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Testimony of Karl Ohls
Resources Development Specialist – Division of Trade and Development
Department of Commerce and Economic Development

House Special Committee on Fisheries
Alaska State Legislature

Monday, March 18, 1996

CS For House Bill No. 514
"An Act relating to finfish farming."

Mr. Chairman, members of the committee, thank you again for the opportunity to testify on CSHB 514. My name is Karl Ohls, resources development specialist in the Division of Trade and Development in the Department of Commerce and Economic Development.

I wish to preface my remarks by discussing two basic approaches to economic development that have been practiced in Alaska.

In the first method, statutes are passed, regulations are written, and a potential new industry is provided with a process through which it can obtain the permits and approval necessary to operate. The state then says, "You're on your own."

The second approach — and the one this administration favors — is to work in partnership with industry to identify the needs of the industry, set up a support structure, and to work with industry to overcome whatever obstacles or barriers stand in the way of success.

One of the main purposes of the Governor's Marketing Alaska Initiative was to develop specific ideas for putting the second approach into effect. Industry/government work groups were formed to identify the actions the government could take to help strengthen Alaska's economic sectors.

Our assessment is that CSHB 514 reflects the first approach. It sets up a system through which people can obtain finfish farming permits. Based on our current experience with what we could call "mature" seafood-related businesses, this approach probably will not be enough to establish a successful finfish farming industry in Alaska.

I'd like to offer the committee some cautionary information based on current events in the seafood industry.

Alaska's salmon industry is a mature industry. The products it produces —

canned salmon and fresh-frozen salmon — have been market mainstays for decades. But even with this maturity and years of building business relationships with seafood buyers, the industry is facing serious challenges from new international competition. At the Department of Commerce, we are devoting considerable resources to assisting the industry. We are searching for surplus salmon markets, distributing information on market conditions and alternatives, researching potential value-added products, and organizing the administration's comprehensive response to the problem. This demonstrates that even industries that have been around for a while can suddenly run into problems that require considerable government attention and resources. This should be factored into your considerations.

By contrast, oyster farming is a new industry. The legislation that banned salmon farming also set up a complicated system for issuing permits for shellfish farms. The entrepreneurs that obtained shellfish farm permits and sites have been engaged in a constant struggle ever since to make their businesses profitable. Some of the help they could have used included technical support, extension services, market information, and coordinated sales assistance. The lessons learned from Alaska's oyster farming experience could be a valuable guide to what would need to happen to make finfish farming work in Alaska.

My final example is salmon hatcheries. The State of Alaska entered the aquaculture industry in a big way starting in the 1970's. The thought was that once the salmon started returning in large enough numbers, the situation would take care of itself. But because of the changing world market situation, the hatcheries have been scrambling to stay afloat and find markets and new products for the returning salmon.

At the Department of Commerce, we support new ventures and creative diversification in the seafood industry. We only request that the legislature be fully aware of all the ramifications of a new seafood-related industry and what would be required to make it work.

We must be careful not to create expectations and raise hopes for success and profit without being fully prepared to offer consistent, long-term and appropriate support. Setting up a process for an industry and then just leaving it to fend for itself would not be fair to the industry, its investors, or the people of the state.

Alaska State Legislature

Official Business

State Capitol
Juneau, AK 99801-1182

House Bill 514

By Representative Eldon Mulder

"An Act to repeal the ban on fin fish farming"

SPONSOR STATEMENT

HB 514 would repeal Alaska's current ban on fin fish farming and will allow Alaskan's to participate in the economic benefit of a growing world-wide industry. HB 514 will allow Alaskan processors and entrepreneurs to participate in a business that could provide thousands of year round jobs in areas of the state that otherwise are limited to seasonal employment.

In 1987 the State of Alaska chose to insulate itself from the world salmon market, first by placing a moratorium, and later by enacting an outright ban on fin fish farming. This ban was intended to protect long standing Alaskan wild salmon markets from pen-reared salmon. At the time Alaska controlled, for the most part, the world salmon market and initially the ban, in part, had it's desired effect. Over the years fish farmers began to improve their product and started to nip away at Alaska's share of the world market. In 1984 Alaska held approximately 44% of the worlds salmon market, while farmed fish contributed only 5% to the world market. Just 10 years later, in 1994, Alaska held approximately 30% of the worlds salmon market while fish farms held 35% of the world market. Norwegian fish farmer's produced 414,000 pounds of salmon in 1994 and say that they are planning to produce 2,00,000 pounds in 2010. That would almost double the amount of salmon produced in 1994. Alaska's market share has been reduced by 32% in only 10 years and can be attributed, almost entirely, to the successes of fish farms. Fish farmers are continuing their rapid expansion and there appears to be no end in site.

Clearly, the intent of the ban has not been successful in protecting Alaskan salmon markets. Put simply, Alaskan residents and businesses have been banned from participating in the economic growth of this industry. In fact, we may well be so far behind the curve in salmon farming that we may never be able to be catch up and our share of the world salmon market will continue to dwindle.

Fish farmer's, unlike the harvester's of wild fish, are able to provide a fresh product to consumers on a year round basis as well as taking great care in the handling of the product to insure a high quality product. The ability of fish farmer's to provide a consistent year round product is the single most important advantage that fish farmer's have over the harvester's of wild fish. Wild fish harvester's have been unable to respond to the market demand of providing a fresh product on a year round basis. They have also had difficulty matching the aesthetic quality of farmed fish due to the nature of the fishery.

Alaska State Legislature

Official Business

State Capitol
Juneau, AK 99801-1182

House Bill 514
Sponsor Statement

Fish farmers are now beginning to produce a variety of species, other than salmon, in significant numbers and will, in the near future, be capable of significantly impacting the world market. It is reasonable to expect fish farms to continue to erode Alaska's share of the world fisheries market unless we choose to recognize and address market trends on a world wide basis.

HB 514 will allow Alaskan's to share in the opportunity for economic growth of this developing industry while providing year round employment in rural Alaska. HB 514 will help to ensure that Alaska continues as a leader in the world seafood market.

Secs. 2 — 4. Permanent laws. See Table of Disposition of Acts.

Approved: June 4, 1990
Effective: September 2, 1990

CHAPTER 89

AN ACT AMENDING THE JURISDICTION OF THE DISTRICT COURT, AND INCREASING THE PERIOD DURING WHICH A DISTRICT COURT JUDGE SERVES UNDER AN INITIAL APPOINTMENT BEFORE BEING SUBJECT TO VOTER APPROVAL.

(CSSB 482(Jud))

Be it enacted by the Legislature of the State of Alaska:

Secs. 1, 2. Permanent laws. See Table of Disposition of Acts.

Sec. 3. The provisions of AS 15.35.100(a), as amended by sec. 1 of this Act, apply to district court judges who enter into the duties of the office on or after September 2, 1990.

Approved: June 4, 1990
Effective: September 2, 1990

CHAPTER 91

AN ACT PROHIBITING FINFISH FARMING; AND PROVIDING FOR AN EFFECTIVE DATE.

(CSHB 432(Res))

Be it enacted by the Legislature of the State of Alaska:

Section 1. FINDINGS. Based on a legislative examination of the potential effects of allowing finfish farming in the state on the common property resources and on the overall economic well-being of the state; the number of serious concerns associated with finfish farming and the need for study of finfish farming that has caused the legislature to enact two moratoriums on finfish farming and establish a nonlegislative task force to study the issue and to report its findings and recommendations to the legislature; a review of the final report of the Alaska Finfish Farming Task Force which notes several possible benefits and some serious risks of finfish farming; the need for the legislature to take action before the current moratorium on finfish

farming expires on July 1, 1990; the recommendation of the task force that the legislature not extend the moratorium, but make a final determination to either allow or prohibit finfish farming; and the testimony and evidence received; the legislature finds that

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

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

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

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

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

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

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

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

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

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

Sec. 2. Permanent law. See Table of Disposition of Acts.

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

Permitted to become law
without signature
Effective: July 1, 1990

LEGAL SERVICES

DIVISION OF LEGAL AND RESEARCH SERVICES
LEGISLATIVE AFFAIRS AGENCY
STATE OF ALASKA

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Juneau, Alaska 99801-2105

MEMORANDUM March 13, 1996

SUBJECT: Sectional Summary of CSHB 514( ), (version C); An Act relating to finfish farming.

TO: Representative Eldon Mulder

FROM: George Utermohle
Legislative Counsel

You have requested a sectional summary of CSHB 514( ), (version C); An Act relating to finfish farming.

As a preliminary matter, please note that a sectional summary of a bill is not an authoritative interpretation of the bill. The bill itself is the best statement of its contents.

Section 1 of the bill amends AS 16.40 by adding new sections providing for finfish farming.

Sec. 16.40.220 provides for the issuance of finfish farming permits and regulation of finfish farming activities.

Sec. 16.40.230 provides that violations of AS 16.40.210 - 16.40.239 are class B misdemeanors.

Sec. 16.40.239 defines key terms used in AS 16.40.210 - 16.40.239.

Sections 2 - 3 of the bill make amendments to provisions of AS 03.05 providing for regulation of finfish farms and finfish farm products by the commissioner of environmental conservation on the same basis as aquatic farms and aquatic farm products.

Section 4 of the bill defines "finfish farm" and "finfish farm product" for purposes of AS 03.05.

Section 5 of the bill amends AS 16.05.050(17) to provide that the commissioner of fish and game may regulate finfish farms on the same basis as aquatic farms.

Section 6 of the bill amends AS 16.05.251(f) to provide that the Board of Fisheries may not regulate finfish farms, except in regard to conservation, maintenance, and management of finfish species acquired for finfish farm stock.

Section 7 of the bill amends AS 16.05.930(g) to exempt finfish farming activities from statutes governing commercial fisheries under AS 16.05.440 - 16.05.723.

Section 8 of the bill amends AS 16.05.940(15) to eliminate a definition of fish farm.

Section 9 of the bill amends AS 16.10.269 to exempt the purchase and sale of finfish farm products from statutes governing the sale of fish taken in commercial fisheries.

Section 10 of the bill repeals and reenacts AS 16.40.210(a) to eliminate the current prohibition against finfish farming by authorizing a person to grow or cultivate finfish under positive control for commercial purposes under a permit issued by the commissioner of fish and game.

Section 11 of the bill makes a technical amendment to AS 16.40.210(b) to conform to the changes made by secs. 1 and 10 of the bill.

Section 12 of the bill amends AS 16.43.940 to exempt finfish farming activities from regulation by the Alaska Commercial Fisheries Entry Commission.

Section 13 of the bill excludes finfish farm products from the definition of "seafood" for purposes of statutes relating to the Alaska Seafood Marketing Institute.

Section 14 of the bill amends AS 17.20.370(7) by making a technical change to the definition of "farmed salmon product" for purposes of labeling or identifying farmed salmon that is offered for sale.

Sections 15 - 19 of the bill make technical and conforming amendments to provisions of AS 38.05, so that state land can be made available for finfish farming sites on the same basis as state land is made available for aquatic farming sites.

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Legislative Research Services

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March 12, 1996

MEMORANDUM

TO: Representative Eldon Mulder

FROM: Maria Gladziszewski
Legislative Analyst/Manager

RE: **Finfish Farming Ban in Alaska and World Salmon Production**
Research Request 96.043

You asked for a brief history of the finfish farming ban in Alaska. You requested background on when it was first introduced and by whom. You also asked about legal challenges to the finfish farming prohibition and for any other information that may be pertinent. In addition, you asked for statistics on worldwide salmon production, including changing market share and salmon prices. Finally, you asked for information on what other kinds of pen-reared fish are currently available on the world market.

The Ban on Finfish Farming in Alaska

Although a moratorium on issuing finfish farming permits in Alaska was officially first enacted in 1987, there had been no commercial finfish farming in Alaska. The only farming projects had been state and federal feasibility studies. The Alaska Departments of Fish and Game and Commerce and Economic Development, in cooperation with the National Marine Fisheries Service, had investigated the growth, survival, and market quality of salmon reared in sea water in Alaska during the mid-1980s at the Little Port Walter Hatchery on the south end of Baranof Island.

On May 12, 1987, during the first session of the Fifteenth Alaska legislature, Senators Zharoff, Eliason, and Duncan sponsored a bill to establish a one-year moratorium on finfish farming (SB 297); the moratorium was to expire July 1, 1988. During the second session, in 1988, another bill (SB 514) extended the moratorium until July 1, 1990 and established the Alaska Finfish Farming Task Force. The second bill was introduced on April 20, 1988 by the Senate Rules committee but the provision extending the finfish farming moratorium was added on May 6th by the Senate Finance Committee. The legislature found that finfish farming raised a series of socio-economic, biological, and environmental issues that required in-depth examination and requested that the

Finfish Farming Task Force address those concerns. On January 15, 1990, the Task Force submitted its report to the Alaska legislature. The report concluded that

> the findings, Alaska's unique position as a leading seafood producer, and the broad range of potential types of finfish farming activities do not support an unequivocal "yes" or "no" as to whether any particular type of finfish farming should be permitted. . . . If the legislature decides to allow finfish farming, it is imperative that the necessary regulatory framework be in place in advance of any farming activity. If this caveat is satisfied, the task force concludes that fish farming would have little or no adverse effect on wild stocks in the environment.[1]

The final recommendation of the Task Force was that the legislature should resolve the issue of finfish farming by statutory permission or prohibition before the moratorium expired. Task force members argued that further study and debate was unlikely to change significantly their findings and that the decision whether to permit finfish farming was a political one. They concluded, therefore, that "the legislature should resolve the issue of finfish farming by statutory permission or prohibition before the moratorium expires."[2]

On January 19, 1990, just a few days after the Finfish Farming Task Force report was released, a bill prohibiting finfish farming was introduced. House Bill 432 passed the House in April and the Senate on May 7, 1990. The version sent to the Governor for his signature was sponsored by Representatives Grussendorf, Ulmer, Goll, Davidson, Navarre, Wallis, Hudson, Taylor, C. Davis, Jacko, Kubina, MacLean, Swackhammer, Zawacki, and Boucher and by Senators Fischer, Halford, Szymanski, Duncan, Binkley, Rodey, Kerttula, Jones, Eliason, Zharoff, and Coghill. On June 4, 1990, Governor Cowper did not sign but allowed to become law without his signature the bill prohibiting finfish farming.

Attached are all the available minutes from the hearings in the Alaska House of Representatives on the finfish farming prohibition. The House Resources Committee heard the bill on March 5, March 13, and March 14; the House Judiciary Committee heard the bill on April 3 and April 4. Also attached is the letter from Governor Cowper allowing the bill to become law.

As far as we have been able to determine, no legal challenges have been brought regarding Alaska Statute 16.40.210, the statute prohibiting finfish farming. George Utermohle, legislative counsel, knows of no legal challenges to the finfish farming prohibition.

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[1]Alaska Finfish Farming Task Force, *Report to the Legislature*, January 15, 1990, p. 32.

[2]Ibid, p. 32.

Data on Salmon Production and Prices

Worldwide and Alaska salmon production continues to increase, while salmon farming continues to increase more rapidly than other contributors to production.

Data spanning the last fifteen years on world salmon harvest, farmed salmon production, and average salmon harvest prices in Alaska are presented in Tables One, Two, and Three, respectively. **Worldwide production data presented in these tables should not be considered as one hundred percent reliable because of the difficulty in obtaining production figures from other nations.**

Data from Tables One and Two are presented in two graphs to illustrate worldwide salmon production trends between 1980 and 1994. Figure One illustrates total world salmon production, Alaska catch and worldwide farmed salmon in millions of pounds. Figure Two illustrates the percent of worldwide production contributed by the Alaska catch and by worldwide salmon farming.

Whereas worldwide salmon production has more than doubled and Alaska production has nearly doubled in the past 15 years, *salmon farming worldwide has increased nearly 67 times over the same period.* Tables One and Two (as well as Figure One) show that while worldwide salmon production has increased from 1,242 million pounds in 1980 to 2,855 million pounds in 1994, and Alaska production has also increased from 510 million pounds to 866 million pounds, the contribution of salmon farming has increased dramatically from 15 million pounds in 1980 to 1,003 million pounds in 1994.

Figure Two illustrates that Alaska's contribution to worldwide salmon production has decreased from 41 percent in 1980 to 30 percent in 1994 while the contribution of salmon farming to worldwide production has increased from one percent in 1980 to 35 percent in 1994. By 1994, farmed salmon production had exceeded Alaska wild harvests on the world market.

Average salmon harvest prices in Alaska (by species) for the years 1980 through 1995 from Table Three are presented in Figure Three.

Other Species of Farmed Fish

According to Catherine Egan, staff with the monthly publication *Northern Aquaculture*, fish currently available from North American finfish farms includes trout, arctic char, catfish, tiliapia (a warm water species with appeal to Asian markets), sturgeon, sea bass, walleye, and pike. Industry entrepreneurs are also working on culturing cod but that has not yet reached the commercial production stage.

I hope this information is useful for your purposes. Please do not hesitate to call if you have additional questions.

Attachments

TABLE ONE:
WORLD SALMON HARVEST FROM MAJOR FISHING COUNTRIES
(millions of pounds)*

Year	Alaska Total(Wild)	Other U.S. Wild	Other U.S. Farmed	Canada Wild	Canada Farmed	Japan Wild	Japan Farmed	Russia Total	Norway Farmed	Scotland Farmed	Chile Farmed	Percent Farmed*	Percent Alaska*	WORLD TOTAL*
1980	510	50	1	unavailable	0	unavailable	4	unavailable	9	1	0	1%	41%	1,242
1981	612	60	2	unavailable	1	unavailable	3	unavailable	19	3	0	2%	44%	1,379
1982	562	67	2	unavailable	1	unavailable	5	unavailable	23	5	0	3%	43%	1,307
1983	561	78	1	unavailable	1	unavailable	4	unavailable	37	6	0	3%	35%	1,595
1984	660	31	3	110	1	378	11	unavailable	49	9	0	5%	44%	1,512
1985	669	58	4	240	1	488	14	271	63	15	1	5%	34%	1,94[illegible]
1986	590	69	3	220	2	409	18	179	101	23	3	10%	40%	1,458
1987	493	69	6	143	6	374	27	308	124	28	3	14%	35%	1,390
1988	526	80	8	189	20	374	36	109	184	40	7	17%	30%	1,726
1989	71[illegible]	66	12	176	39	440	41	402	253	68	18	21%	34%	2,089
1990	689	44	17	191	51	484	57	[illegible]37	330	77	42	29%	33%	2,106
1991	726	54	14	187	62	370	49	554	342	76	54	26%	28%	2,563
1992	691	48	29	143	71	405	50	231	282	89	76	31%	31%	2,198
1993	846	unavailable	unavailable	unavailable	unavailable	unavailable	unavailable	unavailable	unavailable	unavailable	unavailable	31%	31%	2,729
1994	866	unavailable	unavailable	unavailable	77	unavailable	unavailable	unavailable	456	130	152	35%	30%	2,855

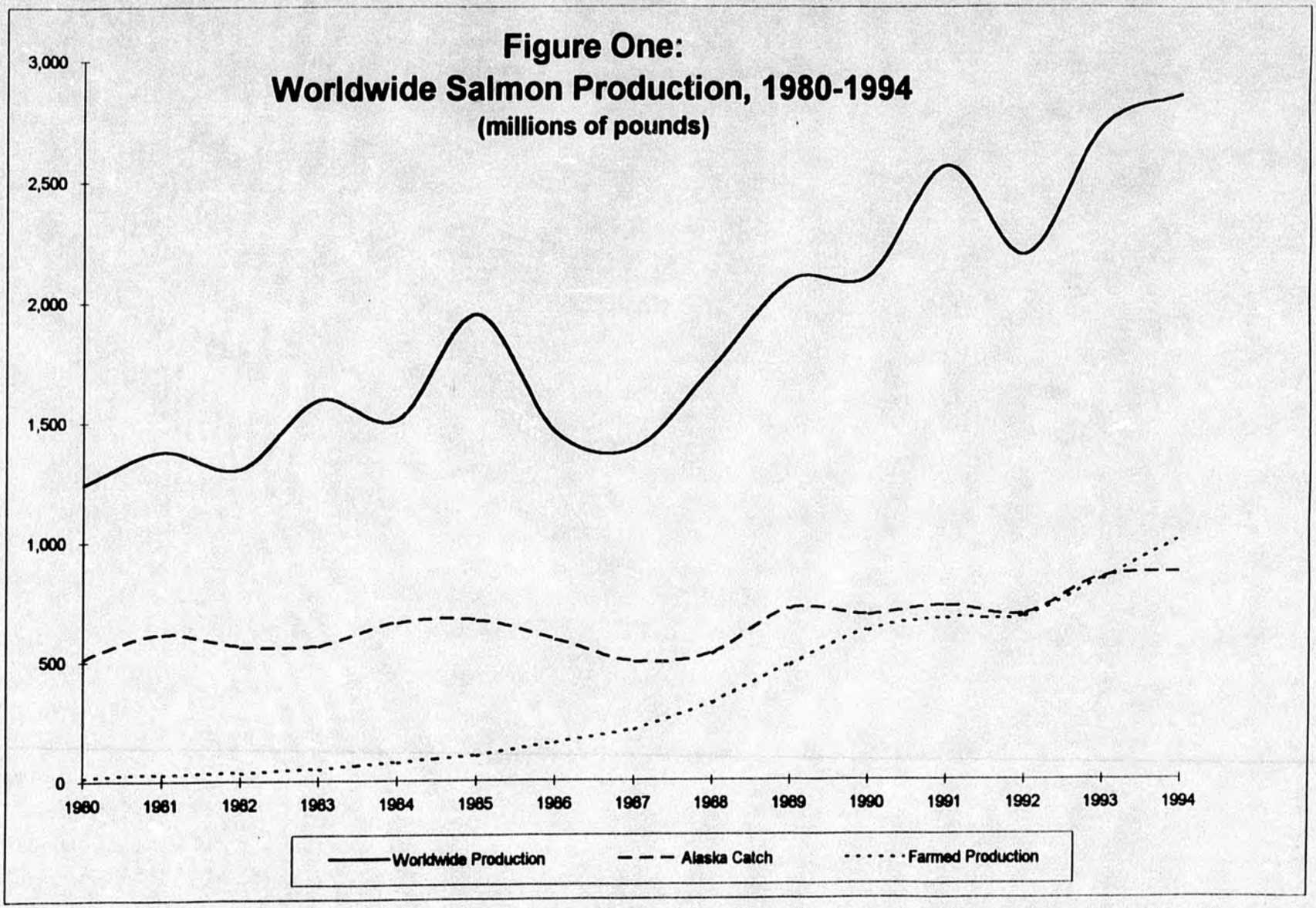
NOTES:

- Data for U.S. and Alaska were listed on several tables in the ASMI source document. For virtually every year, data did not match across tables.
- Data for this table are best-guess approximations from all sections of ASMI's document and are rounded to the nearest one million pounds.
- Given the known discrepencies for Alaska, the reader is cautioned that other country data are also suspect.
- World totals and individual country data were taken from different tables. World totals should exceed the arithmatic sum totals in all cases but, for unexplained reasons, they do not in 1986, 1987, 1989, 1990, and 1992.
- Percentage farmed was calculated using farmed totals from Table Two.
- Total harvest is illustrated in Figure One; percentages are illustrated in Figure Two.

SOURCES:

Salmon 2000 Yearbook, Alaska Seafood Marketing Institute, April 1993. Data on wild salmon harvest from page 4, farmed salmon harvest from page 3, world totals from page 3.
World and Alaska totals for 1993 and 1994 from the Alaska Seafood Marketing Institute.

Prepared by Legislative Research Services, March 1996 (96.043a).



NOTE: This figure illustrates data contained in Table One of Legislative Research Services Memorandum Number 96.043. See Table One for additional notes.

SOURCE: Alaska Seafood Marketing Institute, *Salmon 2000 Yearbook*, April 1993 and additional data.
Prepared by Legislative Research Services, March 1996 (96.043).

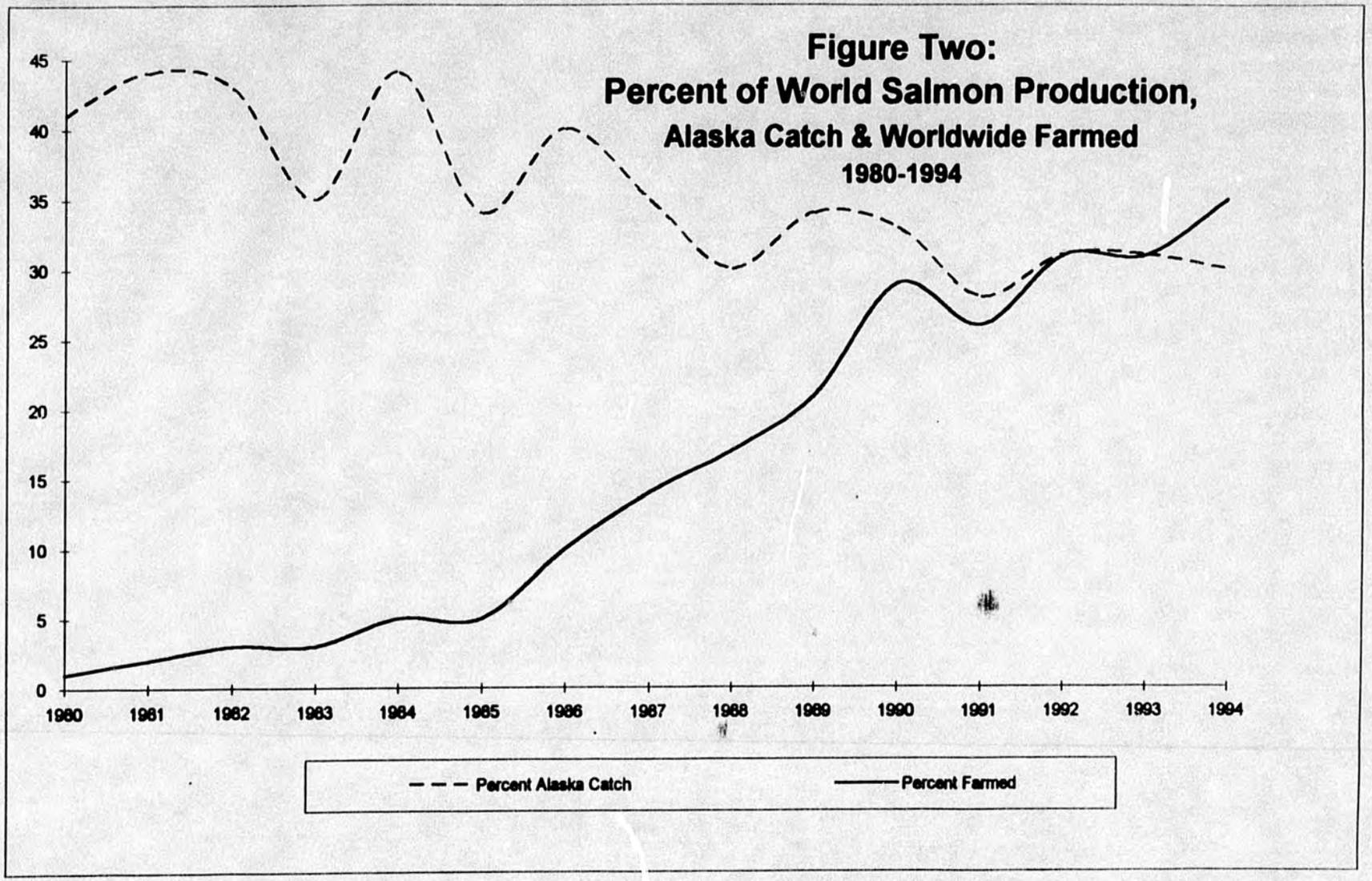
TABLE TWO:
WORLD FARMED SALMON PRODUCTION
(millions of pounds)

YEAR	NORWAY	SCOTLAND	CHILE	CANADA	U.S.	JAPAN	OTHER	TOTAL
1980	9.1	1.3	0.0	0.4	0.9	4.0	0.0	15.0
1981	18.5	2.9	0.0	0.5	1.9	2.5	0.0	26.0
1982	22.6	4.7	0.4	0.9	1.5	4.7	0.0	33.0
1983	37.4	5.6	0.2	0.7	0.8	3.9	0.0	48.0
1984	49.0	8.6	0.2	0.7	2.7	11.0	1.8	74.0
1985	63.0	15.0	1.1	0.9	4.0	14.1	3.9	102.0
1986	100.5	22.7	2.5	2.2	3.0	17.6	7.5	156.0
1987	123.6	27.9	2.6	6.0	5.5	26.8	17.6	210.0
1988	184.0	39.5	6.8	20.0	8.1	36.0	24.6	319.0
1989	252.7	68.2	18.0	38.8	12.3	40.9	48.1	479.0
1990	330.0	77.0	41.8	51.2	16.9	57.2	46.9	621.0
1991	341.7	76.0	54.0	61.9	14.3	49.2	75.9	673.0
1992	282.1	88.6	76.4	70.5	28.6	50.0	85.0	681.2
1993	unavailable	unavailable	unavailable	unavailable	unavailable	unavailable	unavailable	837.7
1994	456.3	130.0	152.1	77.1	unavailable	unavailable	unavailable	1,003.0

SOURCES:

Salmon 2000 Yearbook, Alaska Seafood Marketing Institute, April 1993.
Body of the table is the bottom table on page 3 and the totals are from the top table on page 3 of the ASMI *Yearbook*.
Data for 1993 and 1994 were supplied by Alaska Seafood Marketing Institute, March 1996.
Detailed data for 1993 were unavailable.

Prepared by Legislative Research Services, March 1996 (96.043b).



NOTE: This figure illustrates data contained in Table One and Two of Legislative Research Services Memorandum Number 96.043. See the Tables for additional notes.

SOURCE: Alaska Seafood Marketing Institute, Salmon 2000 Yearbook, April 1993 and additional data.
Prepared by Legislative Research Services, March 1996 (96.043).

