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Development of Public and Private Hatcheries in Alaska

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The purpose of this report is to provide a brief review of the development of Alaska's public and private salmon hatchery programs from the beginning in 1891 to 1991. The main focus of this report is on the propagation of the Pacific salmon species Oncorhynchus nerka, the sockeye salmon, also known as the red salmon. Because this paper is not meant as an extensive scientific review, most of the references have not been cited in the text, but they are listed at the end of the paper.

For those unfamiliar with Alaska's regulations concerning the State's hatchery programs, a few words now will save possible confusion later. Alaska's salmon hatchery programs involve salmon ranching, where salmon eggs are hatched, reared to a juvenile stage, and released into the natural waters of the state. Salmon farming involves hatcheries also, but Alaska does not allow salmon farming in the state. Therefore, in this paper, all reference to Alaska's hatchery programs refers to salmon ranching, not salmon farming.

Alaska's First Generation of Salmon Hatcheries 1891-1936

By the late eighteen hundreds commercial salmon fishing was a major industry in Alaska. However, the fishing industry was not regulated, and it became evident that the huge catches were beginning to deplete the salmon runs. Sockeye and pink salmon were the primary target species during this period. There was concern about sustaining the resource and fish hatcheries were viewed as a possible solution.

The first salmon hatchery in Alaska was built through the combined efforts of several cannery operators at Karluk on Kodiak Island. It was built in 1891 to propagate sockeye salmon. Most of the early hatcheries were built in areas where large natural runs of sockeye and or pink salmon were present. The number of sockeye eggs taken and fry released between 1891 and 1936 fluctuated greatly with peak numbers being reached between 1910 and 1911. In 1910, a total of 220 million sockeye eggs were taken at sixteen facilities, resulting in a release of over 180 million fry the following year. These are larger numbers in terms of eggs and fry than are presently being done in Alaska. However, a lack of understanding all the biological requirements of sockeye salmon, and a lack of evaluation combined with the failure to secure a permanent funding mechanism lead to the steady closure of these first hatcheries in Alaska. Not all of this work was wasted. Many insights into fish culture procedures in Alaska came from trial and error methods used in these early facilities. For example, Ward T. Bower, a fisheries agent in Alaska, selected procedures most applicable to Alaska and published them in the 1911 annual Alaska fisheries report. He pointed out noteworthy advances such as taking eggs by abdominal incision and the use of a salt solution for removal of dead eggs.

It was also learned that springs or spring-fed streams that did not freeze in the winter were of great value. However, this in turn created another problem by shortening the incubation cycle and producing emergent fry too early in the spring. Since no commercial

the long-term goal of increasing economic returns to commercial fishermen. With the limited entry program in place, legislators felt more confident about expanding the hatchery program because the economic benefits of a rehabilitated fishery resource would not be dissipated among an ever-increasing number of fishermen. At this time, legislators also began to accept that nongovernmental hatcheries had much to recommend them from the perspective of public finance issues: the operation of private hatcheries could be funded from the harvest of returning fish and from tax assessments on the fishermen who had access to the hatchery production, thus shifting the cost of the facilities from the shoulders of the general public to the people who derived benefits directly from them. Thus, fisheries organizations and other Private Non-Profit (PNP) groups were encouraged to build and operate PNP hatchery facilities. The 1974 Alaska State Legislature authorized the Commissioner of ADF&G to issue permits to PNP corporations for the construction and operation of salmon hatcheries.

As the PNP hatchery program developed and hatchery technology progressed, it became evident that the cost of developing viable salmon hatcheries was far greater than was initially expected. In 1974 funds became available through the Renewable Resources Development Fund that was established that year. Additional state loans for construction of PNP hatcheries became available in 1975 when the commercial fisheries loan program was expanded to include hatcheries. The following year, a separate fisheries enhancement loan program was established.

Another positive step toward the long range goal of increasing the commercial salmon harvest occurred in 1974 with the passage of the Magnuson Act. This created a 200 mile limit along Alaska's coastline where foreign registered boats could not fish.

