salmon Recovery Proposal, which would work on increasing annual per capita U.S. salmon consumption from 1.1 to 1.5 pounds.

Other options include addressing fish quality issues, analyzing ASMI privatization and encouraging the development of a national salmon marketing council.

**International treaties**

The report also delves into the role that enhancement programs play in international treaties, such as the U.S.-Canada Pacific Salmon Treaty. Options for consideration include evaluating the effectiveness of enhancement as a treaty component; requiring a feasibility and benefit-cost enhancement analysis in treaty proposals before treaty agreements; and developing an auditing tool to determine if fishermen impacted by treaty agreements are benefiting from enhancement programs.

**Hatcheries and sport fish**  
The enhancement programs in the state supports a large part of total sport and commercial fishing harvests. According to the report, legislators may want to consider initiating an on-going enhancement program review of sport and commercial fishing effort; increasing sport fish license fees to pay for a larger part of the enhancement projects; and encourage Congress to increase federal funds to support increased sport fishery enhancement efforts.

People interested in receiving a copy of the 30-page executive summary can contact Ellison's office in Juneau. The committee has not set a deadline for comments on the report. Written comments may be sent to Sen. Dick Ellison, Senate Fisheries Committee, State Capitol, Juneau, Alaska 99801-1182.

discussion of fishery issues, said Pat Pendleton, from the cooperative's Bellevue office.

**Historic vessel honored**  
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man, who use the fish for personal bait, from the federal permit and reporting requirements.

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## Dispute could stall breakwater project

**KODIAK (AP)** — A \$32 million harbor breakwater project here could be derailed for up to two years by a dispute over where the rock for the project would come from. At issue is the city council's demand for a guarantee that rock for the St. Herman Harbor breakwater would be quarried from adjacent Near Island. The Army Corps of Engineers, which oversees the project, told the city at a recent meeting that it could make no such guarantee without sending the

removed from the island we "have a level area for upland development," he said. "Now we're down to the 11th hour and we're talking about getting the rock from somewhere else." Shadrick said one factor is a 1969 change in Corps policy, giving the contractor with the lowest bid the right to choose the rock source. That would not necessarily preclude Near Island. Corps Real Estate specialist Guy Hopson said the agency would have to certify the quality and quantity of Near Island rock if it were to designate it as



# BRIEFLY House

## Southeast

**Fishermen sue state over chinook limit:** A coalition of Southeast charter-boat operators, anglers and lodge owners have sued the state over the decision to limit chinook sport fishermen to one fish per day starting May 15. The plaintiffs are asking the court to set aside the emergency restrictions announced last month, claiming the state Board of Fisheries committed procedural violations in dividing up the Southeast chinook catch. The board in March divided up mostly wild chinook salmon normally shared with commercial trollers and sport fishermen under terms of the U.S.-Canada Pacific Salmon Treaty. The Alaska Trollers Association had asked the board to divide the catch, claiming the charter-boat industry was threatening their livelihood.

The board gave anglers 41,300 chinook, and 201,690 for trollers.

Dale Holzmeister, the president of the Tongass Sport Fishing Association in Ketchikan, said today the board should not have given commercial fishermen a break over sport fishermen. His association, which is comprised of charter-boat operators and anglers, is one of nine sport, charter and lodge organizations that filed the suit Thursday in state Superior Court in Juneau. The Juneau Charter Boat Operator's Association also is a party to the suit.

"We caught 17 percent last year, and we expect to catch more than 17 percent this year," Holzmeister said. "Automatically, that restricts us."

The suit claims, among other things, that the board should not have considered the trollers' petition, that the board went beyond its statutory and constitutional authority and did not follow proper procedures in making the chinook allocation. The suit asks for a temporary injunction stopping the chinook limit from being enforced.

By BRIAN S. AKRE

THE ASSOCIATED PRESS  
Legislation that would felony to commit "hate" such as painting swastikas in a temple, has passed without opposition.

The House also approved that would require the direct Workers' Compensation to be confirmed by the Work-pensation Board. The bill sponse to the controversy for Linda Rexwinkel.

The hate-crimes bill, 534, would make interfere person's constitutional rights a felony, punishable five years in prison and fine.

Rep. Max Gruenberg, age, said he introduced it to the vandalism of an temple two years ago. He other Jewish leaders were learn that state law treat-crime as a misdemeanor.

The bill also would make for the state to hold r events in any establishm

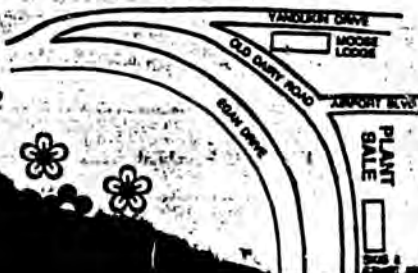
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OF HAIR CARE  
PROFESSIONALS

JORDAN CREEK CENTE

# Columbia salmon travel by barge

## Army Corps moves salmon to the ocean

By JOHN DAVIES

JOURNAL OF COMMERCE

Columbia River towboat companies have begun hauling bargeloads of young fish from Idaho to the Pacific Ocean in an expanded effort to boost survival of steelhead and salmon.

The Army Corps of Engineers began offering the so-called taxi rides for migrating fish more than a decade ago, when National Marine Fisheries Service research found that they greatly improved survival rates. Now the Corps is expanding the transport another 140 miles to Astoria, Ore., where the river meets the ocean.

Barge operators will continue to load tank barges with young fish above the highest dam on the Snake River, but two barges a week now will continue down the river to Astoria, instead of unloading their fish just below Bonneville Dam.

Brix Maritime Co. of Portland, Ore., which has this year's contract to provide tugs for the barges, Wednesday moved the first test barge of fish to Astoria, a spokeswoman for the Columbia River Towboat Association said.

Biologists at the fisheries service suspect that returning runs of steelhead and salmon might be even stronger if young fish were taken an extra 140 miles by barge to the mouth of the Columbia River, instead of being released as far up the river as they now are.

Gene Matthews, a research biologist with the agency, said the main objective of releasing fish near Astoria is to learn whether birds or other kinds of fish are eating salmon or

steelhead after their release below Bonneville. Taking the fish the extra distance and releasing them on an outgoing tide might cut such losses, he said.

The barges continually circulate river water through their tanks, allowing young fish to imprint on the changing chemistry of the water they pass. Biologists theorize that this allows them to recognize the water chemistry and use it when they return to spawn.

Steelhead may not return for several years, Matthews said, so it will be several years before results of the Astoria tests are clear. But Matthews said earlier transport programs had helped steelhead in par-

ticular, that experience with release of hatchery fish at the mouth of the river was positive, and that similar methods have been used in Scandinavian countries.

The Astoria tests are the latest development in the Corps of Engineers' juvenile fish transportation program. As many as 20 million fish — 70 to 80 percent of the entire fish migration on the rivers — will be barged past the dams.

Jerry McMahon, Pacific vice president for the American Waterways Operators, called the barge transport program "a good example of a rational plan" as opposed to "knee-jerk responses to endangered species listing."

## Canada

**Boys save grandparents from fire:** A 9-year-old boy woke his sleeping grandparents and, with help from a friend, pulled them out of their burning trailer house moments before the structure engulfed them. Third-grader Brandon Stickle and Lindsey Lohrenz, were riding their bicycles to Brandon's home Thursday evening when they noticed smoke coming from the trailer's attached wagon. The youngsters ran inside and found Dick Stickle, 64, asleep in a bedroom and Phyllis Stickle, 56, asleep in a bedroom. Smoke was filling the living room. The two children couldn't awaken the adults at first and had to clap their hands next to his ear to wake him. Brandon said flames were leaping out of the spigots in the bathroom. "Everyone rushed outside, bending over to avoid the smoke that had fanned out at head-level. Brandon ran to the phone to call for help."

**Kills boy on Vancouver Island:** An 8-year-old boy was mauled by a cougar as his father and about a dozen other people watched in horror at the elementary school playground at the Nootka Indian community on Vancouver Island, B.C. The boy was attacked Tuesday evening as he sat on the grass. He was pulled from a forest bordering the playground and was killed. The boy's father and a teacher at the school, hurt. He watched helplessly as children screamed in pain. The school's janitor shot and killed the 60-pound animal. "It was a terrible thing to go through," said janitor Peter Skilton. "I came to grips with it."

Williams took the unconscious boy to a first-aid center. One of 250 residents, but the youngster died from his injuries. "This is a sad, sad day," said Richard Leo, a community leader. "We're all just shocked and sickened. The community is turning to anger as parents are ignoring the danger from wild animals. The school board for years that this was a problem. Repeatedly for a fence to be put around the area. Nothing has been done. Maybe the school board should have said the incident was a tragedy. Further comment."

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## NOTICE OF ROAD CLOSURE

The Department of Transportation and Public Facilities is advising the public that Old Glacier Highway from Highland Drive to the river will be CLOSED Wednesday, May 13, from 9:30 a.m. to 4:00 p.m. This closure is to assist Harborview Elementary School in the safety of children participating in National Fun Day. For more information may be obtained by contacting the Department of Transportation and Public Facilities at 789-6211.

Published: May 8, 11, 12, 1992

Summit

Mom's love to fish, too!  
Just ask Linda Egan 1001 Winner!



# Hatchery studies are funded

## Work not to be completed in time for legislature

by BOB TKACZ

An analysis of statewide salmon enhancement programs got a \$48,000 boost this month with approval by the Legislative Council of three research contracts with the University of Alaska. But the work being purchased is not due until more than a month after the end of next year's legislative session.

### Results after public comments

Even preliminary results of the research are not expected until one month before the end of next year's legislative session, and well after already postponed public participation in the project has been concluded.

The analysis is being prepared by the staff of the Senate Special Committee on International and Domestic Fisheries.

According to the committee, it was to probe five major subjects: eas relating to state and private hatcheries and other fisheries enhancement projects, and was to be presented to the legislature by January 15, 1992.

The research contract with the university does not require work to begin until November 15, and sets a completion date of June 30, 1992.

Only a preliminary analysis of the university work will be sent to the Senate committee on about April 1, about five weeks before the end of the legislative session, according to Molly McCammon, aide to Sen. Lyman Hoffman (D-Bethel) and coordinator of the project.

### Eliason requests funds

Under the pressure of a "request" from special committee chairman and Senate president Dick Eliason (R-Sitka) for a unanimous vote on the expenditures, the Legislative Council unanimously approved "reimbursable service agreements" for preparation of a salmon fishing cost computer model for \$20,000; a "worldwide demand analysis for Alaska salmon", for \$18,000; and a public policy simulation model, for \$10,000.

The Legislative Council is a House/Senate Committee that manages lawmakers' affairs between sessions.

### UAF to do research

The research will be conducted by faculty of the Economics Department of the UAF School of Management, with some assistance from the Commercial Fisheries Entry Commission, according to Kodiak representative Cliff Davidson.

When the overall analysis was begun in mid-June, Eliason emphasized the need for public participation in the study.

"I cannot emphasize enough how strongly we believe that your participation in this process is vital," Eliason said in a letter inviting public participation.

### Public will have go at staff work

At the November 1 Legislative Council meeting it appeared fishermen and the general public would get their say after staff work is completed, but before the technical research was available.

Rep. Gene Kubina (D-Valdez) expressed concern that regional workshops that were to be part of the analysis have been canceled.

McCammon said public participation was postponed because of difficulty finding available time between various fish expo, Board of Fisheries and North Pacific Council meetings and legislators' travel plans. She said workshops may be scheduled for early December after the draft analysis, and university research is completed, and hearings during the coming legislative session.

session.

Ginny Fay, an aide to Sen. Sam Cotten (D-Eagle River), added that the public would have more to comment on after the research work was underway.

But with the UA studies expected with about five weeks left in the legislative session time for public review and comment is likely to be short.

### Three months behind

"We don't anticipate leaving any particular group out," Eliason said during the meeting, adding that the project was running about a month behind schedule.

McCammon said work is actually "closer to three months" behind schedule, largely because of preparation of the RSAs.

"Do you want haphazard work, or do you want something meaningful. We just don't want to pay a lot of money and get nothing for it," McCammon said.

The delay means elimination of much of the work on economics of present and potential future hatchery operations, McCammon said.

The study is the first in depth look at Alaska's hatchery system in 20 years, according to McCammon.



## MARKET REPORT

Early reports from Kodiak estimated that Gulf of Alaska longliners would deliver between 13 and 14 million pounds of halibut to processors in early May. What fishermen receive for halibut, and several other species these days, is no longer called payment. It's called "an advance." Early ex-vessel advances, then, ranged from \$1.70 to \$1.90 a pound, depending on fish size.

While 14 million pounds of halibut is still a big pile of flatfish, the May derby was characterized as a relatively mediocre opening in Kodiak, thanks to generally poor weather and a spotty bite, both out deep and in shallow. Despite some blown-out windows and tangled gear, the word was that the fishing was worse than the weather. Average Kodiak deliveries were reported in the 20,000- to 40,000-pound range.

Speaking of halibut in the news, the topic rated front-page coverage in the May 8 issue of *The New York Times*. Not far from the Brady handgun control bill and the President's thyroid gland was a special report from Seward, Alaska, titled, "Frenzy and Plenty of Blood, In One-Day Halibut Season." The two-column story was pressed tightly against a photograph of two small children going hungry in storm-ravaged Bangladesh.