TABLE THREE:
ALASKA SALMON HARVESTS, 1980 to 1995
Harvest Value and Average Price per Pound

YEAR	Harvest Value (millions of dollars)	Average Harvest Price (dollars per pound)				
		Chinook	Sockeye	Coho	Pink	Chum
1980	$254.4	$1.42	$0.59	$0.80	$0.35	$0.45
1981	$397.2	$1.51	$0.87	$0.92	$0.43	$0.48
1982	$309.6	$1.60	$0.83	$0.86	$0.22	$0.43
1983	$320.2	$1.16	$0.70	$0.60	$0.25	$0.32
1984	$343.1	$1.74	$0.77	$0.96	$0.25	$0.35
1985	$386.5	$1.54	$0.99	$0.90	$0.24	$0.40
1986	$434.2	$1.52	$1.43	$0.90	$0.24	$0.35
1987	$510.0	$2.02	$1.55	$1.14	$0.42	$0.46
1988	$781.4	$2.71	$2.35	$1.74	$0.79	$0.87
1989	$587.1	$1.85	$1.42	$0.62	$0.44	$0.40
1990	$574.4	$1.88	$1.28	$1.01	$0.33	$0.45
1991	$342.8	$2.07	$0.84	$0.79	$0.15	$0.32
1992	$607.2	$2.01	$1.33	$0.92	$0.21	$0.41
1993	$390.0	$1.44	$0.71	$0.86	$0.13	$0.37
1994	$482.4	$1.35	$1.03	$0.87	$0.19	$0.26
1995	$441.3	$1.23	$0.85	$0.85	$0.15	$0.28

NOTES:

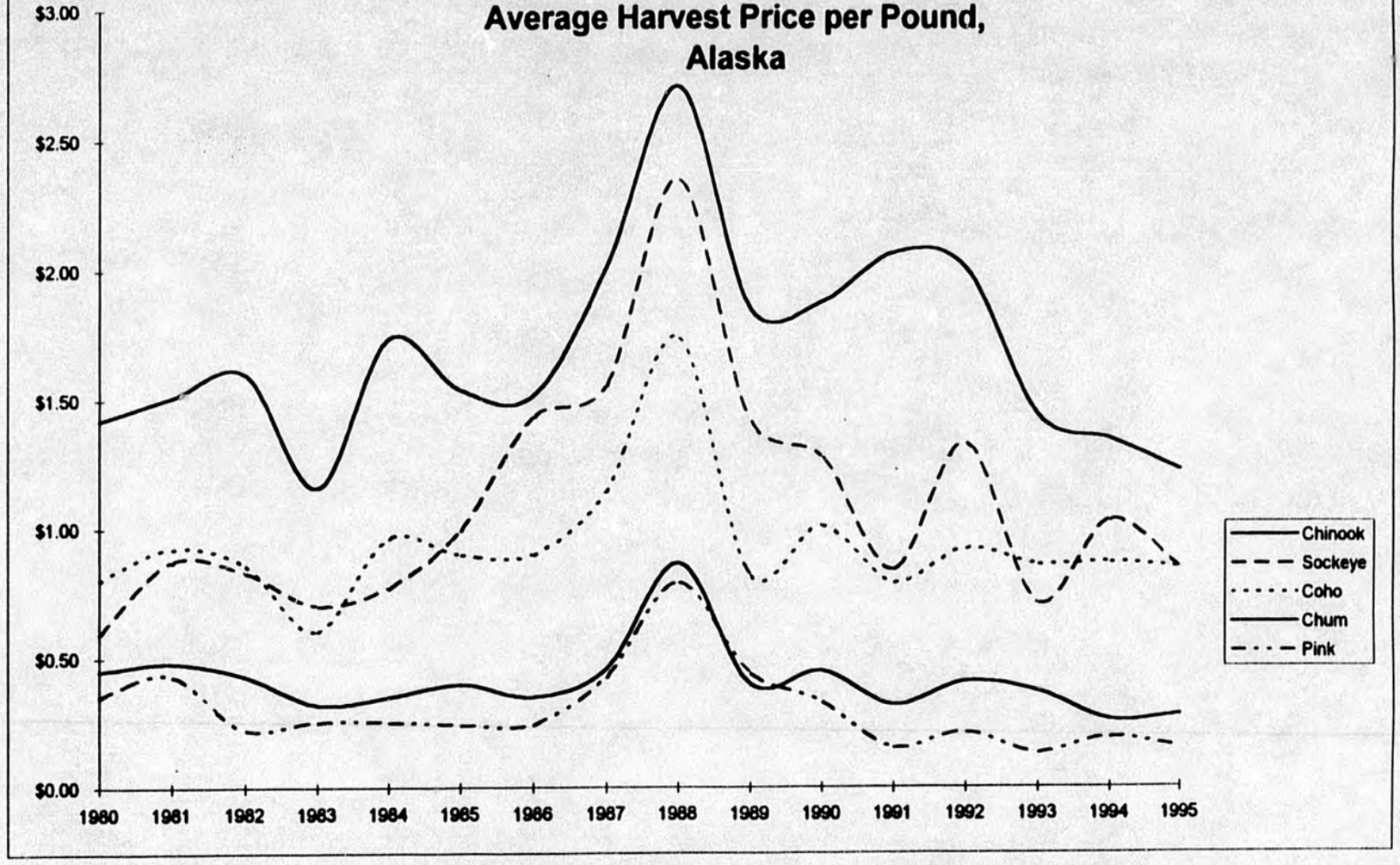
Prices and harvest values should be considered conservative estimates.
Ex-vessel prices per pound for 1993 and 1994 are based on fish tickets and do not include subsequent price adjustments. Data for 1995 are preliminary.

SOURCE:

University of Alaska Anchorage, Institute for Social and Economic Research, Salmon Market Information Service Database (based on data provided by the Alaska Commercial Fisheries Entry Commission & the Alaska Department of Fish & Game).

Prepared by Legislative Research Services, March 1996 (96.043c).

Figure Three:
Average Harvest Price per Pound, Alaska



NOTE: This figure illustrates data contained in Table Three of Legislative Research Services Memorandum Number 96.043. See Table Three for additional notes.

SOURCE: University of Alaska Anchorage, Institute for Social and Economic Research, Salmon Market Information Service Database

Prepared by Legislative Research Services, March 1996 (96.043).

ADN
3/12/96

Fish farms reeling in the buyers

Chile expands program

By A.K. O'REILLY
Journal of Commerce

SANTIAGO, Chile — This nation has become so successful in exporting salmon and trout that a delegation of Alaska salmon fishermen came to visit Chilean farms late last year.

"We are here to see what they do and to bring back ideas for our fish production," said Charles Pratt of Prince William Sound Aquaculture Association.

Chilean exports of farmed salmon and trout increased more than 30 percent to more than 90,000 metric tons, but revenue rose no more than 23 percent to nearly $456 million because of low prices. Salmon and trout exports are expected to increase again this year and in 1997.

Other seafood produced here include turbot — a flat fish grown in captivity and favored by European gourmets — as well as scallops, oysters and mussels, along with some varieties of algae, all grown along Chile's extensive coastline.

Please see Page D-4, FISH

The nation had total seafood exports last year of 178,000 metric tons, valued at more than $500 million.

Fundacion Chile, a technology transfer institution set up in 1976, is responsible for the booming aquaculture industry. Salmon ranching — releasing small fish in rivers and hopefully capturing adults as they swim up the same river to spawn — had been tried with little success in Chile since the early 1940s.

Fundacion Chile introduced salmon growing in floating cages in 1979, giving birth to an industry that currently includes more than 60 companies, from large operations tied to the country's most powerful economic groups to small independent producers, directly employing over 15,000 people. The institute is studying the commercial exploitation of several other marine species, including abalone, sea urchins and sturgeon.

The main market for frozen salmon, which represents two-thirds of the total product, is Japan. Fresh and chilled salmon is exported to the United States, Europe and other Latin American countries.

These exports are shipped via air on such carriers as American Airlines, Federal Express and three Chilean airlines — Lan-Chile, Ladeco and Fast Air, the latter an all cargo carrier.

Brazil is emerging as a significant buyer. Tomas Pablo Bascunan, general manager in Chile for FedEx, said he expects fresh salmon cargoes to Brazil to double this 1996-97 season to 1,000 tons.

Miami is the main port of entry for Chilean salmon exported by air to the United States. Competition among carriers there has led to lower freight rates for the Chilean growers, who truck their fish in refrigerated containers to Pudahuel, Santiago's international airport. There was airplane service from Puerto Montt's Tepual Airport, but the service was discontinued because freight rates didn't compensate for flying empty planes south.

The bulk of salmon exports are shipped by sea. Claudio Pommiez, head of the SAAM agency in Puerto Montt, in the center of the salmon growing region, represents Chilean Line in its ANDEX Service, which it operates jointly with Japan's NYK Line. SAAM handles 58 percent of all frozen salmon exports to Japan.

"We expect that frozen salmon exports will double in volume by the year 2000," Pommiez said, "and we will have the facilities to handle it."

While SAAM might well have the necessary equipment, the Port of Puerto Montt has neither the ship frequencies nor the infrastructure necessary to move refrigerated containers. These containers are trucked some 500 miles north, to the Port of Lirquen, near Concepcion, for loading.

14.

Alien pike serious threat to salmon on Kenai River

The Associated Press

KENAI — Forget habitat loss, overharvesting and calamitous acts of nature. The most serious threat to salmon on the Kenai River may be evil-eyed, sharp-fanged, alien invaders.

No, the predators are not from outer space. They were brought to the Peninsula by well-meaning amateur fish planters who wanted northern pike in their favorite fishing holes.

"It's not a question of whether they are going to expand throughout the drainage, but when," said Terry Bendock, a biologist for the Alaska Department of Fish and Game in Soldotna. "As we've seen them spread throughout the Susitna River Basin, we've seen commensurate declines in coho and sockeye stocks."

Pike, commonly referred to as "water wolves," are ruthlessly efficient predators.

They hunt by ambush. Hiding in weed beds, they coil snakelike at the approach of their prey and strike with furious savagery. Their mouths are lined with row upon row of sharp teeth all angled back toward the throat much like a snake's.

Pike feed on fresh-water invertebrates, salmon fry, other fish and even birds that pike catch on or near the water.

Once pike reach about 5 years old, they start looking for bigger meals. They have been known to completely wipe out other fish species in an ecosystem, at which point pike survive almost exclusively through cannibalism.

For concealment purposes, the pike's favored habitats are weedy, shallow lakes and relatively slow-moving river systems. In larger lakes, they stalk the edges of weed beds in search of prey. Unfortunately, these habitats are also the favored rearing areas of young silver and red salmon.

"When you open up a salmon river system to pike, salmon are what they are eating," said Dave Rutz, an Alaska Department of Fish and Game Biologist who has been studying the effect the introduction of pike has had on trout and salmon in the Susitna Basin.

"I've caught pike 450 millimeters long with 20 young salmon in them."

Rutz said the Susitna River system is a little different from the Kenai River system in that the Susitna has more shallow weedy ponds and lakes to provide excellent spawning and rearing areas for pike.

"Pike don't like fast water, so the Kenai River is probably safe," Rutz said. "But a lot of the Peninsula's coho production comes from the Moose River and the Moose River system is ideal pike habitat."

Bendock, however, pointed out that pike routinely use fast, strong rivers as migration routes to more suitable habitat. The pike in the Moose River drainage probably migrated down Soldotna Creek and up the Kenai into the Moose River system, he said.

Pike were first introduced in the Mackey Lakes by misguided amateur fish planters in the early 1970s, Bendock said. Ten years later, pike had worked their way into the Moose River, Soldotna Creek and all of the Mackey Lake system.

Rutz said pike are the worst possible predators in a salmon river. They are incredibly damaging to silver and red stocks. Pike prey on juvenile red salmon as they leave lakes.

And there's no way to get rid of them. Pike are tough fish, resistant even to poisoning, which is no longer considered biologically acceptable.

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ASSEMBLY NOTICE

Board Seat Vacancy
Anchorage Telephone Utility
Board of Directors

The Anchorage Municipal Assembly is seeking resumes from citizens interested in serving on the Anchorage Telephone Utility Board of Directors. One seat will become vacant January 14, 1996. This is a five-year seat. Current compensation is $700.00 per month

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Anchorage Daily News, Saturday, December 23, 1995, B12

recreation, fragments wildlife habitat and corrodes visual aesthetics (think about the view across Turnagain Arm from Girdwood). Road building has its own long-lasting problems, and deter- implications on the scientific community. If a forest is clear-cut as is prescribed for certain forest units in our back yard, is it healthier? Is the beetle infestation a symp- tion/Pa (the spec larly bea rrection Pa trail abo) and the steep slopes from nea again Arm age Glacie turnoff y to Hope. Soon wa near Seward

The threat to salmon is not pike

The recent studies concerning the northern pike's impact on the Deshka and Kenai river systems have been grossly misrepresented. The information presented has piggybacked this fish's poor, but growing, popularity throughout the United States and Canada. The terminology used by biologists to describe pike include: "alien invaders," "evil-eyed," "sharp-fanged" and "worst possible predators." These descriptions sound more like something from a Stephen King novel, not a freshwater sport fish.

Pike have sharp teeth and are predators of their environment. Any fish is a predator within the food chain, including the popular rainbow trout and Dolly Varden. So what's my point? The declining salmon runs are being diminished by humans, the environment and other fish. Singling out pike as the major cause for the salmon's decline is ridiculous.

Declining salmon runs begin when schools of salmon are netted by commercial fishermen for consumer demand. Anglers decrease this number as salmon swim up rivers. Both commercial fishermen and anglers directly impact and reduce the numbers of successful spawners. Environmental factors include the proper water temperatures, bottom content and clean water for a successful hatch.

Salmon eggs that hatch into fry are again impacted by anglers and other fish. Most anglers never realize the impact of running their boats up/down river systems. Each year many king salmon fry are wiped out by impellers and propellers while pursuing the later silver salmon runs. The rainbow trout and Dolly Varden not only eat young fry, but also eat the eggs deposited on river/stream bottoms. This makes them more of a salmon predator than pike, who only eat fry.

The real issue of declining salmon is not pike. A balanced study of all contributing factors and some personal sacrifice by everyone are needed to truly preserve this great fishery for the younger generations to come.

— Mike Skalisky
Wasilla

Toll gates just a bad idea

In response to Larry Vehrs letter (Dec. 18), titled "Toll gates a fair solution," why shouldn't Anchorage allow commuters police protection? How will we pay to build and man these toll gates? If there's a car accident due to ice on the approach to the toll gate, the city would get sued for millions. Who would pay for that?

What about the hundreds of people who will be inconvenienced in having to stop at a toll booth? W

$45 a week in gas plus Anchorage theaters and restaurants we frequent isn't enough for him? The revenue generated by tourists and commuters is enough to justify their use of our police force.

The community would never allow toll booths to be set up. It would cost Anchorage more than it was worth. Our relationships with other communities would be damaged, and for what? A few bucks and a lot of inconvenience for Anchorage residents, tourists and commuters.

Last September in Palmer, I was involved in a car accident. Wasilla police and Palmer ambulances rushed to our aid

and, of course, I the city ... I'm about human dec

Focus o

Contrar guest colum the New Te not be the be "true" meanin This particular

Church teachings will survive

Did Jesus have brothers and sisters? Did Mary and Joseph have other children? John Dart of the Los Angeles Times reports in the Daily News (Dec. 20) that some Catholic Scripture scholars suggest yes. Does a "new" discovery

COUNTER POINT
TALKING BACK TO THE NEWS

ters. What would father and moth birth records han different meanin tions.

The science of philology, which the impact of wor which in turn hel of Scripture. By definitive answers cult questions. Fa ed Catholic Script the basis of phil gives the opinion, the brothers and

8.22. The d gained al- ır the open, 25 points in visers. "There was strong leadership by big companies."

Most broad-market indexes finished higher after spending off late in the trading day with the 30-year Treasury bond adding more than 1 point, triggering stocks to noon said talks in the stalemate between the White House and congressional Republicans are expected to resume today.

JIM COLE / The Associated Press

ps a year-old flounder back into a culture tank Dec. 28 in Newington, usiness partner Chris Duffy have started a fish farm for flounder that arantee year-round delivery of quality live fish.

Farming next wave in fishing

Industry tries to meet increasing demand

By DAVID MOORE
The Associated Press

NEWINGTON, N.H. — Long gone are the days when fishermen had the run of the sea. Now, government regulations, polluted waters and overfishing have put quite a squeeze on the fishing industry..

But some fishermen are turning to technology to keep their businesses alive. What used to be done with boats and nets on the high seas now is moving inland with fish farming — a technique that brings fishing into a controlled environment on steady ground.

"The big picture is that within the next 15 years we will have to come up with about 30 million tons of seafood a year," said Ken Cooms, executive director of New England Fisheries Development Association, a seafood industry trade group.

"We're pretty much maxed out on wild fishing production so the only place we can turn is to aquaculture."

Fish farming for salmon and other key species is banned in Alaska, where opponents see fish farms as threats to a well-developed commercial fishing industry that targets wild stocks. But the continued development of salmon farms in Norway, Chile and Canada has cost Alaska fish some markets and likely has contributed to a glut of salmon that has held down prices.

In New Hampshire, Chris Duffy and George Nardi had 10-plus years in the fishing business when they realized that farm fishing was the way to go.

Last year, they opened GreatBay Aquafarms in Newington, N.H., and this month they will begin hatching their first batch

Please see Page D-4, FARM

y's purchase clears Justice hurdle

Disney's agreement to sell lems," said Harold Vogel, en- ership of both KCAL-TV and

[illegible] $1.70 a share, in the quarter, up from $229 million, or $1.10 a share. Chase stock gained $3.87½ to $60.87½.

NATIONSBANK CORP.: The Charlotte, N.C., bank reported earnings of $510 million, or $1.87 a share, up from $405 million, or as much as it earned in the same quarter a year earlier, but quite a bit less than the $1.11 a share expected by analysts. Revenue rose 42 percent, to $4.59 billion from $3.23 billion a year ago. Intel shares rose $2.37½, closing at $55.75 Tuesday on the NASDAQ Stock Market. The compa-

WELLS FARGO & CO.: The San Francisco-based company saw earnings rise 42 percent in the fourth quarter to $306 million, or $6.29 a share, from $215 million, or $3.96 a share, in the year-earlier period. Wells Fargo shares gained $4.25 to $214.62½ in NYSE trading.

docks Tuesday in the secon higher prices in the opilio Alaska Marketing Associat crabbers, Monday night una from processors of $1.25 a p earlier, according to Gary S association. The crabbers re Tuesday. The crabbers wan last year's average price of significantly higher than th brought. Virtually all of the honoring the strike, Stewa processors headed out to th began Monday.

FARM: Industry moves beyond the sea

Continued from Page D-1

of summer flounder.

The fish, which is popular in China, Japan and Korea, and in raw fish or sushi restaurants worldwide, has not been raised on land in the United States before.

"Land cultivation offers more control over the future," Duffy said. "Unlike wild harvesting, we will be able to guarantee the quality and delivery of live fish 365 days a year.

"We are not going to put fishermen out of business, we will be a supplement to the industry as commercial fishermen bring in smaller catches."

GreatBay will produce up to 400,000 young summer flounder each year through a complicated process that requires close monitoring of water temperature and quality, and food for the fish.

Up to 90 percent of the hatchlings will die in the first five months due to natural and environmental conditions, but the mortality rate in nature is far greater.

GreatBay's building, a long converted warehouse, is sectioned off into rows of different sized fiberglass tanks where eggs are hatched and hatchlings are grown.

The food chain is reproduced in the building. Algae, which grow in clear plastic tanks, are fed to zooplankton, which in turn are fed to the hatchlings. About halfway through the process, hatchlings are weaned onto pellet food similar to what aquarium fish eat.

"With increased concerns about ocean pollution and mercury in fish, we will be able to guarantee markets fresh, high-quality fish," Nardi said. "Markets respond to that kind of sales pitch."

GreatBay will keep four to five tanks of brooding stock that will be stimulated with light so some will spawn year-round. The fish are normally caught at sea in the summer months only.

Once the fish are about 6-months-old, they are then shipped to grow-out farms where they mature to about three pounds. Then they're ready for market.

GreatBay is not the first fish farm in the country, but part of a growing trend to produce fish outside of the sea walls. Catfish, salmon and a variety of shellfish also are growing in similar facilities.

Such operations also exist in Europe, Asia and South America, many with government-backed loans and incentives.

"Agriculture became agribusiness with government support," Duffy said. "Aquaculture now needs to become aquabusiness in the same way."

Oil being hunted off

ST. JOHN'S, Newfoundlanc search for oil off western N oil find despite corporate si say industry analysts. "The or think they have somethir after," Ian Doig said Tuesd the confidence is there." Bu refusing to comment in det to look for offshore oil in th

AIDEA loans $1.16 r

The board of directors of th Development and Export A million in financing for Taq $1.49 million total loan will First Bank of Ketchikan. T Taquan Air to consolidate i Ketchikan waterfront.

Alyeska terminal ha

The Alyeska Pipeline Servi Terminal experienced a bri afternoon, the company sai occurred shortly after 4 p.m maintenance work on a ma terminal's operating genera was lost. The system was s source and full power was r Alyeska spokeswoman Jen

DEAL: Disney purchase of Capital Cities/ABC gains Jus

Continued from Page D-1

single market.

"Disney's commitment to sell KCAL-TV ensures that the deal will not harm competition in the sale of advertising in Los Angeles, and makes further action by the division unnecessary at this time," Anne Bingaman, assistant attorney general for antitrust, said in a statement.

Disney said it filed an application with the FCC seeking a temporary waiver of the two-station rule pending the KCAL-TV sale, the statement said. Disney agreed to keep KCAL-TV and KABC-TV separate until the sale.

The Justice Department didn't find any other anti-competitive effects from the combination, which will create a leading entertainment and media business with annual revenue of about $17 billion. Industry analysts weren't surprised by this, since the two companies are engage in fundamentally differen businesses.

"It's a pretty clean stc ry. The only overlap tha you had were the tw stations in Los Angeles, said Vogel, the media ana lyst. Shares of both compa nies closed unchanged afte trading on the New Yor

BHP: Australian giant looks to continue century-old gr

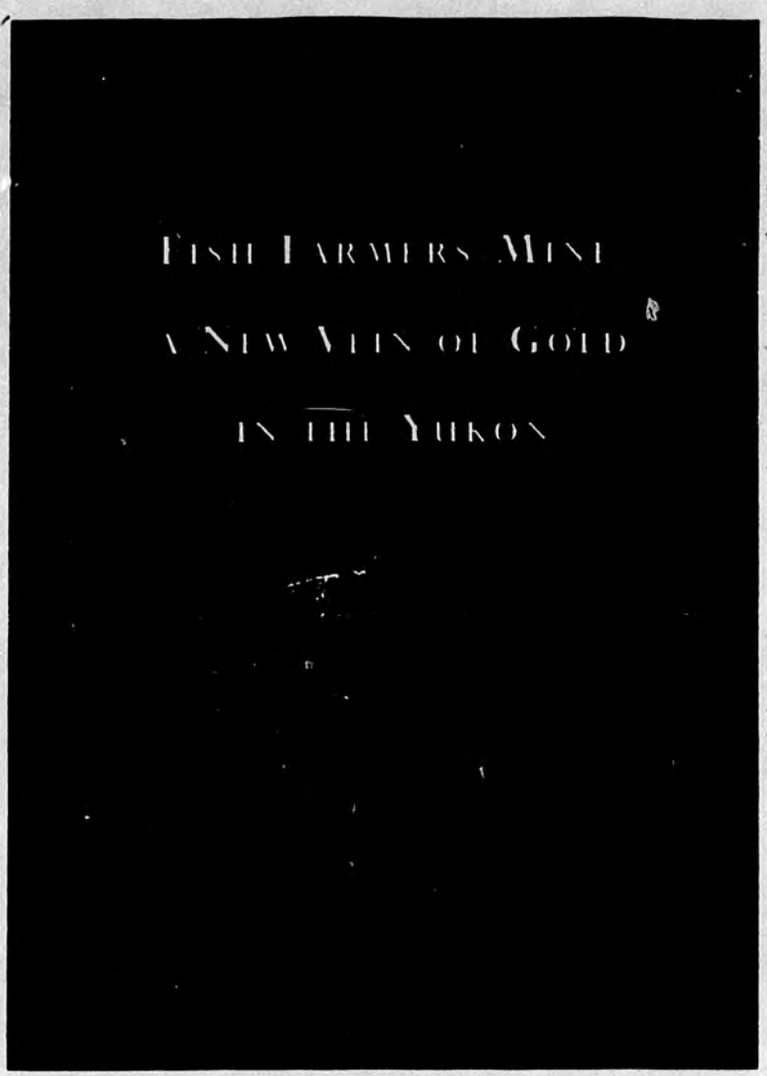
Continued from Page D-1

Co., one of the biggest copper producers in the United States. Then, BHP announced an overhaul of its corporate management structure aimed at bolstering its far-flung operations. That was followed by a surprise 590 million Australian dollar take-over offer for the 51.5 percent of Tube-

According to BHP's five-year plan, the company will invest 20 billion Australian dollars in new projects by 2000. The figure excludes significant acquisitions such as Magma, as well as expenses related to exploration for petroleum and minerals.

Since Prescott got the top job in 1991, BHP's total assets have swelled by nearly 40 percent to more than 30 billion Austra-

of Magma with nearly 9(stock in hand. The Tube proceeding. Assuming b are completed, BHP's det estimated 10.5 billion Au Analysts aren't worried, partly because BHP's spewing out cash. In the l last May 31, BHP earr



A Charmed Future *for* Arctic Char

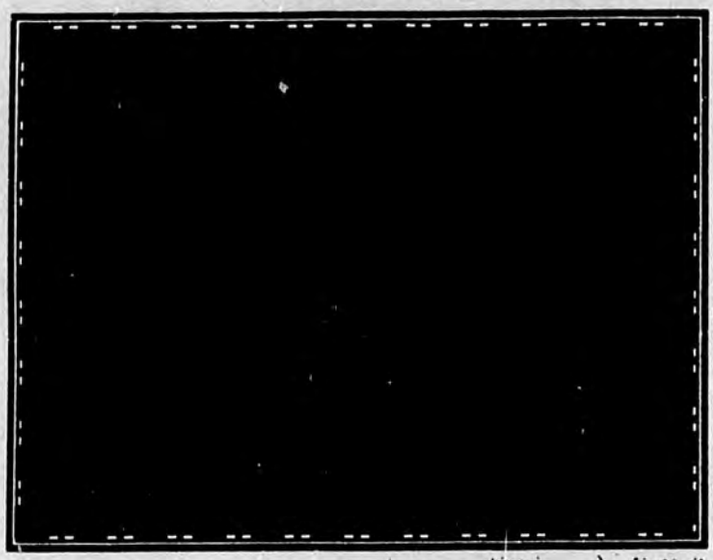
Canada's Yukon Territory has long lured dreamers, prospectors and adventurers hoping to strike it rich. Today, nearly a century after the storied Gold Rush of 1898, an Ontario-based company believes it has hit the mother lode in the Yukon. But this treasure doesn't come from nuggets. It comes from eggs. Icy Waters Ltd. is rearing a unique strain of Arctic char in the rugged country just outside the territorial capital of Whitehorse. They've trademarked the name Yukon Gold for these charmed char and hope

Story and Photos
By Daniel Shaw

that the fishes' high quality, coupled with a well-defined marketing strategy, will set off another gold rush in the Great White North.

Why Whitehorse?

A popular stop on the Alaska Highway, Whitehorse is a bustling outpost of about 25,000 people. But wander even a few miles out of town to Icy Waters' 200-acre site, and you're just as likely to encounter a moose as another person. The countryside is stunning, wide open and rolling, nourished by myriad lakes and rivers and guarded by 10,000-15,000-foot peaks in the distance. Fall comes early here, brightly painting the ground cover and wind-stunted trees and delivering a dusting of snow to the hilltops at the end of August. The tourists are mostly gone from Whitehorse by then, and the last few Yukon River king salmon, deep red, beat-up, but still miraculously strong, are negotiating the world's longest fish ladder at the end of their epic 2,000-mile journey home to spawn.



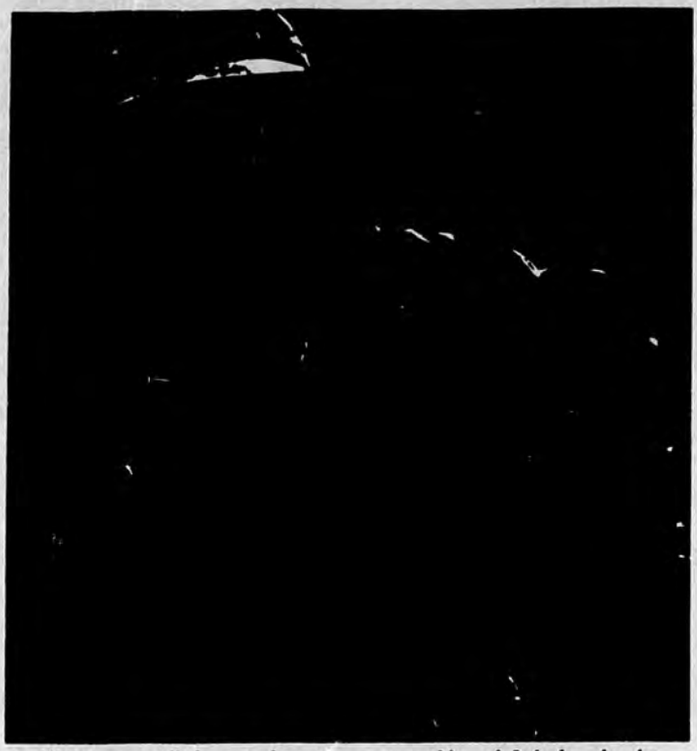
It's also the time of year when bears come down from the high country to fish and forage. Not too many fish farm managers wake up to find a black bear staring through their picture window or a grizzly soaking in the overflow pond, but it's just one of the occupational hazards faced at the Icy Waters facility. In the dead of winter, when temperatures routinely drop to -40°F, there's just four hours of daylight and farm workers have to chop through ice to feed and harvest the fish. In the summer, clouds of insatiable biting bugs make life miserable.