In 1976, Alaska legislation was passed creating Regional Aquaculture Associations that were responsible for the regional planning and coordination of salmon enhancement activities. The legislature felt that comprehensive planning on the regional level; primarily, careful hatchery site selection, would help mitigate potential problems such as intermingling of hatchery and wild stocks.

All of this legislation and funding set the stage for the development of the public and private hatchery programs that developed during the 70's and 80's.

The State Operated Program 1959 to 1971

The policy of regulation instead of artificial propagation remained in effect after statehood. With the exception of the rebuilding of the Kitoi Bay Hatchery, no new facilities were built during this period and salmon runs in Alaska continued to decline. The 30 year average of annual commercial harvests (1945 to 1975), was 83 million fish, compared to an average annual harvest of 45 million fish between 1960 and 1975, and an average annual harvest of 23 million fish between 1973 and 1975. This dramatic drop in the commercial salmon harvest prompted state action. Although the state Department of Fish and Game had been involved on a small scale with enhancement of the sport fishery, and with research and experimental hatchery production of salmon for the commercial fishery, the legislature sought to consolidate and expand the programs.

By 1968, public concern about the depressed fishery was high and the progress of hatchery programs in other states and countries was being watched with interest. A general obligation bond authorization for $3 million dollars to build state hatcheries was passed by the legislature and overwhelming approved by the general public.

The basic idea behind the state hatchery program was to supplement the existing wild salmon stocks in the state with hatchery fish which would be available for harvest by commercial, sport and subsistence fishermen. The legislature planned for a long range goal of increased commercial harvest from the 30 million fish level to a steady supply of 100 million (+) salmon to provide a long-term source of employment and economic activity.

Alaska's Hatchery Program 1971 to 1991

In 1971, the Division of Fisheries Rehabilitation Enhancement and Development (FRED Division) of the Alaska Department of Fish and Game (ADF&G) was created by the Alaska State Legislature. The legislature directed the division "through rehabilitation, enhancement, and development programs to do all things necessary to insure perpetual and increasing production and use of food resources of Alaska waters." But FRED Division has been more than just hatcheries. It was modeled after the agriculture industry and covered many disciplines. So, from the beginning fish pathology, fish genetics, fish culture, biometrics, limnology, biology, engineering and a coded wire tag processing lab were all part of the overall development. Between 1974 and 1980, the legislature passed an additional 74.3 million dollars of general obligation bonds, approved by the public, to build a state hatchery system.

In 1973, the United Fisherman's Association (UFA) was formed, organizing commercial fishermen at the state level for the first time. Fishermen's groups such as UFA were a driving force behind Alaska's salmon hatchery programs. This group, along with others, believed it would take artificial propagation as well as some restrictive regulations to bring the commercial harvest level back up from 23 million fish to 83 million fish.

In 1973, the legislature implemented limited entry in the commercial salmon fishery with

the long-term goal of increasing economic returns to commercial fishermen. With the limited entry program in place, legislators felt more confident about expanding the hatchery program because the economic benefits of a rehabilitated fishery resource would not be dissipated among an ever-increasing number of fishermen. At this time, legislators also began to accept that nongovernmental hatcheries had much to recommend them from the perspective of public finance issues: the operation of private hatcheries could be funded from the harvest of returning fish and from tax assessments on the fishermen who had access to the hatchery production, thus shifting the cost of the facilities from the shoulders of the general public to the people who derived benefits directly from them. Thus, fisheries organizations and other Private Non-Profit (PNP) groups were encouraged to build and operate PNP hatchery facilities. The 1974 Alaska State Legislature authorized the Commissioner of ADF&G to issue permits to PNP corporations for the construction and operation of salmon hatcheries.

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fish feeds were available, most facilities attempted unsuccessfully to produce their own fish food. Such was the life of the early fish culturist in Alaska.

By 1933, only two federally-operated hatcheries and one private hatchery were still producing fish. That year a new United States Commissioner of Fisheries, Frank T. Bell, made a tour of Alaska and ordered the hatcheries to be closed. He took the view that these hatcheries were a waste of public money and further constituted an unjustified subsidy to a special industry. He said "The salmon will reproduce naturally, if a sufficient number are allowed to reach their spawning grounds. If any district is threatened with depletion, we will restrict the gear or the fishing period and permit it to build up by natural propagation rather than try to do it artificially.