If the word was not out before, it's certainly out now. "You've got absolute madness out there," Bob Alverson is quoted in the article. Perhaps it was the tone reporter Timothy Egan was fishing for. He certainly had trouble shaking it, as he relayed the images of the Alaska halibut harvest: "the Oklahoma land rush of commercial fishing... one of the most intense food-gathering rituals in North America... a marathon of misery... the torture of a spring day in the Gulf of Alaska... a 25-mile-long line of hooks with bloody shanks of herring..."—you get the picture.

For many, in case you're lucky enough not to know any of 'em, *The New York Times* is the fountain of ALL news, no matter where it occurs. So expect to see a rash of follow-up stories on halibut—halibut quality, halibut IQs, halibut-related death and dismemberment, etc.—in a host of other, less prestigious publications in coming weeks. The press is on the scent, so tidy up the boat and keep your fish on ice.

Meanwhile, back on the armed vs. wild salmon battlefield, a May 2 report from the Alaska trade office in Tokyo contained news of a victory for wild fish producers. While the translation left a bit to the imagination, it nevertheless had some good news for fishermen and some very disturbing news for fish farmers.

According to K. Muguruma of the trade office, Japanese importers and wholesalers are rethinking their farmed salmon purchases from Norway, Chile, Canada and Great Britain, and "looking at Alaskan natural, wild salmon again." That's good news.

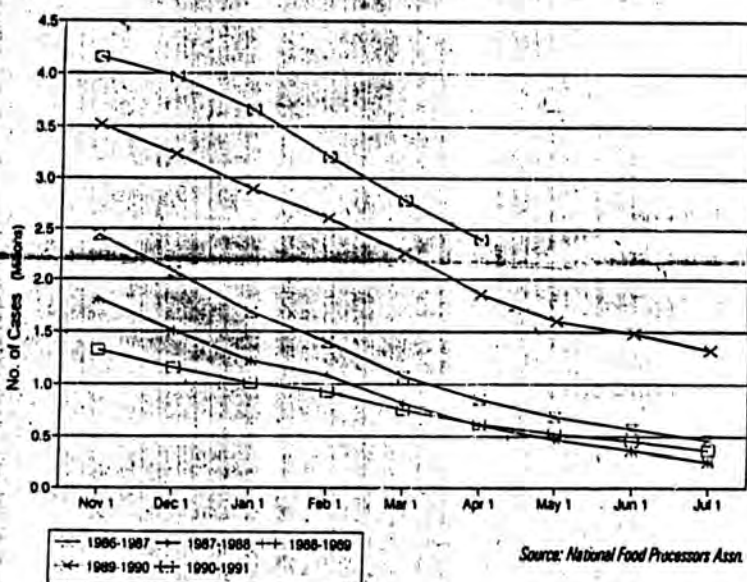
The disturbing part is what Muguruma reports about farmed fish. The renewed interest in wild fish, he says, is "because farmed fish, not only salmon, has a serious problem for some kinds of pathogenic organ, and Atlantic salmon seems to be anxious about nuclear radiation for the Japanese people." What the report appears to indicate is that Japanese buyers are not only concerned about tainted farmed fish, but they are worried about nuclear radiation affecting fish from Norway. As any politician knows, it doesn't have to be true to affect public preference.

Despite the misfortunes of farmed salmon, the Tokyo wholesale price for fresh 7- to 11-pound Norwegian Atlantics was about \$4.86 a pound as of April 30. Few frozen, wild salmon could command a similar yen. Interestingly enough, large Canadian troll kings were only slightly behind, selling for \$4.69 a pound, the same price as 6- to 9-pound Canadian troll sockeye. That's right, the boys in B.C. have not only learned how to catch sockeye on troll gear; they've learned to market them, too. Bristol Bay net sockeye, 6 to 9 pounds, were selling for \$3.43 a pound. Cook Inlet fish the same size were pegged at \$3.62.

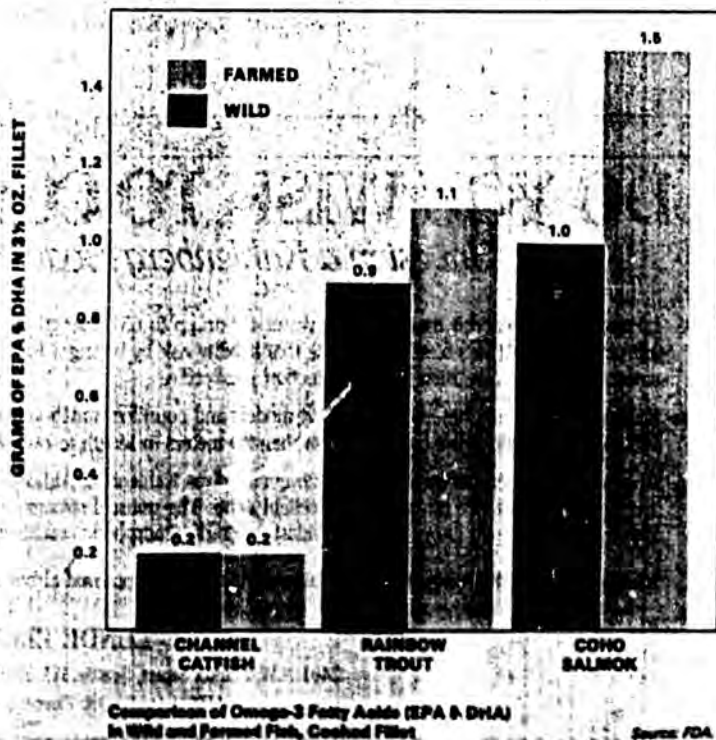
Just how much salmon is there on the world market? According to Canadian government sources, the total salmon supply in 1989 was 930,000 metric tons—up 81,000 tons since 1985. Of that, 171,000 tons were farmed-raised Atlantic salmon—about 4.5 times what was produced in pens in 1985. The farm culture of Pacific salmon is also on the rise. Figures for 1985 show farmed Pacific salmon production was only 7,600 mt. By 1989 the volume had grown to 41,200 mt.

One fish that's having no trouble commanding a price lately is the once-lowly pollock. Shatter-pack pollock fillet prices continue to nip at the heels of King Cod. Even the small 2- to 4-ounce fillets were testing \$2.00 a pound (F.O.B. Seattle) in late April and block prices ranged from \$1.60 to \$1.75. Larger, 8-ounce and up fillets were selling for \$2.25, just about 60 cents cheaper than cod. □

### CANNED SALMON — TOTAL STOCKS (BASIS 48 TALE)



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## Too Many Fish?

Rising concern about plugged salmon markets, low fish prices and the small physical size of returning pink salmon has prompted a governor's task force and legislative study group to question whether state and non-profit salmon hatcheries are doing their jobs too well. Some have suggested that the flood of hatchery fish has not only soured the salmon market but contributed to the over-grazing of the ocean as well.

While it is fitting to question the cost/benefits and environmental consequences of aggressive hatchery programs, let's not turn the process into a self-destructive witch hunt. Fishermen thin in the wallet this year should be skeptical of simplistic scientific and economic hypotheses. Cutting hatchery budgets will not turn back the clock for the Alaska salmon industry.

If there is a lesson to be learned from the state's battle over salmon farms, it's that Alaska does not control the valve of world salmon supply. Outlawing the pen production of salmon in Alaska did nothing to prevent the growth of salmon farming elsewhere. One glance at a menu or stroll by a seafood case should be enough to convince anyone that the state's ban did nothing to reduce market competition from farmed fish, either. It's foolish to think that cutting Alaska's hatchery production will significantly limit world salmon supply or do anything to improve Alaska's share of the marketplace.

If there's one thing that really does make a salmon farmer nervous it is Alaska's potential to increase, not decrease, the supply of high-quality, reasonably priced wild salmon products. But let's face it—a skin-on, bone-in canned salmon will never fill that bill. The product belongs in a museum with the "iron chink" that produced it. So, it's time to move on, and we're lucky to be sitting on enough raw material to wage a revolution. What we have to do is get on with it.

—JuA



# Legislators begin examination of hatcheries

by BOB TKACZ

Another state group has been formed to look into the future of salmon fishing in Alaska. This one, the Hatchery Research Project Study Group, belongs to the Alaska Legislature. Its work plan calls for a report to the Senate Special Committee on International and Domestic Fisheries on January 15, 1992.

Five major subject areas will be researched by about a dozen staffers of Fisheries Committee senators who are inviting involvement from some 70 people or groups involved in hatchery and enhancement projects.

Aquaculture associations, private non-profit hatchery operators and others have been urged in a letter from committee member and Senate president Dick Eliason to participate in the project.

"Some people have expressed concern about what the intent of this group might be," Eliason wrote in the June 28 letter. "I want to put your fears at rest."

According to Eliason, the first stage of the project will identify "issues, concerns and conflicts" cited by participants in the hatchery/enhancement business. "I cannot emphasize enough how strongly we believe that your participation in this process is vital," Eliason declares.

Once top issues of concern are set out in a draft report, participants will be asked for suggestions to improve "and possibly redirect" the state's enhancement program.

An "intensive workshop" this fall to discuss the future of the hatchery program as well as extensive formal hearings during the 1992 legislative session are also planned, according to the Senate president.

The work group is scheduled to complete a status report on September 1, and brief legislators on November 1. No schedule of meetings involving the public or has yet been set.

The main topic areas the work groups will study include the history and development of hatcheries; economics and marketing; fisheries management; roles and responsibilities in a statewide enhancement program; and recommendations for a statewide enhancement program.

Allocation of hatchery fish will also be a major element of the Senate working group's study.

"In the past when you've developed a regional hatchery plan the regional team has always been told to stay out of allocations," said Molly McCammon, a staff aide to Sen. Lyman Hoffman (D-Bethel) and chief coordinator of the working group. Nevertheless, fishermen and state and private hatchery operators in Prince William Sound developed the state's first regional hatchery management plan that included

allocation issues in a marathon effort that was completed early in 1990. And the Board of Fisheries has warned Southeast hatchery operators and fishermen that they should bring a proposal for their own management plan to the board's next meeting on their region's issues during the 1993-94 meeting cycle. If no comprehensive hatchery plan is offered the board will impose one on the region, chairman Mike Martin warned during last winter's session.

Non-state entities have been under pressure from the legislature to take over management, or at least provide funding for, the state hatcheries in their areas. In the current climate of reduced state spending under the Hickel administration that pressure has become more intense.

In addition, various legislators, for a variety of reasons, are pushing for changes, if not reductions, in the state hatchery system.

Sen. Hoffman, for at least two years, has been critical of what he has viewed as the Department of Fish and Game's slow progress in the transfer of hatcheries to aquaculture control. "His [Hoffman's] interest is definitely to free up more money to focus on other areas of the state. I think there are a number of other legislators who are looking to free up money to put into the general fund," McCammon said.

Hoffman has also complained that Southeast and Southcentral Alaska have received the vast majority of hatchery funding while the westward and Arctic regions have a right to equal funding and a greater need for the economic development they can foster.

"One of the things that we're definitely looking at is what are the goals of the hatchery program and how much should they be viewed as a tool for economic

*Participants will be asked for suggestions to improve "and possibly redirect" the state's enhancement program.*

—Sen. Dick Eliason

development in a region," McCammon noted.

The working group's study plan lists reviews of a wide variety of hatchery funding issues including gear group and federal funding for enhancement as well as funding for sport fish and subsistence hatcheries. "There may be a growing reluctance by the legislature to fund hatcheries and growing concern from different interest groups on what effect hatchery production is having on overall production and management schemes," McCammon noted.

Hatchery economics could take a licking from a variety of quarters during the project. At a forum on hatchery issues last March, sponsored by the Fisheries Rehabilitation, Enhancement and Development Division of ADF&G, some fishermen complained that hatchery production of pink salmon in particular was driving down prices. Although this season's pinks run has not yet reached the record levels ADF&G projected, many commercial fishermen, including Sen. Eliason, feel continued hatchery production of humpies is a waste of state dollars.



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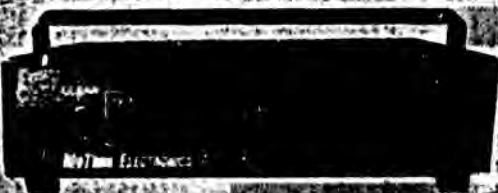
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## 1991 fish shorter and skinnier

by DONNA PARKER

With every eye in Prince William Sound scanning the horizon for jumpers that weren't showing up for the forecasted record return of pink salmon, lots of questions were being bandied around on the back deck of boats everywhere.

Fishermen are not the only ones querying the cause for reduced runs and weight of pink and chum salmon from Prince William Sound to Chignik. And while some fishermen want to blame it on the 1989 Exxon oil spill, scientists believe cooling ocean temperature, decreased food supply and increased hatchery production (see related story) are the more likely culprits.

According to research being conducted by the Cooperative Fisheries and Oceanographic Studies Program, the nearshore temperature of the Gulf of Alaska began to decline last year as part of a 20-year cycle that historically corresponds with decreasing salmon stocks.

In the past year alone, it has dropped a startling two degrees, that not only reduces plankton production, it also reduces the digesting metabolism of fish. Both those factors hamper the growth rate of fry and make them more vulnerable to predation.

The Cooperative Fisheries and Oceanographic Studies program is a joint venture that includes participation by the University of Alaska, Prince William Sound hatchery corporations and the Alaska Department of Fish and Game in Cordova. Its director, Ted Cooney, believes that the precipitous decline in north Gulf temperatures may be confusing the salmon while at sea.