So why would anyone want to do anything, including farm fish, here? The water. The plenitude and purity of the water supply is unbeatable. It re-creates the char's natural environment and makes Icy Waters' operation economically feasible. Two separate water sources feed the farm: water flows to the growout tanks from a series of lakes and to the hatchery from springs on the hillside above the facility. There's even an old mineshaft on the property (it still holds the remains of five Gold Rush miners that died in a cave-in) that fills with groundwater for emergency use. And the best part is that the entire system is gravity-fed. There's no pumping involved, saving enormous energy costs.

In the wild and on farms, char stick close together and grow best at high stocking densities.

"This is the best place in the world to grow Arctic char," said Icy Waters' vice president of production Eric Johnson.

("Char" and "charr" are both acceptable spellings of *Salvelinus alpinus*. Icy Waters uses "charr," while we employ the more common usage, "char.")



Icy Waters eventually hopes to have its proprietary Nauyuk Lake broodstock in three locations. "These fish truly are special," said Whitehorse farm manager Virginia Illingworth, showing off an eight-year-old male broodstock.

Fantastic Fish

Although Icy Waters didn't exist until 1985, its story began in 1978, when Canada's Department of Fisheries and Oceans (DFO) set out to find the hardiest, biggest, most beautiful strain of Arctic char to culture. They found it in remote Nauyuk Lake on the Northwest Territories' northernmost coast. The search paid off, for the fish took to aquaculture right away.

Icy Waters, a subsidiary of privately-owned conglomerate First Echo Group Inc. of Kitchener, Ontario, started up in 1985 as Polar Sea Fisheries Ltd. (They changed the name shortly thereafter to more accurately reflect Arctic char.) Its own search for the best fish to culture ended in 1987, when the company bought 1,000 of those Nauyuk Lake fingerlings from DFO.

That year, Icy Waters also bought a bankrupt fish farm in Prince Rupert, B.C. They dismantled the tanks and moved them to the Whitehorse site, where they built a 5,000-sq.-ft., state-of-the-art hatchery. The hatchery includes an ova room that can incubate 2 million eggs and indoor smolt tanks that can hold 250,000 20-to 40-gm. smolts.

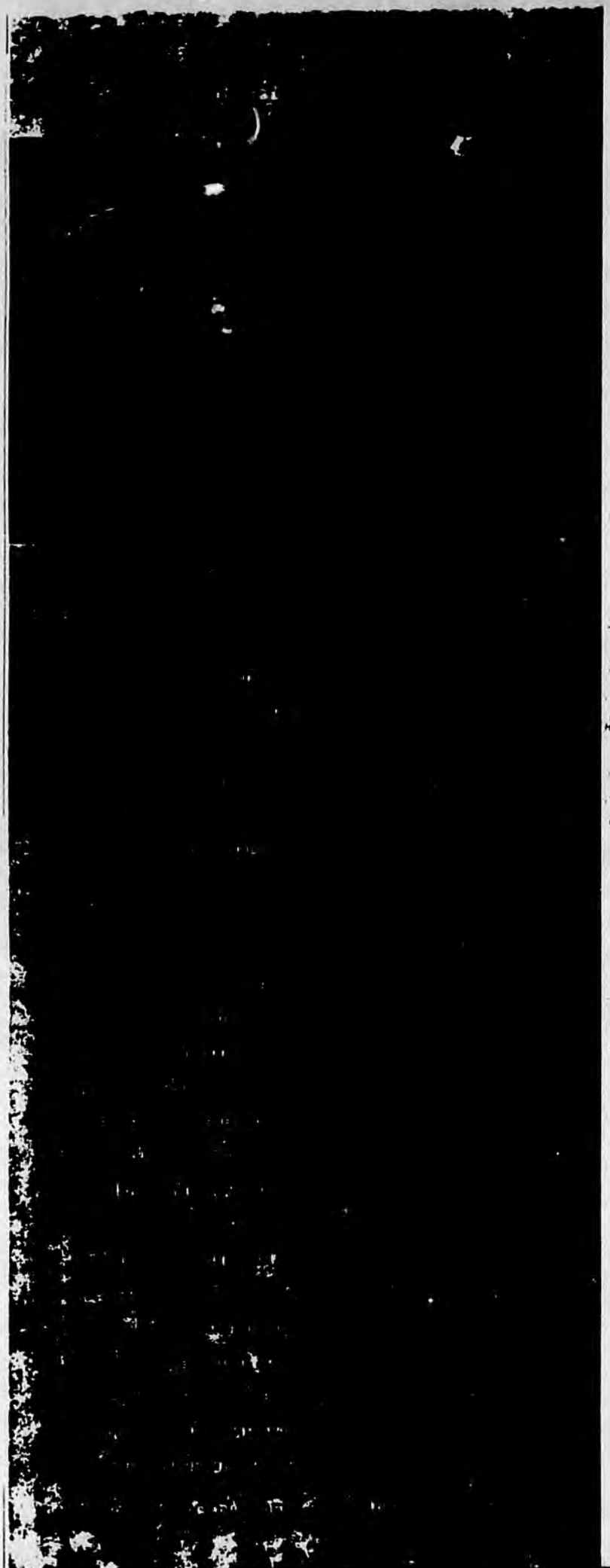
And these smolts turn into big, beautiful fish. There are dozens of strains of char inhabiting waters above the 60th parallel around the world, but the Nauyuk Lake fish grow larger, faster (from four to six pounds) than other char and have firm, pink flesh. Their coloring is bright and distinctive—a major selling point considering that almost all of the fish are sold fresh, head-on, gilled and gutted.

Icy Waters vice president Eric Johnson checks up on the Yukon Gold char of the future in the farm's high-tech egg room.

"We consider this strain proprietary to us," said Icy Waters president Tim Fleming. "We're the only ones who have the broodstock... We get four to five inquiries a week about selling our eggs, but we won't do it."

The Nauyuk Lake char has exceeded all expectations Icy Waters had for it. It grows to market size in 24 to 30 months, and the growout time is dropping with each generation. Its feed conversion ratio is 1.2:1. Icy Waters produced about 75 tons of char in 1995 and hopes to be producing 2,000 tons within a couple of years.

"It amazes me that it's such a young fish to aquaculture," said Johnson, an experienced salmon farmer. "It's taken years for coho salmon to get where they are. These char are performing like a 20th generation fish, and they're in their third generation... Because of the conditions it faces in



the wild, it has the ability to adapt well in culture." In the wild, for instance, char stick close together in large schools, so on the farm they grow best at high stocking densities.

Just how hardy are these fish? The Yukon farm's transformer took a direct lightning strike last year, knocking out the power and the oxygenation unit and dropping dissolved oxygen levels in the tanks to 1.8 parts per thousand. Salmon die when the level drops below 4, but not a single char expired. "Had this been a salmon farm, we all would have been on a long vacation," said farm manager Virginia Illingworth.

But Icy Waters is not a salmon farm. Over the years they've developed breeding and feeding techniques unique to their strain of Arctic char, and they pamper the fish from day one. Water flowing to the hatchery and the tanks can be heated or cooled. Fish are harvested from the tanks one or two at a time to prevent trauma that might damage their appearance and flavor.

The Other Side of the Coin

Growing fish, of course, is just one half of the equation. In a world flooded with farmed salmon, Icy Waters has to sell their fish—at a $4 per pound premium over farmed salmon. The mistake many aquaculture companies make, says Bill Trought, vice president of the product division, is that they have no idea how to market their fish.

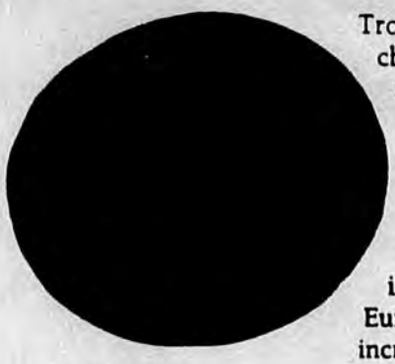
"Salmon farming is production-driven," he said. "We're market-driven. [Many farmers] raise their fish and say, 'Who's going to buy it now?' And a lot of fish farms are in a perpetual state of prototype."

Icy Waters' president Tim Fleming, a practicing attorney until devoting himself to fish farming a few years ago, said he wanted to avoid those traps. "I know nothing about fish farming or about food products," he said. "But I do know how to put together a good team. I said, 'I want a fish farmer and I want a marketer,' and I got the best of each. When the fish is on the farm, it's Eric's (Johnson) fish. The minute a fish comes out of the tank, it's Bill's (Trought)."

And Trought's marketing strategy is to bring the fish to chefs of high-end restaurants through the best distributors they can find. "We're developing alliances with distributors, but our customers are the chefs. We're presenting this fish as a high-quality product for eating on special occasions. When it goes on a menu we know it will be the top-priced fish product," said Trought. And at $6.75 per pound (head-on, dressed) to chefs in California, that shouldn't be difficult. "We're selling it to the best dining places around the world. We feel we're positioned ideally for this. Chefs are looking for something different."

Trought pointed out that Yukon Gold char offer a unique pink flesh color, large size, and a delicate yet distinctive flavor. In other words, he's selling novelty and quality.

The result, said Trought, is "a fish that sells itself."



"There's definitely a market for high-quality char in Europe."

Trought recently made a presentation to chefs in Bath, England. He bought a one- to two-pound char at a market there and had a chef serve it alongside an Icy Waters fish. "Nobody touched the other fish." He noted that fillets of small char go for US$55 on the menu at the Frankfurt Sheraton. "There's definitely a market for high-quality char in Europe," he said, and Icy Waters has been increasing its shipments to Germany.

Likewise, the char has gotten raves from chefs at high-end eateries in San Francisco and Los Angeles. In Los Angeles, Santa Monica Seafood, which carries a large number of exclusive restaurant accounts, has agreed to distribute the fish. "You can always sell fish," said Tim Fleming, explaining the marketing impetus. "But you have to sell it at a price that allows you to live."

The Fish of the Future

As they create a demand for their char worldwide, Icy Waters has to step up production. To do this, the company has purchased a salmon farm, SeaFresh Fish Co. Inc., in Washington state and contracted with one in Galway, Ireland, to use as Arctic char growout facilities. Both farms, like the Whitehorse facility, will raise the fish in tanks in fresh water. The Washington site will deliver mature fish to the U.S. market, while it will be much easier to market char to the EU from Ireland. Whitehorse will continue to grow fish primarily for the Canadian market. Within five years they hope to be selling 5,000 tons of char in North America and Europe. They also plan to open a broodstock facility in the Northwest Territories and eventually will have broodstock in at least three locations for security's sake.

Everyone at Icy Waters has faith in their fish. They're confident it can fill a niche at the top of restaurant menus. "I raise a real nice Atlantic salmon," said Dan Phillips, who owned SeaFresh and who has now gone to work for Icy Waters. "These guys were raving about their char and I was thinking it's a bunch of B.S. I went to Vancouver to try it, and it was better than my salmon... There hasn't been a lot of work done on this species. We're only in the fourth generation. It'll get even better." □

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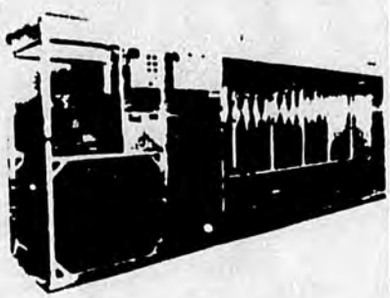

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ADN 4/30/95

Chile has learned to grow salmon, and it is working on a bumper crop

PUERTO MONTT, Chile — In the remote farmland of this country, there is a dusty road used mostly by oxen teams. A mile-long, rutted driveway drops to a rock coastline, and behind a 12-foot-high iron gate is one of many entrepreneurial mavericks who are changing the face of the global salmon industry.

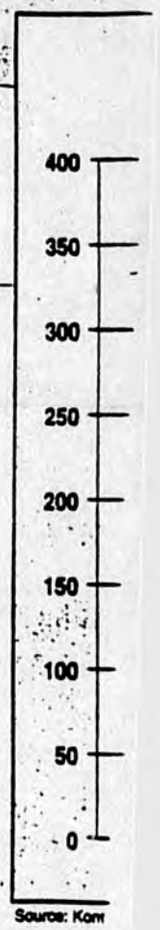
At Patagonia Salmon Farming, salmon — known as wild, mystical fish in Alaska — are being raised like cattle on tight, science-driven schedules in hundreds of floating pens, each half the size of a tennis court, set up like stockyards. From the air, the clusters of pens look like floating ice cube trays.

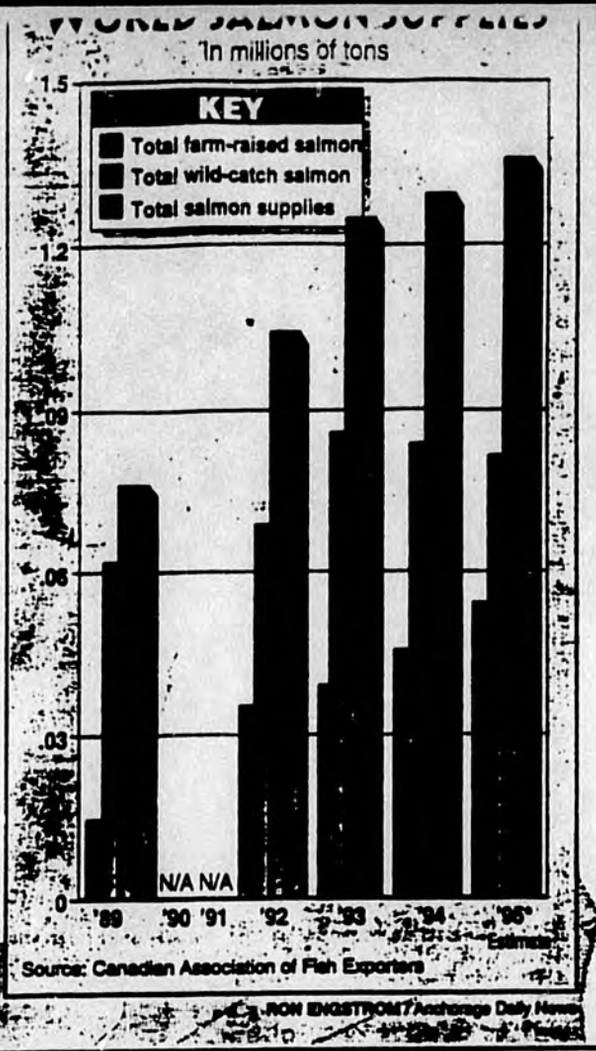
Unlike the Alaska fish that often take years to mature, then are scooped up by the hundreds and dumped in fishholds, the Chilean fish need only 12 months to mature to the 4 to 6 pounds favored by their biggest customer, the Japanese. They are sorted and handled by hand.

The fish farm is so sterile that delivery trucks must drive through moats of disinfectant. Vats of iodine are scattered throughout the compound so visitors and workers can repeatedly disinfect their rubber boots.

At the helm of Patagonia Salmon Farming is Bernd Wrege, a veterinarian turned production

Please see Page C-3, SALMON




In millions of tons
KEY
Total farm-raised salmon
Total wild-catch salmon
Total salmon supplies
1.5
1.2
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'89
'90
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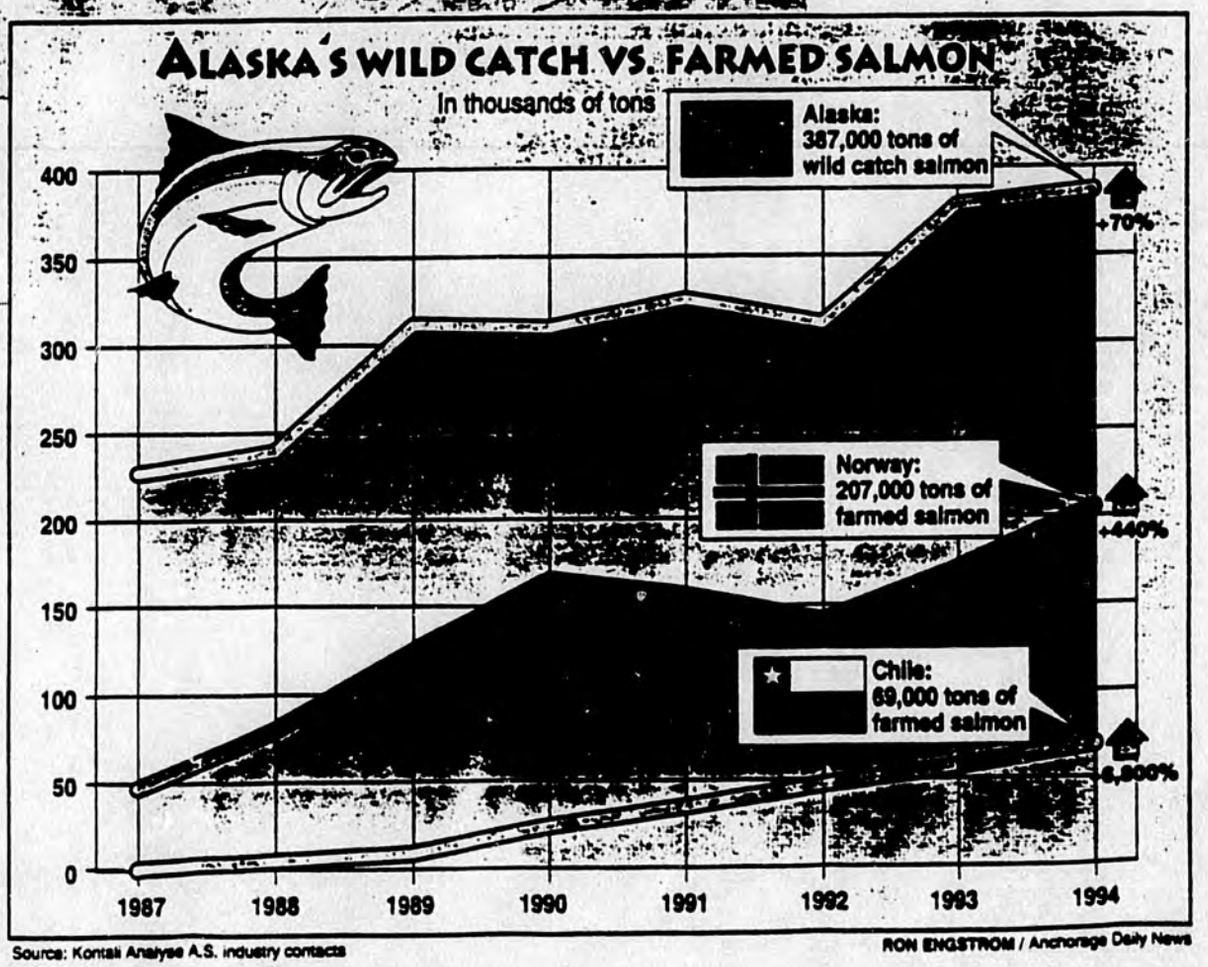
'95*
Estimate
Source: Canadian Association of Fish Exporters
RON ENGSTROM/Anchorage Daily News


ALASKA'S WILD CATCH VS. FARMED SALMON
In thousands of tons
Alaska:
387,000 tons of
wild catch salmon
+70%
Norway:
207,000 tons of
farmed salmon
+440%
Chile:
69,000 tons of
farmed salmon
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400
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1987
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1989
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Source: Kontali Analyse A.S. industry contacts
RON ENGSTROM / Anchorage Daily News

SALMON: Chile has learned

Continued from Page C-1

scientist. He is only one of hundreds of Chilean fish-farm managers calculating ways to beat Alaska fishermen at a game they have been playing for many, many more years.

It appears they know what they are doing.

During the past 10 years, the Chilean fish-farm industry has grown 10,000 percent. In 1981, Chile produced 1 ton of salmon. Last year, the country produced 69,000 tons and exported to more than 25 countries. That compares with 386,000 tons produced by all of Alaska.

And it doesn't stop there.

"We're projecting a 20 percent growth for 1995," said Jorge Cassigoli Lopez, a veterinarian and technical manager for the Association of Chilean Salmon and Trout Producers. The organization was formed in 1986 and provides technical assistance and marketing support to roughly 50 fish-farming companies, or 90 percent of the fish farms in Chile.

While Alaska fishermen are preoccupied with salvaging traditional markets, Wrege and his colleagues are scanning the world for new markets. They are looking for ways to cut overhead. They know if they continue to produce bruise-free, perfectly sized salmon year-round their business will continue to explode.

Are the Chilean fish farmers a threat to Alaska fishermen?

"The short answer is yes," said Bill Atkinson, a salmon-market analyst and newsletter writer from Seattle. "Things are already changing dramatically. I think they need to know that. It's not death walking in on them, and they don't need to cringe in fear. But the more they know about the whole thing, the better off they are."

Japan has the world's largest appetite for salmon. And in the mid-1980s, Alaska was king, providing roughly 85 percent of Japan's imported fish. At that time, Chile produced about 1 percent of Japan's imported salmon. That is changing quickly. Last year, Chile's share had grown to 17 percent and Alaska's share had dropped to less than 49 percent.

Chile now trails only Norway as a producer and exporter of farmed salmon.

Fish farming was banned in Alaska in 1988 after many fishermen protested that farmed fish might pollute the water and scramble the genetics of wild fish. Critics of the policy said the fishermen just didn't want the competition. While Chilean fish farmers are a little curious about Alaska fishermen, their hatcheries and their production costs, they spend no time worrying about them. Their competition is Norway.

Norway's production is expected to be up 30 percent to 40 percent this year, according to James Anderson, a University of Rhode Island economist who tracks the salmon industry. Last year, Norway produced 207,000 tons of salmon.

"They are saying they will produce 1 million tons in 2010," Cassigoli said. That would almost double the amount of salmon produced worldwide in 1994.

Chilean fish farmers plan to be right behind them. Patagonia Salmon Farming produced about 50 tons in 1986, its first year. Last year, the company produced 1,000 tons, Wrege said. "And in the next three years, we expect our production to reach 3,000 tons."

THE FISH-FARM DISTRICT

Most of Chile's fish farms are 600 miles south of the capital city of Santiago, at the north end of the Chilean archipelago, an undeveloped coastline stretching 1,300 miles south to Tierra del Fuego.

Cold pristine water brought from Antarctica by the Humboldt current and runoff from the snow-capped and glacial-laced Andes to the east flush the area's sheltered bays.

The hub of the fish-farm industry is Puerto Montt, a port city choked with open street markets, noisy buses, horse-drawn carts and about 100,000 people. A paved road leading south out of town quickly turns to dirt as traffic disappears.

About 30 miles down that road, hidden in a thicket of alders, a small blue sign marks the long driveway for Patagonia Salmon Farming.

At 8 a.m. one sunny January morning, a small van rattles by packed with a

how to grow a bumper crop

dozen campesinos, or workers, dressed in yellow rain pants and black rubber boots. As the van passes through the gate, it drives through disinfectant to kill any germs that might harm the highly susceptible fish.

After finishing his veterinarian degree, which is a baccalaureate degree in Chile, Wrege and a college buddy started in the mid-1980s. The money came from the friend's father, a Chilean shipbuilder.

Besides salmon, Wrege's company also produces and exports trout to Germany.

Wrege, who was born in Chile, speaks nearly flawless English, except rather than answering questions with a simple "yes" or "correct," he says, "correctly."

The farm-fishing industry employs about 8,000 workers, and Wrege's company is considered small with only 100 employees. Another 50 come on board when his small processing plant is running.

Wrege's workers earn about $125 a month. His cheap labor costs are what makes him competitive.

Wrege is using manual labor to feed and tend to fish while Norway has automated much of its fish care. Chile's low labor costs also help to offset some of its high costs of getting fish to markets.

Wrege said he places a premium on fish handling. His workers attend hour-long classes on fish handling once or twice a week. At every doorway, on the docks and before and after getting in skiffs to visit the pens, all workers and visitors step in vats of disinfectant. They also get bonuses for recycling.

Once a week, Patagonia workers change the holding pen nets, which are washed and disinfected in a gigantic washing machine that sits on shore. Daily, a Patagonia employee puts on diving gear and plunges into each pen to pluck out dead fish.

Patagonia's pens stretch 100 feet deep and sit about 30 feet off the ocean floor in scenic Illque Bay, which is flushed by a 10-foot tide.

In these pens, Wrege can turn a smolt into a 4- to 6-pound salmon in about a year. That's fast.

It takes an Alaska Bristol Bay wild salmon up to five years to reach 5 pounds. Norwegian fish farmers need six to 12 months longer than their Chilean counterparts because their fish are in colder water and get less light, according to a U.S. Embassy report to the U.S. Department of Agriculture.

Where Alaska fishermen are somewhat dependent on prayer, luck and government's management practices, Chilean fishermen are scientists and businessmen working year-round looking for ways to make their industry grow and earn money.

MAKING A FISH

To Chilean fish farmers, every step of the salmon-producing process is an opportunity to cut overhead, starting with fish eggs.

Chile imported 7 million fertilized eggs in 1985 and more than 60 million eggs in 1989, according to the magazine Fish Farming International. Currently, most silver eggs are coming from Oregon and Washington.

"If taxpayers here ever found out we are selling salmon eggs when they are closing the fishery down here, they wouldn't be happy about it," said J.L. Fryer, a fish disease researcher at Oregon State University in Corvallis, Ore.

Please see Page C-5, SALMON

Continued from Page C-3

Most of Chile's Atlantic salmon eggs come from Ireland and Scotland. Chile produces only 25 percent of the eggs it uses.

At 20 cents an egg, it is a small part of the total production cost, Wrege said. "But in the next five to eight years, Chile will produce all its own eggs, and that will lower production cost."

Eggs can be turned into smolt in three or four months, he said. After an additional eight to 10 months, the smolt are ready for the fish farm. Patagonia has its own hatchery; otherwise the going price for a 50-gram smolt is about $1.20.

Although fish farming is illegal in Alaska, it is legal to raise smolt in hatcheries and release them to graze the high seas. The fish are scooped up a year to four years later when they return to the hatchery. This is called fish ranching, rather than fish farming.

Salmon ranches have failed in Chile, and there are no indigenous salmon runs.

The Chilean farm producers' biggest expense is fish food, something Alaska fishermen simply don't have to worry about.

Wrege said that 65 percent of his production cost is feed.

Fortunately for Chilean fish farmers, feed is relatively cheap. In Chile, there is "big competition" between eight food-producing companies, Wrege said. "In Norway, there is one."

The Chilean fish-food industry is so competitive and growing so rapidly that some industry analysts are predicting the country will soon export more fish food than fish.

Chilean fish farmers pay about 45 cents for a pound of food, Wrege said. It takes about 5 to 7 pounds of food to produce a 4- to 6-pound salmon.

There is an art to knowing when and how to feed fish, Wrege said. There are many opinions. Wrege is experimenting with a couple of different types of fish food in an attempt to reduce the amount of fat on the fish's bellies. The Japanese don't like the belly fat, he said.

Wrege has calculated exactly how long it takes for a food pellet to sink — two minutes. That figure combined with the number of fish in a pen and a bit of calculator magic tells Wrege exactly how much food to throw in a pen to minimize waste.

"Very little is lost through the nets," he said.

When the fish are ready for market, Wrege checks the going prices. If they are not quite high enough, he leaves the salmon in their pens. Bristol Bay fishermen don't have that luxury.

When the price is right, Wrege's fish are gently taken from their pens. At a processing platform a few feet away, they are bled and their heads removed. Then they are packed in totes on ice for the short skiff ride to shore. On shore, Patagonia has a small processing plant.

Using numbers collected by a Japanese writer, Bill Atkinson reported in early 1994 that the total cost, including the profit margin, to produce a fish is $1.82 to $2.27 a pound. Wrege said his costs are at $2.08 a pound.

Most of the silver salmon Chile produces is frozen and shipped out of Puerto Montt by ocean freight to Japan. Most of the Atlantic salmon is packed on ice and trucked to Santiago overnight. There it is loaded on a cargo plane for a 10-hour flight to Miami. The Atlantic salmon mostly ends up in U.S. grocery stores and restaurants. Some is shipped to Europe, but Chilean farmers are finding they can't compete in Europe because of Norway's lower transportation costs.

The economics and handling of Bristol Bay salmon couldn't be more different.

Because Bristol Bay salmon appear in a mass and are harvested rapidly in such a short period of time, the fish are dumped by the tons into holds on fishing boats. Sometimes the fish sit in the holds for hours before being off loaded onto a refrigerated tender. Prince William Sound salmon return at a slower pace over a period of months, so Sound fishermen are able to handle the fish more gingerly.

Alaska's commercial fishermen in Bristol Bay pay their crew of three to four deckhands from 15 percent to 30 percent of the take. For overhead, they have fuel and nets to buy. A fishing permit sells for about $200,000. And a boat costs about $100,000. In the late 1980s, Bristol Bay fishermen sold their salmon for about $2.40 a pound. Last year they got about 97 cents a pound for their fish.

FISH TROUBLES

Not all is rosy in Chile. Problems plague Chile's fish farmers. They are battling diseased fish, bandits and occasionally violent storms, which have destroyed a few fish farms.

To stop sea lions from stealing fish, Wrege has put nets around his pens. Last year, sea lions made off with about 5,000 of his fish.

But those thieves are not his biggest problem.

"The Mafia is stealing our fish," Wrege said. "Chile lost 12 percent of all of its production to these thieves."

The salmon rustlers come in the middle of the night. They anchor their boats offshore, then a diver sneaks in, cuts the nets and empties fish into his own net bag.

Cassigoli called it "ocean raiding" and agreed it is a big problem for the fish farmers. The stolen fish are sold off the dock at a row of popular and cheap seafood restaurants just outside of Puerto Montt, Wrege said.

"We have three guards at night," Wrege said. "All the fish farms use guns." And they have a spotlight mounted on a platform on shore to help stop the bandits.

Disease is another ongoing battle for the Chilean fish farmers.

A board of veterinarians screens eggs brought into the country for disease, so Chile has been able to avoid some diseases like the furunculosis that crippled the Norwegian fish farms in the mid-1980s. But Chilean fish farmers are battling their own diseases, including — BKD, or bacterial kidney disease, and rickettsia.

The BKD was discovered years ago and probably came from eggs bought in the United States, according to Fryer, who has spent his career studying the disease. "The rickettsia is a brand new bug."