This policy of regulation instead of artificial propagation remained in effect in Alaska until recent times and there are still proponents of this policy. This is an important concept and we'll revisit it later in this paper.

Fish propagation was continued by one private sockeye hatchery at Quadra until its closure in 1936.

Hatchery Development between 1936 and Statehood 1959

In the fifteen years between 1936 and 1951, little interest was shown in salmon propagation. The U.S. Bureau of Fisheries approached the problem of depleted salmon runs by imposing regulations on fishermen in order to decrease the commercial catch, not by encouraging artificial propagation of salmon. During this time a few experimental hatcheries were started. The federal government built Little Port Walter on Baranof Island in 1939. It's main focus at the beginning was pink salmon biology. Construction of the Kitoi Bay Research Station was completed in 1954. Their principal objective was to develop techniques for introduction of sockeye into lakes which were not utilized by anadromous fish. The hatchery provided sockeye fry for various experiments in stocking these lakes. There are presently several kokanee populations around Kodiak that resulted from these stocking experiments. In 1954, Deer Mountain Hatchery in Ketchikan became operational. Like the Kitoi Bay facility, it was originally designed to provide salmon fry for lake stocking programs. Most of the work was done with sockeye and coho salmon. When Alaska achieved statehood in 1959, the U.S. National Marine Fisheries Service was developing a fish culture research lab at Auke Bay near Juneau. All four of these facilities are still active today and involved with various research projects. The Kitoi Bay Research Station was destroyed by a tidal wave during the 1964 earthquake and was rebuilt as a production pink salmon hatchery, beginning in 1965.

A more comprehensive look at Alaska's first hatcheries can be obtained by reading the book "Alaska's Salmon Hatcheries 1891-1959" by Patricia Roppel.

In 1971, when FRED Division was created, there were five facilities operating in Alaska: Little Port Walter, Kitoi Bay, Deer Mountain, Fire Lake and Auke Bay. None of them were operating at a production level.

The number of hatcheries increased to ten by 1974, with a combined egg take of 25 million eggs. At this time Crooked Creek was the only sockeye salmon facility and it incubated only 290,000 sockeye eggs; or roughly, 1% of the total eggs taken that year.

During the next six years the public and private hatchery programs expanded at a rapid pace and by 1980, there were twenty five hatcheries in operation, taking a total of 290 million eggs. Of that total, there were four sockeye salmon facilities; East Creek, Gulkana, Big Lake and Crooked Creek which combined took a total of 33 million sockeye salmon eggs. Crooked Creek is the only sockeye salmon facility in Alaska that does not use the "standard sockeye culture procedures" in its operations. It has never had an IHNV problem.

Most hatcheries, in 1980, were producing pink salmon. This was because pink salmon do not require fresh water rearing and they are the fastest maturing salmon with a life cycle of just two years. Therefore, pink salmon could be added to the commercial fishery quicker than any other species.

In the spring of 1980, ADF&G personnel met to devise a sockeye salmon culture policy. The policy was designed to both avoid IHN as much as possible and to minimize the loss of fish when the disease occurred. It became known as "farming around" IHN.

This policy was the turning point of sockeye culture in Alaska and the main reason for the success of the program from 1980 until the present. The three key principles of this policy are:

1. A virus free water source.
2. Rigorous disinfection.
3. Isolation/compartmentalization.

Table 1. Schedule of Salmon Hatchery Development and Major Species Produced

BY1971

Facility	Major Species	Comments
Little Port Walter	None	Fish culture research facility.
Deer Mountain	chinook	
Kitoi Bay	pink	Remodeled and expanded in 1976.
Auke Bay	None	Fish culture research facility.
Fire Lake	Sportfish Rehab	Closed in 1979.

BY1974 - The five hatcheries listed above plus the five listed below equals nine, two federal and eight state (all public).

Facility	Major Species	Comments
Crystal Lake	Chinook	
Fort Richardson	Rainbow	Upgraded 1981-1983.
Crooked Creek	Sockeye	Upgraded 1977-1982.
Tutka Bay	Pink	
Elmendorf	Chinook	Upgraded 1976-1983.