That caused Cooney, on August 6, to

*"[Return of fish] has to do with what the ocean has tossed up for a food supply for the fish this particular year."*

—Ted Cooney

remain hopeful while everyone else had virtually given up on the bit PWS pink run.

"This ocean cooling may have interrupted normal migration, causing this year's return to be late and perhaps weak...so I think the run will materialize, but it will be late," said Cooney.

Cooney credits his optimism on fairly charitable environmental conditions that existed last spring. Those conditions peaked in 1989 and caused a record pink run to return to the Sound in 1990. Though temperatures and plankton production began to deteriorate last year, Cooney said, there should have been plenty of food to sustain the emerging fry.

Next year is another story. "A temperature decline of two degrees was noted when we estimated 1.2 billion wild and hatchery fry entered the salt-water environment in the Sound this year."

"So based on conditions for growth of the fry, things look pretty bleak for fish returning next year. As far as I can tell, that has nothing to do with the oil spill or increased competition for food; it has to do with what the ocean has tossed up for a food supply for the fish this particular year," he said.

## Concern spreading on impacts of hatchery fish on wild species

by DONNA PARKER

There is growing evidence that increased hatchery production may be harming wild stocks and confounding the management of mixed salmon fisheries in Alaska.

It is a development that has emerged worldwide and spurred international conferences in Vancouver and the Soviet Union this summer. And though Alaska's hatchery program is considered a world model, the issue is heating up for public debate this year. A special state Senate investigation was recently launched (ACF, August 2) and the Prince William Sound Science Center and University of Alaska are sponsoring an international "think tank" on Alaska hatchery and wild salmon interaction in November.

According to Alaska Department of Fish and Game commissioner Carl Rosier, emerging trends in salmon returns are leading biologists to reevaluate the relationship between hatchery and wild stocks.

"There is a fair amount of concern, being expressed on this issue all along the coast. We're beginning to think in terms of wild stock protection areas, but we haven't really looked at the question of the carrying capacity of the ocean. We've been at this for 15 years now and it's been extremely successful at producing fish. But it's time to get some of these answers and determine where we are going," Rosier said.

### Emerging trends

Mid-season assessment of run strength indicates that pink and chum runs in Prince William Sound, Cook Inlet and Kodiak may be in trouble. Chum and pink emerge from streams as fry and compete during early marine life cycles. Some runs have

already been called a "bust," others called "weak or late" and all are seeing very small fish. Generally, small fish mean big runs, but with the possibility of that not occurring in some regions for the second year in a row, biologists are beginning to speculate that there may no longer be enough carrying capacity in the ocean to adequately feed the dramatically increased hatchery and wild runs of the past decade.

Two ADF&G studies submitted to the Vancouver conference concluded that declining wild pink salmon runs in PWS appear to be the result of lower escapement levels caused by their overharvest when traveling with strong hatchery runs.

The return of wild pink ad chums to PWS this year may already be in trouble. By early August, the chum runs were so poor that minimum escapement goals were far from being met and fish managers do not anticipate commercial harvests of those fish this year. Wild pink escapement levels also lag far behind. Only 30 percent of hatchery chums returned, causing the Prince William Aquaculture Corporation to lose \$2 million in cost recovery monies expected from that fishery. Far more shortfalls might occur if the record pink hatchery forecast return fails to materialize.

One of the ADF&G papers examined the interaction of hatchery and wild stocks in PWS, Cook Inlet and Kodiak. It linked increased hatchery production with decreased fish weight in those areas. (Researchers say not enough data currently exist to do a similar analysis in Southeast.)

According to the report, 296 million pink fry were released from PWS hatcheries in 1988. That nearly doubled to 531 million

See: Possible harm, page 7)

## Attention Fishermen

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pink salmon fry the following year. This year 700 million salmon of all species were released from PWS Sound hatcheries. More than 200 million hatchery fry released from Cook Inlet and Kodiak hatcheries join the Prince William Sound smolt as they move into north Gulf currents with wild stocks from those areas.

The report, authored by ADF&G biologists Doug Eggers, Larry Peltz, Brian Bue and Mark Willete concluded that the decreasing trend in average weight in PWS, Cook Inlet and Kodiak was due to increasing trends in run magnitude which, to some extent, has been due to increasing hatchery runs.

Their findings paralleled a similar discovery by Japanese scientists. The abundance of hatchery chum salmon in Japan has increased from five to 50 million in the past decade. A paper presented by Japanese scientists at the Vancouver conference concluded that the exponential increase of the hatchery population caused a decrease in average fish size. The report also concluded there was little evidence linking increased salmon mortality to bolstered hatchery production. However, the authors expressed fears that hatchery production was depleting the gene variability of wild stocks.

Three wild chinook and one coho run on the Columbia River in Washington state have already been decimated by the introduction of non-indigenous hatchery stocks. That caused the National Marine Fisheries Service in June to recommend that the chinook stock be designated as endangered. It also determined one native coho stock no longer exists. If the chinook are classified as endangered, that could halt commercial and sport harvests of salmon returning to the Lower Columbia River.

Though that scenario is far from being realized in Alaska, there is concern that

some wild stocks may be in need of intervention. So far concern is limited to the wild pink and chum stocks of Prince William Sound. Both ADF&G papers cite excessive harvesting of wild stocks while intermingling with returning hatchery fish.

The department is currently considering wild stock protection areas to save existing gene pools located near hatcheries. But according to ADF&H biologist Mark Willete, there is not yet good evidence to support growing speculation that the increased hatchery production has topped the ocean's carrying capacity and is causing mortality both inside and downstream of the Sound.

"There may be a negative effect in early marine life, but that is very difficult to measure. So there probably is not yet a problem with the carrying capacity of the ocean. But we haven't looked at all the data. The ability of the ocean to support a large abundance of fish changes," Willete said.

That is supported by research being conducted by the Cooperative Fisheries and Oceanographic Program which indicates PWS fry consume only five percent of current plankton production in the region. However, director Ted Cooney admits it is not yet known how much plankton is needed to support the remaining marine life in the area.

Though that view is pervasive within the department, there is increasing concern from management biologists downstream of PWS, that hatchery production there is hampering return of fish downstream in Cook Inlet and Kodiak.

#### **Cook Inlet and Kodiak**

From monitoring the Exxon oil spill, biologists know that the Gulf of Alaska currents move from Prince William Sound, into Cook Inlet, and then south toward

(See: *Possible harm*, page 8)



(Photo by MATT MILLER)

**KITOI BAY HATCHERY EMPLOYEES** Mary Hermon and Jamie Hushower use pipes to brain mature salmon before their eggs and milk sacs are removed. During the moderate chum runs, hatchery employees usually worked five hours daily to slaughter the 1500 salmon that made it up the hatchery's ladder overnight.

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## Possible harm, contd.

(from page 7)

Kodiak.

Some biologists are now speculating that the gigantic releases of pink salmon fry in Prince William Sound are getting first crack at the food supply and leaving too little for the fish from regions downstream where runs have suffered the last two years.

According to Nick Dudiak, an enhancement biologist with ADF&G, PWS fry are released several weeks prior to the natural emergence of wild stocks and release of hatchery fry downstream where the climate is colder. Those regions, say Dudiak, rely on the Gulf coastal current plankton production to supplement local plankton production.

"With that in mind," said Dudiak, "there definitely has to be less plankton available because of the intensive feeding going on by increased numbers of pink salmon fry being released from PWS prior to the current reaching other areas."

Indeed, last year's runs in Cook Inlet and Kodiak were fractions of their predicted strength. They had to compete with a near doubling of PWS hatchery production in

*"How much [hatchery production] is too much? That's a question a lot of people are asking. And it's not being asked just in terms of the carrying capacity of the ocean. How much is too much in terms of the economics of the fishery? And how much is too much in terms of what we can manage?"*

—Hal Geiger

1989.

The Cook Inlet return to the Tutka Bay hatchery which forecast a harvest of 830,000 fish, is being called a "bust" for the second year in a row. This year the return was so meager, they barely recovered their brood stock and almost no cost recovery or commercial fishing occurred on that run. The wild stock may be in as bad shape. With a projected harvest of 2.3 million pinks, only

425,000 had been landed by August 5. Last year only about one-third of the projected return made it home by season's end.

And for the second year in a row, pinks are smaller. Pinks landed in Kodiak, where the normal average weight has been 3.6 pounds, now average 2.8 pounds, with some weighing as low as 1.9 pounds. Chums are even skinnier. The statewide average weight is down from nine to six pounds. In Cook

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Inlet, only 8,500 chums had been landed from a projected harvest of 167,000. Minimum escapement levels have not been met in a single stream.

The picture is not so dismal further downstream in Kodiak. Still, it is not a pretty picture. Last year only half the projected pink run returned. This year's weak showings have already caused fish and game biologists to reduce their preseason forecast from 20 to 14 million.

And of the 700,000 chums predicted, only 570,000 were landed last year. With 350,000 in the hopper so far this year, the run will probably fall short of the 800,000 projection.

While these numbers are conspicuous, most biologists say they are little more than circumstantial. Prince William Sound Aquaculture Association director Heather McCarty calls any correlation between declining runs and hatchery production "ridiculous."

"Wild stocks are traditionally very cyclical with many peaks and valleys having occurred in the past century — long before hatchery production was introduced. So it's ridiculous to insinuate that hatchery production has caused the recent ups and down of salmon runs statewide," McCarty said.

Nevertheless, PSWAC seconds the call for beefed-up investigation of the interrelationship of hatchery and wild stocks. Already, the aquaculture association shells out \$170,000 annually in a labor-intensive tagging study that helps evaluate early marine survival and growth rates as well as the intermingling of stocks when harvested.

"We agree there should be more investigation, but with an open mind. We don't want to start out with an hypothesis that hatchery stocks are taking all the food away from the poor wild stocks. That's not very scientific," McCarty said.

Existing collection of data is complicated by declining water temperatures that historically have corresponded with weakened run cycles. And to confound things further, these declines in weight and mortality coincide with the EXXON VALDEZ oil spill. Fish returning this year are the young produced by fish who swam through oil infested waters in 1989. Unfortunately, oil spill litigation has delayed the release of research data that might help answer these troubling questions.

Certainly no one is prepared to point an accusatory finger at Prince William Sound or other regional aquaculture production or enhancement projects statewide. But people are beginning to ask, how much is too much?

(See: *Hatchery harm*, page 21)

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## Hatchery harm, contd.

(from page 8)

### Where to draw the line

According to ADF&G biometrician Hal Geiger, who penned a paper on management problems incurred by hatchery returns, increased production has also caused



gear conflicts to flare. These conflicts, said Geiger, are often solved, not by divvying up current production, but by increasing hatchery production.

"How much [hatchery production] is too much? That's a question a lot of people are asking. And it's not being asked just in terms of the carrying capacity of the ocean. How much is too much in terms of the economics of the fishery? And how much is too much in terms of what we can manage?" Geiger said.

The Alaska Board of Fisheries has been given no guidance in how to settle enhanced-run gear conflicts or solve mixed wild and hatchery harvest problems. For the most part, the Board has exercised a hands-off policy and left the refereeing to aquaculture associations. That may no longer be possible, however.

"We're betting quite a bit of money we're not doing any damage," said Geiger, "so we have to get some answers...we need a management policy," he said.

It's hoped that is what will emerge from the Senate investigation headed by Senator Dick Eliason.

According to Molly McCannon, aide to the Senate Committee on Fisheries, legislators will be taking a comprehensive look at the whole array of enhancement policy, management, and costs.

"We don't have a hidden agenda. We don't know where this will take us...but looking at this issue now is more timely than ever," she said.

## ASMI marketing

Grocery stores in select areas around the country have kicked off the summer with a promotion that features Alaska salmon in in-store demonstrations. To date consumers in Denver and New Orleans have sampled salmon that have been microwaved with a bit of lemon and butter.

The response has been overwhelming. Retail prices have ranged from \$5.49-\$8.49 per pound for steaks and \$5.99-\$8.99 per pound for fillets.

ASMI says it is important to note that the salmon was sold as Alaska salmon and not differentiated by species.

The salmon in the market was purchased in 1990 when ex-vessel prices for salmon were considerably higher for the product.