While the Atlantic stock and kings and trout appear somewhat resilient to the disease, the silver salmon are not as hearty.

"The coho's demise is imminent," Fryer said. "If you put coho in those pens down there, something around five to six weeks later they will begin to die with rickettsia."

"The coho was going to be their big item," he added.

different antibiotics being used to fight the diseases, Fryer said. "That list has shrunk to three or four. People became conscious that some of these compounds had mercury in them. Some were known carcinogens."

The U.S. Food and Drug Administration regulates how much of the antibiotics can be in the imported fish. For example, the FDA can detect up to 10 parts per billion of oxolinic acid.

"Most Alaskans applaud this thing and root for the rickettsia," Fryer said.

The fish farmers are finding ways to manage around the problem, including loading fewer fish in the pens, he added. "My guess is they will develop some brood stock. That will be of help to them."

Wrege said most fish farmers load their pens with about six fish per square yard. But he has cut that density in half and found it an effective way to battle some of the disease problems.

Wrege also has lost a lot of fish to early maturation. When a fish gets ready to spawn, the quality of its flesh deteriorates.

The storms, competition and low market prices have taken their toll. Last year, three Chilean fish farms went bankrupt Wrege said.

THE FUTURE OF FISH

Alaska commercial fishermen seem to be looking for niches to sell fish products like Alaska salmon nuggets, which were tested in school lunch programs across the country in 1994. Chile isn't limiting itself to that. They are looking for new markets to sell fresh and frozen fish in bulk.

"We're looking at Asia and at China. The income is increasing there quite a lot," said Cassigoli, pointing out he has read recently that there are many millionaires in China.

"In two or three years, this company will produce other products," said Wrege of Patagonia. "Already two companies save the (fish) eyes. Chinese people eat these. Subproducts — in the future — this is big business."

Although the amount of smoked fish produced by Chile is quite small, it grew by 800 percent between 1993 and 1994, Cassigoli said. Most of the smoked salmon is going to Europe.

Because of Chile's low labor costs, the country is in a good position to exceed in value-added products, like filets and smoking.

The Chilean government plays virtually no role in the salmon-producing business. The country has virtually no environmental regulations. Fish farms pay a yearly rent to use the open sea, but it is minuscule, Wrege said.

"Chile doesn't have to worry about management. The government isn't going to shut them down," said Anderson of the University of Rhode Island. "They don't have to worry about the Endangered Species Act. The government is working with them."

Anderson also said that the Chilean fish farmers understand international trade and business.

"I don't need to disparage the Alaska industry," said Anderson. "But they tend to be the last guys to figure out where the new markets are. The fact is, a lot of salmon is moving into Singapore and Hong Kong. All of southeast Asia is growing very rapidly."

Alaska fishermen historically simply have shipped their fish to Japan.

"They are too busy worrying about government edicts, rules and regula-

Please see Page C-6, SALMON

Continued from Page C-5

tions to get their head above water to think about global markets," he said. And when the fishing season ends, "what do they do next? They go to Seattle or Hawaii and hang out. Or they go to management meetings until the cows come home. They are rarely thinking about new markets."

That is changing.

While the Alaska Seafood Marketing Institute, which promotes the consumption of Alaska seafood, is looking for niches to sell processed, or value-added, salmon, the organization is also looking for ways to educate consumers about the different types and qualities of salmon.

"We have a wide range of products for a wide range of incomes and there is literally a salmon for every pocketbook," said Art Scheunemann, executive director of the marketing agency.

The Alaska salmon industry needs to continue to work on improving quality, Scheunemann said. For example, the state has a loan program for fishermen who want to refrigerate their fish holds.

And the agency thinks consumers need to know that "fresh is a relative term," he added. A fish that has sat on ice for five days might not taste as good as a fish that was flash frozen a month ago.

"If I fly first class to Toyko, I am still worn out when I get there," he said.

Some industry watchdogs think Alaska should join with fish-farming countries in promoting salmon as an alternative to beef and chicken.

Although ASMI agrees with this approach, the agency still is looking at marketing and capitalizing on the differences between farm and wild salmon.

"I hate to be sarcastic, but our fish eat a natural diet, theirs eat dog food."

Still, "the bottom line is if people buy more of both we will be better off," he said.

Earlier this year, Chile and British Columbia fish farmers signed an agreement that they would cooperate in developing and marketing fish-farmed salmon.

While Chile continues to look for new export markets, it's sitting on about 1,000 miles of undeveloped coast. But there seems to be little chance of fish farms springing up along that stretch of coast anytime soon because there are no roads, harbors or airports.

So instead, the country that just became a force in the salmon fish-farming business 10 years ago, now is looking at shellfish farming.

"Chile is a country starting in other species," Cassigoli said. "Until three or four years ago we didn't know we could farm scallops and abalone."

And shrimp?

"No, we don't have shrimp," Cassigoli said. "You have them in Alaska? It's not too cold? Can you send me some information?"

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New Frontiers for Fish Farming

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New Frontiers for Fish Farming

While other countries make a business boom out of farming salmon, trout, halibut and flounder, Alaska has made it different at best and illegal at worst to practice mariculture. The debate continues as to whether salmon farming make sense in Alaska.

Alaska's commercial fishing industry has geared up marketing efforts to counteract increased international consumption of farmed salmon.

By Joel Gay

It's a cool May day on the farm, but beads of sweat dot Jimmie Payton's forehead as he bends over his crop and tears at the weeds. Like all farmhands from Des Moines to Djakarta, Payton has no end of work.

Payton isn't bent over corn stalks, however. He's leaning out of a skiff in Jakolof Bay, near Seldovia, tending a crop of oysters at Eagle Rock Seafarms owned by Jim Hemming and Joe Banks. In a few months the harvest will be shipped to Anchorage or perhaps end up in Seattle or New York.

Certainly the cold, clean coastal waters [illegible] Alaska farmed oysters so good and demand for them so high. But while the future looks good for shellfish farmers in Alaska—sales are increasing every year and more than $5 million worth of oysters are in the water now—the same cannot be said for salmon farmers in the state. There are none.

A Protectionist Philosophy

Nor are there trout farms, halibut farms or flounder farms, all of which are a booming business in coastal areas around the world. In spite of Alaska's tremendous natural endowments, its clean water and long coastline, the state's involvement with

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mariculture has been rocky at best and at times downright antagonistic.

It's paradoxical, says Ray RaLonde, a mariculture specialist with the University of Alaska Marine Advisory Program. On one hand, Alaska has perfect conditions for fish farms of all sorts. On the other, he says, "Alaska is a very special place, and there has been a healthy movement to prevent the problems we see in mariculture elsewhere." That protectionist philosophy has kept most types of mariculture from taking root.

"The issue is: Does disease spread from the pen to the wild? Most likely not, but we really don't know."

RAY RALONDE
MARICULTURE SPECIALIST

In the management of its fish and game, as in many other areas of state governance, Alaskans had learned from the mistakes made elsewhere, says RaLonde. It was feared, for instance, that if non-indigenous species were imported, they might overrun native populations, introduce diseases or dilute the genetic makeup of local stocks, whether clams or coho salmon. And even those species that grew here naturally, like the Pacific oyster, were allowed in only after rigorous scrutiny and approval by numerous state agencies.

RaLonde says the biology of farmed vs. ranched fish is debatable. Some were worried that penned fish might escape, and the interbreeding with wild stocks could change vital stages in the lifecycle, such as maturation age and spawning times. But biologists are working on using sterile fish for farming.

The hatcheries system in place does a good job of managing disease,

the most prevalent of which is IHN virus in sockeyes. Part of the reason for the healthy stocks is the state's strict fish-transport permitting process, which includes screening for disease. RaLonde doubts that penned fish would present a health threat to wild salmon.

"The issue is: Does disease spread from the pen to the wild? Most likely not, but we really don't know," he says.

The first mariculture attempts in Alaska started in 1910 when oysters were dumped on several beaches to see if they would spread. The effort was only marginally successful, and the industry never took off until the late 1970s, when a few individuals began experimenting with mussel and oyster farming. Even then it was difficult, RaLonde says, because of Alaska's conservative stance on mariculture regulations.

But if shellfish were allowed only grudgingly, salmon farming was all but forbidden outright. Alaska has had a healthy commercial fishing industry for more than a century, and people believed they should leave well enough alone. Raising salmon in net pens would only be asking for trouble, they figured. On the other hand, the state fully condoned another variety of mariculture called salmon "ranching"–raising juvenile salmon in hatcheries, releasing them into the ocean to forage for one or more years, then harvesting the fish when they returned.

Foreign Farming

During the same period Alaska was protecting itself from the potential dangers of ocean farming, other coastal regions welcomed farmers with open arms. In countries such as Norway and Scotland, where the wild salmon stocks had been depleted, farming was seen as a replacement industry and sometimes earned government subsidies. Chile never had salmon to begin with, but its clean coastal waters were deemed a good starting place, and Japanese corporations began

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investing there. It was an idea whose time had come.

In 1980, salmon farmers worldwide produced 15 million pounds—a mere 1 percent of the total world salmon. In contrast, Alaska salmon fishermen that year netted 511 million pounds. Over the next 10 years, the farm harvest grew more than 4,100 percent, to 621 million pounds and 28 percent of the world market. Even though Alaska's wild salmon catch was 100 million pounds higher in 1990 than in 1980, its market share dropped from 41 percent to 29 percent.

The success of fish farming has come at the expense of commercial fishermen, primarily in Alaska and Canada. Before 1980, anyone who wanted salmon had to contend with its wildness—fresh fish were available only in the summer, and after that, the choices were either frozen or canned. But farmed fish could be delivered fresh year-round with consistent quality, appearance and size. Chefs quickly learned to love farmed salmon and eventually consumers did, too.

As that industry grew during the 1980s, the idea of allowing salmon farming in Alaska popped up again. Proponents argued that Alaska should jump on the bandwagon and take advantage of the state's resources. It could provide thousands of residents with year-round jobs and extend the state's fishing "season" to 12 months. Opponents said it could be the death of the commercial fishing industry, that it would jeopardize the health of indigenous stocks and would create havoc all along the coast.

In 1988, the Alaska Legislature weighed in on the side of opponents and put the idea to rest, making it illegal to farm salmon in the state.

Sen. Loren Lehman, who represents a west Anchorage district, voted for the bill making salmon farming illegal. He admits that farmed fish has consistent quality and is available year-round, unlike the state's wild stocks. But he says, "I don't know that Alaska would be a good place for fish farming. We have unique fisheries different from Washington, Norway or Chile. I find it hard to believe you could feed the fish for the entire life cycle and make it pay. On the other hand, I support economic development, as long as it doesn't hurt the state's established industries."

Henry Mitchell, executive director of the Bering Sea Fishermens Association, is even more adamant about the economic prospects of fish farming.

"You'd have to be nuts to try fish farming," he says. "The world market's glutted already. I don't think anyone could come here without a state or federal subsidy and make a profit."

Tom Mears, executive director of the Cook Inlet Agricultural Association, says that whatever economic opportunities there were have passed. "We did those calculations when salmon was going for twice what it is now, and it was marginal then."

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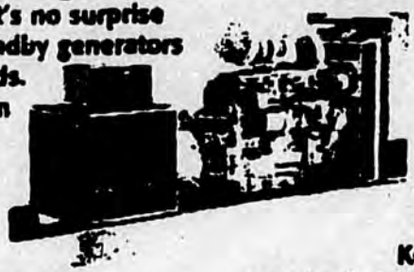

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Marketing Maneuvers

By the time the salmon-farming ban had passed, Alaska fishermen had started to see their world crumble, due mostly to the phenomenal success of farmed fish. Japan, which has always been the single biggest customer of Alaska sockeye salmon, began importing more Chilean farmed salmon and trout, and the price of sockeyes dropped to record low levels–from 1987 to 1994, a Bristol Bay sockeye fell in value from $1.5 to less than $.5. European fish smokers who historically relied on Alaska chums and coho have increasingly turned to Norwegian farmed Atlantic salmon. Even the canned salmon market has suffered as consumers' tastes turned more toward fresh fish.

In hopes of shoring up their sagging sales, Alaska fishermen and processors have cranked up new marketing strategies on all fronts.

Halibut Explosion

If salmon fishermen are just now starting to counteract their competition from farmed fish, Alaska's halibut fishing fleet should be on guard, too. Norwegian biologists, with financial aid from their government and the mariculture industry, have successfully begun culturing halibut, Atlantic cod and other species in net pens. The first shipments of 10- to 15-pound halibut have just started reaching European markets, says Ron Tavernier, a University of Alaska Fairbanks student researching the fledgling industry.

"They delivered 20 metric tons last year, they're expecting 200 tons this year, and 1,400 tons by 1998," he says. "They said they're moving slowly, but to me it seems they're really pumping along."

In what seems like a repeat performance of the salmon farming industry 20 years ago, other countries are lining up behind Norway with programs of their own. Tavernier says Iceland, Scotland and Canada will soon have their own pen-raised halibut on the market.

Many in the U.S. fishing industry are watching the halibut farming explo-

sion with keen interest. One is Bob Alverson, executive director of the Seattle-based Fishing Vessel Owners Association, a group that includes many longtime halibut longliners. His fleet could be in for tough times if halibut mariculture achieves the same growth as salmon did in the 1980s.

IFQs to the Rescue?

But Alverson believes the North Pacific halibut industry is in better shape to withstand the market onslaught. The United States made a pre-emptive strike last year, he says, by adopting individual fishing quotas (IFQs). Under the previous system, fishing occurred in two or three short, intense periods, and fresh fish was available perhaps three weeks a year. With IFQs, boats can fish any time from March through November, and markets should have fresh fish most of the year.

"The key to mariculture is the continuous supply of fresh fish to the trade," Alverson says, "and if the wild fish industry cannot do the same, fishermen are going to be in peril. I think the IFQ program will help save U.S. fishermen from the enormous impact of the halibut mariculture program."

That's not to say all fishermen like IFQs, however. Even as the program began last March, a legal challenge was working its way through the federal court system.

There is no limited entry system for Alaska's small shellfish mariculture program, except perhaps the program itself, according to oyster farmer Joe Banta. There is so much bureaucracy to get the necessary permits, he says, many people quit before getting started. A shellfish farmer needs permits from the Alaska departments of Natural Resources, Fish and Game, and Environmental Conservation and the Division of Governmental Coordination–and even more if the farm is located in a state park. "There are more regulations on this than there are to drill for oil," Banta adds.

In fact, there are fewer active shellfish farms than there were in 1991, according to the Alaska Department of Fish and Game. It's hard work, the learning curve is steep, and the payoff is slow in coming, farmers say. The state leases tidelands only in certain areas, and farmers have three years to prove up by producing a certain number of animals. If they don't, they lose their permits. In the meantime, however, they don't qualify for most types of financing because their permits are only temporary. It's a Catch-22, farmers say, and not all of them survive the first three years.

But some do and their product is catching on. And as pioneers like Joe Banta blaze trails to new markets, others will find the going easier. Yet Alaska may not ever support a huge shellfish farming industry. With 35,000 miles of coastline, says Ray RaLonde, "You'd think there would be a place for aquatic farms. But it seems like every piece of land has someone interested in it." ❑

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Dave Bathke, president,
Northcoast Mechanical,
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JOURNAL OF COMMERCE

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Quote Of The Week

"I've lived in the state all my life, and I've never seen a winter like this."

— James Wilke, owner,

Experts cast grim picture for salmon

By Tim Bradner
Alaska Journal of Commerce

A deep gloom is settling over the state's salmon fishing industry, the backbone of Alaska's commercial fishing.

Processors are struggling with falling prices, unsold inventory and heavy losses despite, or perhaps partly because of, the record-breaking 1995 Alaska harvest.

Fishermen, many paid at prices close to break-even in 1995, worry they will be paid less in 1996.

"This year was a huge disaster," said Bob Waldrop, marketing manager for Seattle-based Norquest Fisheries.

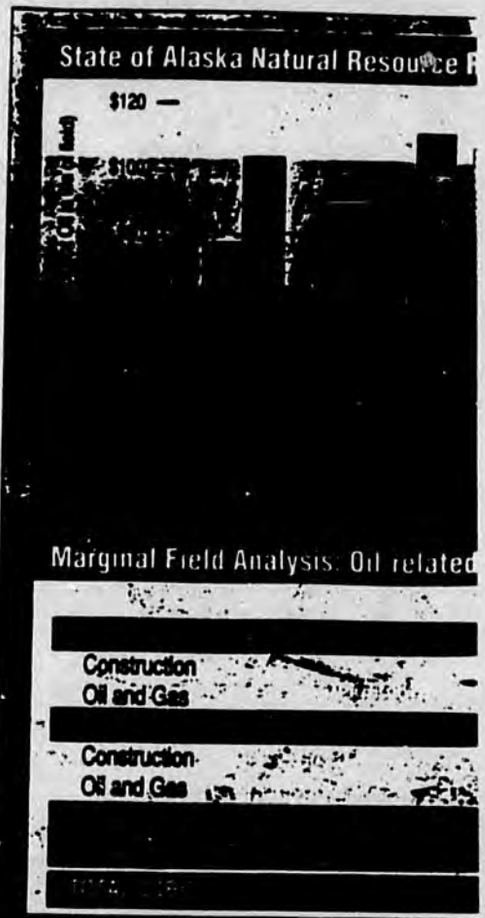
Vince Curry, executive director of the Pacific Seafood Processors Association, agreed. "It's as bad as anyone has ever seen it."

"From a producer's point of view, the salmon market is pretty much of a mess," said Gunnar Knapp, a University of Alaska Anchorage economist who follows fisheries.

"In 1995 wild and farmed salmon producers combined to produce 1.4 million tons of fish, an increase of 9 percent over 1994 and 39 percent increase since 1990."

The outlook is that prices may slump further and certainly won't get any better, given the productivity of world salmon fisheries and the glut of salmon on world markets.

Prices for frozen sockeye in Tokyo dropped 18 percent between late September and mid-December, according to the UAA's Salmon Market Information Service. Canned salmon



Continued on

Residential, commercial rental glut develo

By Ingrid Martin
Alaska Journal of Commerce

spring then eased back to 11 percent for fall. Still, they remain 2 percent higher than the

Salmon prices lag in world market after record 1995 Alaska harvest

Continued from Page 1

isn't doing much better. Prices for canned pink salmon were down to $23 for a case of 24 one-pound cans, the lowest in 20 years, although prices for canned sockeye were better.

Market psychology is now part of the equation. "Why would anyone buy salmon now if they think prices will go lower?" Waldrop asked. Prices do go lower when few buy, and the expectation becomes a self-fulfilling prophecy.

Losses are heavy. One Alaska processor reportedly managed to sell several truckloads of frozen salmon on the East Coast for about 40 cents a pound. The company had $1.25 per pound invested in the fish, after paying the fisherman, processing, transportation and storage. The firm took an 85-cent-per-pound loss on the transaction.

Some small or medium-sized processors may not be able to sustain those kinds of losses. Inlet Fisheries Inc., a veteran Kenai-based processor, filed for Chapter 11 bankruptcy protection in December.

Waldrop and others in the industry see a real shakeout coming in salmon. There is simply too much salmon on world markets and, despite marketing efforts, too few buyers.

Demand is increasing, but not fast enough. "All producers — farms and fishermen alike — have high debt and fixed costs and no incentive to reduce production," Waldrop said.

The readjustment, which many think may take as long as a decade, will be painful. Some processors will try to diversify to survive.

"But what do they diversify into? And where do they get the cash to diversify?" Waldrop asked.

Some in industry now think that if the downward trend of salmon prices continues, some lower-value species, like pink salmon, may become uneconomic to fish, at least in the manner they are now being harvested.

As for salmon fishermen, there will simply be fewer of them. Prices can't get any lower without many fishermen dropping out. "Some are at or below break-even now, and have been for some time," Waldrop said

Bill Hall, a fisheries loan specialist at the Alaska Commercial Fisheries and Agriculture Bank in Anchorage, said that even with limited entry in salmon, about 50 percent more salmon fishermen exist than can be economically sustained.

> **"All producers — farms and fishermen alike — have high debt and fixed costs and no incentive to reduce production," Waldrop said**

If the number of salmon fishermen does decline to an "economically sustainable" level, how will that affect Alaska?

Hall expects the same amount of fish can be caught by fewer fishermen, who will fish more efficiently and catch higher volumes. But the survivors are more likely to be nonresident fishermen. Studies consistently show that most of the more efficient fishermen, those most likely to be profitable at lower prices, are nonresidents, Hall said.

If that happens, an unintended consequence of the state's limited-entry license program for salmon is that it will create exclusive rights for nonresident fishermen while making it difficult for young Alaskans to enter and get experience in fishing.

Waldrop said there will always be market niches for seasonal wild-caught salmon. "Higher-value species like sockeye and coho (salmon) can maintain their market identity," as wild-caught fish, "but pinks and chums will probably lose their species identity," and be looked at more as ingredients in fish sticks or minced fish blocks for institutional buyers."

But Waldrop expects farmed salmon to take more and more of the market. "We don't buy wild-grown broccoli in the grocery store, do we?" It's the same for salmon, he said.

Ironically, political barriers prevent Alaska making the necessary economic adjustments. State law prohibits salmon farms, for example. Some in the industry say if salmon farms could operate year-round it would help processing firms use their infrastructure more efficiently. It would lower costs and, ironically, put them in a financial position to pay better prices to fishermen during the big summer run.

The fish-farm ban has been pushed by fishermen, although biologists also have concerns over diseases from farmed salmon infecting healthy wild stocks.

But some Alaska processors are reported to be looking at buying salmon farms elsewhere as a survival strategy. "It would make the most sense to allow these companies to invest where they now do business," one official said, asking not to be identified.

But Curry, of the seafood processors' association, feels it would be unwise for Alaska to allow salmon farming now.

"It doesn't make sense. Our wealth is in our natural stocks," and the state's current policy of maintaining the quality of those stocks is a good one, he said.

Hall points to the limited-entry program as another barrier. "You just can't change the structure of the industry without changing limited entry," he said.

The system — created in the 1970s to control and eventually reduce the number of fishermen going after salmon — has now become an artificial cost burden, said Hall and others.

Permits are bought and sold, in some cases for high prices. For many fishermen the cost of the permit is as much as the boat and gear, about one-quarter to half of the total investment, Hall said. If you could eliminate the cost burden of the permit, the industry's ability to deliver a cost-competitive product would improve."

But how to do that? Hall agreed that few state politicians want to open the Pandora's box of changing the limited-entry program. An initiative from the fragmented fishing community is equally unlikely.

Other politically-driven restrictions create inefficiencies, such as limits to the length of boats in many fisheries and bans against fishermen going after the same species in different fisheries in one year.

Some in the industry feel structural inefficiencies of the way Alaska salmon are caught keeps costs high. Small boat fishermen working as independent businessmen, most without any training in business management in an industry with increasingly close margins, will inevitably fall victim to market forces, they argue.

"We sustain this system with laws and regulations for social reasons, which are not invalid. But we have to admit its high costs," said one industry official.

Hall said a political, as well as economic, solution is needed. "State government created these artificial costs, so government has to be part of the solution."

[redacted]

Representative Tom Brice
State Capitol
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Americans could dominate the market for farm-raised salmon, but the U.S. has shot itself in the foot and let Chile walk away with a booming industry.

"Real fish don't eat pellets"

By Nina Munk

WITH THE SUREFOOTEDNESS of a tightrope artist, Ivette Ronc steps along a series of shaky platforms suspended over Chile's Lake Llanquihue. In the chilly water below are 72 submerged pens, each containing 2,500 tiny Atlantic salmon fry, fresh from a nearby hatchery.

Seven months from now Ronc's fish will be trucked from the lake to saltwater pens in protected fjords along the coast of southern Chile. There they'll be coddled for another 17 months until, weighing at least 9 pounds each, their gills will be split, their blood drained and their meat processed and airlifted to grace tables in New York and Los Angeles and Chicago and Tokyo.

From nowhere a few years ago, Chile has emerged as the world's second-largest producer of farmed salmon, after Norway. Production hit about 165 million pounds last year, worth $335 million, a healthy addition to this fast-developing nation's exports, and continues to grow. "We can easily reach 220 million pounds [by 1997]," boasts Guillermo Soto Giordani, general manager of Santiago-based Unimare Trading. Unimare expects to sell $35 million of farm-raised salmon this year, most of it through a joint venture with Japan's Maruha Corp.

U.S. fishermen are outraged. A bumper sticker on the back of a pickup truck in Anchorage, Alaska--the world's only region with really big stocks of wild salmon, and still the world's largest producer—snaps: "Real fish don't eat pellets."

The reference is to the pellets containing high-protein feed that Chilean aquaculture engineer Ronc and others like her supply every 10 to 15 minutes to the salmon fry, along with medicated baths as a vaccine against disease.

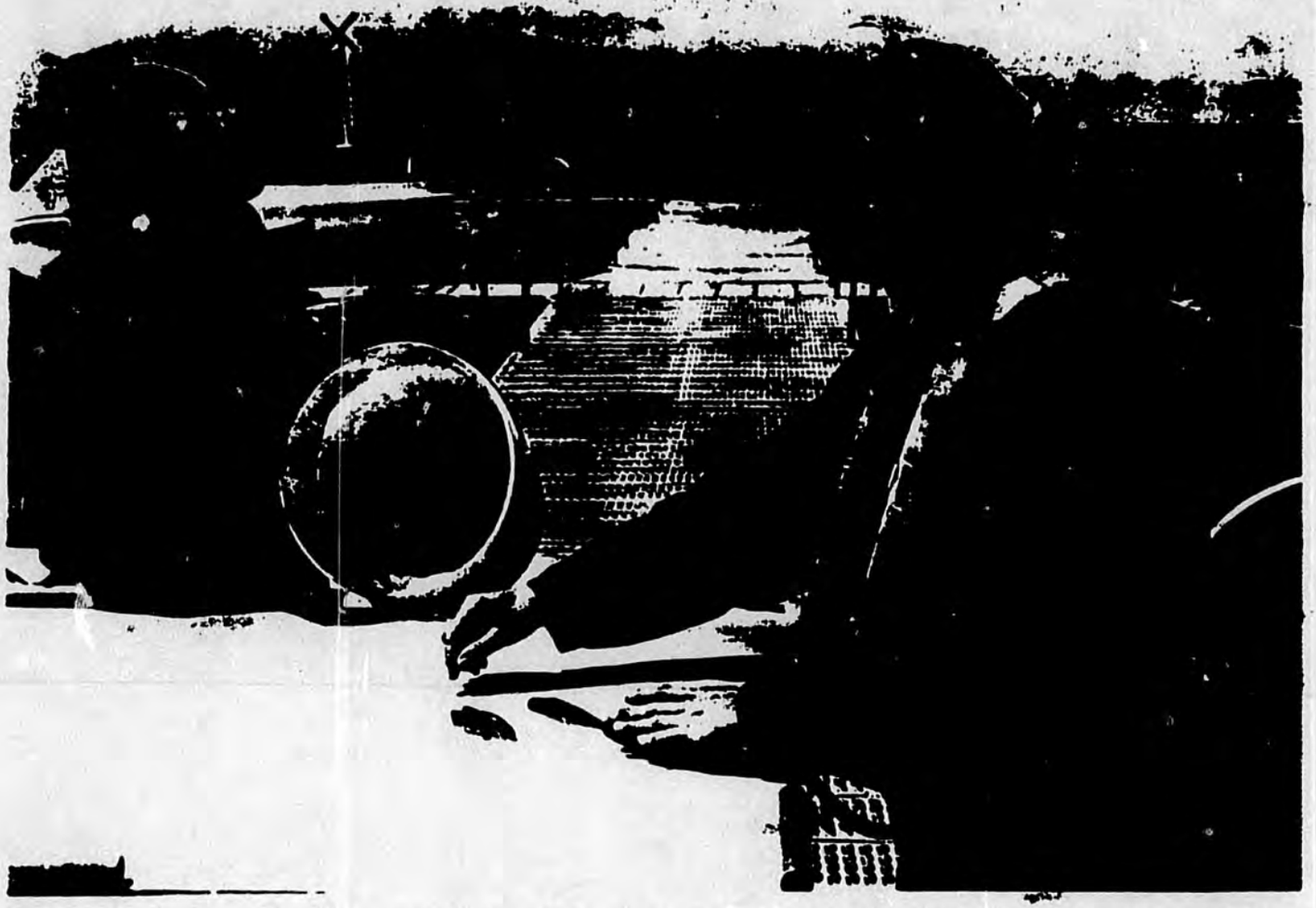
In the wild only about a tenth of these fry would make it; under Ronc's supervision the survival rate is 90%. "I am like a nurse," says Ronc.

Nurses for fish? Yes, but that's not really what the Alaskan fishermen are sore about. The development of farmed salmon has almost doubled the global supply of the fish while chopping Alaska's share of the world salmon market from 46% to 32% in the past decade. In Japan, where over two-fifths of the world's salmon is consumed, Alaska's share has dropped from 85% to 55% since 1987.

With more supply, prices fall. Alaska's prized sockeye salmon hit an average of $2.35 a pound at the dock

RIGHT
Ivette Ronc inspects her charges on Lake Llanquihue. **These coddled fry are fed every 10 to 15 minutes, receive medicated baths and have their netted pens changed weekly.**

BELOW
Processing salmon in Puerto Montt, Chile. **From there, it's airlifted to markets around the globe.**



in 1988, but last year went for about 89 cents a pound.

It also miffs the Alaskans that Chilean salmon is available fresh yearround while Alaska's traditional salmon season is June to August. Says John van Amerongen, editor of the Seattle-based *Alaska Fisherman's Journal*: "A guy who used to just fish in the summer for salmon is now forced to go out nine months of the year. That's hard on a guy, and dangerous."

Why not farm salmon in Alaska? Good question. Answer: Prodded by the powerful commercial fishing interests, in 1987 the Alaska state legislature first placed a moratorium on and then banned outright the farming of any creatures with fins. Score one for Chile.

Chilean salmon farmers got another boost in 1990, when fish-farmers in Maine filed dumping charges against Norwegian salmon farmers. Washington slapped duties averaging 24% on Norway's salmon; total imports of Norwegian salmon crashed from over 30 million pounds in 1989 to 3 million in 1991.