BY1980 - The ten hatcheries listed above plus the sixteen listed below equals twenty six, two federal, sixteen state and eight PNP (eighteen public, eight private).

Facility	Major Species	Comments
Sheep Creek	Pink	
Armin F. Koernig	Pink	
Sheldon Jackson	Pink	
Cannery Creek	Pink	
Burnett Inlet	Pink	
Burro Creek	Pink	
Gunnuk Creek	Pink	
Beaver Falls	Chum to (Sockeye)	Later switched to a sockeye facility.
Hidden Falls	Chum	
Russell Creek	Chum	Upgraded 1982.
Whitman Lake	Chum	
Gulkana	Sockeye	Began with one streamside incubator.
Big Lake	Sockeye	
East Creek	Sockeye	Closed in 1982.
Kowee Creek	Steelhead	
Klawock	Coho	

Table 2. Development of Sockeye Hatcheries in Alaska 1974 - 1980 (all public facilities).

Year	Green sockeye salmon eggs taken (in millions). Crooked Creek	Gulkana	East Creek	Big Lake	Total	Survival Green Egg-Fry
1974	0.3	1.2	0	0	1.5	59%
1975	5.9	1.2	0.8	0.2	8.1	42%
1976	9.9	1.2	3.1	9.6	23.8	58%
1977	5.8	1.3	2.1	8.7	17.9	45%
1978	8.2	1.3	2.6	10.8	22.9	47%
1979	7.2	3.5	6.3	6.0	23.0	46%
1980	16.4	6.2	5.0	5.5	33.1	76%

The expansion rate of hatcheries between 1980 and 1985 was almost as fast as 1974 to 1980. During this period, thirteen more facilities were built (see Table 3) bringing the total to thirty seven. One facility, East Creek, was closed. In 1985, these thirty seven state and PNP hatcheries took a total of 987 million eggs. Eight of the thirteen new hatcheries added during this period were built to produce chum salmon. Chum salmon are the only other salmon besides pink salmon that don't require fresh water rearing. Now that the annual commercial harvest numbers had begun to rise, fishermen were interested in a more valuable species.

Table 3.

BY1985 - The twenty six hatcheries listed previously minus East Creek and Fire Lake (closed) plus thirteen equals thirty seven, two federal, twenty state and sixteen PNP (twenty two public and sixteen private).

Facility	Major Species	Comments
Sikusuilaq Springs	Chum	Located north of the Arctic Circle.
Eklutna	Chum	
Main Bay	Chum to (Sockeye)	Later converted to the first sockeye smolt hatchery in Alaska.
Medvejie Creek	Chum	
Port Camden	Chum	
Gastineau Channel	Chum	
Snettisham	Chum to (Sockeye)	Later switched to a sockeye hatchery.
Neets Bay	Chum	
Port Armstrong	Pink	
Solomon Gulch	Pink	
Wallace F. Noerenberg	Pink	
Trail Lakes	Sockeye	
Clear	Char	

BY1991 - Pillar Creek was the only facility added to the previous list of thirty seven hatcheries, bringing the total to thirty eight, two federal, fourteen state and twenty two PNP (sixteen pubic and twenty two private).

Facility	Major Species	Comments
Pillar Creek	Sockeye	Only facility built since 1985.

In 1985, 87 million sockeye salmon eggs or a little over double the amount taken in 1980 were taken by five sockeye hatcheries; Beaver Falls, Big Lake, Gulkana, Crooked Creek and Trail Lakes. Gulkana had the largest sockeye salmon egg inventory with 31.7 million eggs.