## Bill's Small Engine Rep

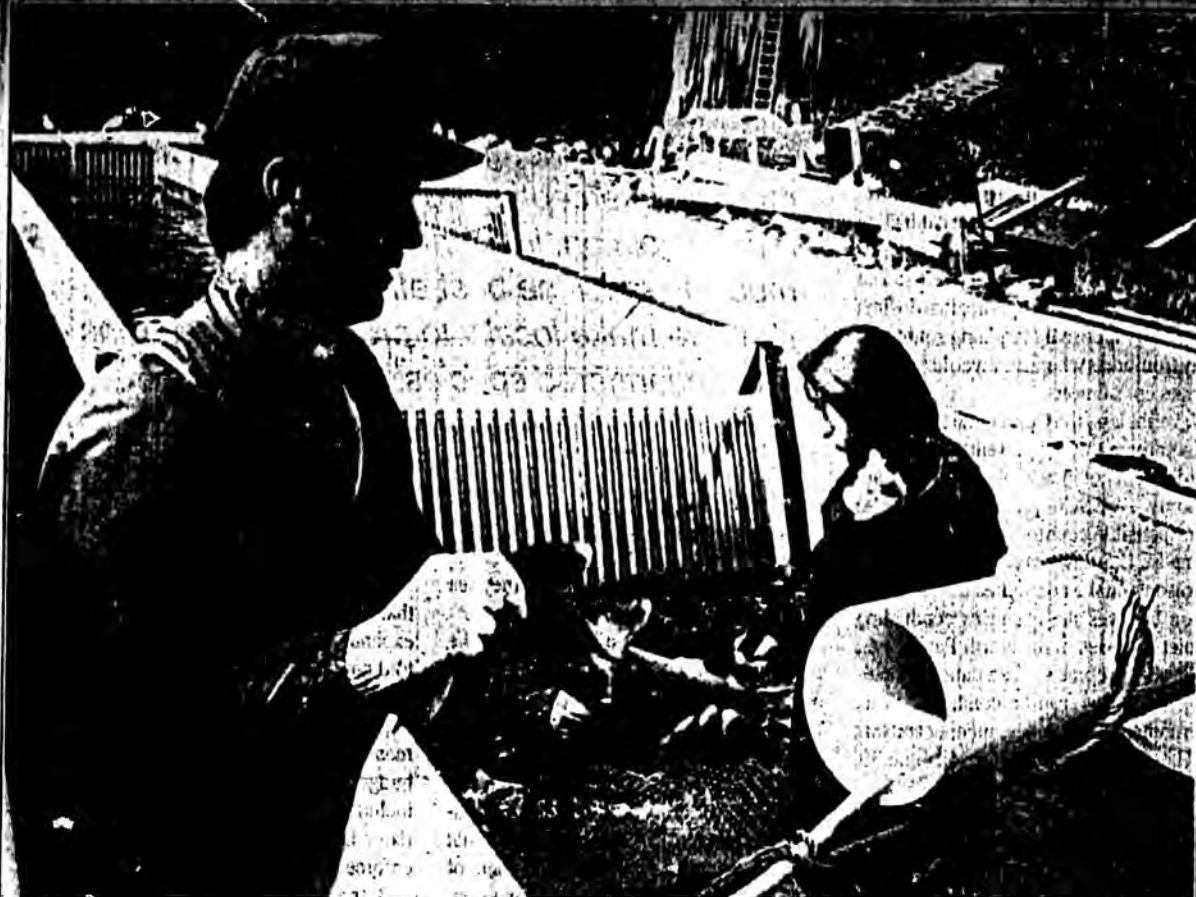
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(Photo by MATT MILLER)

**KITOI BAY HATCHERY MANAGER TIM JOYCE** prepares to send a salmon down to a pipe chute on its way to be slaughtered as Jim Latimer dips for more chums during a recent egg take.

## Kitoi hatchery one of region's most successful

by MATT MILLER

The Kitoi Bay hatchery, located on Afognak Island north of Kodiak and one of southcentral's most successful hatcheries, is currently gearing up for this September's high volume pink run.

Owned by the state, Kitoi Bay is operating at a fairly comfortable level compared to other hatcheries which may be struggling, primarily because its funding is provided by the Kodiak Regional Aquaculture Association. In 1989, a cost recovery fishery netted nearly eight million pinks and put almost \$10 million into the bank — enough principal to fund most of the hatchery's \$800,000 yearly operating costs.

The hatchery was initially built in 1953 for federal sockeye research and, as a state facility, progressed to studying smolt stocking and ladder development techniques while developing rainbow trout, king, silver, and pink fry in the mid '60s through the early '80s.

The numbers of emergent pink fry rarely topped 25 million fish and returning fish averaged about 400,000 a year during the early part of the last decade.

But then in the mid-80s, between 75 and 98 million fry were incubated each year, and corresponding returns fluctuated wildly between 519,000 and 7.62 million fish.

And later, Kitoi Bay began rearing a majority of the fry for an extra six weeks before releasing them — a technique that hatchery manager Tim Joyce says increases their survival rates by at least 200 percent.

In addition to a 175-million pink egg take planned for next month, Joyce says they'll also be attempting to raise nearly 25 mil-

lion chum, five million red, and one million silver fry. The hatchery is normally maintained by four year-round staffers, but that will jump to a total of 16 employees during the height of the pink run.

Joyce believes much more hard data are needed to determine the impact of hatchery fish on wild ones.



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# Trouble in Salmon City

by Donna Parker

*Ocean temperature, plankton shortage or too many hatchery fish?*

All indicators were pointing toward premier pink runs in Prince William Sound and Kodiak; temperature conditions, great plankton blooms, fry virtually boiling in near-shore waters. But as run peaks approached in early August, the predicted record returns weren't showing up. And in Cook Inlet, where the season was already wrapped up, fishermen were chalking up 1991 as a total bust.

Not only weren't the fish coming back in the big numbers predicted, they were coming back small. And not just pinks, but chums too. The two species have similar early life-cycles, both entering the saltwater as fry at the same time. So for the second year in a row, a lot of underweight fish were wandering home and there were fewer of them.

What's going on?

It's a question on the lips of fishermen and fish managers alike.

Some are wondering whether the dramatic increase in Prince William Sound hatchery production during the past two years has maxed out the carrying capacity of the ocean.

In 1988, 296 million pink fry were released from pink salmon hatcheries in PWS. That nearly doubled to over 531 million the following year and has remained at that level since. It conspicuously corresponds with eroding wild stock runs within PWS and in Cook Inlet and Kodiak, too.

This year PWS hatcheries released 700 million salmon fry of all species and there are plans to increase production in the future. Some biologists speculate that the increased production may be depleting available plankton supplies, both within the Sound and in Gulf areas downstream.

But the whole issue is complicated by a near-shore temperature decline. According to research being conducted by the Cooperative Fisheries and Oceanographic Studies program at the University of Alaska, the near-shore temperature in the north Gulf has declined by two degrees. The warmer Gulf temperature of the past decade has corresponded with increased wild and hatchery runs. The temperature decline now corresponds with weakened runs.

That temperature decline also affects the production of plankton as well as early life mortality of salmon made more vulnerable to predation. And according to oceanographer Ted Cooney, there is now speculation that the reduced temperature, noted most dramatically this year in the Gulf, may be confusing salmon and causing them to return late. It may also be affecting offshore mortality rates and average weights of returning fish.

"This ocean cooling may have interrupted normal migration, causing this year's return to be late and perhaps weak. But this year's fry entered even colder waters, so

next year's return may be even worse," Cooney said.

To complicate things further, these declines in weight and, in some cases, mortality, coincide with the Exxon Valdez oil spill. Fish returning this year are the young produced by fish who swam through oil-infested waters in 1989. Unfortunately, oil spill litigation has delayed the release of oil spill research.

At a recent conference in Vancouver, it was learned that the exponential increase in Japanese chum hatchery production to 50 million in the past decade has caused weights to decrease but does not seem to be affecting mortality. However, hatchery programs in Washington have already decimated some local wild stocks. Some of the problem is caused by the interception of wild stocks when targeting on strong hatchery runs. Progressively, escapement levels of wild runs decline, causing increased reductions in wild stock returns.

To determine whether Alaska hatchery production is affecting the return of wild stocks, a "think tank" of the leading experts is being assembled by the Prince William Science Center and the University of Alaska to take a hard look at hatchery programs in Prince William Sound and Southeast.

According to Gary Thomas, director of the PWS Science Center and one of the organizers of the "think

tank," it's time to take a hard look at hatchery production in a responsible fashion.

"What we're beginning to see may produce alarmists who run around saying 'the sky is falling.' Unfortunately, that usually causes reactionary measures. But instead of shooting from the hip, it's time to come up with a technical and accurate assessment of what's going on so that we can have intelligent management that will sustain the resource as well as the communities dependent on it," Thomas said.

The state legislature has also created a Senate special committee to investigate hatchery production and policies, with a final report due at year's end.

While there are many troublesome questions being raised, at least some are looking for answers in hopes that Alaska's hatchery systems, the second-largest in the world, will remain an international model of how to do it right.

State biomatrician Hal Geiger authored one of the two ADF&G papers on hatchery and wild stock interaction presented at the Vancouver conference. Perhaps his comments will spur state agencies to timely action.

"It's a very complicated issue and where we are now is kind of confused. . . . We're betting quite a bit of money that we're not doing any damage so we have to have some answers."

□

## Central Salmon Late, Weak, or What?

by Donna Parker

The projected salmon bonanza for 1991 hasn't exactly panned out as anticipated—at least not in central Alaska. After the first commercial opening in Kodiak, biologists reduced their forecast estimate of pink salmon from 20 to 14 million fish. Meanwhile, Cook Inlet fishermen were calling their season "a bust," and the situation in Prince William Sound was looking iffy, as well.

### Prince William Sound

A forecast run of 42 million pink salmon for Prince William Sound helped amass a record statewide projection of 110 million humpies. But those numbers were nowhere in sight when fishermen took their first crack at Prince William Sound Aquaculture Corporation fish on August 5.

The run of returning wild stocks should have peaked by the first week in August, but by August 5 the run was so poor that minimum escapement goals were far from being met.

Nearly 90 percent of the fish returning to the Sound are hatch-

ery salmon. Those fish weren't showing up either. PWSAC, which produces most of the region's salmon, has a cost recovery goal of \$7 million. By August 5, PWSAC had anticipated a harvest of 3 million of its hatchery pinks. But by that date only 729,000 pinks had been caught in cost recovery openings, including fish used as brood stock. And PWSAC had accumulated only \$674,000 in cost recovery revenue. A common property fishery on PWSAC fish was not permitted until August 5. Though catches had not been determined by the time this JOURNAL went to print, ADF&G biologists had seen very little indication of run build-up in an aerial survey conducted the day before.

"So far, it's not looking very good. We should be seeing excellent build-ups now, but it's just not happening," said PWS assistant area biologist Ellen Simpson.

Two reasons remain for fishermen to hold out hope that the run is more late than it is weak. The return to Solomon Gulch Hatchery in Valdez came in as predicted at about 7 million fish, which may

indicate good overall marine survival for pinks on the high seas. And the sex ratio of the run continues to be dominated by males, a sign that the run is still far from peaking.

Meanwhile, the Sound's hatchery and wild chum runs were coming in at only 30 percent of their projected level. And that is on a run forecast at only 39 percent of the average run strength from 1974 to 1989. This year's sad return is being blamed on poor plankton blooms in 1986 and 1987 when those fry were released from hatcheries or emerged from natal streams.

### Cook Inlet

Cook Inlet's salmon season was in trouble from the outset. Low prices prompted fishermen to boycott three sockeye openings in the Upper Inlet. Though they eventually got \$1.00 a pound when everyone else in the state was getting \$.70 and \$.80, the expected run of 3.2 million reds never materialized.

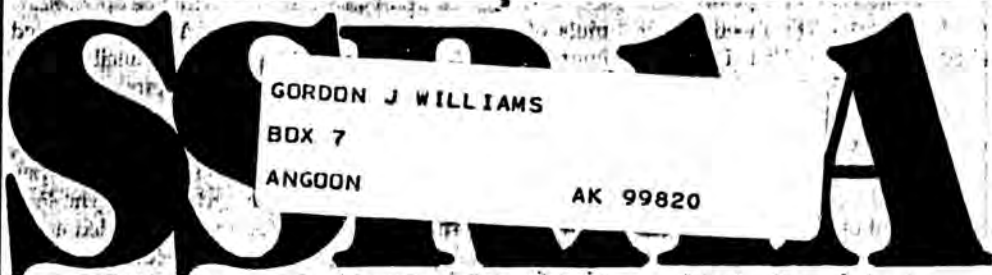
*continued on page 38*



Inside:

Annual report, page 3

Board notes, page 2



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S P A W N I N G N E W S

# '91 releases largest in history

This spring saw the largest release of SSRAA fish in history. The 74 million salmon fry and smolts released were 1.5 million more than this year's goal and 41 per cent higher than last year's releases. The previous high, in 1989, was topped by nearly 21 per cent.

Almost two million kings, 3 million coho, 39 million summer chum, 30 million fall chum and about 500,000 sockeye were released this year.

Each site's release goals were generally met, although Neets Bay's chinook release at nearly a half million was lower than expected. (Overall, Neets Bay releases exceeded the goals for the hatchery.) SSRAA's board will get more details on that shortfall later in the year, according to General Manager Don Amend.

Coho releases, at about 2.8 million annually, have remained stable since 1985. The

year's chinook release was lower than last year's, with releases at Whitman Lake about the same and Carroll Inlet up by about 100,000 fish. The Earl West Cove king release was down about 86,000, but that number is controlled by the number the Crystal Lake Hatchery was able to provide to SSRAA. In the future, SSRAA should be releasing about 2.6 million kings annually, Amend said.

The summer chum release, at 38.9 million, was the largest ever. It included the highest-ever release at Earl West Cove and the first release from Kendrick Bay, where 6.2 million were released. Neets Bay released nearly 21 million summer chum as expected. Future summer chum releases are expected to be slightly higher.

The fall chum release at 29.7 million was the second largest (Turn to back page)

## SE enhancement still a priority: FRED director

When Jeff Koenings was named director of the Alaska Department of Fish and Game's Fisheries Rehabilitation, Enhancement and Development (FRED) Division in early May, his hope was that SSRAA would take over the FRED Beaver Falls sockeye facility. To accomplish that, the state would budget both operating funds for the year, and enough capital monies to improve the facility so that it could become self-sufficient.