Rushing to replace the Norwegians, the Chileans increased their salmon exports to the U.S. from 4.6 million pounds in 1989 to 26 million pounds two years later, and then to 50 million pounds in 1994.

Washington State could, if allowed, provide tough competition for the Chileans. Washington Fish Growers Association Executive Director Daniel Sweeker says salmon farming in Puget Sound waters should be a booming business. It isn't because the aquaculture industry has been stopped in its tracks by environmentalists and homeowners who don't want their view of Puget Sound disturbed by salmon pens.

In their efforts to obtain a saltwater salmon farming permit Sweeker and his wife, Debby, spent $500,000 and five years battling the Sierra Club Legal Defense Fund and a shoreline residents association calling itself the Marine Environmental Consortium. Still, no salmon.

"Americans, I think, do not favor free trade," says Francisco Ruiz Tirado, a director of the Association of Chilean Salmon & Trout Farmers. Touché!

3/20/96 ADN

Fish-farming bill just barely afloat

Commercial interests likely to sink measure

By DIRK MILLER
The Associated Press

JUNEAU — Halibut farmers, black cod breeders and ground-fish growers could find a place in Alaska to plant their crops if an Anchorage lawmaker's bill makes it past the House and Senate.

But the sponsor says the bill has little hope of success this session.

Rep. Eldon Mulder's bill allowing fish farming originally included salmon, but that was taken out of the bill by the House Fisheries Committee. The Fisheries panel sent the legislation on to the House Resources Committee Monday night.

Of the three committees left to review the bill, two

Please see Page D-4, FISH

FISH: Little time to pass

Continued from Page D-1

are headed by lawmakers from commercial fishing towns. Commercial fishing organizations oppose the legislation, even with the prospect of salmon farming removed.

Saxman Democrat Rep. Bill Williams, the co-chairman of Resources, said he did not like the measure when Mulder first introduced it this session. Williams said the fishing industry already is trying to deal with a glut of salmon and he did not like the prospect of adding more farmed fish to overstocked seafood markets.

"It just doesn't sound right," Williams said Tuesday.

If the bill makes it past Williams, it still must go through Rep. Carl Moses' Rules Committee, which schedules bills for floor votes. The Rules panel can become a graveyard at the end of a session for bills the chairman does not like.

Moses, a Democrat representing the Bering Sea fishing towns of Unalaska and Dutch Harbor, said the bill is fairly controversial, even with salmon farming taken out of it. Moses would not say if he favors the bill.

Mulder said the bill has a difficult path ahead of it.

"It really depends on the amount of animosity by commercial fishing groups," the Republican said. "The reality is our backs are up against the wall."

In hearings held by the Fisheries panel, the measure was opposed by commercial fishing organizations.

Theo Matthews, executive director of United Cook Inlet Drift Association, a driftnet fishermen's organization based in Kenai, said the group does not support fish farming, even if salmon are not included.

"If it's going to be brought up again, it shouldn't be this late in the session," Matthews said at a hearing last week.

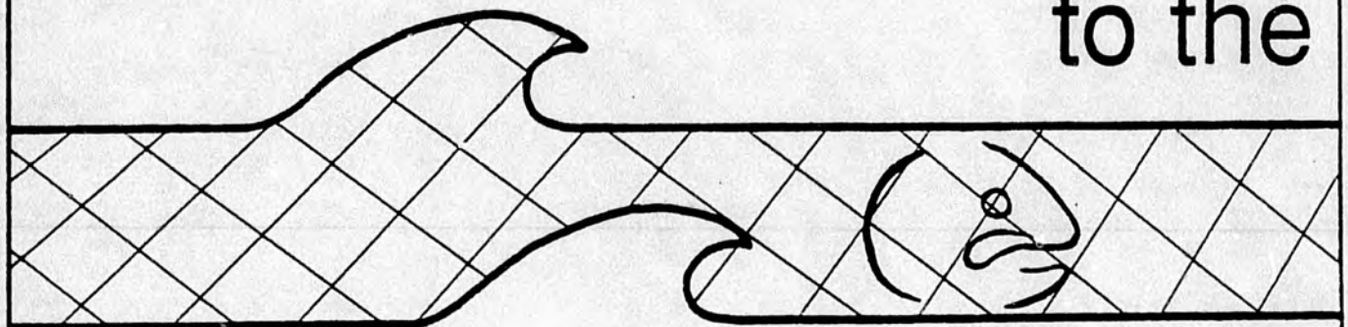
Fishermen said there were concerns about diseases being spread by farmed fish and that any escapees could interbreed with wild stocks.

House Fisheries chairman Alan Austerman said with just 48 days left in the session, there is little time for the bill to pass.

Alaska

FINFISH FARMING TASK FORCE

REPORT to the ALASKA LEGISLATURE



FISHERIES
005016

January 15, 1990

Alaska Finfish Farming Task Force

REPORT TO THE ALASKA LEGISLATURE

January 15, 1990

Alaska Finfish Farming Task Force
P.O. Box AM
Juneau, AK 99811
907/465-3568

THE ALASKA FINFISH FARMING TASK FORCE

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Mary Lou Cooper Elton, Juneau -- Public Member
Theodore Merrell, Juneau -- Fisheries Biologist, Chairman
Brent Paine, Anchorage -- Aquatic Farming Advocate
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Fran Armon
Chris Clark
Martha Fischbach

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Many individuals and organizations helped the task force in its efforts, and we gratefully acknowledge their efforts.

In addition, the task force would like to express its appreciation to Mike Nizich and the staff of the Office of the Governor, Division of Administrative Services for providing the task force with administrative support; to John Lucas and the staff of the Office of Management and Budget, Division of Audit and Management Services, particularly June Baker and Donna Voss, for providing office space and support for the task force staff; and Sen. Arliss Sturgulewski and her staff, for arranging conference rooms, recording equipment, and teleconferencing services for task force meetings.

Sen. Tim Kelly, President of the Alaska Senate
Rep. Sam Cotten, Speaker of the Alaska House of Representative
Pouch V
Juneau, AK 99811

Senator Kelly and Representative Cotten:

Transmitted herein is the final report of the Alaska Finfish Farming Task Force. The task force has met its charge as stated in Ch. 145 SLA 1988; the findings and recommendations included in this report reflect that mission.

These findings and recommendations have resulted from our review of prior research, inspection of finfish farms, the testimony of experts, and public comments. This report represents the consensus of the entire task force. All of our findings and recommendations were agreed upon by every task force member.

The time constraint on the task force prevented us from considering every issue in great depth. We have focused our efforts on those issues over which there is the most controversy and on the issues for which more definitive answers are available. We hope that you will find this report useful to your deliberations.

With the submission of this report, the task force will cease to exist as a formal body. However, our project coordinator has been retained to be available as needed through the legislative session to assist in the deliberations of this important issue.

Finally, on behalf of the task force, I would like to take this opportunity to thank you for creating this opportunity to participate in an important public policy issue.

Sincerely,

Theodore R. Merrell

Theodore R. Merrell, Chairman
Alaska Finfish Farming Task Force

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Chapter 1

INTRODUCTION

The viability and desirability of finfish farming in Alaska, particularly salmon, has long been a subject of controversy. The state is currently under its second finfish farming moratorium. This one expires on July 1, 1990.

The Alaska Finfish Farming Task Force was created by the Alaska Legislature in 1988 (Ch. 145 SLA 1988) to study the socioeconomic, biological, and environmental issues related to finfish farming. The task force was charged with addressing finfish farming in Alaska in freshwater, in marine environments, and in tanks or other upland structures containing marine water. In addition, the task force was to consider hatchery operations related to finfish farming.

By statute, the composition of the task force must represent a variety of perspectives. Specifically, the task force is comprised of one representative of the commercial salmon fishermen, one aquatic farming advocate, one private economist, one fisheries biologist, and one public member with no involvement in the seafood or aquatic farming industry. State employees were not eligible to serve on the task force.

Although the legislation authorizing the task force was passed in 1988, the Legislature did not fund the task force until its 1989 legislative session. In July 1989, Governor Cowper announced his appointments to the task force; the first meeting was held in late July.

This task force is not the first body in the state to consider the issue of finfish farming. During the Sheffield Administration, the Governor's Mariculture Advisory Committee was formed to look at the issue. In addition, the Alaska Legislature has considered various pieces of legislation pertaining to aquatic farming.

One of the first actions of the task force was to familiarize itself with the work that preceded it. In addition, it considered new information on social, environmental, and economic impacts that has recently become available from the operation of West Coast and foreign salmon farms. The world markets for salmon are changing dramatically; many assumptions regarding salmon farming economics and marketing that are based on historical data may not be relevant today.

In 1989, the State of Alaska implement its plant and shellfish mariculture regulations, giving state officials additional experience in the regulation of an industry that shares many of the characteristics of the proposed finfish farming industry.

To ensure that it evaluated finfish farming based upon the most current information available, the task force took testimony from experts on every major issue. In addition, the task force toured salmon farms and hatcheries in the Puget Sound area. It visited both salt water marine pen farms and fresh water smolt and pan-sized fish farms.

Due to the limited time available to the task force to perform its mandated tasks, it has focused on the specific issues set forth in Ch. 145 SLA 1988:

-- protecting the health of the existing fisheries resource;

-- siting of farms to protect the environment and minimize use conflicts;

-- the supply of finfish farming oroodstock;

-- the cost of regulating finfish farming;

-- the economic benefits and costs of finfish farming; and

-- strategies for improving the marketability of Alaska salmon, particularly those species that compete with farmed salmon.

The task force has incorporated other concerns into its evaluation of these issues as appropriate.

The remainder of this report addresses the six major topics listed above. Each of these topics is divided into its component specific issues. Each issue is defined in broad terms, and a set of findings, briefly summarizing information pertaining to the issue that was collected by the task force, is provided. Where pertinent, the trade-offs associated with the different approaches to addressing each issue are discussed. Finally, the task force presents its recommendations as to the manner in which future State efforts should address each issue and some general conclusions and concerns about the role of finfish farming in Alaska.

The task force did not begin its work with any supposition that finfish farming is desirable or undesirable for Alaska. To address some of the issues included in the legislation authorizing the task force, however, it is necessary to presuppose the existence of a finfish farming industry. For example, one cannot determine the cost of regulating a finfish farming industry without assuming that an industry will exist. The reader should

not construe any finding or recommendation pertaining to a specific issue to be either endorsement or disapproval of finfish farming in Alaska.

For clarity, a brief explanation of a few terms used in this report and in the discussion of finfish farming is provided below.

-- **Finfish** is used as a generic term for finfish indigenous to Alaska, except where noted.

-- **Finfish farming** is the growing of fish to market size in an enclosed environment. **Aquatic farming** includes sea plants and shell fish as well as finfish.

-- **Ocean ranching** is the release of hatchery-reared fish into the public waters for eventual recapture.

-- **Aquaculture** is the cultivation of fish and plants in both fresh and salt water. However, in Alaska, the term is specific to the State's and private nonprofit hatcheries' ocean ranching programs.

-- **Mariculture** is fish cultivation in salt water. However, in Alaska, the term is used to refer to all aquatic farming activities.

To avoid confusion, we have tried to be explicit in our references to finfish farming and ocean ranching by avoiding the more general terms, mariculture and aquaculture.

Chapter 2

THE HEALTH OF THE FISHERIES

Any effort to initiate finfish farming in Alaska must provide for the maintenance of the health of the state's existing commercial, recreational, and subsistence fisheries. There is continuing public concern regarding the effects of finfish farming on disease transmission and genetic alterations in wild stocks.

Finfish farming also could affect the health of existing fisheries through its impacts on the environment. This issue is addressed as the first concern in Chapter 4.

DISEASE

Concern

Can diseases from finfish farms be transmitted to wild and hatchery finfish stocks, with substantive adverse impacts on those stocks?

Findings

a. Fish raised in farms are subject to increased stress from handling and from the high density of fish per volume of water; this increased stress makes farmed fish more susceptible to disease than are fish in the wild.

b. Diseases occurring in farmed stocks also occur in the marine environment and in wild stocks.

c. Disease transmission between captive stocks and wild stocks is a two-way problem. Captive stocks are probably more susceptible to disease because of increased stress. The potential for disease transmission between captive and wild stocks exists in both ocean ranching operations and fish farm operations.

d. The importation of nonindigenous stocks poses the risk of importing diseases that are not present in existing wild and hatchery stocks. To control the spread of disease,

the State has imposed strict regulations limiting the movement of salmon and their gametes within Alaska and prohibits the importation of live fish or gametes from outside the state.

e. Disease pathogens can travel through the water table in land-based farming operations. Upland finfish farming can result in the contamination of the water table with pathogens that infect fish.

f. The risk of disease transmission from captive to wild stocks increases in direct proportion to the degree to which captive fish and the water they use contact wild fish. Of the three alternatives for finfish farming (upland freshwater, upland marine, and marine pens), marine pens, with the certainty of fish escapement, pose the greatest risk of spreading disease.

g. Upland marine and fresh water facilities pose less risk of contamination of natural waters than do marine pens.

h. The addition of finfish farming to aquaculture activities in Alaska would increase the demand for the pathology services necessary to control disease. Providing these services to a finfish farming industry would strain existing State technical and financial resources.

i. Pathology services are available in other fish farming regions from private laboratories.

j. Pathological services can be provided by persons certified by the American Fisheries Society under State authority. This practice currently exists in the ocean-ranching program.[1]

Recommendations

1. The finfish farming industry can be accommodated without significant threat of disease to wild and hatchery stocks if the State continues to meet its responsibilities in fish disease control and if monies are provided for additional health services or private pathological services are created.

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[1] This finding is repeated in Chapter 5, as finding f.

2. Current policies prohibiting importation of live salmonids, including gametes, should be placed into statute and rigorously enforced.[2]

3. To ensure adequate control of disease in the finfish farming industry, the State will need to provide for the development of private pathology services or increase staff and funding for existing State services.

4. If the State allows private pathology services, there should be a licensing or certification process.

5. Water discharged from upland marine and fresh water facilities should be screened and the effluent treated.

GENETICS

Concern

Does escapement of farmed finfish pose a threat to the genetic integrity of wild stocks?

Findings

a. Each finfish stock has its own unique genetic characteristics. Therefore, the interbreeding of wild stocks with selectively bred farmed stocks could alter the genetic characteristics of wild stocks.

b. Fish farmers would practice selective breeding to enhance characters that are best suited for the farm environment. Over time, farmed fish stocks will diverge genetically from the donor wild stocks; the characteristics for which farmed stocks are bred diminish their suitability to life in the wild.

c. The greater the extent of fish escaping from fish farms, the greater the possibility that farmed fish will either interbreed with or compete with wild stocks.

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[2] This recommendation is repeated in Chapter 2, as recommendation 2 in the section on genetics.

d. The survival capacity of escaped farmed stocks is uncertain. While it is possible for farmed stocks to survive outside a farm environment, it is not clear what percentage would breed successfully.

e. The genetic impact on stocks of wild fish resulting from interbreeding with escaped farm fish would depend on the ratio of farmed fish to wild fish of the same species in the stream.

f. The State's genetic policy prohibits the importation of live salmonids into the state.

g. The State's genetic policy does not allow for stocks to be transported between major geographic regions of the state.

h. The State's genetic policy has been adopted to protect Alaska's diverse natural salmon and trout stocks; however, it is not always rigorously followed.

i. Several options exist for protecting the genetic integrity of wild stocks, including: restricting farming to upland marine or fresh water tanks; using triploid farm stocks (fish that have a third set of chromosomes, rendering them sterile); and establishing wild stock genetic reserves.

Recommendations

1. The existing State genetics policy is adequate to protect the genetic integrity of the state's fisheries and should be rigorously applied to fish farming.

2. Current policies prohibiting importation of live salmonids, including gametes, should be placed into statute and rigorously enforced.[3]

3. The State should not permit the siting of finfish farms within a 20 kilometer radius from the mouth of a stream that has significant production of the same species.

4. The task force concurs with the Alaska Chapter of the American Fisheries Society resolution on genetic sanctuaries:

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[3] This recommendation is repeated in Chapter 2 as recommendation 2 in the section on disease.

One recommendation for the protection of wild stocks in the Genetic Policy is the establishment of wild stock sanctuaries. These sanctuaries would be areas in which no enhancement activity is permitted except gamete removal for broodstock development. Populations of fish in these areas would represent "gene banks" of wild-type genetic variability. Sanctuary status could also be a conservative use status for the protection of particular significant or unique wild stocks.

[Editor's Note: the task force uses the term reserve, instead of sanctuary, elsewhere in this report.]

5. The State should form an ad hoc committee to determine whether the State is strictly adhering to its genetics policy.

Chapter 3

BROODSTOCK

The major broodstock issues are the sources of donor broodstock for finfish farming activities in Alaska and the creation of finfish broodstock as privately-owned resources.

OWNERSHIP OF BROODSTOCK

Concern

Should the State allow the private ownership of broodstock?

Findings

a. Finfish broodstocks are a common property resource.

b. Finfish farmers would need control over their broodstock to develop domesticated stocks most suitable for farming.

c. Private ownership of broodstock could lead to the exportation out of state of gametes or live salmonids that are now unique to Alaska.

d. Private ownership of broodstock could lead to patentable genetic alteration based on the indigenous species.

e. A system of private nonprofit hatchery regulations could be designed that would allow farmers to develop pedigreed broodstock without losing State ownership.

f. Finfish farming hatcheries would require a new statutory authorization for operation.

Recommendations

1 The State should not permit private ownership of broodstock.

2. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority.[4]

3. All hatcheries within Alaska should be operated under nonprofit status.

4. A new permit allowing the cultivation of eggs and the sale of smolt to the finfish farming industry should be required. Existing hatcheries may be limited or precluded from participation by the conditions of their existing permits.

5. The State should create a new statutory authorization for the operation of finfish farming hatcheries.

6. There should be a statutory ban on the export of indigenous finfish stocks.

SOURCES OF BROODSTOCK

Concern

How can finfish farmers be provided secure sources of donor broodstock? How can finfish farmers be allocated broodstock to minimize the impact on the common property resource?

Findings

a. The State of Alaska owns all finfish broodstock; there are no privately-owned broodstock in Alaska.

b. Current laws, policies, and aquaculture activities do not provide for a source of broodstock for finfish farming.

c. Given current State policy on disease and genetics, the initial source of broodstock for finfish farming would have to come from State hatcheries, private nonprofit hatcheries, or wild stocks.

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[4] This recommendation is included in Chapter 3 as part of recommendation 1 in the section on sources of broodstock.

d. Existing genetic policy limits sources of donor broodstock to stocks found in the general vicinity of a net pen or upland tank farm.

e. Sources of donor broodstock for enclosed freshwater systems can be less restrictive than broodstock for marine net pen farms, both in species and in stock selection, because of the lower potential for impacts on wild stocks from enclosed freshwater systems.

f. Use of indigenous broodstock would provide finfish farms with stocks that are more resistant to naturally occurring diseases.

g. Some broodstock sources are more desirable than others because of characteristics such as fish size, color of flesh, reduced tendency toward premature sexual development, and size of the donor population.

h. Finfish farmers require a high degree of control over their selective breeding and husbandry practices in order to develop broodstock biologically and economically suited to farm operations.

i. Finfish farmers eventually would be able to develop their own broodstock with State permits and could supply new farms with smolt.

j. Current salmon management practices fully allocate returning adult salmon to either natural spawning escapements or to the sport, commercial, and subsistence fisheries.

k. Salmon egg surpluses do occur in the State and private nonprofit hatchery systems; however, current statutes would prevent these surpluses from being used as sources of donor broodstock for finfish farming.

l. Private nonprofit hatcheries harvest and sell fish to cover their costs. There is no provision in current statutes for private nonprofit hatcheries to sell eggs or smolt for cost recovery.

m. Egg surpluses occur due to overescapement up rivers and streams. Overescapement is one source of broodstock for existing hatchery programs. Current statutes prohibit the use of overescapement as a source of broodstock for finfish farming.

n. Direct sales from fishermen holding live fish transport permits would be the least desirable method of broodstock acquisition for finfish farming due to the lack of disease and genetic control.

o. A single hatchery may maintain several genetically different broodstocks as long as each is segregated from the others.

p. Sources of broodstock for finfish farming could be identified by Regional Planning Teams.

Recommendations

1. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority. Cultivation and in-state sale of broodstock and smolt by finfish farmers should not be prohibited.[5]

2. The finfish farming industry should develop its own stocks under new State provisions for nonprofit finfish hatcheries.

3. New private nonprofit hatcheries under State authority would be required to rear broodstock for finfish farming operations.

4. The preferred initial source of broodstock is surplus hatchery eggs. Other sources include overescapement, cost recovery fish, and allocation by the Board of Fisheries.

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[5] Part of this recommendation is repeated in Chapter 3 as recommendation 2 in the section on ownership of broodstock.

Chapter 4

SITING OF FINFISH FARMS

Physical characteristics of finfish farm sites affect the degree to which farms alter the local environment, and farms may interfere with other users of water and adjacent uplands. Physical characteristics of sites also affect the economic viability of finfish farms.

ENVIRONMENTAL IMPACTS

Concerns

What are the environmental impacts of finfish farms? How can they be minimized?

Will predator control measures by finfish farmers adversely affect populations of birds and mammals?

Findings

a. Proper siting of finfish farming facilities is the most important element in minimizing the transference of disease, genetic interference with wild stocks, degradation of water quality, aesthetic degradation, and predation by marine mammals, and in avoiding conflicts with existing users and designated uplands uses.

b. The primary environmental impacts of net pen farming stem from increased sedimentation, changes in the benthic infauna (bottom-dwelling organisms), and reduced water quality in the vicinity of the pens resulting from the deposition of fecal material and uneaten feed.

c. The degree of impact of net pen farming varies inversely with the degree of flushing, which depends largely on water depth and current.

d. The degree of impact of net pen farming varies directly with the surface area occupied by pens and the stocking density of the fish farms.

e. Criteria for the siting and intensity of farming activities can be used to reduce the environmental impacts of marine pen farming in an area.

f. Pre-site surveys and periodic monitoring of water quality and the benthic community beneath pens are essential to ensuring minimal environmental impacts.

g. The primary environmental impacts from fresh water and marine upland tank farming operations stem from their use and disposal of water.

Recommendations

1. The State should use existing siting guidelines to develop a set of criteria specifically applicable to finfish net pen farming in Alaska. These include the State of Washington's Recommended Interim Guidelines for the Management of Salmon Net-Pen Culture in Puget Sound and the Alaska Department of Natural Resources' Etolin Island Area Mariculture Pilot Project. Guidelines for siting should also reflect the Alaska Department of Fish and Game's disease and genetics policies.

2. The State should use the Consistency Review Process of the Alaska Coastal Management Program in permitting finfish farm sites. The Alaska Coastal Management Program provides "a framework for local and public participation in State decisions, and a mechanism for the resolution of conflicts between government agencies, individuals, and local communities." However, special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement.

3. Only nonlethal predator control measures, such as bird and mammal exclosure nets and electric fences, should be allowed for finfish farming.

USER CONFLICTS

Concerns

Will the presence of finfish farms restrict, preclude, or degrade current or potential uses of sites and adjacent areas by others for commercial, recreational, and subsistence activities?

How can the State identify potential conflicts with existing uses of uplands and coastal areas, especially where those uses do not require State permits?

Findings

a. Net pen farms may have adverse aesthetic impacts on upland land owners or other users.

b. An average finfish farm would take up one to two acres of surface area. Additional subsurface area would be required.

c. Net pen farms may interfere with navigation around the site and restrict access to uplands.

d. Finfish farms may preclude or interfere with other commercial and recreational uses of farm sites or adjacent uplands.

e. Year-round commercial activities by finfish farms may be incompatible with use of uplands set aside for wild or scenic purposes, such as State and federal parks, monuments, and wilderness areas.

f. The State does not have a complete inventory of existing uses of State waters other than those operating under a specific State permit, except for Etolin Island, Prince of Wales Island, and Prince William Sound. The use of State waters for navigation, sport and commercial fishing, water sports, or anchorage are activities for which State permits are not usually required.

g. The State's consistency review procedure for coastal permitting and its existing aquatic farm permitting procedures provide some mechanisms for identifying and resolving user conflicts.

h. The State's salmon enhancement program uses marine net pens, and they are routinely permitted under existing regulations.

Recommendations

1. Area planning represents the best method of determining consistency of uses. However, where area plans do not exist, the consistency review process must allow

for expanded public review to ensure consistency with activities that do not require State permits.

2. Fish farms and ancillary use of adjacent uplands must be compatible with zoning and designated uses of the uplands. No finfish farming should be permitted in waters adjacent to State and federal parks.

Chapter 5

COST OF REGULATION

The development of a finfish farming industry in Alaska will require the development of some new regulatory programs and the expansion of some existing ones.

Concerns

What is the cost of providing necessary regulation and oversight to a finfish farming industry? How could the finfish farming industry bear some of these costs?

Findings

a. Success of the finfish farming industry will require the support and cooperation of the government agencies charged with monitoring, permitting, and enforcement.

b. The cost of conducting site evaluation, preparing adequate site plans, and other work anticipated in the permit application process is a significant front-end cost to finfish farmers.

c. The Department of Environmental Conservation, the Department of Fish and Game, the Department of Natural Resources, and the Division of Governmental Coordination would all have regulatory responsibilities related to finfish farming.

d. The task force estimates that approximately $500,000 would be required annually by State agencies to regulate a finfish farming industry, assuming 10 to 15 permit applications per year requiring the equivalent of 5 additional full-time positions.[6]

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[6] The exact cost of regulating finfish farming will vary according to the specific provisions contained in enabling legislation and the number of permit applications that are received. Recent draft estimates provided by State agencies project a cost of $1.15 million to regulate an industry with 50 permit applications per year. The fiscal note to CSSB 106 (L&C) (1987) estimated that it would cost approximately $640,000 to regulate all forms of aquatic farming.

Federal and local governmental agencies would also experience some costs associated with regulating finfish farming.

e. The cost of administering regulatory requirements for hatcheries would be similar whether for ocean ranching or finfish farming.

f. Pathology services can be provided by persons certified by the American Fisheries Society under State authority. This practice currently exists in the ocean ranching program.[7]

Recommendations

1. The State should reduce its regulatory expenses by encouraging the use of private pathology services.

2. The finfish farming industry should pay economic rent for use of public resources. Forms of rent include local and State property taxes, State income taxes, sales taxes, permit fees, tideland leases, and a raw fish tax of three percent of the farm gate value.

3. Special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement. Applicants should bear the cost of these public notice provisions.

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[7] This finding is repeated in Chapter 2 as finding j in the section on disease.

Chapter 6

ANALYSIS OF COSTS AND BENEFITS

Development of a finfish farming industry will provide economic benefits to finfish farmers, their suppliers and processors and, through taxation, State and local governments. At the same time, costs will accrue to State and local governments, and users of coastal marine waters, tidelands, and uplands. The costs and benefits to the state of this new industry must be weighed carefully.

In addition, it is important to look closely at the economics of finfish farming, to avoid making false assumptions about the economic viability of the industry.

COSTS AND BENEFITS ACCRUING TO ALASKA AND ITS RESIDENTS

Concerns

Do the socioeconomic, environmental, and biological costs associated with the introduction of finfish farming to Alaska outweigh its benefits?

Are the benefits associated with finfish farming likely to be concentrated among few individuals and businesses, who may or may not be Alaskan, while costs associated with finfish farming are likely to be borne by many Alaskans?

Findings

Costs:

a. The State's fishery management and limited entry programs, State and private nonprofit ocean ranching efforts, and federal management of the 200-mile economic zone have improved the economic health of the commercial salmon fisheries in Alaska.

b. Allocation of broodstock to finfish farming could result in fewer smolt available for common-property ocean ranching programs.

c. The commercial fishing industry could suffer economic loss from lower prices caused by the increase in supply of fish resulting from finfish farming. (See Appendix B for detailed estimates.)

d. The existence of a finfish farming industry in Alaska would preclude the use of a marketing strategy that equates Alaska salmon with wild salmon and emphasizes its desirability as a natural product.[8]

e. The costs associated with disease, genetic change, diminished water quality, loss of anchorages or recreational opportunities, and loss of other commercial opportunities can be mitigated through proper regulation of the finfish farming industry.

f. Non-Alaskan investment in the finfish farming industry would lead to the exportation of profits.

g. The costs associated with the finfish farming industry would not be evenly dispersed geographically.

h. An indirect impact of finfish farms could be diminished public concern for protecting the habitat of wild stocks.

Benefits:

a. The finfish farming industry would create jobs. Finfish farming might provide jobs in rural areas with otherwise limited employment opportunities.

b. There would be a year-round supply of fresh salmon from Alaska, benefiting processors and consumers.

c. Secondary industries, such as pathological services and transportation, would benefit from a finfish farming industry.

d. Existing ocean-ranching facilities seasonally use large amounts of fish feed. Land-based fish processing plants in Alaska produce by-products suitable for the meal used

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[8] This finding is repeated in Chapter 7 as finding g in the section on competition between farmed fish and Alaska commercial fisheries.

in fish feed. The addition of finfish farming could eventually bring fish feed demand to levels high enough to sustain in-state fish feed production.

e. Current waste disposal practices by fish processors may not be tolerated by regulatory agencies in the future; development of in-state fish feed production for the finfish farming industry could utilize this waste. In addition, fish processors might purchase some currently underutilized species of fish for use in fish feed.

f. Finfish farming could provide an alternative source of revenue for hatcheries, although the task force does not advocate State and private nonprofit hatcheries' moving away from their original purposes.

g. Benefits from finfish farming would not accrue immediately upon authorizing the industry. If legislation were passed in 1990 allowing finfish farming, eggs would not become available until 1992 at the earliest because of the need to allocate eggs for that purpose. Fish would enter marine pens in the spring of 1993 and would not reach market size for another eighteen months. Therefore, finfish farms would not achieve a positive cash flow until late 1994, at the earliest. (See the time line in Appendix A for a complete explanation.)