Table 4. Sockeye Salmon eggs (in millions) taken at state-owned Hatcheries in Alaska 1981 - 1985

Year	Crooked Creek	Gulkana	East Creek	Beaver Falls	Big Lake	Trail Lakes	Green Egg Total	Survival Green Egg-Fry
1981	21.0	9.2	7.1	0	7.4	0	44.7	76%
1982	20.3	10.9	0	0	12.9	3.4	47.5	83%
1983	21.5	13.0	0	0	16.1	1.2	51.8	73%
1984	19.6	26.8	0	0.8	16.9	3.8	67.9	77%
1985	23.6	31.7	0	1.3	21.5	8.9	87.0	67%

Between 1978 and 1986 over 100 million sockeye salmon eggs were taken from Upper Thumb River at Karluk Lake(Table 5). These eggs were incubated in a facility along side the river, and planted back into the river at the "eyed" stage. The overall survival rate from green egg to fry was 40% (Table 6). Once the eggs were planted back into the river, they were subject to the natural hazards such as freezing, flooding, etc.

Because these eggs were not kept beyond the eyed stage, and because their survival rate was affected by natural events other than normal hatchery operations, they were not included in with the regular hatchery facility numbers, but rather were treated as a special project.

Table 5 Egg takes from the early-run (July to mid-August) sockeye salmon at Upper Thumb River, Karluk Lake 1978-1986.

Brood year	Brood source	Number of eggs taken	Fish spawned		Average fecundity	Survival to eyed-stage (%)	Number of live eggs	Incubation location
			Females	Males				
1978	Upper Thumb	3,071,000	1,030	525	2,982	84.1	2,583,000	Devil's Creek
1979	Upper Thumb	4,816,000	1,491	489	3,298	81.9	3,945,000	Devil's Creek
1980	Lower Thumb	4,115,000	1,563	925	2,679	73.8	3,038,000	Upper Thumb
1981	Lower Thumb	2,902,000	1,241	701	2,338	81.0	2,343,000	Upper Thumb
1982	Upper Thumb	11,190,000	4,888	1,404	2,282	82.0	9,206,000	Upper Thumb
1983	Lower Thumb	15,256,000	6,353	2,138	2,401	80.0	12,284,000	Upper Thumb
1984	Upper Thumb	15,475,000	6,452	3,324	2,399	85.8	13,207,000	Upper Thumb
1985	Upper Thumb	20,949,000	8,471	3,057	2,473	89.4	18,612,000	Uper Thumb
1986	Upper Thumb	23,443,000	9,259	3,804	2,532	84.6	19,823,000	Upper Thumb
Total		101,217,000	40,748	16,367			85,041,000	
Average					2,484	84.0		

Table 6 Numbers of fry produced and survival rates from eyed-eggs planted in Upper Thumb River from 1978-1985, estimated by marking and recapturing fry.

Brood year	Sample year	Number of eyed eggs planted	Estimated number of fry	95% Confidence interval		Mean survival (%)
				Upper	Lower	
1978	1979	2,583,000	724,000	----	----	28.0
1979	1980	1,449,000	21,000	24,000	20,000	1.4a/
1980	1981	3,038,000	663,000	705,000	622,000	21.8
1981	1982	2,344,000	1,643,000	1,689,000	1,597,000	70.0
1982	1983	9,206,000	2,715,000	3,164,000	2,055,000	29.5
1983	1984	12,284,000	4,811,000	5,154,000	4,469,000	39.1
1984	1985	13,207,000	5,704,000	5,559,000	5,849,000	43.0
1985	1986	18,612,000	8,970,000	8,882,000	9,066,000	48.2
Total		62,723,000	25,251,000			
Average				----	----	40.3

a/ Low survival attributed to planting technique and floods in October and November, 1979.

Between 1985 and 1991, only one new facility was built, the Pillar Creek sockeye salmon hatchery in Kodiak (Table 7). This is a central incubation facility. No eggs are taken and no fry are released at this site. All the eggs are transported in and all the fry transported out. This is similar to the Trail Lakes sockeye salmon facility.

Two additional sockeye salmon facilities were added, Snettisham Hatchery near Juneau and Main Bay in P.W.S. The Main Bay Hatchery was converted in 1986 from a chum salmon hatchery to the first sockeye smolt hatchery in Alaska. It was transferred from the state to the private sector in 1991. The conversion of Snettisham Hatchery from a chum/chinook hatchery to a sockeye hatchery was begun in 1988 with the incubation of 300,000 sockeye eggs. It operates as a central incubation facility and is involved with the stocking of several canadian lakes. The program continues to grow and in 1991 they incubated 12.4 million sockeye eggs. As a point of interest, otolith marks are placed on all the sockeye fry produced at this facility.