That would have amounted to about \$3 million, which was to come out of ADF&G's \$10 million capital improvement projects budget. SSRAA's Board was to vote on the takeover contract in September.

By early June, the game plan had changed. ADF&G's capital monies shrank to \$5 million, and the funds for the Beaver Falls sockeye improvements were nowhere to be found.

According to Koenings, the remaining \$5 million was split two ways: Prince William Sound Aquaculture Corporation (PWSAC) would receive \$3 million to upgrade the Main Bay sockeye facility.

The other \$2 million was to go to the Cook Inlet Aquaculture Association for the Tutka pink facility in lower Cook Inlet, just outside of Homer.

Why did Beaver Falls drop out?

"When \$5 million fell out," (Turn to back page)



Jeffrey P. Koenings

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**INDEPENDENT AUDITOR'S REPORT**

To the Board of Directors  
Southern Southeast Regional Aquaculture Association, Inc.  
Ketchikan, Alaska

We have audited the accompanying balance sheets of Southern Southeast Regional Aquaculture Association, Inc. ("SSRAA") (a nonprofit organization) as of December 31, 1990 and 1989, and the related statements of revenues, expenses, capital additions, and changes in fund balance, and changes in cash for the years then ended. These financial statements are the responsibility of the Organization's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards, governmental auditing standards issued by the Comptroller General of the United States, and the provisions of the Office of Management and Budget Circular A-133, "Audits of Institutions of Higher Education and Other Non-Profit Organizations". Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of SSRAA as of December 31, 1990 and 1989, and the results of its operations and its cash flows for the years then ended in conformity with generally accepted accounting principles.

Our audits were made for the purpose of forming an opinion on the basic financial statements taken as a whole. The supplementary information presented in Schedules I and II is presented for the purpose of additional analysis and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the audits of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

May 29, 1991

## Annual report information

Information from Hogan Mecham Richardson and Company's audit of SSRAA's books from Jan. 1 through Dec. 31, 1990 begins on page 3.



## BOARD MEETING NOTES

March 8, 1991 - The meeting was called to order by Vice President Dave Pitcher at 7 p.m. at the Super 8 Motel in Ketchikan. Directors Kelly and Street were excused; 19 directors attended.

Under old business, after discussion, without objection, the Cost Recovery Committee was shelved until such time as the need for it might resurface. Director Robert George suggested that SSRAA might become involved in a small joint venture with the Klawock Hatchery. Without objection, the issue was referred to the Planning Committee, and Amend was asked to bring back a report developed a few years ago with information on other hatcheries.

Brian Wartman moved with George's second to accept the recommendation of the Finance Committee to approve the employee disability plan. Motion passed unanimously.

Chuck Cohen, with Pat Roppel's second, moved to accept the Finance Committee recommendation to retain management consultant Harvey A. Meier. Motion passed with six opposed.

It was the recommendation of the Regional Planning Committee not to take action regarding changes at Earl West Cove until there was a specific request in writing from the Wrangell Advisory Committee, and then to solicit additional input.

Under new business, General Manager Don Amend reported that a few hours earlier, the Board of Fish had approved an earlier opening date, June 15, for Earl West Cove fishing, and that a minimum 18-hour break between rotations had been approved. There was discussion of possible rotation schedules, with several board members suggesting, as the RPC had, a troll-only fishery in Earl West Cove before the net fisheries began.

Cohen moved, with a second by Doug Elwell, that the General Manager check on the constraints of the Fish Board and within those constraints, develop a rotational fishery for Earl West Cove which has a four-day troll-only opening, followed by two net fishery rotations with a for-

mula of 24-hour gillnet fishery; 42 hour break; 12 hour seine fishery; then go to a 24:18:12 rotation from approximately June 27 through the beginning of September; and then return to the 24-42-12 formula for the remainder of the season, with the plan to be returned to the board for approval at its April meeting. Motion passed with five opposed.

An amendment moved by Wartman with Ken Duckett's second to amend the Chin Point closure portion of the management plan to read "summer chum broodstock" and to change "obtained" to "assured" passed with five opposed.

On a motion and second by Cohen and Wartman's, the Carroll Inlet portion of the management plan was amended, replacing "set net" with "barrier net," and to deleting the last sentence regarding applying for a set net permit.

Duckett moved, with a second by Rich Andrew, to approve the 1991 Harvest Management Plan as amended. Motion passed with one opposed.

Management consultant Bob Weyant made a presentation and was asked to put his comments in writing.

The RPC recommended that the increased chinook production from Whitman Lake be placed in Carroll Inlet. Wartman moved with George's second to follow the RPC recommendation. Motion passed with one opposed.

The RPC recommended switching to a Chickamin-only stock at Neets Bay using Whitman Lake brood. George moved, with Wartman's second, to accept the RPC recommendation. Motion passed with three opposed.

The Finance Committee recommended that the general manager request debt deferment of \$600,000 for a minimum of six years, with a preference for eight years, in return for SSRAA's taking over the FRED Beaver Falls Hatchery. George, with a second by Benkman, moved to accept the recommendation. Motion passed with four opposed.

George moved, with a second by Wartman, to accept the RPC recom-

mendation for 1991 mitigation project priorities. Motion passed with one opposed.

Amend explained the Ketchikan City Council suggestion that the city and borough use raw fish tax monies to jointly fund maintenance and insurance costs of the Whitman Lake dam, passing ownership of the dam to SSRAA. The Finance Committee recommended accepting ownership of the dam with those conditions, at no cost to SSRAA.

Roppel moved, with Wartman's second, to accept the Finance Committee recommendation. Cohen moved, with Tom Fisher's second, to amend the motion to include a strategy to capitalize the costs up front (including bringing the dam up to some level of industrial specification) or to get a written agreement for maintenance cost funding. The motion to amend and the main motion as amended passed unanimously.

Wartman, with a second by Bob Rooney, moved to record names on ayes and nays on board votes. After discussion, the motion was withdrawn. At George's suggestion, without objection, it was agreed that directors would notify the recording clerk at the time of the vote if they wanted their dissent noted. Wartman moved, with Roppel's second, that smoking be allowed in areas other than the meeting room, beginning with the May 1991 meeting. Rick Lindblom moved with Curtis Tucker's second to amend the motion to say that a break would be taken every hour or so. Amendment passed, with three opposed. The main motion passed, with seven opposed. George asked that his dissent be noted on both votes.

The board recessed its regular meeting at 11:30 p.m. and convened in Executive Session at 11:34 p.m. At 12:01 a.m. March 9, 1991, the board reconvened in open session. Cohen moved to rescind the motion passed at the Jan. 19, 1991 meeting regarding a retirement annuity for the General Manager. Wartman seconded; motion passed unanimously. Cohen moved with Rooney's second to approve an 8 per cent annual salary bonus for the general manager effective Jan. 1, 1991, funding through an insurance annuity plan designated by the manager and acceptable to the Executive Committee, or in cash, at the manager's option. Motion passed with George, Lindblom and Wartman opposed. Cohen moved with a second by Duckett to authorize the Executive Committee to settle with Alaska Crown Seafoods. Motion passed, with George abstaining.

The meeting was adjourned at 12:10 a.m.

April 19, 1991 - Pitcher called the meeting to order at 7:15 p.m. at the Westmark Cape Fox Lodge in Ketchikan. Directors Cohen, George, Gregory, Helfrich, Street and Tucker were excused; 15 directors attended.

Pitcher introduced Howard Ferren of the Prince William Sound Aquaculture Corporation. Ferren made a presentation on PWSAC's al-

location plan process and answered questions from board members. Rooney reported on the UFA and noted that he had a list of lawmakers to write to regarding subsistence for anyone who was interested. Benkman reported on the Regional Planning Team meeting, and asked that copies of the Annette Island agreement with the Bureau of Indian Affairs be included in the next board packet for directors' information.

Under old business, Chris Guggenbickler of the Wrangell Advisory Committee spoke about his committee's position on the proposed Earl West Cove rotation schedule. Benkman, with a second by Elwell, moved to approve the Earl West Cove Special Harvest Area rotation schedule as submitted. The motion passed with five opposed.

Amend outlined current funding status for the possible takeover by SSRAA of the Beaver Falls FRED facility, and the process he would follow if so authorized by the board. Andrew moved, with a second by Louie Munch, to accept the plan as submitted. The motion passed with five opposed; Wartman asked that his dissent be noted.

Under new business, Andrew and Fisher moved and seconded the Finance Committee recommendation for self-health insurance for a five-year period. Motion passed with two opposed.

Regarding a resolution supporting region-wide allocation of hatchery fish, Benkman, who serves on the joint allocation committee, said he believed by trying to solve allocation problems regionally, the end result would be to get rid of a lot of headaches and would help many seiners feel better about SSRAA.

Benkman moved with a second by Roppel to pass the resolution on allocation as presented. The motion passed with two opposed. Wartman asked that his dissent be noted.

Duckett moved, with second by Pat Kelly, to approve the FY 1992 budget to be submitted to DOCED as presented. Motion passed unanimously.

Amend outlined a proposal from Cape Fox regarding Mahoney Lake enhancement. Duckett moved, second by Roppel, to continue discussion with Cape Fox regarding possible Mahoney Lake enhancement if Cape Fox will agree that there be no monetary compensation to Cape Fox resulting from the enhancement activity. The motion carried with one opposed; Fisher abstained.

Under directors' comments, Lindblom said he had voted no on the allocation resolution because he saw no control on the scope of the committee to strictly limit its application to enhanced fish; he did not want the Board of Fish to apply what was meant to be an allocation plan for enhanced fish to the common property fishery.

The meeting was adjourned at 11:05 p.m. The next meeting was set for May 17, 1991.

## BOARD OF DIRECTORS

### Seine representatives:

Bryan Benkman, Seattle, *Kona Rose*  
Rick Lindblom, Marysville, Wa., *Alma J.*  
Dave Street, Seattle, *Foremost*  
Brian Wartman, Seattle, *Ariel*

### Gillnet representatives:

Ken Duckett, Ketchikan, *Katie D.*  
Doug Elwell, Seattle, *Willow*  
Louie Munch, Ketchikan, *Sisu*  
Rich Andrew, Ketchikan, *Defiance*

### Power troll representatives:

Thomas Fisher, Ketchikan, *Antares*  
Harold Helfrich, Ketchikan, *Sand Dollar*  
Dave Pitcher, Ketchikan, *Nevada*  
Robert Rooney, Wrangell, *Dorothy*

### Hand troll representative:

Curtis Tucker, Ketchikan, *Havoc*

### Municipalities:

Jeff Meucci, Petersburg

### Chambers of Commerce:

Harry Sundberg, Wrangell

### Native Corporations:

Robert George, Jr.,  
Klawock

### Processors:

Pat Kelly, Metlakatla

### Sportfish:

Ralph Gregory, Ketchikan

### Subsistence:

Chuck Cohen, Wrangell

### Public at large:

Pat Roppel, Sitka  
Lyle Simpson, Ketchikan



# 1990's Annual Financial Report

The annual audit of SSRAA's books was conducted by Hogan, Mecham, Richardson and Company of Ketchikan. It covered the period Jan. 1 through Dec. 31, 1990.

The letter on page one, and following balance sheets,

statements, notes and supplementary information are reproduced exactly from that audit.

Additional information is available at the SSRAA office, 1621 Tongass Ave. No. 103, Ketchikan.

## BALANCE SHEETS

December 31, 1990 and 1989

|                                                          | 1990                | 1989                |
|----------------------------------------------------------|---------------------|---------------------|
| <b>ASSETS</b>                                            |                     |                     |
| <b>CURRENT ASSETS</b>                                    |                     |                     |
| Cash and cash equivalents                                | 378,117             | 900,774             |
| Marketable securities, at cost which approximates market | 1,365,741           | 1,057,508           |
| Grants receivable                                        | 93,613              | 4,162               |
| Interest receivable                                      | 32,211              | 38,838              |
| Prepaid insurance                                        | 80,754              | 83,313              |
| Refundable deposits                                      | 1,355               | 770                 |
| <b>TOTAL CURRENT ASSETS</b>                              | <b>2,474,448</b>    | <b>1,562,708</b>    |
| <b>PROPERTY AND EQUIPMENT</b>                            |                     |                     |
| Net of accumulated depreciation                          | 8,161,748           | 8,606,195           |
|                                                          | <b>\$10,636,196</b> | <b>\$10,168,903</b> |
| <b>LIABILITIES AND FUND BALANCE</b>                      |                     |                     |
| <b>CURRENT LIABILITIES</b>                               |                     |                     |
| Accounts payable                                         | 204,616             | 51,836              |
| Current portion long-term debt                           | 184,144             |                     |
| Interest payable                                         | 614,158             |                     |
| Accrued vacation payable                                 | 52,386              | 49,254              |
| Deferred grant revenue                                   |                     | 7,232               |
| <b>TOTAL CURRENT LIABILITIES</b>                         | <b>1,055,304</b>    | <b>108,322</b>      |
| <b>LONG-TERM DEBT</b>                                    | <b>11,802,879</b>   | <b>11,541,683</b>   |
| <b>OTHER LIABILITIES</b>                                 |                     |                     |
| Interest payable                                         | 590,837             | 605,067             |
| <b>FUND BALANCE (DEFICIT)</b>                            | <b>(2,812,824)</b>  | <b>(2,086,169)</b>  |
|                                                          | <b>\$10,636,196</b> | <b>\$10,168,903</b> |

See accompanying notes to the financial statements.