Recommendation

1. The State of Alaska should not subsidize finfish farming beyond the amount needed to regulate the industry.

ECONOMIC VIABILITY OF FINFISH FARMING IN ALASKA

Concern

Will the present economics of finfish farming constrain the ability of individuals to enter the industry?

Findings

a. Finfish farming is a high-risk industry for which there are very few insurers.

b. People with no experience in fish farming or cultivation will probably be uninsurable.

c. Insurance for unanticipated losses will be a requirement for obtaining conventional financing for finfish farms.

d. Growth rates and food conversion rates of farmed fish are very important factors that influence the cost of growing fish to market size.[9]

e. Low water temperatures that characterize Alaska waters slow growth rates and, by extending the time needed to grow fish to market size, may increase the debt service cost associated with finfish farming.

f. There are economic incentives toward vertical integration in salmon farming to take advantage of all profit centers.

g. A few small, family-owned, **fresh water** farming facilities exist in Washington; they cater to specific market niches.[10]

h. Net pen farms in the Pacific Northwest are, for the most part, owned by corporations and are capital intensive.

i. For a two-acre net pen farm, it is estimated that capital of at least $1 million over a 30-month period would be needed before a cash flow from market-sized salmon would begin.

j. High capitalization and other costs required for finfish farming may limit its growth in Alaska.

k. The present poor world-wide economic climate for farmed fish will limit entry of Alaskans into the finfish farming industry and may help avoid the boom and bust cycle experienced by the finfish farming industry in British Columbia.

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[9] This finding is also contained in Chapter *1*, in the section on marketing opportunities for farmed Alaska salmon.

[10] This finding is also contained in Chapter 7, in the section on marketing opportunities for farmed Alaska salmon.

Chapter 7

MARKETING

There have been major changes in world markets for Alaska finfish recently. In 1982, Alaska produced 59 percent of fresh and frozen salmon (includes chinook, coho, sockeye, and pen-reared) in the world; pen reared salmon accounted for 5 percent. In 1987, Alaska produced 43 percent of fresh and frozen salmon; pen reared accounted for 32 percent.

Neither the potential for finfish farming in Alaska nor its impacts on the commercial fishing industry can be properly evaluated without considering the marketing issues involved. Nor is it possible to evaluate the impact of the industry to the state without considering other alternatives for Alaska to respond to the widespread availability of farmed salmon on the world markets.

MARKET POTENTIAL FOR ALASKA FINFISH FARM PRODUCTS

Concern

What is the market potential for Alaska farmed finfish?

Findings

a. Species of finfish that have been commercially reared in net pens and are indigenous to Alaska include chinook and coho salmon, rainbow trout, steelhead, and Arctic char. Other indigenous species with the potential for farming include sablefish (black cod), grayling, sheefish, and sockeye salmon.

b. Black cod and halibut farming are still in the research and development phase, but are very promising.

c. Alaska farmed finfish will have to compete in already crowded world markets.

d. There are some market niches (for example, Arctic char) that have yet to be exploited.

e. Some finfish farmers in Washington and British Columbia have stopped raising chinook and coho salmon (species indigenous to Alaska) in favor of Atlantic salmon for economic reasons.

f. Feed composition can be used to modify color and nutritional quality of farmed salmon to increase its market value.

g. At current prices, there is an estimated surplus of 100,000 metric tons (about 14 percent of demand) of salmon on world markets, resulting in continued downward pressure on prices.

h. Prices for farmed salmon have fallen during 1989 along with the prices for wild salmon. Salmon filling specific market niches have been able to avoid dramatic price drops, e.g., pan-size coho salmon.

i. On the average, a farmed finfish will cost more per pound to produce than a wild fish.

j. Production of pen-reared salmon has recently outpaced market demands for fresh fish, and a considerable volume is now entering the frozen market. Fresh and frozen Atlantic salmon now compete with Alaska sockeye and coho in the Japanese market.

k. World production of farmed salmon in 1989 exceeded projections. Norway had projected farmed salmon production of 120,000 metric tons in 1989, up from 89,000 metric tons in 1988. Norway's actual production in 1989 is now estimated to be 150,000 metric tons.[11]

l. Projections for world-wide production of farmed salmon in 1990 are 186,000 to 220,000 metric tons.

m. Alaska is a price taker in a world dominated by pen-reared salmon.

n. There is presently room for expansion in the market for high quality, fresh finfish, especially in the Midwest.

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[11] David Aiken, World Aquaculture, "The Economics of Salmon Farming," Vol. 20(3), September 1989, p.15.

o. Downward pressure on prices will persist as a result of increased production of both wild and farmed salmon.

p. Currently, the demand for pan-sized (under 2 lbs.) salmon and salmon over 6 lbs. is good; there is little market demand for salmon between 3 and 6 lbs.

q. Growth, survival, and food conversion rates of farmed fish are very important factors that influence the cost of growing fish to market size.[12]

r. Small, family-owned, **fresh water** farming facilities exist in Washington; they cater to specific markets.[13]

s. A guaranteed year-round supply of fresh Alaska salmon (wild and farmed) could enable processors to attract and hold customers, who prefer certainty of supply from a single source.

COMPETITION BETWEEN FARMED FISH AND ALASKA COMMERCIAL FISHERIES

Concern

Will salmon farming in Alaska tend to undermine the price of wild salmon, adversely affecting Alaska's existing commercial fishing industry?

Findings

a. Markets for Atlantic and Pacific salmon raised in fish farms overlap with salmon taken in the Alaska fisheries. As production increases, competition will increase. (See Appendix B.)

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[12] This finding is repeated in Chapter 6, in the section on the costs and benefits to the finfish farming industry.

[13] This finding is repeated in Chapter 6, in the section on the economic viability of finfish farming in Alaska.

b. Some market-niche fisheries have been hit harder than others; troll-caught salmon, for example, historically have earned a premium price on fresh and quality-sensitive markets but now face stiff competition from pen-reared Atlantic salmon.

c. Alaska has lost most of its European market for salmon for smoking to farmed Atlantic salmon from Norway and Great Britain.

d. Alaska salmon has been displaced in U.S. fresh salmon markets east of the Mississippi River by farmed Atlantic salmon grown in Norway and on the coast of Maine and in Canada's Maritime Provinces.

e. Alaska salmon has been displaced in U.S. fresh salmon markets west of the Mississippi River by farmed Atlantic salmon grown in Washington, British Columbia, and Chile.

f. More pen-reared salmon is appearing in frozen salmon markets; an estimated 17,000 metric tons will be sold in the Japanese frozen market in 1989. Alaska frozen salmon sales to Japan compare at 100,000 metric tons in 1989.

g. The existence of a finfish farming industry in Alaska would preclude the use of a marketing strategy that equates Alaska salmon with wild salmon and emphasizes its desirability as a natural product.[14]

h. Competition in world markets between farmed salmon and Alaska wild salmon will continue to occur whether or not Alaska permits finfish farming.

MARKETABILITY OF ALASKA SALMON

Concern

What strategies exist for improving the marketability of Alaska salmon, especially those species that compete with farmed salmon?

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[14] This finding is repeated in Chapter 6 as finding d in the section on costs and benefits accruing to Alaska and its residents.

Findings

a. The three most important factors affecting the marketability of Alaska wild salmon are price, consistency of supply, and quality.

b. Market forces will determine the price of Alaska wild salmon.

c. No biological strategy exists for improving the consistency of supply of Alaska wild salmon throughout the year.

d. Strategies for improving the marketability of Alaska wild salmon are limited to focusing on quality.

e. Alaska does not have a mandatory quality inspection program.

f. On world markets, Alaska salmon are perceived as not being of consistently high quality.

g. Improved quality assurance and inspection programs would improve the position of Alaska salmon in world markets.

h. New markets can be developed for profitable value-added finfish products such as easy-to-prepare specialty items.

i. Negative public perceptions about chemical additives associated with farmed salmon may enhance market opportunities for Alaska wild salmon.

Recommendations

1. Alaska must develop a strategy to respond to its eroding market share for salmon sales.

2. A mandatory quality assurance and inspection program for the Alaska salmon industry that would include catcher boats, tenders, and processors should be implemented as soon as possible.

3. In conjunction with improved quality, marketing efforts should be expanded to include an aggressive, world-wide marketing program, extolling the virtues of Alaska wild salmon.

Chapter 8

GENERAL FINDINGS AND RECOMMENDATIONS

Throughout their deliberations, the foremost consideration of the members of the Alaska Finfish Farming Task Force has been to ensure that Alaska's stocks of salmon and other species of fish and their pristine environment are not jeopardized. To this end, the task force evaluated all of the major issues; it invited testimony from more than two dozen individuals who are authorities on specific aspects of finfish farming (Appendix C) and reviewed dozens of relevant documents (Appendix F). The products of these examinations are a series of factual findings and recommendations concerning specific issues based on these facts. The issues and recommendations are summarized as follows:

The environmental and biological impacts of finfish farming can be minimized through careful attention to proper siting and enforcement of the conservative regulatory policies outlined in Chapters Two and Four.

Current fisheries management techniques are designed to minimize disease and genetic problems. Risk management of disease and genetic problems found in finfish farms would be no different than for current fisheries management.

The State should retain ownership of its valuable finfish stocks. Ultimately, the goal of finfish farming broodstock development is to use farmed fish as broodstock, thus minimizing continued dependence on publicly owned broodstock. The preferred initial source of initial broodstock is surplus hatchery eggs. Other sources include overescapement, cost recovery fish from nonprofit hatcheries, and allocation by the Board of Fisheries.

The cost of providing adequate regulation of a finfish farming industry would be high, but successful development would bring employment and other benefits to Alaska. Although development of finfish farming eventually might bring in enough revenue to offset the costs to the State, costs would accrue to the State from the permitting and regulatory programs even if the industry fails. The Legislature is the appropriate body for deciding where to rank development of finfish farming in its funding priorities at a time when State revenues remain low and show signs of future declines.

Current market conditions for farmed salmon are poor. However, a developing finfish farming industry in Alaska may find some marketing opportunities.

Markets for Alaska seafood will be adversely affected by the global development of salmon farming, regardless of what happens to salmon farming in Alaska, and a long-term strategy to improve the marketability of Alaska salmon should be developed.

As directed by the enabling legislation, the task force examined various finfish farming activities. It has determined that risks differ among these farming activities. When compared to marine pens, the impacts of upland enclosed systems are greatly reduced by isolation, species limitation, and fewer potential user conflicts.

The potential genetic and socioeconomic impacts of rearing non-salmon species of finfish in marine net pens also appear to be less than those involved with salmon net pen culture, although farming of most of these species is still in the research and development phase.

The task force did not address some of the specific concerns expressed in written public comments on the draft report, because these issues are already covered by existing regulations (e.g., disposal of dead fish in hatcheries, use of antibiotics and food additives, and treatment of diseased fish).

The task force concludes that the findings, Alaska's unique position as a leading seafood producer, and the broad range of potential types of finfish farming activities do not support an unequivocal "yes" or "no" as to whether any particular type of finfish farming should be permitted. That is a political decision that will have to be made by the Legislature. Further study and debate are unlikely to change significantly the task force's findings of fact; consequently, there is no reason to extend the current moratorium beyond its expiration date of July 1990. Therefore, the task force's final recommendation is as follows:

> The Legislature should resolve the issue of finfish farming by statutory permission or prohibition before the moratorium expires.

If the Legislature decides to allow finfish farming, it is imperative that the necessary regulatory framework be in place in advance of any farming activity. If this caveat is satisfied, the task force concludes that fish farming would have little or no adverse effect on wild stocks in the environment. Most of the necessary regulations can be adapted or extended without change from those that are already in effect for the State's ocean ranching and hatchery programs, but additional funding must be provided to extend them to fish farming.

SUMMARY OF RECOMMENDATIONS

Chapter 2

Disease

1. The finfish farming industry can be accommodated without significant threat of disease to wild and hatchery stocks if the State continues to meet its responsibilities in fish disease control and if monies are provided for additional health services or private pathological services are created.

2. Current policies prohibiting importation of live salmonids, including gametes, should be placed into statute and rigorously enforced.

3. To ensure adequate control of disease in the finfish farming industry, the State will need to provide for the development of private pathology services or increase staff and funding for existing State services.

4. If the State allows private pathology services, there should be a licensing or certification process.

5. Water discharged from upland marine and fresh water facilities should be screened and the effluent treated.

Genetics

1. The existing State genetics policy is adequate to protect the genetic integrity of the state's fisheries and should be rigorously applied to fish farming.

2. Current policies prohibiting importation of live salmonids, including gametes, should be placed into statute and rigorously enforced.

3. The State should not permit the siting of finfish farms within a 20 kilometer radius from the mouth of a stream that has significant production of the same species.

4. The task force concurs with the Alaska Chapter of the American Fisheries Society resolution on genetic sanctuaries:

One recommendation for the protection of wild stocks in the Genetic Policy is the establishment of wild stock sanctuaries. These sanctuaries would be areas in which no enhancement activity is permitted except gamete removal for broodstock development. Populations of fish in these areas would represent "gene banks" of wild-type genetic variability. Sanctuary status could also be a conservative use status for the protection of particular significant or unique wild stocks.

5. The State should form an ad hoc committee to determine whether the State is strictly adhering to its genetics policy.

Chapter 3

Ownership of Broodstock

1. The State should not permit private ownership of broodstock.

2. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority.

3. All hatcheries within Alaska should be operated under nonprofit status.

4. A new permit allowing the cultivation of eggs and the sale of smolt to the finfish farming industry should be required. Existing hatcheries may be limited or precluded from participation by the conditions of their existing permits.

5. The State should create a new statutory authorization for the operation of finfish farming hatcheries.

6. There should be a statutory ban on the export of indigenous finfish stocks.

Sources of Broodstock

1. All finfish gametes should remain in the ownership of the State by requiring that hatchery production for finfish farming be done under State permit and authority. Cultivation and in-state sale of broodstock and smolt by finfish farmers should not be prohibited.

2. The finfish farming industry should develop its own stocks under new State provisions for nonprofit finfish hatcheries.

3. New private nonprofit hatcheries under State authority would be required to rear broodstock for finfish farming operations.

4. The preferred initial source of broodstock is surplus hatchery eggs. Other sources include overescapement, cost recovery fish, and allocation by the Board of Fisheries.

Chapter 4

Environmental Impacts

1. The State should use existing siting guidelines to develop a set of criteria specifically applicable to finfish net pen farming in Alaska. These include the State of Washington's Recommended Interim Guidelines for the Management of Salmon Net-Pen Culture in Puget Sound and the Alaska Department of Natural Resources' Etolin Island Area Mariculture Pilot Project. Guidelines for siting should also reflect the Alaska Department of Fish and Game's disease and genetics policies.

2. The State should use the Consistency Review Process of the Alaska Coastal Management Program in permitting finfish farm sites. The Alaska Coastal Management Program provides "a framework for local and public participation in State decisions, and a mechanism for the resolution of conflicts between government agencies, individuals, and local communities." However, special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement.

3. Only nonlethal predator control measures, such as bird and mammal exclosure nets and electric fences, should be allowed for finfish farming.

User Conflicts

1. Area planning represents the best method of determining consistency of uses. However, where area plans do not exist, the consistency review process must allow for expanded public review to ensure consistency with activities that do not require State permits.

2. Fish farms and ancillary use of adjacent uplands must be compatible with zoning and designated uses of the uplands. No finfish farming should be permitted in waters adjacent to State and federal parks.

Chapter 5

1. The State should reduce its regulatory expenses by encouraging the use of private pathology services.

2. The finfish farming industry should pay economic rent for use of public resources. Forms of rent include local and state property taxes, state income taxes, sales taxes, permit fees, tideland leases, and a raw fish tax of three percent of the farm gate value.

3. Special provisions for public notice of finfish farming permit applications, including requirements for newspaper display ads with location maps and direct agency notification to interested parties, should be developed to encourage the greatest degree of public involvement. Applicants should bear the cost of these public notice provisions.

Chapter 6

Costs and Benefits Accruing to Alaska and its Residents

1. The State of Alaska should not subsidize finfish farming beyond the amount needed to regulate the industry.

Chapter 7

Marketability of Alaska Salmon

1. Alaska must develop a strategy to respond to its eroding market share for salmon sales.

2. A mandatory quality assurance and inspection program for the Alaska salmon industry that would include catcher boats, tenders, and processors should be implemented as soon as possible.

3. In conjunction with improved quality, marketing efforts should be expanded to include an aggressive, world-wide marketing program, extolling the virtues of Alaska wild salmon.

Chapter 8

1. The Legislature should resolve the issue of finfish farming by statutory permission or prohibition before the moratorium expires.

APPENDIX A

PRODUCTION SCENARIO FOR A 200 METRIC TON CHINOOK SALMON FARM

Appendix A presents a scenario for the operation of a hypothetical salmon farm in Alaska if enabling legislation were passed in 1990. The scenario is composed of 1) estimated timelines for the development of a marine net pen salmon farm and a fresh water hatchery; 2) an overview of the production of salmon, including a growth/mortality model, a production schedule, and a feeding and marketing model; and 3) an economic review, including a cash flow/operating expenses model and a brief discussion of the economic returns to the state.

The scenario assumes that the most economically viable finfish farm in Alaska would be a salt water net pen salmon facility with the following characteristics:

a. The size of an individual farm site, whether a family-operated farm or a corporate farm, would be between one and two surface acres. It would produce between 200 and 400 metric tons annually (100,000 to 200,000 fish), depending on the size of the fish and production.

b. The farm could be operated by a family with some part-time labor or by a corporation with three to five full-time employees.

c. Major infrastructure for a 200 metric ton farm includes six to eight 15 x 15 meter steel or plastic net pens, nets for each pen, anchors and lines for the farm, work boat, and a storage facility for supplies and fish feed.

I. ESTIMATED TIMELINE FOR THE DEVELOPMENT OF A CHINOOK SALMON FARM IN ALASKA

Table 1 provides an approximate timeline for the major steps in the development of a salmon farm, assuming that legislation providing for finfish farming is enacted in the 1990 legislative session. It includes the time frame for the development of the marine pen facility and for the development of a fresh water hatchery to serve the farm.

Table 1. TIMELINE FOR ESTABLISHING AN ALASKA FINFISH FARM

ACTIVITY	TIME
Finfish Farming Legislation enacted into law[1]	July 1990
Finfish Mariculture Regulations Adopted[2]	January 1991
Potential Applicants Identify Farm Locations, Broodstock Sources and Permit Requirements	July 1990 - April 1991
DNR Publishes Notice of Districts Open for Applications[3]	Prior to April 1, 1991
State Agencies Accept Consolidated Finfish Farm Applications	April 1, 1991 - June 1, 1991
State Review of Applications	June 1, 1991 - Dec. 1, 1991
All Necessary Permits Issued	December 1, 1991
Secure Supplier of Smolts (State or PNP Hatchery)[4]	Winter/Spring 1992
Smolt Supplier Begins Fresh Water Growth of Eggs/Fry	Fall 1992
Net Pens Placed in Water[5]	Spring 1993
Smolts Delivered to Marine Farm Site[6]	April - June 1993
Harvest/Sales Begin[7]	November 1994

[1]Assumes legislation enacted at the beginning of new fiscal year. Could be earlier depending on effective date of enabling legislation.

[2]Assumes agencies can promulgate regulations (similar to existing Aquatic Farm Regulations) in six months.

[3]Assumes finfish farming permit process to be similar to existing Aquatic Farm permit process.

[4]Assumes smolt production to be contracted out to an existing State or PNP hatchery. Eggs could be surplus to the hatchery, from cost recovery fish, or egg take from surplus wild stock.

[5]If surplus smolts were available, pens could go into the water as early as spring 1992.

[6]Assumes one year of fresh water growth for smolt before going into salt water. Another operation is to use "zero-check" smolt (no over winter of fish in fresh water, instead fry are placed directly into salt water).

[7]Sales begin after 19th month in marine growout facility and continue into the 25th month.

TABLE 1. (CONTINUED)

ACTIVITY	TIME
Development of Fresh Water Hatchery Facility:	
Identify Source of Fresh Water and Location of Hatchery[8]	July 1990 - January 1991
Application for Fresh Water Hatchery Permits	January 1991
Permits for Finfish Farm Hatchery Issued	November 1991
Eggs Placed into Hatchery[9]	July - October 1992
Smolt from Finfish Farming Hatchery Placed into Salt Water Pens	April - June 1993
Egg Take from Captive Broodstock	July - October 1995, 1996

[8]Assumes the fish farm company will develop its own fresh water hatchery at the same time as it develops the marine growout facility.

[9]Assume sources of eggs to be from one of the following: surplus eggs from existing hatcheries, cost recovery fish from PNPs, or wild egg take.

II. PRODUCTION OVERVIEW

The production cycle includes the following:

-egg take or purchase of fertilized eggs,
-incubation of eggs and the production of fry,
-fresh water rearing of fry to smolts,
-marine growout of juvenile salmon to market size, and
-marine growout of mature salmon for broodstock.

1. EGGS AND SPAWNING

Initial sources of eggs before a farm develops its own broodstock include purchase of either surplus eggs or eggs from cost recovery fish from existing State or private nonprofit hatcheries. A farm that produces 200 metric tons annually will require 100,000 smolt. Fifty-seven female chinook salmon would be required to produce 100,000 smolt, assuming 2,500 eggs per individual salmon and a 30 percent mortality rate from egg to smolt. [100,000 smolt/(2,500 eggs/female x 70% survival rate.]

Assuming a conservative male/female ratio of 1:2, a 200 metric ton farm will require about 85 chinook salmon. Thus, for a 10,000 metric ton industry, 4,250 adult chinook salmon are needed for broodstock annually.

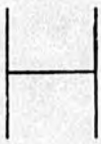
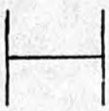
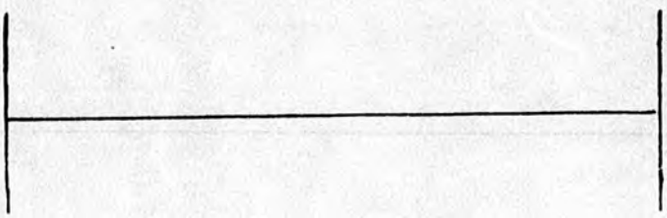
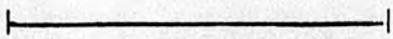
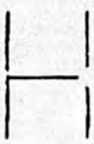
2. SIZES OF FISH

When fry emerge from the substrate and start feeding, they average about 0.4 grams each and are transferred into a freshwater raceway. At an average weight of twelve grams, they are transferred to the growout net pens in sea water. When they reach six to eight pounds, they are slaughtered and sold.

3. SCHEDULING THE PRODUCTION CYCLE

Scheduling is based primarily on the physiological activity of the fish in the different phases of operation and secondarily on economic considerations (e.g., when to harvest). Table 2 provides an outline of one complete production cycle. This table can be cross-referenced with Tables 3 and 4 to determine the sizes and the biomass of the production at various stages of the production cycle.

TABLE 2. PRODUCTION SCHEDULE FOR A SOUTHEAST ALASKA CHINOOK SALMON FARM

TASK	----YEAR 1 ----- JASONDJFMAMJ	----YEAR 2----- JASONDJFMAMJ	----YEAR 3----- JASONDJFMAMJ	----YEAR 4----- JASONDJFMAMJ
FRESH WATER GROWTH •EGG TAKE[1] •SPAWNING •FERTILIZATION •HATCHING[2]				
•FRY EMERGE FROM INCUBATOR[3] •TRANSFER TO PONDS •START FEEDING				
•SMOLTING •TRANSFER TO SALT WATER CAGES[4]				
SALTWATER GROWTH • FEED FISH • SEPERATE BY SIZE • MAINTAIN PROPER DENSITY • MAINTAIN FARM				
HARVEST/SALES START[5]				
BROODSTOCK • SPAWNING • FERTILIZATION • INCUBATION IN FW				

NOTES

1 Wild egg take or purchase from existing hatchery (state or PNP) until development of own broodstock
2 50 to 75 days after fertilization (900 Temp. Units)
3 100 to 150 days after fertilization
4 Smolting occurs 60 - 150 days after emerge from incubator
5 Sales begin after 19th month in marine growout facility

4. GROWTH AND MORTALITY MODELS

Growth and loss patterns are presented in Table 3 for the freshwater rearing stage and Table 4 for the salt water rearing stage. These tables can be used to aid in planning management strategies for stocking, transferring and grading farmed fish, installation of net pens, and timing sales. The tables assume a strategy of getting the largest smolts possible into saltwater as early in the year as possible to take advantage of seasonally warming ocean waters. The strategy also times sales in the winter months when wild salmon are in short supply.

The data in Tables 3 and 4 are based on the following assumptions:

a. The average size of fry is 0.4 grams when "buttoned up," during the month of November, and they are transferred to salt water as 12-gram (average) smolts.

b. The farm will experience a monthly mortality rate of one to two percent (fresh water cumulative mortality of approximately six percent and a salt water cumulative mortality of about 34 percent).

c. The average water temperature is approximately 12 degrees C for fresh water growth, and in salt water, the average temperature is 10 to 15 degrees C during summer months and above 6 degrees C in winter. (These temperatures were taken from data for mean monthly sea surface temperatures in southeast Alaska.)

d. Salt water growth rates for Chinook salmon are based on actual rates experienced in northern B.C. and at the NMFS Little Port Walter station in southeast Alaska.

e. Mortalities assume fish losses due to disease, precocity, predation, algae blooms, and unknowns. The model uses a B.C. industry-wide standard of two percent average mortality per month. Column 10 in Table 4 presents the cumulative mortality expressed in percentage of the original number of fish.

TABLE 3. GROWTH/MORTALITY MODEL FOR FRESH WATER REARING

MODEL OF A 100,000 FISH SALMON FARM

MONTH	MONTHS IN POND	NUMBER OF FISH	AVG WEIGHT FISH (g)	DAILY GROWTH RATE	% MORTALITY (Assumed)
November (start feed)	0	113000	0.4	0.000	0
December	1	110740	1.1	0.034	2
January	2	109633	2.7	0.030	1
February	3	108536	5.0	0.021	1
March	4	107451	8.0	0.016	1
April	5	106376	12.0	0.014	1

TABLE 4. GROWTH/MORTALITY MODEL FOR MARINE GROW OUT

MODEL OF A 100,000 FISH (INITIAL) PACIFIC SALMON FARM IN SOUTHEAST ALASKA

MONTH/YR	MONTHS IN GROWOUT	NUMBER OF FISH	AV. WEIGHT/ FISH (lbs.)	DAILY GROWTH RATE (%)	BIOMASS (lbs.)	MORTALITY % Assumed	NUMBER FISH LOST	BIOMASS LOST	CUMULATIV % MORTALI
January (Year 1)									
February									
March									
April	0	100000	0.026		2600	0	0	0	0
May	1	95000	0.051	2.246	4845	5	5000	255	5
June	2	92150	0.100	2.244	9215	3	2850	285	8
July	3	91229	0.195	2.226	17790	1	922	180	9
August	4	90316	0.381	2.233	34410	1	912	348	10
September	5	89413	0.510	0.972	45601	1	903	461	11
October	6	88519	0.601	0.547	53200	1	894	537	11
November	7	87634	0.702	0.518	61519	1	885	621	12
December	8	86757	0.801	0.440	69493	1	876	702	13
January (Year 2)	9	85022	0.900	0.388	76520	2	1735	1562	15
February	10	83322	1.001	0.355	83405	2	1700	1702	17
March	11	82489	1.201	0.607	99069	1	833	1001	17
April	12	81664	1.450	0.628	118412	1	825	1196	18
May	13	80847	1.800	0.721	145525	1	817	1470	19
June	14	80039	2.600	1.226	208100	1	808	2102	20
July	15	79238	3.604	1.088	285574	1	800	2885	21
August	16	77653	4.350	0.627	337792	2	1585	6894	22
September	17	75324	4.805	0.332	361931	3	2330	11194	18
October	18	73817	5.405	0.392	398983	2	1506	8143	26
November (Sales Begin)	19	73079	5.955	0.323	435187	1	738	4396	28
December	20	72348	6.057	0.057	438214	1	731	4426	27
January (Year 3)	21	70901	6.206	0.081	440014	2	1447	8980	28
February	22	68774	6.305	0.053	433622	3	2127	13411	31
March	23	68087	6.406	0.053	436163	1	688	4406	31
April	24	66725	7.007	0.299	467541	2	1362	9542	33
May	25	66058	7.808	0.361	515778	1	667	5210	33

5. FEEDING AND MARKETING MODEL

The feeding and marketing model presented in Table 5 projects feed consumption, weight of fish, and sales revenue over the production cycle. It can be used to plan feed purchases, storage capacity, and sales revenue.

The model assumes an average conversion rate (pounds of feed required to produce one pound of salmon flesh) of 1.7, with a range of 1.3 to 1.9. This rate is based on actual data from the NMFS Little Port Walter research.

The model utilizes feed cost assumptions for extruded feed from Moore-Clark in LaConner, Washington. Extruded feed is more expensive than dry feed ($.46/lb. versus $.32/lb. FOB Sitka, Alaska).

The model assumes sales occur after the fish reach a six pound average to obtain maximum value for the crop. Thus, sales begin in November (the 19th month) of the second year in salt water and continue at a rate of 15 percent of the biomass through May (25th month).

III. ECONOMIC CONSIDERATIONS AND BUDGET ANALYSIS

Cash flow requirements for a 200 metric ton southeast Alaska Chinook salmon farm are presented in Table 6. Growth, mortality, and feed conversion rates and sales are from Tables 2, 3, and 5.

CAPITAL EXPENSES

Pens. The analysis assumes the use of premanufactured steel net pens, assembled and installed by the supplier. Two 15 x 15 meter net pens, necessary for initial smolt growth and required for the first year, cost $19,000 each. A total of four of these pens are required by the start of the second year. Two large 33 x 33 meter pens valued at $38,000 each are needed during the second year. Cost data are from Viking Pacific Seacage Systems (Oppdrett Service Canada LTD) in North Vancouver, B.C. The cost includes the cost of anchoring the cages. Also included in the model are two 15 x 15 meter wooden net pens in the second year to be used as mobile enclosures to transfer fish from one pen to another and for grading fish.