Table 7. Sockeye eggs taken (in millions) at Sockeye Salmon Hatcheries in Alaska 1985 - 1991.

Year	Crooked Creek	Gulkana	Beaver Falls	Big Lake	Trail Lakes	Main Bay	Snettisham	Pillar Creek	Green Egg Total	Survival Green Egg to Fry
1986	21.5	31.7	1.7	18.1	4.7	0.3	----	----	78.0	78%
1987	21.0	33.0	6.8	20.4	10.8	10.5	----	----	102.5	70%
1988	19.4	35.1	7.3	20.5	6.9*	7.2	0.3	1.1*	97.8	75%
1989	16.5	35.0	7.0*	14.8	10.0*	3.0	8.4	5.3*	100.0	73%
1990	14.8	30.1	1.5*	15.2	10.8*	5.7	10.9	5.1*	94.1	72%
1991	17.7	36.1	5.7*	8.6	13.0*	10.9*	10.3	6.6*	108.9	

* Operated with private funding.

During the six year period (1974-1979) before the sockeye salmon culture policy was instituted, green egg to fry survival rate averaged 46%. During the eleven years (1980-1991) following the adoption of the sockeye culture policy, green egg to fry survival averaged 75%. When the cause of mortality occurring during incubation from 1981-1990 was investigated, it was found that only 4% was due to the IHN virus. In the last four years, 1988 through 1991, overall losses due to IHN virus had dropped to less than 2%.

The main point here is that with the sockeye culture policy in place and being followed, the culture and production of sockeye salmon can be done very successfully.

In 1991, there were thirty-eight hatcheries in operation; (Figure 1) two federal, twenty-two PNP and fourteen state facilities. The breakdown according to primary species produced is:

12	-	Pink
9	-	Chum
8	-	Sockeye
3	-	Chinook
2	-	Research

and 1 each for - Coho, Rainbow, Steelhead, and Char

These thirty-eight hatcheries took a combined total of 1.7 billion eggs. Of this total, 110 million were sockeye eggs.

At present there are eight hatcheries whose main production is sockeye salmon (Figure 2). Three are private and five are public.