## NOTES TO FINANCIAL STATEMENTS

December 31, 1990 and 1989

# STATEMENTS OF REVENUES, EXPENSES, CAPITAL ADDITIONS, AND CHANGES IN FUND BALANCE

Years Ended December 31, 1990 and 1989

|                                                                                    | 1990                  | 1989                  |
|------------------------------------------------------------------------------------|-----------------------|-----------------------|
| <b>REVENUE</b>                                                                     |                       |                       |
| Enhancement tax proceeds .....                                                     | 2,188,889             | 1,409,209             |
| Grants from Federal government<br>(passed through State of Alaska) .....           | 106,339               | 102,477               |
| Grants from Federal government .....                                               | 56,941                | 9,338                 |
| Terminal fish proceeds .....                                                       | 1,178,799             | 412,158               |
| Other .....                                                                        | 51,514                | 65,312                |
|                                                                                    | <u>3,582,482</u>      | <u>1,998,494</u>      |
| <b>EXPENSES</b>                                                                    |                       |                       |
| Regional activities .....                                                          | 75,561                | 78,823                |
| Whitman Lake Hatchery .....                                                        | 341,004               | 322,711               |
| Neets Bay Hatchery .....                                                           | 667,964               | 576,036               |
| Tagging and quality control .....                                                  | 215,691               | 251,427               |
| Special projects .....                                                             | 526,560               | 581,829               |
| Neets Bay Harvest .....                                                            | 198,719               | 81,609                |
| Administration .....                                                               | 488,902               | 427,305               |
| Grants and contracts .....                                                         | 173,265               | 1,111,816             |
| Disallowed grant expenditures .....                                                | 82,035                |                       |
|                                                                                    | <u>2,769,701</u>      | <u>2,431,556</u>      |
| Income (loss) before depreciation ..                                               | 812,781               | (433,062)             |
| Depreciation .....                                                                 | (728,180)             | (708,807)             |
| Operating profit (loss) .....                                                      | <u>84,601</u>         | <u>(1,141,869)</u>    |
| <b>OTHER INCOME (EXPENSE)</b>                                                      |                       |                       |
| Interest income .....                                                              | 132,291               | 120,875               |
| Interest (expense) .....                                                           | (1,045,268)           | (675,263)             |
|                                                                                    | <u>(912,977)</u>      | <u>(554,388)</u>      |
| Excess (deficiency) of revenues<br>over expenses before<br>capital additions ..... | (828,376)             | (1,696,257)           |
| <b>CAPITAL ADDITIONS</b>                                                           |                       |                       |
| Federal grants (passed<br>through State of Alaska) .....                           | 101,721               | 102,477               |
| Excess (deficiency) of revenues<br>over expenses after<br>capital additions .....  | (726,655)             | (1,593,780)           |
| <b>FUND (DEFICIT) TO BEGIN</b> .....                                               | (2,086,169)           | (443,135)             |
| Prior period adjustment .....                                                      |                       | (49,254)              |
| Fund (deficit) to begin, restated .....                                            | <u>(2,086,169)</u>    | <u>(492,389)</u>      |
| <b>FUND (DEFICIT) TO END</b> .....                                                 | <u>\$ (2,812,824)</u> | <u>\$ (2,086,169)</u> |

See accompanying notes to the financial statements.



# NOTE 2

## TROUBLED DEBT RESTRUCTURING

During 1989, SSRAA negotiated with the Alaska State Department of Commerce to restructure SSRAA's debt. The restructuring delayed payments on all loans until January, 1991, extended the loan period for some of the loans, and changed the annual payments for some of the loans. Interest accruing during the period when no loan payments were required was added to the loan's principal balance on January 1, 1990 and paid over the life of the loan. Accrued interest was \$1,204,995, and \$605,067, respectively at December 31, 1990 and December 31, 1989.

# NOTE 3

## NOTES PAYABLE

1990 1989

Long-term debt consists of the following:

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$35,103, maturing in January, 2009. Secured by Whitman Lake Hatchery, assignment of surplus fish, and assignment of assessments.

303,606 277,247

Note payable to the Department of Commerce, State of Alaska, at 8% interest. Annual payments of \$277,357, maturing in January, 2009. Secured by Whitman Lake Hatchery, assignment of surplus fish, and assignment of assessments.

2,663,561 2,466,104

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$49,368, maturing in January, 2010. Secured by Whitman Lake Hatchery, equipment, assignment of surplus fish, and assignment of assessments.

435,038 397,276

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$24,067, maturing in January, 2011. Secured by assignment of surplus fish, and assignment of assessments.

215,646 196,926

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$63,572, maturing in January, 2010. Secured by assignment of surplus fish, and assignment of assessments.

560,208 511,582

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$42,547, maturing in January, 2011. Secured by assignment of surplus fish, and assignment of assessments.

381,245 348,142

## ADDITIONS,

1989

1,409,209

102,477

9,338

412,158

65,312

1,998,494

78,823

322,711

576,036

251,427

581,829

81,609

427,305

111,816

2,431,556

(433,062)

(708,807)

(1,141,869)

120,875

(675,263)

(554,388)

(1,696,257)

102,477

(1,593,780)

(443,135)

(49,254)

(492,389)

\$2,086,169



**STATEMENT OF CHANGES IN CASH**

Years Ended December 31, 1990 and 1989

|                                                                                | 1990             | 1989             |
|--------------------------------------------------------------------------------|------------------|------------------|
| <b>OPERATING ACTIVITIES</b>                                                    |                  |                  |
| Excess (deficiency) of revenues over expenses after capital additions .....    | (726,655)        | (1,593,780)      |
| Adjustments to reconcile net income to net cash provided (used) by operations: |                  |                  |
| Depreciation .....                                                             | 728,180          | 708,807          |
| Addition of accrued interest to note principal .....                           | 445,341          |                  |
| Investment income                                                              |                  |                  |
| Included as operating item .....                                               | (47,989)         |                  |
| Loss from write off of long-term interest receivable .....                     |                  | 18,662           |
| Gain on sale of fixed assets .....                                             | (5,950)          |                  |
| Decrease in accounts receivable .....                                          |                  | 6,298            |
| (Increase) decrease in prepaid expenses .....                                  | 2,559            | (13,115)         |
| Decrease in interest receivable .....                                          | 6,627            | 5,920            |
| (Increase) decrease in refundable deposits .....                               | (585)            | 1,170            |
| (Increase) in grants receivable .....                                          | (89,451)         | (288)            |
| Increase (decrease) in accounts payable .....                                  | 152,780          | (25,564)         |
| Increase in interest payable .....                                             | 599,928          | 173,056          |
| Increase in accrued vacation payable .....                                     | 3,132            |                  |
| Increase (decrease) in deferred grant revenue .....                            | (7,232)          | 7,232            |
| Cash provided (used) by operating activities .....                             | <u>1,060,685</u> | <u>(711,602)</u> |
| <b>INVESTING ACTIVITIES</b>                                                    |                  |                  |
| Proceeds from investments .....                                                | 3,557,508        | 2,644,388        |
| Purchase of investments .....                                                  | (3,817,782)      | (2,257,501)      |
| Capital expenditures with unrestricted cash .....                              | (176,063)        | (224,286)        |
| Capital expenditures with cash from grants .....                               | (101,721)        | (102,477)        |
| Cash provided (used) by investing activities .....                             | <u>(538,058)</u> | <u>60,124</u>    |
| <b>FINANCING ACTIVITIES</b>                                                    |                  |                  |
| Principal payments on long-term debt .....                                     |                  | (155,174)        |
| Cash (used) by financing activities .....                                      |                  | <u>(155,174)</u> |
| Increase (decrease) in cash and cash equivalents .....                         | <u>522,627</u>   | <u>(806,652)</u> |
| CASH AND CASH EQUIVALENTS TO BEGIN .....                                       | <u>378,117</u>   | <u>1,184,769</u> |
| CASH AND CASH EQUIVALENTS TO END .....                                         | <u>\$900,744</u> | <u>\$378,117</u> |

See accompanying notes to the financial statements.

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$21,332, maturing in January, 2011. Secured by assignment of surplus fish, and assignment of assessments.

191,149 174,552

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$122,545, maturing in January, 2012. Secured by land and leasehold improvements at Neets Bay, assignment in trust of Term Special-Use Permit, and an assignment of future revenues and proceeds of sales of surplus fish and eggs.

1,114,758 1,080,512  
(Continued on next page)

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Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$59,590, maturing in January, 2013. Secured by assignment of future revenues and proceeds of sales of surplus fish and eggs.

549,470 517,000

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$105,384, maturing in January, 2014. Secured by Deed of Trust on Neets Bay real property, Neets Bay leasehold improvements and equipment, assignment of U.S.D.A. Forest Service lease, and an assignment of future revenues and proceeds of sales of surplus fish and eggs.

900,000 900,000

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$62,240, maturing in January, 2009. Interest will not begin to accrue until June 20, 1990. Secured by Deed of Trust on Neets Bay real property, Neets Bay leasehold improvements and equipment, assignment of U.S.D.A. Forest Service lease, and an assignment of future revenues and proceeds of sales of surplus fish and eggs.

538,342 538,342

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$40,581, maturing in January, 2009. Interest will not begin to accrue until June 20, 1990. Secured by equipment at Neets Bay and Whitman Lake hatcheries and an assignment of future revenues and proceeds of sales of surplus fish and eggs.

351,000 351,000

Note payable to the Department of Commerce, State of Alaska, at 9.5% interest. Annual payments of \$472,931, maturing in January, 2013. Secured by Deed of Trust on Neets Bay real property, an assignment in trust of Term Special-Use Permit, Neets Bay Hatchery equipment and an assignment of future revenues and proceeds of sales of surplus fish and eggs.

3,783,000 3,783,000

11,987,023 11,541,663

Less current portion

184,144 0

\$11,802,879 \$11,541,663

Principal maturities on long-term debt over the next five years are as follows:

For the year ended December 31:

|      |           |
|------|-----------|
| 1991 | \$184,144 |
| 1992 | 238,204   |
| 1993 | 259,792   |
| 1994 | 283,348   |
| 1995 | 309,051   |

#### NOTE 5

#### SALMON ENHANCEMENT TAX

The 1980 Alaska State Legislature enacted legislation for adoption and implementation of a salmon enhancement tax. Under the legislation, processors are required to collect a 3% enhancement tax from sellers of salmon and transfer it directly to the State. Each year the State may appropriate the tax receipts to each aquaculture association in the State of Alaska. Revenue from the salmon enhancement tax is recognized by SSRAA as appropriations are received. Appropriations received for the years ended December 31, 1990 and 1989 totaled \$2,188,889 and \$1,409,209, respectively.



**NOTE 7**

**INVESTMENT IN TIME CERTIFICATES OF DEPOSIT, REPURCHASE AGREEMENTS AND MARKETABLE SECURITIES**

SSRAA has designated investment in time certificates of deposit, repurchase agreements, and marketable securities to be used for the purpose of meeting debt service requirements and to provide for funding of normal operations, if the need should arise. At December 31, 1990 and 1989, SSRAA had \$525,000 and

\$200,000, respectively, invested in repurchase agreements, all of which had original maturities of less than three months and are included in cash and cash equivalents. SSRAA had \$1,365,741 and \$1,057,508 at December 31, 1990 and 1989, respectively, in marketable securities, which are included as current assets.

There were no realized or unrealized gains or losses relating to SSRAA's marketable securities during the years ended December 31, 1990 and 1989.

**SCHEDULE I — PROPERTY AND EQUIPMENT**

December 31, 1990 and 1989

|                                            | 1990               | 1989               |
|--------------------------------------------|--------------------|--------------------|
| Beaver Falls Hatchery .....                | 534,066            | 363,985            |
| Whitman Lake Hatchery .....                | 4,747,327          | 4,747,327          |
| Neets Bay Hatchery .....                   | 7,365,400          | 7,190,136          |
| Remote operating and field equipment ..... | 767,721            | 729,730            |
| Office furniture and equipment .....       | 54,917             | 54,918             |
| Construction in progress .....             |                    | 106,351            |
|                                            | <u>13,469,431</u>  | <u>13,192,447</u>  |
| Less accumulated depreciation .....        | <u>(5,307,683)</u> | <u>(4,586,252)</u> |
|                                            | <u>\$8,161,748</u> | <u>\$8,606,195</u> |

See accompanying notes to the financial statements.