Nets. Nets for smaller pens are assumed to cost $3,000 each; the larger pens require nets assumed to cost $10,000 each. A space net is planned for each size. The cost also includes the price of a predator net. Nets have a life expectancy of five years. Replacement costs are included.

Power Plant. The model includes the purchase of a 20 kilowatt generator. Cost of maintaining and rebuilding it are included.

Boat. The model assumes a work boat is needed at a cost of $14,000 for boat and motor. Another $5,000 is needed every two years for motor replacement. A replacement boat is planned for year six.

TABLE 5. FEEDING/MARKETING MODEL

MODEL OF A 100,000 FISH (INITIAL) PACIFIC SALMON FARM IN SOUTHEAST ALASKA

MONTH/YR	MONTHS IN GROWOUT	BIOMASS (lbs.)	CONVERSION RATE	FEED CONSUMPTION (lbs./month)	CUMULATIVE FEED CONSUMPTION	FEED COST/ MONTH ($0.46/lb)	CUMULATIVE FEED COST	NUMBER OF FISH SOLD	AV. WEIGHT/ FISH (lbs.)	PRICE ($/lb)	GROSS SALES REVENUES
January (Year 1)											
February											
March											
April	0	2,600	0	0	0	0	$0	0	0.03	$0.00	$0
May	1	4,845	1.3	2,919	2,919	1,343	1,343	0	0.05	0.00	0
June	2	9,215	1.5	6,555	9,474	3,015	4,358	0	0.10	0.00	0
July	3	17,790	1.5	12,862	22,335	5,916	10,274	0	0.20	0.00	0
August	4	34,410	1.5	24,931	47,267	11,468	21,743	0	0.38	0.00	0
September	5	45,601	1.6	17,904	65,171	8,236	29,979	0	0.51	0.00	0
October	6	53,200	1.6	12,159	77,330	5,593	35,572	0	0.60	0.00	0
November	7	61,519	1.6	13,310	90,640	6,123	41,694	0	0.70	0.00	0
December	8	69,493	1.7	13,555	104,196	6,236	47,930	0	0.80	0.00	0
January (Year 2)	9	76,520	1.7	11,946	116,142	5,495	53,425	0	0.90	0.00	0
February	10	83,405	1.7	11,705	127,847	5,384	58,810	0	1.00	0.00	0
March	11	99,069	1.7	26,628	154,475	12,249	71,059	0	1.20	0.00	0
April	12	118,412	1.7	32,884	187,359	15,127	86,185	0	1.45	0.00	0
May	13	145,525	1.8	48,802	236,161	22,449	108,634	0	1.80	0.00	0
June	14	208,100	1.8	112,636	348,797	51,813	160,447	0	2.60	0.00	0
July	15	285,574	1.8	139,453	488,251	64,149	224,595	0	3.60	0.00	0
August	16	337,792	1.8	93,992	582,243	43,236	267,832	0	4.35	0.00	0
September	17	361,931	1.8	43,449	625,693	19,987	287,819	0	4.81	0.00	0
October	18	398,983	1.8	66,693	692,386	30,679	318,498	0	5.41	0.00	0
November (Sales Begin)	19	375,637	1.9	83,980	776,366	38,631	357,128	10,000	5.96	$2.06	$122,673
December	20	317,680	1.9	58,492	834,858	26,906	384,035	10,000	6.06	2.41	145974
January (Year 3)	21	256,925	1.9	8,291	843,149	3,814	387,849	10,000	6.21	2.77	171906
February	22	190,143	1.9	8,780	851,929	4,039	391,887	10,000	6.31	2.77	174649
March	23	127,197	1.9	3,825	855,753	1,759	393,647	10,000	6.41	2.77	177446
April	24	66,277	1.9	2,001	857,755	921	394,567	10,000	7.01	2.77	194094
May	25	0	1.9	0	857,755	0	394,567	9,459	7.81	2.77	216282
TOTAL				857755		$394,567		69,459			1203023

Note: Sales are assumed to begin in November of the second year (19th month) and continue at a rate of 10,000 fish/month through May of year 3 (25th month).
Sale prices are for round fish sold to processors.
This model is intended to represent the complete grow-out cycle of one year class of salt-

TABLE 6 . CAPITAL AND OPERATING COSTS AND YEARLY CASH FLOW PROJECTIONS FOR 200 METRIC TON ANNUAL PRODUCTION
(Thousands of U.S. Dollars)

CAPITAL COSTS:	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	TOTAL
Pens	76	86	0	0	0	0	162
Nets	15	32	0	0	0	15	62
Anchoring	5	5	0	0	0	1	11
Automatic feeders	1	1	0	0	0	1	3
Power plant	10	0	2	0	0	10	22
Equipment	8	8	5	10	10	10	51
Accomodations	100	0	0	0	0	0	100
Boat	14	0	5	0	5	9	33
Miscellaneous	20	16	8	8	8	8	68
Depreciation	19	29	29	29	29	29	164
TOTAL CAPITAL EXPENSES	268	177	49	47	52	83	676
OPERATING EXPENSES:							
Smolts ($0.50 each)	50	50	50	50	50	50	300
Feed	48	340	395	395	395	395	1968
Labor	104	104	104	104	104	104	624
Management	50	50	50	50	50	50	300
Insurance	6	52	93	93	93	93	430
Medicine/Vet.	8	8	8	8	8	8	48
Maintainance & Fuel	16	16	16	16	16	16	96
Contingency	24	24	24	24	24	24	144
TOTAL OPERATING EXPENSES	306	644	740	740	740	740	3910
TOTAL EXPENSES	574	821	789	787	792	823	4586
SALES REVENUE	0	441	1203	1203	1203	1203	5253
NET REQUIREMENT	($574)	($380)	$414	$416	$411	$380	$667
CUMULATIVE NET REQUIREMENT	($574)	($954)	($540)	($124)	$287	$667	

Return on investment = net req./total investment

Equipment. This category covers everything from diving gear and hydraulic winches to water testing equipment and rain gear.

Accommodations. The model assumes the farm will conduct support activities from a barge attached to the net-pen structure. The facilities include living quarters, storage shed for feed, work shop, lab, and office. It is budgeted to cost $100,000.

Depreciation. Net pens, accommodations, power plant, and boat are depreciated at 10 percent per year for a ten-year useful life.

OPERATING EXPENSES

Smolts. The model assumes the farm will initially purchase smolts until its own broodstock mature. The cost per smolt is assumed to be $.50.

Feed Costs. Costs are based on quotes from Moore-Clark's Washington plant for container shipments from Seattle, with freight rates for delivery in Sitka provided by Lynden Transfer.

Labor. The cost of a farm manager is budgeted at $50,000.The salaries of five production employees (production supervisor, two culturists, and two laborers) are budgeted at $104,000 per year. The culturist and laborer positions are budgeted at $8 per hour. For both the laborer and culturist positions, one eight-hour shift per day is required during the six months of reduced daylight, and two eight-hour shifts per day are required for the other six months. Supervisor wages are budgeted at $10 per hour and the position is full-time year round.

Insurance. Insurance coverage for fish stocks is calculated at four percent of the market value of the fish held in net pens, which is the B.C. industry standard.

Medicine/Veterinarian. This $8,000 is based upon the expenses of a B.C. farm for vaccinations and pathology services performed by private veterinarians and pathologists.

Sales revenue. The model assumes a farm site price of $2.77 per pound round weight.

ECONOMIC RETURN TO THE STATE OF ALASKA

The state will receive economic rent from the finfish farming industry in the following ways:

Aquatic farm product tax for finfish. This revenue is estimated to be three percent of the farmgate value (gross sales). This tax is similar to the raw fish tax. For a farm that produces 200 metric tons annually, the estimated annual gross sales revenue is $1,203,000 (from Table 6, assuming the farm is operating at capacity). Thus, the aquatic farm product tax for a 200 metric ton farm would be $36,090 annually. For a 10,000 metric ton industry (fifty 200 metric ton farms), the total annual farm product tax is estimated at $1,804,500. Note that the revenue from this tax is split evenly between the local municipality or borough and the State.

Tideland lease from the State. Currently, there are no tideland leases from the State for shellfish farms; as a result, no estimates are available. However, the revenue to the State from the tideland lease is based on the appraised fair market value. An average farm of two surface acres would lease the amount of tideland utilized, which includes the area up to location of the anchors. Thus, depending on depth, current, and location, the area of the lease would range from approximately 10 to 20 acres per farm.

Permit fees. Current fees include a $50 filing fee, $100 annual permit fee, and a $50 per acre fee if utilizing a permit rather than a lease for tideland use.

Corporate income tax. Estimated at $4,500 up to the first $90,000 of net income, plus 9.4 percent of all net income over $90,000.

Local property tax. Varies depending on the municipality or borough in which the farm is located.

Local sales tax or raw fish tax. This revenue varies depending on whether the local taxing authority has a sales or raw fish tax, and whether the farm is located inside a local taxing authority (municipality or borough).

APPENDIX B

IMPACT OF FARMED SALMON PRODUCTION ON SALMON PRICES

Increased worldwide production of farmed salmon has put downward pressure on the price of Alaska wild salmon. Alaska's salmon fishermen are concerned that production of Alaska farmed salmon will further this price erosion. With available data, we can estimate a range for the lost revenue to Alaska commercial fishermen resulting from an increase in the production of farmed salmon.

In Appendix A, the operation of a 200 metric ton salmon farm is described. The task force has envisioned that over a period of 5 to 15 years from the date finfish farming may be permitted, the industry will grow slowly from 10 to 100 fully productive farms of about 200 metric tons each.

Recent estimates of the elasticity of demand for pacific salmon can be used for a rough estimate of the effect that a farmed salmon industry in Alaska could have on the price of Alaska wild salmon.

It is difficult to provide an accurate estimate of the elasticity for salmon since demand for salmon is increasing and the composition of production is changing with more farmed salmon on the market. Also, the elasticity of demand for salmon depends on the markets in which it is sold. The results provided here should be considered ballpark estimates.

From elasticities provided in Anderson (1988), assuming our maximum estimate of 100 farms each producing 200 metric tons, and assuming a world production of 568,000 metric tons with an exvessel price of $3.00 per pound, we get a range of loss to the Alaska commercial fishing industry due to a decline in price of $15-51 million (See Table 1).

The lower end of this range would occur if wild and farmed salmon competed mostly in the Japanese market, a likely scenario. The high end assumes competition only in the expensive seafood restaurant market, less likely since this market could not absorb more than a small fraction of the total production of wild salmon.

These estimates are based on mostly negative assumptions. It is unlikely that the Alaska salmon farming industry would produce 20,000 metric tons for many years to come. Also, most farmed salmon fills market niches that do not compete with wild salmon. Also, the markets that would be targeted by Alaska farmed salmon producers would likely be filled by another producer if Alaska does not permit finfish farming.

The contribution of salmon farms to the economy may be larger than the negative effects. Refer to Appendix A for information on the economic benefits of salmon farming.

TABLE 1
IMPACT OF ALASKA FARMED SALMON ON ALASKA PRICES

	ELASTICITY	CURRENT PRICE PER LB.	WORLD PACIFIC SALMON (MT)	ALASKA CATCH (MT)	HYPOTHETICAL ALASKA FARM OUTPUT (MT)	RESULTING PRICE CHANGE PER LB.	LOSS TO AK COM. FISHING
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	200	(0.00)	($275,023)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	200	(0.00)	($212,232)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	200	(0.00)	($516,432)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	200	(0.00)	($149,932)
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	1,000	(0.00)	($1,375,115)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	1,000	(0.00)	($1,061,161)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	1,000	(0.01)	($2,582,160)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	1,000	(0.00)	($749,659)
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	10,000	(0.03)	($13,751,146)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	10,000	(0.02)	($10,611,615)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	10,000	(0.06)	($25,821,596)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	10,000	(0.02)	($7,496,592)
N.E. SUPERMARKETS	-1.69	$3.00	568,000	200,000	20,000	(0.06)	($27,502,292)
N.E. FISH STORES	-2.19	$3.00	568,000	200,000	20,000	(0.05)	($21,223,230)
EXPENSIVE SEAFOOD	-0.9	$3.00	568,000	200,000	20,000	(0.12)	($51,643,192)
JAPANESE TRADERS	-3.1	$3.00	568,000	200,000	20,000	(0.03)	($14,993,185)

(1) FROM "WORLD MARKETS FOR SALMON: PEN REARED SALMON IMPACTS"

ELASTICITIES ARE FROM P.189.
PACIFIC SALMON PRODUCTION IS FOR 1987 P.73.

THESE IMPACTS ASSUME ALASKA FARMED SALMON COMPETES ONLY WITH PACIFIC SALMON AND DOES NOT ACCOUNT FOR INCREASING DEMAND FOR SALMON.

TO THE EXTENT THAT ALASKA FARMED SALMON COMPETES WITH ATLANTIC SALMON AND AS DEMAND INCREASES, THE IMPACT ON ALASKA COMMERCIAL FISHING INDUSTRY DIMINISHES.

APPENDIX C

SUMMARY OF TASK FORCE ACTIVITIES

CREATION OF THE TASK FORCE

The Alaska Finfish Farming Task Force was created by the Alaska Legislature under Chapter 145, SLA 1988; the effective date of the act was June 9, 1988.

Under Ch. 145, SLA 1988, the task force was charged with providing an interim report, due by January 30, 1989, and a final report, due by January 30, 1990, to the Legislature addressing "finfish farming in fresh water, in marine environments, and in tanks or other enclosed structures that contain marine water and that are located on land." The task force was also to consider related hatchery operations.

The legislation directed the task force to examine:

(1) whether the farming of finfish can be conducted in a manner that protects the health of the state's fishery resources;

(2) criteria for the siting of finfish farms to minimize land use conflicts and to protect the environment;

(3) net economic costs and benefits of finfish farming in the state to state residents, including jobs created or lost for state residents, tax revenue (assuming an appropriate tax rate), cost of State regulation and monitoring, and effects on markets for salmon caught by the state's commercial fishing fleets;

(4) the cost of providing adequate regulation of finfish farming to protect wild stocks, the environment, public health, and existing beneficial uses of the state's coastal water and land, and the role of the private sector in providing pathological and other services;

(5) identification and analysis of appropriate sources of supply of stock for finfish farms, including but not limited to private nonprofit hatcheries, private for-profit hatcheries, and wild stocks, and their likely effect on existing state policy; and

(6) strategies for improving the marketability of Alaska salmon, particularly those high-value species competing with farmed salmon for domestic and export sales.

No funds were appropriated for task force operations until the 1989 legislative session. As a result, the original deadline for the interim report passed before the task force was established.

Following the 1989 legislative session, the Office of the Governor began organizing the task force. For administrative purposes, the task force was located in the Office of the Governor, Division of Administrative Services. A project coordinator was hired in late June.

TASK FORCE MEMBERS

In late July 1989, Governor Cowper appointed the following task force members: Ken Castner, representative of commercial salmon fishermen; Mary Lou Cooper, public member; Gordon Harrison, private economist; Theodore Merrell, fisheries biologist; and Brent Paine, aquatic farming advocate. Mary Lou Cooper was designated chairman.

In August 1989, Gordon Harrison resigned from the task force to take a job as director of the Legislative Research Agency. Under Ch. 145, SLA 1988, State employees were not permitted to serve as task force members. John Weddleton was appointed as Mr. Harrison's replacement in September 1989.

On October 16, 1989, Mary Lou Cooper resigned as chairman while continuing to serve on the task force. Theodore Merrell was elected chairman by unanimous consent of the task force.

FUNDING

During the 1989 session, the Legislature appropriated $50,000 to the task force. Of this, $16,600 was appropriated for FY 89 and $33,400 was appropriated for FY 90. Because task force activity did not commence until after July 1, 1989, the appropriation for FY 89 lapsed.

In September 1989, the task force received $10,000 from the Department of Commerce and Economic Development through a reciprocal service agreement (RSA). In early November 1989, the Legislative Council awarded $10,000 to the task force. In total, the task force had $53,400 to spend on its efforts.

TASK FORCE MEETINGS

The task force held a series of meetings for the purpose of collecting information and developing its report to the Legislature.

The meetings are briefly described below. A list of persons testifying at each meeting is provided. For additional information, see the minutes of the meetings in Appendix D.

July 31, 1989, Juneau

Topics: Review enabling legislation and budget; develop goals and objectives; plan future activities.

Individual Testifying:

Deborah Greenberg, Special Assistant, Alaska Department of Fish and Game

September 6 & 7, 1989, Anchorage

Topics: Disease, genetics, and broodstocks; report format.

Note: While in Anchorage, task force members also attended various sessions of the American Fisheries Society Convention concerning aquatic farming and related issues.

Individuals Testifying:

Conrad Mahnken, National Marine Fisheries Service, Northwest and Alaska Fisheries Center
Dr. Lee Harrell, National Marine Fisheries Service, Northwest and Alaska Fisheries Center
Dr. Brian Allee, Director of Fisheries Rehabilitation, Enhancement and Development, Alaska Department of Fish and Game
Alex Wertheimer, National Marine Fisheries Service, Auke Bay Laboratory

September 27 & 28, 1989, Juneau

Topics: Siting and marketing; presentation from Tim Kennedy, Cordova fisherman and part owner of fish farms in Washington and British Columbia; presentation from Bill Heard, with the National Marine Fisheries Service, Auke Bay Laboratory.

Individuals Testifying:

Laura Dameron, Southeast Alaska Conservation Council
Rodger Painter, Alaska Mariculture Association
Diane Mayer, Office of the Governor, Division of Governmental Coordination
Janet Burleson, Department of Natural Resources, Division of Land and Water Management
Brian Allee, Department of Fish and Game, FRED Division
Sonja Corazza, United Fishermen of Alaska
Tim Kennedy, commercial fisherman and salmon farm owner
Paul Peyton, Department of Commerce and Economic Development, Division of Business Development
Bill Atkinson, Private Consultant on Japanese markets for seafood (by teleconference)
Bill Heard, National Marine Fisheries Service, Auke Bay Laboratory

October 16 & 17, 1989, Juneau

Topics: Review of previous findings; broodstock ownership, siting, disease, genetics; and commercial fisheries economics, regulation, and management.

Individuals Testifying:

Dr. Anthony Gharrett, University of Alaska and National Marine Fisheries Service
Gale Good, Alaska Trollers' Association
Sonja Corazza, United Fishermen of Alaska (by teleconference)
Ken Parker, Director, Alaska Department of Fish and Game, Division of Commercial Fisheries
Rodger Painter, Alaska Mariculture Association

November 5 & 6, 1989, Juneau

Topics: Regulating finfish farming; costs and benefits of a finfish farming industry; marketing issues; findings and recommendations.

Individuals Testifying:

Chip Toma, private citizen
Rick Harris, Sealaska Corporation

December 5, 1989, Work Session by Teleconference

Topic: Review of draft report and public comments received.

December 18, 19 & 20, 1989

Topic: Finalize report to Legislature.

ADDITIONAL ACTIVITIES

September 24 - 26, 1989, Tour of Puget Sound Fish Farms

On September 24, 25, and 26, task force members Ken Castner, Mary Lou Cooper, Theodore Merrell, and Brent Paine toured finfish farms in the Puget Sound area. Also present on the tour were Rick Harris, Sealaska, Tom Moyer, Legislative Aide to Sen. Bettye Farhenkamp, and Jon Sherwood, project coordinator for the task force.

On the afternoon of September 24, the task force visited the Squaxin Island marine pen fish farm and ocean ranching facility and viewed the proposed site of Swecker Farms marine pen fish farm, both in south Puget Sound.

On the morning of September 25, the task force visited Swecker Farms' processing facility in Olympia and its fresh water tank farm and hatchery facility in Rochester. That afternoon, the task force visited the Sea Farms Washington marine pen fish farm at Port Angeles. In addition, the task force conducted an aerial inspection of several marine pen operations in north Puget Sound.

On the evening of September 25, the task force met with representatives of the Marine Environmental Coalition, a group opposed to most aquatic farming in Puget Sound.

On the morning of September 26, the task force met with several members of the University of Washington faculty, addressing to them questions on disease, genetics, broodstock development, environmental impacts and research activities.

The faculty members were Dr. Ken Chew, Dr. Marsha Landolt, Dr. Bill Hershberger, Dr. Bob Stickney, and Dr. Donald Weston.

The trip to Puget Sound was hosted by Sealaska Corporation. The task force paid for its airfare to and from Seattle and for its food and accommodations. Sealaska Corporation paid for transportation within Washington and for the rental of a meeting room at the University of Washington campus for the morning of September 26. (An ethics report is on file with the Department of Law.)

November 17, 1989, Draft Report Released

On November 17, the task force released its interim report, including the draft version of its final report, to the Alaska Legislature. By November 20, copies of the report were mailed to the 130 people on the task force's mailing list, as well as all of the Legislative Information Offices.

A press release announcing the release of the report was also sent out. The task force received additional requests for the report. Eventually, a total of approximately 300 copies of the report were distributed to interested parties.

The task force received over seventy separate written comments on the draft report.

Throughout its existence, the task force gathered relevant information on finfish farming. Individual task force members collected data on various related topics, and information sent the task force from any source was distributed to the task force or (in the case of a few lengthy documents) summarized for the task force by the project

coordinator or a task force member. (See Appendix F, Bibliography, for a complete listing of sources.)

The task force developed a mailing list numbering approximately 150, including legislators, state and federal officials, various advocacy groups, and interested members of the press and public. Anyone who asked was put on this mailing list. After each meeting, the task force sent out letters summarizing the meeting and setting forth upcoming task force activities.

APPENDIX D

MINUTES OF MEETINGS

ALASKA FINFISH FARMING TASK FORCE
July 31, 1989

MINUTES

The meeting was called to order at 9:00 by Mary Lou Cooper, Chairperson of the Task Force. Task Force members present were: Mary Lou Cooper, Ken Castner, Gordon Harrison, Ted Merrell, and Brent Paine. No members were absent.

Mary Lou Cooper introduced the members of the task force and staff to the audience. Members of the audience identified themselves.

Mary Lou Cooper reviewed the rules and methods of operation of the Task Force.

Jon Sherwood, project coordinator for the Task Force, provided a brief overview of the legislation authorizing the Task Force. He explained that the Task Force is to produce an interim report by December 1, 1989 and a final report by January 15, 1990. He also reviewed the Task Force's budget. The Task Force is funded for $33,000.

Task Force members then engaged in a discussion of their goals and how they would like to achieve them. Ted Merrell stated that the American Fisheries Society was holding its annual meeting in Anchorage in September and there would be a symposium on pen rearing salmon at the meeting. The Task Force decided to meet in Anchorage during the AFS meeting to take advantage of the expertise that would be available there.

Deborah Greenberg, Special Assistant with the Department of Fish and Game, addressed the Task Force on the legislative history of aquatic farming in Alaska. She then explained the Cowper administration position on mariculture. She also summarized the issue papers on finfish farming prepared by the interagency working group on mariculture. The issues included land use, water quality, disease, brood stock, habitat protection and product wholesomeness.

Ted Merrell asked whether minutes of the meetings would be provided. The Task Force decided that minutes indicating who spoke, the general topics, any formal decisions, and a list of observers should be kept.

The Task Force held a discussion of the topics for consideration included in its authorizing legislation. Members asked questions and exchanged information on finfish farming. Much of this discussion focused on the issue of minimizing land use conflicts. The task force identified a number of people to contact for additional information on this issue.

At 12 p.m., the Task Force adjourned for lunch.

The meeting was reconvened at 1:20 p.m. The task force members continued their discussion of the issues contained in the authorizing legislation. As each issue was discussed, contact persons were identified.

The issue of broodstock was addressed briefly. The task force then returned to their discussion of land use conflicts and siting.

Mary Lou Cooper raised the cost-benefit issue. Gordon Harrison stated that it would be a major task and depend on the assumptions made by the task force. Task force members discussed loss of jobs in the fishing industry, market niches, reasons for farming finfish, the cost of regulation, taxation of finfish farming, and the need to look at the three possible types of farming operations: freshwater, upland tanks, and marine pens.

Jon Sherwood handed out travel authorization forms for reimbursement of travel and per diem costs. He also passed out an article on salmon farming provided to the task force by Frank Homan, of Senator Sturgulewski's staff.

The task force discussed the cost of regulation issue contained in the authorizing legislation. Ken Castner said that this issue duplicated parts of the cost-benefit issue, except that it addressed the role of private sector in regulation. He stated that this role is a policy question. A brief discussion was held on this issue.

Mary Lou Cooper raised the issue of broodstock sources. Ken Castner suggested that the task force should review the debate before the Board of Fisheries in December of 1988. Brent Paine stated that he had put together papers on broodstock supplies while working for the Legislature. The task force discussed the practical and policy issues associated with supply of broodstock.

The task force discussed the issue of improving the marketability of Alaska salmon. Ken Castner suggested calling the producers of the Seafood Report radio program in Kodiak for the name of a good marketing person. Mary Lou Cooper mentioned ASMI as a possible resource. Ted Merrell suggested contacting the Alaska Trollers Association.

Ken Castner commented on how the task force members should conduct themselves in public. He said he did not want to see the task force members be perceived as public experts, and suggested that task force members keep their comments private. He stated that he did not want to do anything to poison or damage the quality of the task force's report.

Following the discussion of the issues, it was decided to divide the topics for consideration into five subjects: siting, cost-

benefit analysis, the amount and cost of regulation, broodstock-genetics-disease.

The task force discussed how to proceed. It was decided that each member would take one topic and work with Jon Sherwood to prepare a presentation for one of the meetings.

Ken Castner stated that he would like to teleconference with the other task force members for an hour or so before the next meeting. The task force agreed to do so, acknowledging that Gordon Harrison, and possibly Ted Merrell, would be unavailable to participate.

Mary Lou Cooper offered to take the marketability issue, Brent Paine the broodstock-genetics-disease issue, Gordon Harrison the cost-benefit analysis, Ted Merrell the siting issue, and Ken Castner the cost of regulations.

The task force briefly discussed the structure and intent of the marketability issue.

The task force decided to address the regulation and broodstock-genetics-disease issues at the next meeting. It was decided that the siting and marketing issues would be addressed at a meeting in the last week in September, and the cost-benefit issue would be addressed in an October meeting.

Ken Castner stated that he would like to have Jon Sherwood begin working on early drafts of the report soon. He said that the task force should devote 25 percent of its time to discuss writing.

The task force members updated their addresses and phone numbers for one another. The meeting was adjourned at approximately 5:30 p.m.

<u>List of persons in attendance</u>

Greg Erickson
Deborah Greenberg
Rick Harris
Sheila Helgath
Frank Homan
Eric King
Karl Ohls
Sandy Perry

APPROVED 9/7/89

ALASKA FINFISH FARMING TASK FORCE

September 28 & 29, 1989

MINUTES

The meeting was called to order at 8:35 a.m. on Thursday, September 28, by Mary Lou Cooper, Chairman. All task force members were present: Mary Lou Cooper, Ken Castner, John Weddleton, Ted Merrell, and Brent Paine.

Members of the task force introduced themselves to the new task force member, John Weddleton. Jon Sherwood introduced Fran Armon, who assists Jon in the office, providing administrative support for the task force.

Ken Castner reviewed the task force's past activities for John Weddleton. He listed the five catagories of issues under consideration: broodstock, genetics, and disease; siting; cost of regulation; markets/marketing; and benefits and costs. Brent Paine reviewed the minutes from the last meeting for John Weddleton to provide a general idea of what the task force has accomplished to date.

The task force discussed siting issues, including local control, conflict minimization, environmental concerns, and the Washington interim guidelines for siting.

The task force members identified questions for Bill Atkinson, a fish marketing consultant, to be faxed to Atkinson so he would be prepared to answer them during the conference call on Friday.

Laura Dameron, with SEACC, spoke with the task force stating her concerns: impacts of the coastal environment and socio-economics and lifestyle impacts. SEACC opposes all fish farming because of upland impacts, pollution, water demands, and the potential loss of desire for habitat protection.

Rodger Painter, with the Alaska Mariculture Association, spoke with the task force on the need for rational policy guidelines for siting of finfish farms. He pointed out that state regulations for shellfish farming provide for local control and that the Washington interim siting guidelines address important siting criteria. He also offered his thoughts concerning the economic viability of finfish farming and how state regulation might affect it.

The task force adjourned for lunch and reconvened at 1:30 p.m.

Diane Mayer, with the Division of Governmental Coordination, discussed the state's Project Consistency Review procedures for use of coastal waters.

Janet Burleson, with the Division of Land and Water Management, discussed how the state's permitting process works for aquatic farms.

The task force addressed several questions to Brian Allee, Director of the FRED Division, Department of Fish and Game.

Sonja Corazza, with United Fishermen of Alaska, discussed negative impacts of finfish farming. Her concerns were that pens change the habitat of wild fish, that fish escape in large numbers, and that marketing farmed salmon on Alaska wild salmon quality is wrong. She also addressed siting issues, stating that area planning is very important. She suggested requesting mapping positions with the Department of Natural Resources and the Department of Fish and Game to consolidate habitat and use charts for public use.

The meeting was adjourned at 5:15 p.m.

The meeting was reconvened Friday at 8:30 a.m. by Ken Castner. Due to illness, Mary Lou Cooper was not present; all other members were present.

The task force approved the minutes of the last meeting with amendments. They then discussed the draft of the report's introduction and health of the fisheries section and suggested changes to be incorporated by the project coordinator.

Tim Kennedy, commercial fisherman and salmon farm owner, spoke with the task force. He stated that Alaska finfish farming would not be economically viable without raising Atlantic salmon, and noted that he would not start a fish farm up here.

Paul Peyton, with the Division of Business Development, discussed the economics of fish food production and addressed the outlook for salmon in world markets.

The meeting was adjourned for lunch at 11:25 a.m. and reconvened at 12:45 p.m.

The task force reviewed the siting issues discussed the previous day.

Bill Atkinson, expert on Japanese markets for seafood, was contacted via a conference call. Atkinson addressed several questions on Japanese markets for seafood and the impacts of farmed salmon on these markets.

Bill Heard, with the National Marine Fisheries Service at Auke Bay Laboratories, addressed research in raising salmon at Osprey Bay. He stated that indigenous species could be raised successfully, although he could not speak about the economic viability.