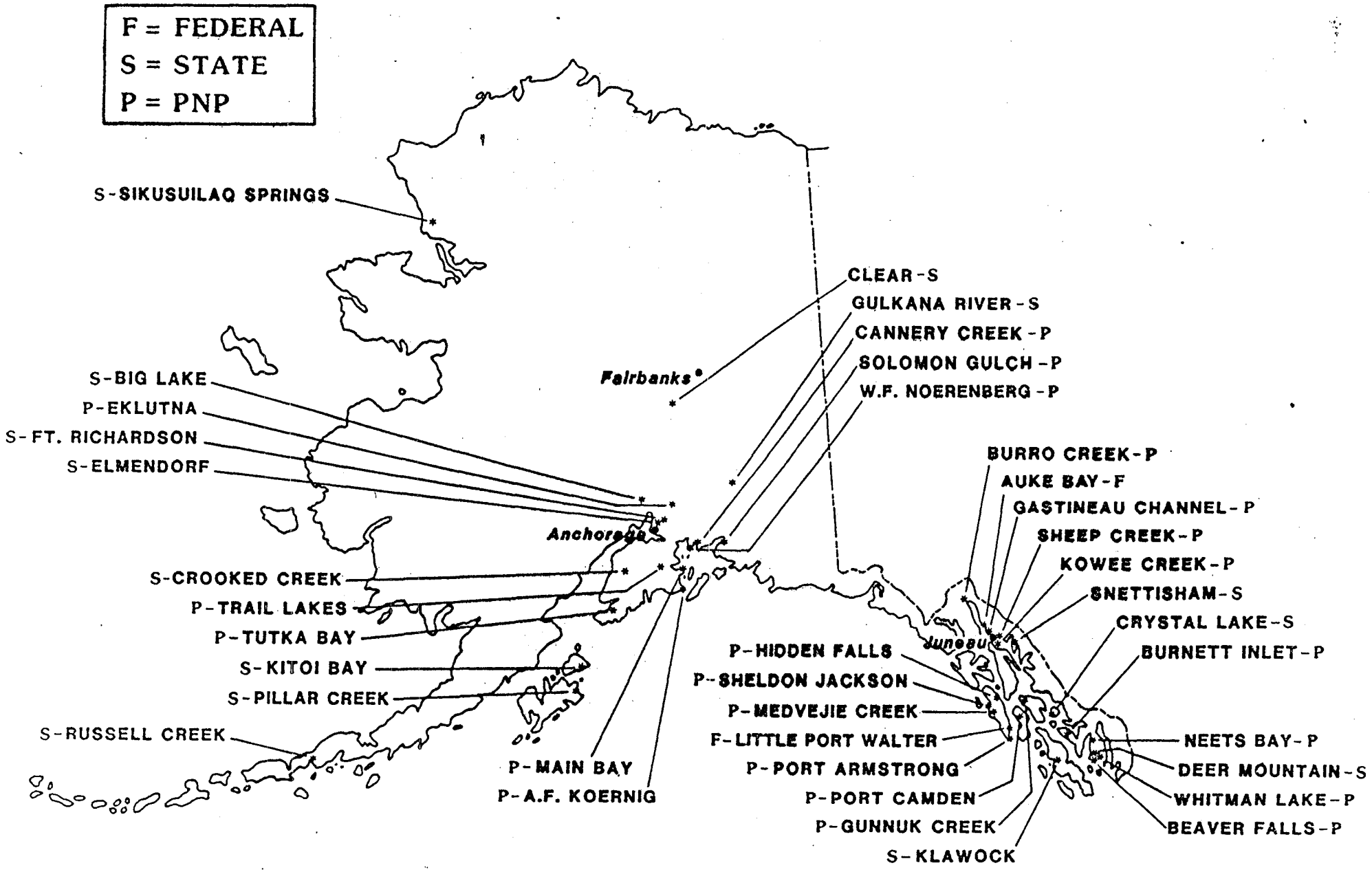
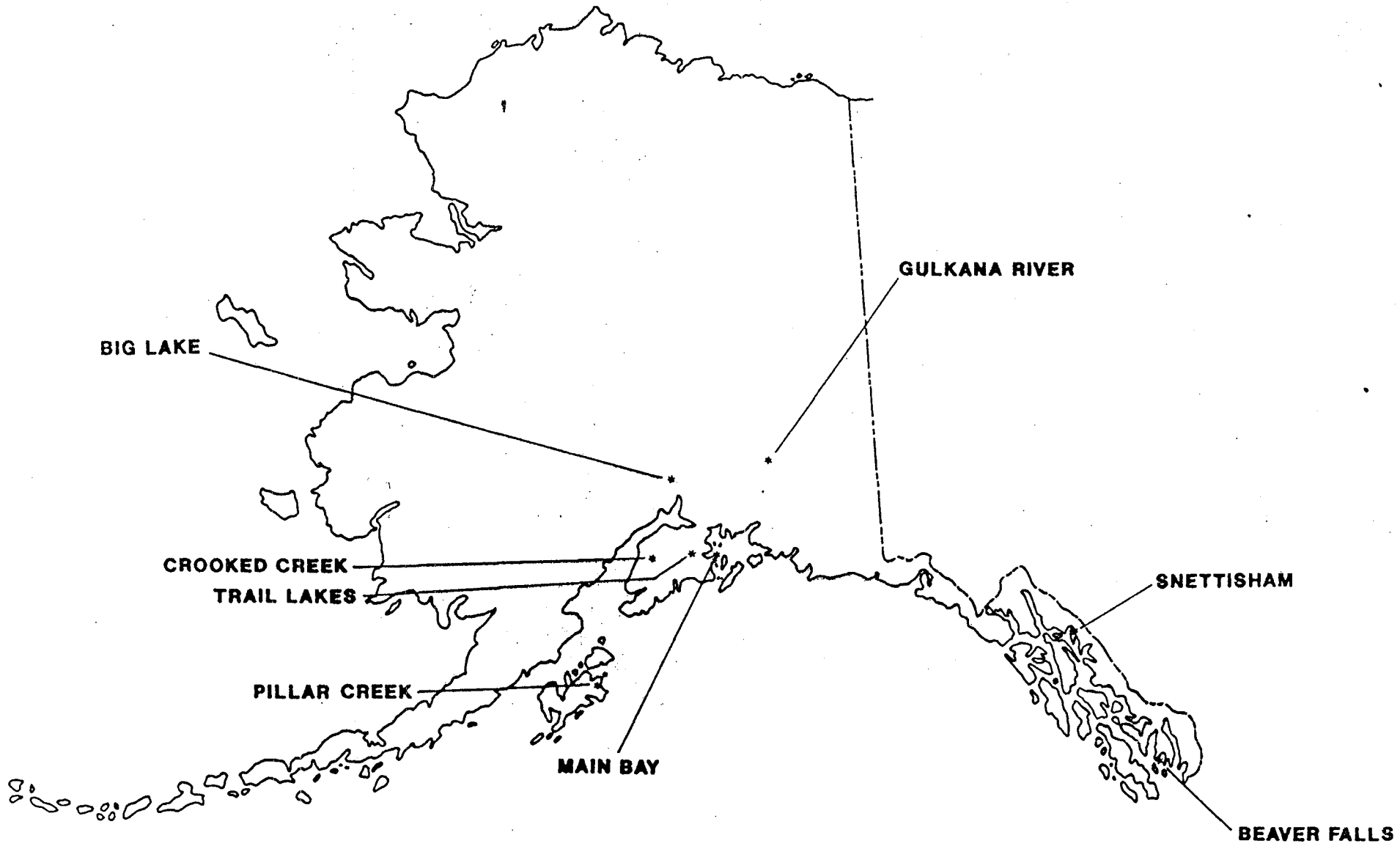