**SCHEDULE II — EXPENSES**

Year Ended December 31, 1990

|                             | Regional Activities | Whitman Lake Hatchery | Neets Bay Hatchery | Tagging and Quality Control | Special Projects | Neets Bay Harvest | Administration   | Grants and Contracts | Total              |
|-----------------------------|---------------------|-----------------------|--------------------|-----------------------------|------------------|-------------------|------------------|----------------------|--------------------|
| Casual and contract labor   | 24,709              |                       | 3,490              | 36                          | 1,153            | 23,063            |                  |                      | 52,451             |
| Charters                    |                     | 10,138                | 34,243             | 5,570                       | 97,419           | 137,110           | 3,375            |                      | 287,855            |
| Committee fees and expenses | 3,488               |                       |                    |                             |                  |                   | 5,260            |                      | 8,748              |
| Consultants                 |                     |                       |                    |                             |                  |                   | 8,500            |                      | 8,500              |
| Employee benefits           |                     | 19,173                | 25,532             | 11,549                      | 11,895           |                   | 17,446           | 4,146                | 89,741             |
| Property and equipment      |                     |                       |                    |                             |                  |                   |                  | 101,721              | 101,721            |
| Fish food                   |                     | 61,902                | 261,554            |                             | 34,688           |                   |                  |                      | 358,144            |
| Fuel                        |                     | 1,346                 | 20,912             |                             | 19,426           |                   | 35               |                      | 41,719             |
| Insurance                   | 5,993               | 14,410                | 20,979             | 2,008                       | 14,594           | 858               | 84,276           | 3,740                | 146,858            |
| Laboratory analysis         |                     |                       |                    | 1,164                       |                  |                   |                  |                      | 1,164              |
| Leases                      |                     | 1,310                 | 2,470              |                             | 885              |                   |                  |                      | 14,665             |
| Other                       | 1,975               |                       |                    |                             |                  |                   | 1,383            |                      | 3,358              |
| Payroll taxes               |                     | 13,997                | 22,147             | 12,084                      | 15,029           | 1,267             | 16,158           | 3,889                | 84,571             |
| Printing and advertising    | 5,738               | 1,035                 |                    |                             | 204              | 1,036             | 427              |                      | 8,440              |
| Professional services       |                     |                       |                    |                             | 30,297           |                   | 64,365           |                      | 94,662             |
| Rent                        | 527                 | 60                    | 713                |                             | 7,203            |                   | 34,574           |                      | 43,077             |
| Repairs and maintenance     |                     | 737                   | 5,964              | 1,399                       | 110,868          | 22,303            | 3,167            |                      | 144,438            |
| Salaries                    |                     | 148,320               | 231,645            | 130,215                     | 158,189          | 10,634            | 193,266          | 41,210               | 913,479            |
| Supplies                    | 3,270               | 41,909                | 33,055             | 50,796                      | 19,493           | 2,448             | 29,778           | 13,266               | 194,015            |
| Travel                      | 29,861              | 2,077                 | 4,732              | 870                         | 1,619            |                   | 12,562           | 2,713                | 54,434             |
| Utilities and telephone     |                     | 14,590                | 528                |                             | 3,598            |                   | 14,330           | 2,580                | 35,626             |
|                             | <u>75,561</u>       | <u>341,004</u>        | <u>667,964</u>     | <u>215,691</u>              | <u>526,566</u>   | <u>198,719</u>    | <u>488,902</u>   | <u>173,265</u>       | <u>2,687,666</u>   |
| Depreciation                |                     | 260,268               | 406,677            |                             | 26,006           |                   | 5,229            |                      | 728,180            |
|                             | <u>\$75,561</u>     | <u>\$601,272</u>      | <u>\$1,074,641</u> | <u>\$215,691</u>            | <u>\$552,566</u> | <u>\$198,719</u>  | <u>\$494,131</u> | <u>\$173,265</u>     | <u>\$3,415,846</u> |

See accompanying notes to the financial statements.



# FRED likes transfer idea - later '91 releases

(Continued from Page 1) ... we were looking at making some of the transfers go forward with the remaining \$5 million. (The Tutka and Main Bay projects) looked like they could hit the street running."

That didn't mean the other projects were "ranked" higher than the Beaver Falls transfer, he said. Operating funds were still available for SSRAA to operate Beaver Falls for the state (as happened last year); but there were no operating funds budgeted for Main Bay, for instance.

"We are just extending the transfer process until next year's (capital budget), at which time the Commissioner has voiced the opinion that it will go through," Koenings said. "We are certainly carrying forward our mission of doing sockeye enhancement in southern Southeast and it will continue to be a high priority

item."

Koenings called the Beaver Falls program "obviously viable - We intend to go fully forward with it. I am heavily involved in sockeye enhancement - that's what I do, that's what we do best. We intend to carry forward on sockeye in the Southeast."

FRED support for sockeye will include continued lake plants to restore runs (such as at Hugh Smith and Virginia Lake) and also the lake fertilization work that has provided a strong run at MacDonald Lake. As a result of that program, MacDonald has the biggest run in a given system in Southeast, Koenings said.

He said FRED also is looking at coho rehabilitation on Prince of Wales Island, working closely with the U.S. Forest Service, studying the carrying capacity for coho in some of the streams and looking at the ef-

fects of logging there.

Koenings, 44, was ADF&G's principal limnologist since 1980, overseeing the department's lake stocking and lake enrichment projects, as well as running the limnology lab in Soldotna. He holds a bachelor's degree in water resources, a master's in water resources and a doctorate in natural resources.

In naming him FRED Director, ADF&G Commissioner Carl Rosier called Koenings a respected scientist with a "vision for where the FRED Division needs to go in the '90s."

That vision includes continued close ties with SSRAA without duplication of efforts. "We want our resources to go as far as possible. Our missions are complementary, not at cross purposes," Koenings said, adding, "I feel this delay (in the transfer of Beaver Falls) won't shake this premise."

(Continued from Page 1)

ever, though lower than 1985's record release of nearly 42 million. Future fall chum releases are expected to be about 37 million.

Sockeye releases were about the same as 1990, more than a half million, with the most releases ever at Shrimp Bay, and lower releases at Beaver Falls.

The coho and chinook were released about the same size and at the same time as last year. However, chum and sockeye were small this year due to lower spring water temperatures.

Summer chum release timing was good, during an excellent plankton bloom, Amend said. The fall chum were smaller but released in May. The sockeye averaged nearly 5 grams when released May 31.

Although that is within the time and size "window" considered optimum, Amend said the general belief is that larger fish released in mid-May would have been better.

Except for the slightly smaller size of some fish, Amend said there were not unusual conditions which should affect ocean survival. No pollack were observed; quality control observations were good; and a net washer new to Neets Bay last year provided the best environment in years for rearing chum. "There was little sign of disease and overall the fish looked very good," Amend said.

Most of the fish released this year will return in 1994. "If survival rates are anywhere near average, this should provide for the largest return of salmon back to SSRAA facilities," Amend said.

## New address?

If you are a permit holder whose address has changed, and you want your *Spawning News* sent to the correct address, you must send the address change to: State of Alaska, Commercial Fisheries Entry Commission, 8800-109 Glacier Highway, Juneau AK 99801. The CFEC fax number is 789-6170. We cannot change your address.

## Notes to financial statements

(Continued from page 7)

### NOTE 9

#### DEFINED CONTRIBUTION PENSION PLAN

SSRAA offers an employee sponsored defined contribution pension plan covering substantially all employees. Any employee is eligible to participate in the plan upon completing an amendment to their employment agreement, which authorizes payment of up to 20% of the employee's gross annual wage (not to exceed \$9,500) through payroll deductions.

SSRAA also offers an employer sponsored defined contribution plan for eligible employees. Employees working at least 1,000 hours a year who are 18 years of age or over, are eligible for plan coverage upon completion of 12 consecutive months of ser-

vice, provided they are employed on December 31 of the year in question. Contributions to the plan are determined annually by the Board of Directors, with the final decision being made in December of each year. For the years ended December 31, 1990 and 1989, SSRAA contributed 2% of all eligible employees' wages to the plan, for a total of \$12,293 and \$13,367, respectively.



### NOTE 11

#### SUBSEQUENT EVENT - DISALLOWED PRE-AWARD EXPENDITURES

In a letter, dated 4-25-91, SSRAA was informed by the State of Alaska, Department of Fish and Game, that "pre-award" expenditures made prior to December 1, 1990 for various US/Canada mitigation grants were disallowed. The total of the disallowed expenditures is \$82,035, and is reported as disallowed grant expenses. The contract specifically stated the starting date was October 1, 1990. However the federal granting agency allowed only expenditures on or after December 1, 1990, using the dates the documents were signed rather than the stated effective date noted on the Grant agreement. SSRAA is currently negotiating to completely recover the disallowed costs.

# Anglers see decline of wild fish as more than loss of sport

© 1991 Seattle Post-Intelligencer

By Rob Taylor  
P-I Reporter

**SKYKOMISH RIVER, NEAR GOLD BAR** — A wall of firs and white mist looms behind the river. Three mergansers shoot past, bank left with the stream and are gone. Pete Soverel's eye returns to his fly, angling across a green ripple 80 feet downstream.

Soverel's hat brim drips with drizzle — perfect weather for a fly-fishing fanatic. And Soverel, who spends 50 days a year up to his thighs in rushing green water, is certifiable.

His target is the wild steelhead, a silvery ghost that can explode from smooth water like a bolt of lightning. One swirls by Soverel's No. 8 caddis fly. "Yeahh," exclaims the fisherman. He gathers armloads of line to cast again.

Chairman of the steelhead committee of the Federation of Fly Fishers, Soverel worships fish that have never eaten pellet food or milled about in rearing ponds.

Wild fish "take their time" returning from the sea, he says. They disperse along the river to lie in fast-moving, streamy water. They hit a fly more aggressively and fight harder than their domesticated cousins.

Hatchery fish, Soverel figures, behave more like nervous commuters. Returning adults rush back to their hatchery site, leaving anglers crowding by the outlet pipes to catch them.

They behave unnaturally, rushing toward men, expecting food. "There's just something wrong there," he says.

Here in the Skykomish, he says, wild runs are depressed.

Soverel calls hatcheries "perhaps the worst" of the calamities that have befallen Northwest salmon and steelhead. His distaste is part science, part aesthetics and part "Pete theories," accumulated in 30 years casting lines.

Soverel wants hatcheries phased out where they conflict with wild runs and their budgets converted to repairing habitat.

His group favors making anglers release wild steelhead until studies show runs are healthy. Anglers could keep hatchery fish, which can be marked.

In a step in that direction, the Wildlife Department proposes to require the release of wild steelhead caught in Western Washington from June to November 1992.

For every Pete Soverel, there appear to be plenty of fishermen who are glad to have hatchery fish. The fact is that about 80 percent of steelhead caught in the Northwest come from hatcheries, and the proportions for coho and chinook are almost as high.

Hatchery fish "are just as big and fight just as hard as natural-spawning fish," says John Kelly of the King County Outdoors Sportsman Council.

"We need hatcheries," agrees Geoff Lebon, president of the Washington Trollers Association, an ocean-fishing group.

"We've ruined our habitat," Lebon says, "especially in the middle of the Puget Sound. Without hatcheries, we wouldn't have much of a fishery."

But many anglers take Soverel's approach, revering wild fish and viewing their peril as an index of environmental damage.

Bruce McNae, president of Washington Steelhead Flyfishermen, says, "They're the coal miner's canary."





A P-I  
SPECIAL  
REPORT

# Hatching Trouble

## Imon hatcheries awning danger state's wild fish

Seattle Post-Intelligencer

by Taylor

Wild salmon waited patiently, dispersed logs and behind boulders, facing upstream, watched for food to float by.

When fry burst in like a mob, Milling in dense packs, they shunned the natives' feeding technique. They raced after drifting, mistaking it for food. They let the current hem downstream. And in what some call "Piper effect," about half the wild fish joined the stampede.

The scene, watched by snorkeling scientists, led the Leavenworth Hatchery's release of spring chinook into Icicle Creek and the Shee River a few years ago. It illustrates problems with hatchery fish: Compared with wild cousins, they are ill-suited for survival yet by sheer strength of numbers, they displace wild fish.

Hatcheries "take eggs and make schmucks of them," grumbles one fishery biologist. Behavior is completely different from wild.

Hatcheries are, to be sure, usually a substitute habitat trashed by dams, logging and growth. They greatly expand fish survival in the early months of life. That has helped meet a rising demand for fish, but at a cost. Hatchery programs contribute to the decline of wild fish and often provide poor substitutes. Scientists worry that the decline of wild runs could lead to a kind of genetic bottleneck that depresses entire fisheries. This year, as the Endangered Species Act has been invoked to protect three wild salmon runs on the Snake River, agencies are taking a new look at hatcheries' benefits and costs.