The meeting was adjourned at 5:00 p.m.

Minutes approved October 17, 1989

List of persons in attendance:

Brian Allee, Department of Fish and Game
Susan Bradley, Coastal Zone Management
Janet Burleson, Division of Land and Water/Department of Natural Resourses
Sonja Corazza, United Fishermen of Alaska
Laura Dameron, Southeast Alaska Conservation Council
Bill Heard, National Marine Fisheries, Auke Bay Laboratories
Sheila F. Helgath, Legislative Research
Frank Homan, Senator Sturgulewski's staff
Bill Janes, Environmental Conservation
Tim Kennedy, Fish Farm Owner
Amy Kruse, Environmental Conservation
Diane Mayer, Division of Governmental Coordination/Office of the Governor
Robert Mikol, Northern Deep Sea Fisheries, Inc.
Rodger Painter, Alaska Mariculture Association
Sheila Peterson, Senator Eliason's staff
Paul Peyton, Commercial Fisheries Development/Department of Commerce and Economic Development
Rick Reed, Habitat Division/ Department of Fish and Game
Lana Shea, Habitat Division/ Department of Fish and Game
John S. Thiede, Department of National Resources

ALASKA FINFISH FARMING TASK FORCE
September 6 & 7, 1989

MINUTES

The meeting was called to order at approximately 1:30 p.m. on September 6 by Mary Lou Cooper, Chairperson. Task force members present were Mary Lou Cooper, Ken Castner, Ted Merrell, and Brent Paine. No members were absent.

Mary Lou Cooper noted that Gordon Harrison had resigned his position on the task force to take a job with the Legislative Research Agency. She stated that the Governor's Office had not found a replacement for Mr. Harrison at that time.

The task force discussed the questions it wanted to resolve at the meeting, a proposal from Sealaska Corporation to tour operating farms in the Puget Sound area, and correspondence received from Sen. Fahrenkamp regarding the task force.

Conrad Mahnken, with the National Marine Fisheries Service, Northwest and Alaska Fisheries Center (NWAFC), joined the task force in a discussion of the genetic and broodstock issues. Both Atlantic and Pacific salmon were discussed..

Dr. Lee Harrell, fish pathologist with NWAFC, discussed the incidence of disease in pen-reared salmon and the potential for spreading disease to the wild stock.

At approximately 5 p.m., the task force adjourned for the afternoon.

The task force reconvened at 9 a.m. on September 7. Dr. Brian Allee, director of the Alaska Department of Fish and Game FRED Division, discussed disease, genetics, and broodstock issues with the task force.

Dr. Allee spoke to the state's existing hatchery programs, efforts to cultivate indigenous species of finfish, and the concept of creating areas free of salmon farming near critical salmon streams.

After breaking for lunch, the task force continued their discussion of Sealaska's invitation to take the task force on a tour of finfish farming operations in Puget Sound. The task force decided to accept the invitation.

The task force discussed the report with project coordinator, Jon Sherwood, who outlined some of the options for structuring the report. The task force directed the project coordinator to begin writing the report using an issue-by-issue format.

Alex Wertheimer, with the National Marines Fisheries Service, Auke Bay Laboratories, spoke to the task force regarding protection of the wild salmon stocks from disease.

The task force approved the minutes of the last meeting. Ken Castner requested that the word "produces" on p. 2 be corrected to "producers." The task force concurred.

The task force discussed developing its preliminary recommendations on the disease, genetics, and broodstock issues.

The task force then enacted its preliminary recommendations as follows:

-- Only indigenous broodstocks should be used in finfish farming in Alaska. No stocks should be imported from out of state.

-- The State will need to allow the use of private pathology services for the finfish farming industry to grow.

-- Current state policies on disease control should be applicable to finfish farming.

The meeting was adjourned at approximately 5 p.m.

ALASKA FINFISH FARMING TASK FORCE
October 16 & 17, 1989

MINUTES

The meeting was called to order in Juneau at 8:34 a.m. on October 16 by Mary Lou Cooper, Chairman. Task force members present included Ken Castner, Mary Lou Cooper, Ted Merrell, Brent Paine, and John Weddleton.

Ms. Cooper announced her resignation as chairman and asked for the selection of a new chairman. By unanimous consent, the members approved Ted Merrell as the new chairman of the task force. Brent Paine took over as chairman of this day's meeting.

Jon Sherwood, project coordinator of the task force, apprised the members that state ethics requirements compel the members to report the services they received from Sealaska Corporation during the September meeting. Although the services do not constitute a conflict of interest, each member must report receipt of those services. Jon Sherwood will submit the required report on behalf of task force members.

Mr. Castner presented an Alaska Native Brotherhood resolution opposing finfish farming and a 1987 study on how commercial fishing affects Homer.

After reading various materials, the members discussed the format of the task force report. They reviewed a series of questions to ask Dr. Anthony Gharrett, a biologist with the University of Alaska Southeast Auke Bay Laboratory and the National Marine Fisheries Service. Mr. Gharrett made comments concerning the destrction of discrete genetic pools in the Pacific Northwest and encouraged the task force to prevent that occurence in Alaska.

Mr. Merrell recounted his interviews with state officials regarding the relationship among state resource agencies, the permitting process, siting issues, and the establishment of sanctuaries. The members talked about these issues, the role of infrastructure for the economic survival of mariculture, and the question of public versus private ownership of broodstock.

The task force then discussed siting. Mr. Castner stressed the importance of this issue by stating that "siting is everything in this game" and that any legislation authorizing finfish farming should contain a fiscal note that reflects the costs of siting. Mr. Paine agreed and said that conflict and confrontation can be diffused if siting is set up properly.

Members concurred that the proper siting of finfish farms should address the transference of disease, genetic interference with wild stocks, environmental degradation, aesthetic degradation, conflicts with existing users, avoidance of marine mammals, avoidance of water-borne organisms lethal to the farmed stock, and avoidance of conflict with designated uplands or neighborhood uses.

Members also wanted to include mention of the state of Washington's interim guidelines for siting and of the Alaska Coastal Zone Management Plan's permitting process for resolving siting issues.

Mr. Paine suggested that siting and the permitting process should be addressed as two separate issues. Mr. Merrell suggested that the Alaska Coastal Zone Management Plan's permitting process be used as a model for the finfish farming permitting process. He then asked for clarification on the structure of the task force report. Mr. Sherwood outlined the distinctions between conclusions and findings. Conclusions, he explained, should be statements of public policy. Findings should be points of agreement among the task force members on matters of fact.

Members then discussed the permitting process. Ms. Cooper and Mr. Merrell supported the inclusion of maps in the public notification process. Questions then arose about the adequacy of the state's inventory of sites.

At 10:30 a.m., Dr. Anthony Gharrett discussed disease and genetics among salmon, the homing habits of various salmon species, siting, how the Alaska Department of Fish and Game enforces its genetics guidelines, the genetic differences that exist among lakes within the same area, patentable gamete production, and the aquaculture research by Japan and the Soviet Union. He distributed a proposal calling for the Alaska Department of Fish and Game to implement its genetic policy by establishing, on a regional basis, sanctuaries for wild fish populations. Mr. Gharrett entertained questions from the members until 11:35. Discussion then returned to siting and permitting.

After lunch, the task force members heard testimony from Gale Good, member of the Alaska Trollers' Association. Mr. Good described his industry and voiced his opposition to finfish farming.

The members spent the rest of the day discussing findings and conclusions relating to siting. Specific issues addressed were: water quality; effluents; water circulation; the use of uplands; predation; disease; aesthetics;

pollution; user conflicts; having finfish farmers produce annual performance reports to governmental agencies; the distinctions among marine pens, marine upland tank facilities, and freshwater upland facilities; distances between farms and wild anadromous streams; distances between farms; and, the incremental implementation of finfish farming.

The meeting was adjourned at 5:14 p.m.

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The task force reconvened at 8:45 a.m. on October 17. John Weddleton presided over the day's meeting. Task force members present included Ken Castner, Ted Merrell, Brent Paine, and John Weddleton. Due to illness, Mary Lou Cooper was absent.

The members adopted, with corrections, the minutes from the September 28 and 29 task force meeting and briefly discussed broodstock issues.

At 9:00 a.m., the task force members listened to United Fishermen of Alaska's Sonja Corazza's testimony on the history of the Alaska fishing industry, the limited entry program, the ocean ranching program, and the implementation of the 200-mile limit. She pointed out that in Anchorage alone, 3900 fishermen contributed $126 million to the economy. Because of the underfunding of the Alaska Department of Fish and Game, she claimed that errors in fisheries management have incurred losses to fishermen. She ended her testimony by voicing her opposition to finfish farming.

After listening to Ms. Corazza's testimony, the members resumed their discussion on broodstock selection for enclosed freshwater systems, the importation of eggs, the use of Atlantic salmon in the Pacific Northwest, the selling of smolt, and other broodstock issues.

At 10:10 a.m., the members heard testimony from Ken Parker, Director of the Division of Commercial Fisheries, Alaska Department of Fish and Game. Mr. Parker presented a fiscal history of his division and described its duties. He provided information about the catches and ex-vessel values among various fisheries; the number of fisheries permits, licenses, and processors and buyers. He showed the relationship between receipts and expenditures for commercial fisheries management before entertaining questions from the members.

Mr. Parker's testimony ended at 11:15 a.m. The members continued their discussion on broodstock issues.

At 11:35 a.m., Rodger Painter, President of the Alaska Mariculture Association addressed the task force, urging support for the development of finfish farming in Alaska. In addition to handing out the latest edition of the "Alaska Mariculture Report" (Volume 3, No. 6), he distributed a paper responding to concerns relating to the permitting process, the ability of regulatory agencies to deal with finfish farming issues, the impacts on wild stocks, disease control, support of adequate funding for regulatory programs, the demands on Alaska's environment by every industry -- from tourism to logging, public use issues, Alaska's declining market share of salmon, and the obtaining of salmon eggs for mariculture. He also addressed the role of private non-profit groups in the cultivation of broodstock. Citing his past experience at the Alaska Seafood Marketing Institute, he noted how the state still has a poor quality assurance program.

After the lunch break, the task force members discussed their agenda, the testimony they had received, developing strategies for retrieving Alaska's 1988 market share of salmon, and issues relating to quality, allocation, habitat, broodstock, costs/benefits, recapitalizing the fishing fleet, permit costs, and marketing.

After a brief break at 3:00, the members established the following meeting dates and deadlines:

November 5 & 6.....Task Force Meeting in Juneau
November 17.....Release of Draft Report
December 5.....Work Session on Draft Report
December 13.....Deadline for Public Comments
December 17 & 18.....Task Force Meeting in Juneau

Citing previous testimony, the members summarized their findings on marketing issues.

The meeting was adjourned at 5:35 p.m.

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The following people attended the task force meetings:

Sonja Corazza, United Fishermen of Alaska*
Laura Dameron, Southeast Alaska Conservation Council

Dr. Anthony Gharrett, Biologist, University of Alaska Southeast Auke Bay Laboratory and the National Marine Fisheries Service
Gale Good, Alaska Trollers' Association
Deborah Greenberg, Special Assistant, Alaska Department of Fish and Game
Sheila Helgath, Legislative Research Agency, Alaska State Legislature
Frank Homan, Aide, Senator Arliss Sturgulewski
Michael Kaill, Biologist, Fisheries Rehabilitation, Enhancement, and Development Division, Alaska Department of Fish and Game
Dale Kelly, Alaska Trollers' Association
Eric King, Alaska Trollers' Association
Richard Lauber, Pacific Seafood Processors' Association
Lynn Morley, Teleconference Moderator, Legislative Affairs Agency, Alaska State Legislature
Dave Moses, Aide, Senator Paul Fischer*
Karl Ohls, Aide, Senator Fred Zharoff
Rodger Painter, President, Alaska Mariculture Association
Ken Parker, Director, Division of Commercial Fisheries, Alaska Department of Fish and Game
Sheila Peterson, Aide, Senator Dick Eliason
Chip Thoma, Observer

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* Participated via teleconference

Minutes were approved 12/19/89.

ALASKA FINFISH FARMING TASK FORCE
November 5 & 6, 1989

MINUTES

The meeting was called to order in Juneau at 9:45 a.m. on Sunday, November 5, 1989 by Ted Merrell, Chairman. Task force members present included Ken Castner, Ted Merrell, Brent Paine, and John Weddleton. Mary Lou Cooper was absent.

Jon Sherwood, project coordinator of the task force, distributed copies of a required "ethics" report on task force activities and the draft report of findings and recommendations dated October 29, 1989. He discussed the maintenance of task force records and announced that on Friday, November 3, the Alaska State Legislature's Legislative Council approved $10,000 additional funding for the task force.

The members discussed task force staffing and agreed to have Mr. Sherwood on contract to testify on behalf of the task force before committees during the upcoming legislative session. They also discussed how to distribute the draft report, the press release that would accompany the report, and what an interim report should contain.

Mr. Merrell announced that Mary Lou Cooper spoke to him about the possibility of her resigning from the task force and that he had requested that she not do so. Members concurred with having her remain on the task force.

At 10:20 a.m., Chip Thoma addressed the task force. He voiced his strong opposition to allowing finfish farming in Alaska. He stated that finfish farming would undermine the marketing of Alaska salmon as a "pure, fresh, cold" commodity that would benefit from the "increasing trend in consumer buying and eating habits [by] stay[ing] away from raised or harvested foods that are linked with pesticides, toxins, or additives..."

The task force then discussed the costs of regulation caused by the introduction of finfish farming to Alaska. Mr. Paine cited fiscal notes from earlier legislation authorizing finfish farming. The members discussed this, the fiscal demands of siting requirements, the number of possible permits to administer, the fiscal impact on other resource programs with the introduction of finfish farming, and the spin-offs of those new demands to other regulatory agencies such as the Board of Fish.

Discussion then resumed on the draft report the task force planned to release on November 17. Several members voiced their concern about the public misconstruing the document as

being conclusive or as representing each individual member's position.

Mr. Sherwood suggested having a cover letter accompany the draft report, in which the task force could solicit public comment while emphasizing that the document is only a draft.

After lunch, the task force discussed costs/benefits issues, including: the volatility of salmon prices; market niches for farmed and wild salmon; the history and purpose of the limited entry program and its conservational and economic repercussions; marketing strategies; the threat finfish farming poses to the livelihood of fishermen; the effects on the market of price, quality, and consistency of supplies; the possible losses to wild salmon stocks from using gametes to start farming operations; finfish farming as an allocation issue; having hatcheries profiting from the sale of smolts; the possible benefits of sharing facilities between finfish farmers and ocean ranchers; incremental start-up of finfish farming; establishing genetic reserves; and, the production of fish meal.

At 4:25 p.m., Rick Harris, of Sealaska Corporation, spoke in support of allowing finfish farming in Alaska and its possible benefit to coastal areas. He argued that finfish farming can help market Alaska salmon as a commodity that is available year-round. Mr. Harris suggested that one form of economic rent would be the servicing of a remote site net pen for common property benefit. The fish would be provided by the state or non-profit hatcher. The finfish farmer would beed the fish until their release and provide and faintain the pen facility.

After a brief break, the task force members resumed their discussion of costs/benefits.

The meeting was adjourned at 6:10 p.m.

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The task force reconvened on Monday, November 6, 1989, and was called to order at 8.43 a.m. by Chairman Ted Merrell. Task force members present were Ken Castner, Ted Merrell, Brent Paine and John Weddleton. Mary Lou Cooper was absent.

The task force began discussing the profile of finfish farmers and the role they would play in the various aspects of the fishing industry. Mr. Castner was concerned that they might not defend the issues that affected the commercial fishing industry, but rather look after only their personal interests. Mr. Paine disagreed, stating that good

The task force adopted the November 2, 1989 draft labeled "Draft with Ted's Changes" for purposes of discussion.

It was decided that costs and benefits needed to be broken into two categories: 1) State of Alaska; and 2) the industry. It was determined that a time line to show the development of a fish farm to market stage was needed for inclusion in the report.

Mr. Castner requested that duplicate references under a heading be footnoted, for purposes of cross-referencing.

The task force decided that the costs associated with the beginning of the industry (insurance, markets, etc.) needed to be included in the report. Time frame estimates were predicated on a 1991 allocation, leaving site approval for 1991, with smolt and fish availability in 1992.

After a brief break, the task force discussed marketing. Findings were clarified and regrouped. The task force decided that separate findings were required for fresh and frozen markets.

The task force discussed: competition between farmed and wild salmon; improved marketing of wild salmon through quality assurance programs; and marketing wild salmon as natural, chemical-free salmon.

The task force recessed for lunch at 12:18 p.m. and reconvened at 1:30 p.m.

The task force briefly returned to its discussion of quality assurance.

Mr. Castner recommended that the report introduction contain a section on the make-up of the task force. He also thought definitions were needed on mariculture, aquaculture and finfish farming.

Several findings in the draft report were amended to provide clarifying language.

Having completed its review of the draft report, the task force verified the November 17, 1989 release of the draft report.

The meeting was adjourned at 5:22 p.m.

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The following people attended the task force meetings:

Laura Dameron, Southeast Alaska Conservation Council
Deborah Greenberg, Special Assistant, Alaska Department of Fish and Game
Rick Harris, Sealaska Corporation
Frank Homan, Aide, Senator Arliss Sturgulewski
Tom Moyer, Aide, Senator Bettye Fahrenkamp
Sheila Peterson, Aide, Senator Dick Eliason
Kate Tesar, Aide, Representative Fran Ulmer
Chip Thoma, Observer

Minutes were approved 12/19/89.

ALASKA FINFISH FARMING TASK FORCE
December 5, 1989
WORK SESSION

MINUTES

The work session teleconference was called to order at 2:30 p.m. on Tuesday, December 5, 1989, by Ted Merrell, Chairman. Task force members present were Ted Merrell, Mary Lou Cooper, Ken Castner, Brent Paine and John Weddleton.

Opportunities for public comment and participation were discussed. A request by Chuck Piedra, of Elfin Cove, to expand the public comment period and testimony methods, was noted. It was decided to continue the same comment procedures as in previous meetings of the task force. No written comments relative to substantive changes in factual findings in the draft report had been directed to the task force as of the December 5 meeting. The task force reiterated that written comments on the draft report should be received by December 13, 1989, to ensure consideration.

The task force reviewed and edited the final chapters of the draft report. Jon Sherwood, project coordinator, discussed the format and content of the final chapter of the report.

The work session was adjourned at 4:42 p.m.

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The following people observed the task force meeting:

In Juneau--

Chip Thoma, Observer
Mary McDowell, Aide to Senator Dick Eliason
Frank Homan, Aide to Senator Arliss Sturgulewski
Gordy Williams, Angoon
Karl Ohls, Aide to Senator Fred Zharoff

In Anchorage--

Valerie Brown, Alaska Wildlife Alliance
Jay Nelson, Aide to Representative Cliff Davidson
Bryce Edgemon, Aide to Representative George Jacko
Charles McKee, Observer

Minutes were approved 12/19/89.

ALASKA FINFISH FARMING TASK FORCE
December 18-20, 1989

MINUTES

The Alaska Finfish Farming Task Force meeting was called to order on December 18, 1989, in Juneau, at 1:19 p.m., by Ted Merrell, Chairman. Members present were Ted Merrell, Mary Lou Cooper-Elton and John Weddleton. Brent Paine and Ken Castner were absent due to weather and eruption of Redoubt Volcano causing flight cancellations.

Format and appendices of the final report were discussed. Mr. Merrell noted patterns to the public comment received. Members felt that comments from the public sector about the draft report indicated a need for clarification of numerous points, but no significant changes in format or content. Minutes of October 16-17, November 5-6, and December 5, 1989 meetings were reviewed and corrected. Final approval was postponed pending Mr. Castner's approval.

Brent Paine arrived at 2:28 p.m. The task force recessed at 2:30 p.m., returned at 3:29, and adjourned at 3:30 p.m.

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Ted Merrell called the task force to order on December 19, 1989 at 8:53 a.m. Members present were Ted Merrell, John Weddleton, Mary Lou Cooper-Elton and Brent Paine. Ken Castner was absent but arrived later at 9:34 a.m.

Members began reviewing the revised draft on an item by item basis, starting with the Cost of Regulation (Ch. 5). The consensus was that the actual costs will depend on the legislation that is passed.

Discussion of regulatory costs continued, including taxation and public notice costs. A recommendation limiting predator control to non-lethal methods was adopted. The task force addressed the compatibility of wilderness areas and national monuments (Ch. 4) with finfish farming, and modified the recommendation on that subject.

The task force recessed for lunch at 12:30 p.m. and reconvened at 1:45 p.m.

Minutes of October 16-17, November 5-6 and December 5, 1989 meetings were approved as corrected.

The task force continued its review of public comments on the draft report and adopted many changes in wording to clarify the findings and recommendations.

Brent Paine's Production Model draft and timeline of a typical finfish farm was discussed. The task force agreed that a clear

description of a finfish farm should be included in the production model section.

The Health of Fisheries (Ch. 2) was taken up next. Disease transmission, genetics and risks were clarified. A consensus was reached on content and format of the final chapter of the report: All recommendations in the body of the report should be repeated; the facts do not support an unequivocal "yes" or "no" to finfish farming in Alaska; the legislature should not extend the current moratorium; and finfish farming could be done without harming fishery resources if strictly regulated. Ted Merrell agreed to prepare a draft of the chapter for review by the task force next morning.

The task force was adjourned at 6:45 p.m.

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Ted Merrell reconvened the task force at 8:15 a.m. on December 20, 1989. Members present were Ted Merrell, John Weddleton, Ken Castner, Brent Paine and Mary Lou Cooper-Elton.

The task force completed Chapter 8, General Findings and Recommendations. Costs and Benefits (Ch. 6) were considered and clarified. Marketing (Ch. 7) was discussed and it was decided that it needed to be revised and expanded to reflect numerous comments by the public. John Weddleton agreed to rewrite this section and return a revised draft to Jon Sherwood as soon as possible.

Jon Sherwood will prepare a final draft of the task force's report, incorporating all the changes that were adopted and the additional sections from Brent Paine and John Weddleton. This draft will be sent to task force members for approval by the first week of January, 1990.

No further meetings of the task force will be necessary, but a final teleconference to approve any changes in the report to the legislature, may be required.

The meeting was adjourned by Chairman Ted Merrell at 1:05 p.m.

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The following people attended the task force meeting:

Rodger Painter, Alaska Mariculture Association
Mary McDowell, Aide to Senator Dick Eliason
Frank Homan, Aide to Senator Arliss Sturgulewski
Sheila Helgath, Legislative Research Agency
Kate Tesar, Aide to Representative Fran Ulmer
Barnaby Dow, Aide to Representative Mike Davis
Chip Thoma, Observer
Gordon Williams, Self/Alaska Trollers/Angoon F&G Adv. Committee

APPENDIX E

LIST OF PERSONS SUBMITTING COMMENTS ON DRAFT REPORT

ALASKA FINFISH FARMING TASK FORCE

PUBLIC COMMENT TO DRAFT REPORT

#	Name	Organization	Address
1.	James Kallander		PO Box 2272, Cordova, AK 99574
2.	Joe Craig		Box 941, Douglas, AK 99824
3.	Lonnie Haughton	F/V China Cove, Inc.	PO Box 3006, Ketchikan, AK 99901
4.	News articles	Seattle P.I. &	Alaska Fisheries Journal
5.	William Royce	AFS	10012 Lake Shore Blvd NE,SEA,WA 98125
6.	Paul Zimmerman	Keener Packing Co.	PO Box 890, Kenai, AK 99611
7.	Sen. Zharoff	State Legislature	PO Box 405, Kodiak, AK 99615
8.	Barry Griffin	Nor'Eastern Trawl	7910 NE Day Rd W, Bainbridge Is, WA
9.	William Wilson	AIFRB	13611 Capstan Dr., Anc., AK 99516
10.	Rep. Jacko	State Legislature	PO Box 47001, Pedro Bay, AK 99647
11.	James Mackovjak	Pt. Adolphus Seafoods	PO Box 63, Gustavus, AK 99826
12.	Concerned citizens	Elfin Cove	Elfin Cove
13.	Charles Piercy	F/V Tuckahoe	PO Box 1025, Ward Cove, AK 99928
14.	Charles Piedra		Box 4, Elfin Cove, AK 99825
15.	Jeff Hetrick		PO Box 7, Moose Pass, AK 99631
16.	Joseph Mehrkens	SE AK Nat Res Center	PO Box 20212, Juneau, AK 99802
17.	Kathryn Troll	SE AK Seiners Asso.	PO Box 9579, Ketchikan, AK 99901
18.	Brian Paust-see#60	Coop Ext Svc-Sea Grant	PO Box 1329, Petersburg, AK 99833
19a.	Ralph Mackie	Craig Fishery Adv Com	(see #28 below-dupl.)
19b.	Julie Hursey	F/V Thunder	Box 213, Petersburg, AK 99833
19c.	Debra Lyons		Box 296, Petersburg, AK 99833
20.	Chris Nerison	Cordova Dist Fshrmn Un	PO Box 939, Cordova, AK 99574
21.	Charles Piedra		Box 4, Elfin Cove, AK 99825
22.	Shirley Piedra		Box 4, Elfin Cove, AK 99825
23.	Denby Lloyd	Office of Governor	Box A, Juneau, AK 99811
24.	Rosemary Enderle		PO Box 10, Elfin Cove, AK 99825
25.	David Bedford		PO Box 1211, Petersburg, AK 99833
26.	Ralph Guthrie		Box 595, Petersburg, AK 99833
27.	Chris Sharpsteen		Box 1255, Petersburg, AK 99833
28.	Ralph Mackie	Craig Fishery Adv Com	PO Box 252, Craig, AK 99921
29.	Sid Cox	United Cook Inlet Drft	Box 4649, Kenai, AK 99611
30.	Jerry Wickstrom		3605 Arctic #745, Anc, AK 99503
31.	Pete Granger	Seafood Producers Coop	2875 Roeder Ave, Bellingham, WA 98225
32.	Mardi Hutchens		11340 Borealis, Eagle River, AK 99572
33.	Chip Thoma		
34.	Nick Yurko	Gast Channel F&G Adv C.	9412 Longrun Dr., Juneau, AK 99801
35.		United Fishermen of AK	211 4th St. Ste 106, Juneau, AK 99801
36.	Cheryl Sutton	Kenai Pen Fshmns Asso	Box 546, Soldotna, AK 99669
37.	Wolf Benson	Benson Sea Farms	PO Box 1541, Petersburg, AK 99833
38.	Laura Dameron	SE AK Conservatn Cil	PO Box 21692, Juneau, AK 99802
39.	Roger Painter	AK Mariculture Asso	130 Seward St., Ste 201, Juneau, AK
40.	Cathy Conner	Juneau Audubon Society	PO Box 21725, Juneau, AK 99802
41.	David Rogers	Sea Culture of AK Inc	130 Seward St., Ste 504, Juneau, AK
42.	Paul Barnes	AK Fish Trade	Box 211121, Auke Bay, AK 99821
43.	Rebecca Knight		PO Box 1331, Petersburg, AK 99833
44.	Robert Martin	T&H Reg Electrical Aut	PO Box 210149, Auke Bay, AK 99821
45.	Wallace Fields	Kodiak Reg Aquaculture	Box 1691, Kodiak, AK 99615
46a.	Sen. Fahrenkamp	Sen. Resources Com	PO Box V, Juneau, AK 99811
46b.	Sheila Helgath	Leg. Research Agency	PO Box Y, Juneau, AK 99811-3100

#	Name	Organization	Address
47.	Sen. Jones	State Legislature	352 Front St., Ketchikan, AK 99901
48.	Scott Swanson		3800 Valley Ave, Juneau, AK 99801
49.	Valerie Brown	AK Wildlife Alliance	PO Box 202022, Anchorage, AK 99520
50.	Paul Peyton		1647 Harbor Way, Juneau, AK 99801
51.	David McFadden	F/V Sand Dab	PO Box 668, Petersburg, AK 99833
52.	Geron Bruce	Unit SE AK Gillnetters	PO Box 021186, Juneau, AK 99802
53.	Oliver Holm	Kodiak Reg Aquaculture	Box 3407, Kodiak, AK 99615
54.	John Nielsen	AK Shellfish Grower's	Box 220029, Anchorage, AK 99522
55.	William Heard	(replcemnt) NMFS-AukeB	PO Box 210155, Auke Bay, AK 99821
56.	Sen. Eliason	State Legislature	PO Box V, Juneau, AK 99811
57.	Rep. Ulmer	State Legislature	PO Box V, Juneau, AK 99811
58.	Bruce Smith		PO Box 45, Gustavus, AK 99826
59.	Steve Pennoyer	NOAA, Marine Fish.	PO Box 21668, Juneau, AK 99802-1668
60.	Brian Paust's art.	Coop. Ext. Svc.	(see #18)
61.	Rep. Davidson	House Resources Com.	PO Box V, Juneau, AK 99811
62.	Richard Harris	SEALASKA Corp.	One Sealaska Plaza, Juneau, AK 99801
63.	Neil Kinney		(Homer?)
64.	Brad Pierce		
65.	Dennis Watson	City of Craig	PO Box 23, Craig, AK 99921
66.	Rebecca Knight		PO Box 1331, Petersburg, AK 99833
67.	Dan Hull		310 N 46th #402, Seattle, WA 98103
68.	Nick Barlett		Box 4032, Homer, AK 99603
69.	Jim Green		1033 Millar St., Ketchikan, AK 99901
70.	Dan Berkshire		13010 Sher Circle, Anc, AK 99516
71.	Nevin Holmberg	US F&W Svc	PO Box 021287, Juneau, AK 99802-1287
72.	Doris Howe	(From Sen. Eliason)	Box 67, Gustavus, AK 99826
73.	Brian Allee	ADF&G, FRED Div.	PO Box 3-2000, Juneau, AK 99802-2000
74.	Chip Toma	(articles from indiv.)	
75.	Dale Kelley	AK Trollers Asso.	130 Seward St.,#213, Jnu, AK 99801
76.	Concerned citizens		Juneau, Douglas, Auke Bay, Hoonah,Tok

APPENDIX F

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