Hilborn, a University of Washington professor of fishery biology, claims the costs are in dollars and lost wild fish — and that benefits have been overstated. Many hatcheries' adult survival rates are low, Hilborn says. The Leavenworth Hatch-

ATCHERIES, Page A4

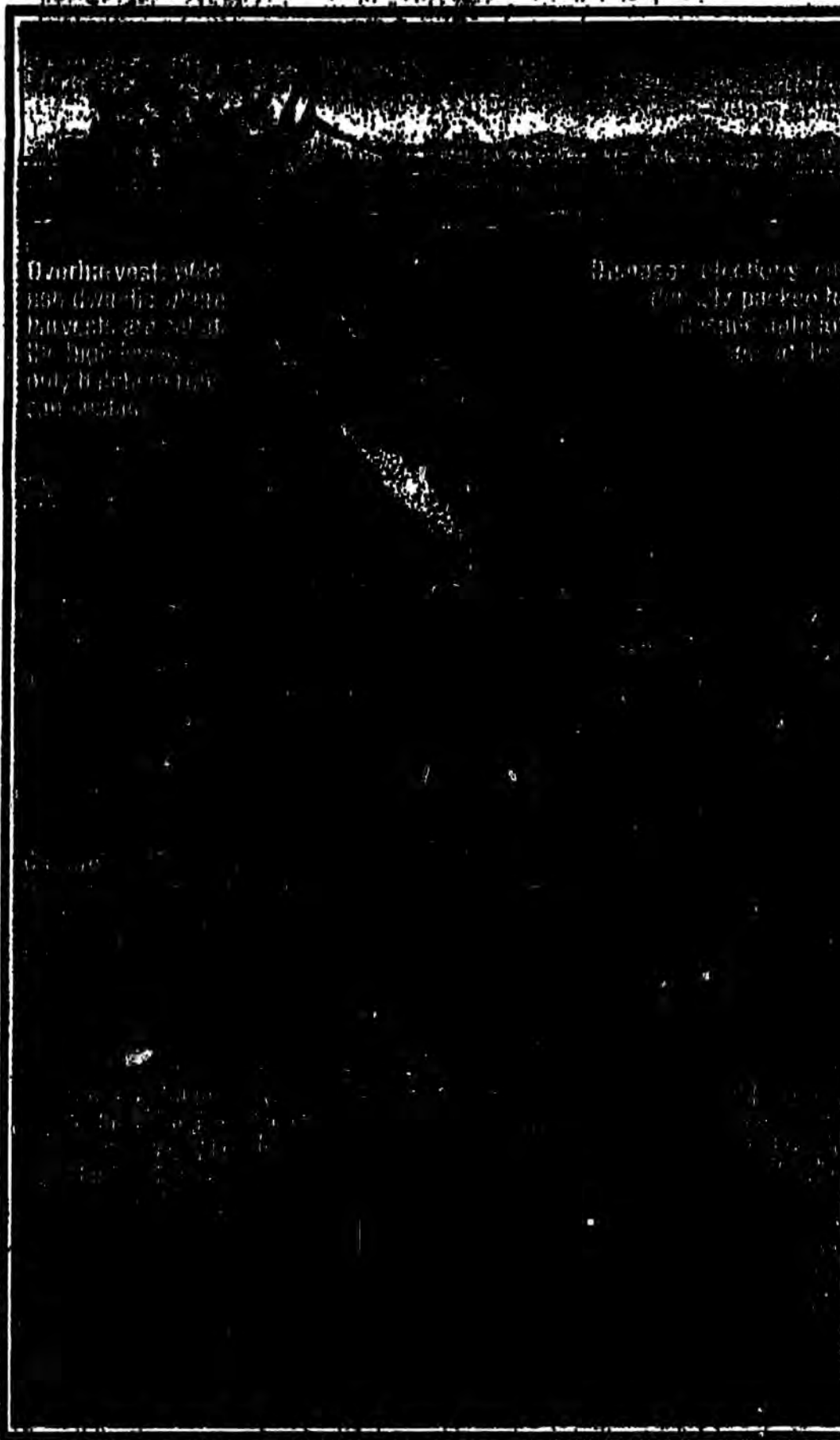
Idea: Some recreational fishermen release wild fish.

Warning: Fishery managers are considering changes to boost wild runs.

Warning: Hatcheries help fishermen push wild fish toward extinction.

Over the vast, wild  
north down the Snake  
River, hatcheries are set at  
the high end of the  
scale. Hatcheries are  
notorious.

Because of the danger of  
the fish being packed in  
the same hatchery  
run at the



LAUREN

# hcheries: bate of costs benefits

Page 1

roduces only about three fish — caught or returned to 1 — for each 1,000 released.

ew returns can drive the cost h far above their market

A UW study of four British ible hatcheries found that adult catch from one, the r River's Quamel Hatchery, about \$800 per fish. Hilborn

The cheapest, he asserts, about \$3 a pound even with- ounting the costs of catching, ing and selling the fish.

me justify the costs as the of urbanization or cheap electricity. But Hilborn con- the money would be better on improving habitat.

he Leavenworth Hatchery, ys, "is not doing anybody any It's just driving the wild fish he ground."

the wild, superiority of wild is well-documented. Studies shown they produce two to times more returning adults hatchery fish mating in the

Wild fish survive better at and return more surely to native spawning grounds.

t the extreme, hatcheries can cause a net loss of fish. A

year Oregon study compared tal streams seeded with ary fry with those that were The seeded streams suffered

percent drop in wild fish, despite a slight increase in initial adult returns, seeded

me contained 33 percent few- ish overall in the second ration.

hat study shook Oregon's ry programs. They cut back ing of coastal streams and ed hatcheries and harvests e to protect wild fish.

Where hatcheries do succeed, orn contends, they usually e out wild fish but have ble sustaining their initial

luction. "Ten years down the l, they get half or a quarter of t they initially got."

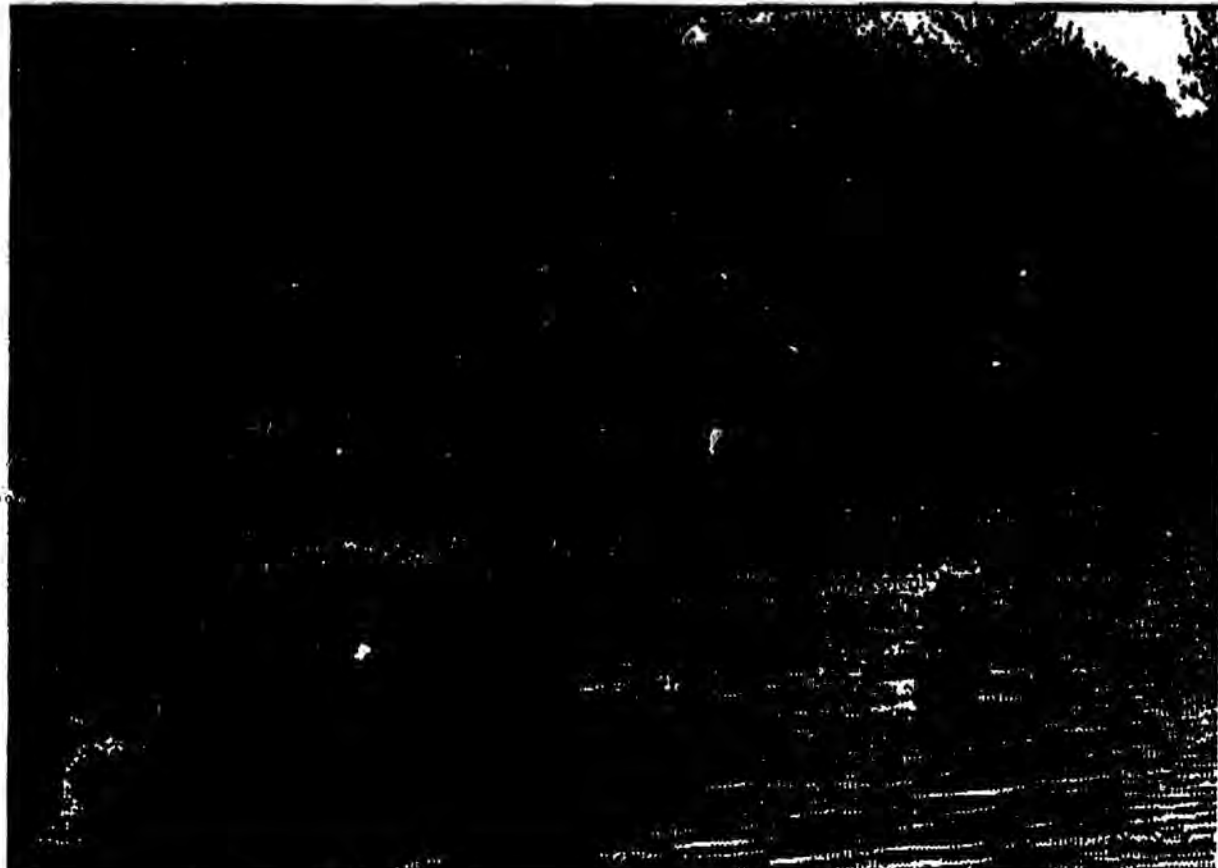
Since the early 1960s, for in- os, hatcheries from southern

ington to northern California, e doubled their output of coho

its, but their returning adults e dropped since the mid-1970s.

Scientists are divided on the e of such declines. Some

ne factors such as ocean con-



GRANT M. HALL

"There's just something wrong there," Pete Sovarel says of hatchery fish, which rush toward men, expect food — an unnatural behavior. He wants some hatcheries phased out and their budgets used to repair habi-

fire. A state Department of Wild- life effort to breed bigger steel- head produced a lot of albino fish. Taking eggs and sperm from the first fish to return, once a com- mon cost-cutting move, has re- duced survival rates of hatchery fish in the wild; their eggs hatched during winter floods.

Another harmful practice has been the transfer of eggs and fish from one watershed to another. The Columbia River's Bonneville Hatchery has received chinook eggs from as far away as Eastern Washington, Southern Oregon and even Alaska.

Such exchanges are now more tightly controlled, but throughout the Northwest they have eroded genetic differences among both hatchery and wild stocks.

Agricultural science has dem- onstrated the costs of such uniformity, as new hybrids gave farmers higher yields but new vulnerability. The National Academy of Sciences blamed genetic similarity for an epidemic of corn blight in 1970 and 1971. Corn plants "had become as alike as identical twins," the academy said. "What- ever made one plant susceptible made them all susceptible."

The Lyons Ferry Hatchery provides an unusually clear exam- ple of how hatcheries can orn-

There are signs the same thing has happened in the wild. Stream surveys last year found that hatch- ery fish made up as much as three-quarters of the fish on Snake River spawning grounds.

Interbreeding "severely con- taminated what we have known as wild Snake River fall chinook," Schmitten says. The incident "raises the question of whether we even have any wild chinook left."

Schmitten's agency has pro- posed listing the run as "threat- ened" under the Endangered Spe- cies Act and said in a report that hatchery operations "pose clear and immediate threats" to its genetic integrity.

Fred Allendorf, biology profes- sor at the University of Montana, Missoula, warns that many such losses "will lead to disastrous losses of biodiversity." If remain-

ing fish are left with a nar- range of genes, he warns, I could fail to adapt to chan- conditions and collapse.

Bill Hopley, assistant chief salmon culture at the Depart- of Fisheries, dismisses the th- of a crash as "theoretical."

Research is so sketchy " nobody can claim for a fac know" that salmon stocks crash, he says. If it were happen, he suggests, such a catastrophe would be far dis- "We're talking evolutionary scales here."

Jim Lichatowich, former t of research for Oregon's De- ment of Fish and Wildlife, waiting for irrefutable proof : disaster.

"To prove it," Lichato- says, "you would have to bring resource close to collapse. T not a responsible policy."



stages, hatcheries from southern Washington to northern California have doubled their output of coho smolts, but their returning adults have dropped since the mid-1970s. Scientists are divided on the cause of such declines. Some blame factors such as ocean conditions rather than hatchery shortcomings.

Not all areas are seeing production fall. Bill Koss, assistant director of the Washington Department of Fisheries salmon program, says the state's total salmon production has grown, thanks largely to hatcheries, to an average of about 8 million salmon in the late 1980s from 5 million in the early 1980s.

"We can have coexistence of wild fisheries and hatchery fisheries, without having one negatively affecting the other," Koss asserts.

Hilborn calls that claim "one of the great lies."

Despite their differences, both sides agree that in many places more hatcheries would bring diminishing added returns, if any. The Columbia River system, for example, now receives more juvenile fish each year than ever by Hilborn's count. Its returning adults, however, have dropped to between one-fifth and one-eighth of their historic abundance.

Bob Francis, head of the UW's Fisheries Research Institute, argues that hatcheries may have bumped against the limit of the Columbia's present capacity.

For hatchery fish, low survival stems partly from conditioning. Fed pellets in crowded pools, they fail to recognize predators and know little about scavenging in the wild. They charge food, wasting valuable energy.

Genetically, non-native hatchery stocks tend to be less adapted to local conditions than natives. Human management may exacerbate the problem. And narrow genetic heritage may reduce their ability to adapt to future change.

Selective breeding can back-

fire an epidemic of corn blight in 1970 and 1971. Corn plants "had become as alike as identical twins," the academy said. "Whatever made one plant susceptible made them all susceptible."

The Lyons Ferry Hatchery provides an unusually clear example of how hatcheries can promote such uniformity. Built by the Washington Department of Fisheries to compensate for the toll dams had taken on the Snake River fall chinook, Lyons Ferry, instead, may have helped push the run into extinction.

The Snake River's fall chinook run once was one of the most productive in the Northwest, but it dwindled in the 1960s and '70s as seven huge dams converted pools and rapids to a chain of tepid lakes. By last year, the late-summer flood of quicksilver had tailed off to a trickle of 78 fish.

For several years, even as the run declined, the hatchery steadily culled almost one-third of the wild spawners in a vain effort to meet its assigned production goal: replacing 18,300 returning fall chinook lost to the dams. It never came close.

"They've been taking way too many of the wild fish," says Roland Schmitt, regional administrator of the National Marine Fisheries Service.

If the Lyons Ferry managers erred, Oregon officials did worse. They flooded the Snake River with genetic outsiders: strays from a mismanaged effort to restore runs in the Umatilla River.

Adult fish returned to find irrigators had left only a trickle of water in the Umatilla. Spawners didn't have a chance of staying there, says Larry Peck, director of salmon culture for the Washington Fisheries Department.

Since the mid-1980s, countless Umatilla hatchery fish have glided past the river's parched mouth and up the Snake River, where Lyons Ferry managers unwittingly mixed them with the fall chinook they bred in captivity.