F = FEDERAL
S = STATE
P = PNP
S-SIKUSUILAQ SPRINGS
S-BIG LAKE
P-EKLUTNA
S-FT. RICHARDSON
S-ELMENDORF
S-CROOKED CREEK
P-TRAIL LAKES
P-TUTKA BAY
S-KITOI BAY
S-PILLAR CREEK
S-RUSSELL CREEK
P-MAIN BAY
P-A.F. KOERNIG
Fairbanks
Anchorage
CLEAR-S
GULKANA RIVER-S
CANNERY CREEK-P
SOLOMON GULCH-P
W.F. NOERENBERG-P
BURRO CREEK-P
AUKE BAY-F
GASTINEAU CHANNEL-P
SHEEP CREEK-P
KOWEE CREEK-P
SNETTISHAM-S
CRYSTAL LAKE-S
BURNETT INLET-P
Juneau
P-HIDDEN FALLS
P-SHELDON JACKSON
P-MEDVEJIE CREEK
F-LITTLE PORT WALTER
P-PORT ARMSTRONG
P-PORT CAMDEN
P-GUNNUK CREEK
S-KLAWOCK
NEETS BAY-P
DEER MOUNTAIN-S
WHITMAN LAKE-P
BEAVER FALLS-P

FIGURE 1



HATCHERIES WHOSE MAJORITY OF PRODUCTION IS SOCKEYE SALMON

FIGURE 2

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OPERATIONAL STATUS SUMMARY OF HATCHERIES IN ALAKSA

November, 1993

PNP Operated Hatcheries with Permits:

Permit No.	Note	Organization	Location	Status
1		NERKA	PWS/Perry Isl	Inactive
2		PWSAC	PWS/AFK	Operational
3		Sheldon Jcksn	NSE/Indian R.	Operational
4	*	THCC	NSE/Sandy Beach	Inactive
5		AK Aquaculture	SSE/Burnett Inlet	Operational
6		DIPAC	NSE/Kowee Cr.	Operational
7		Kake NPF Corp	NSE/Gunnuk Cr.	Operational
8		SSRAA	SSE/Whitman Lk.	Operational
9		Fish Fry Inc.	NSE/Salmon Cr.	Revoked
10		Meyers Chuck AA	SSE/Meyers Chuck	Revoked
11		DIPAC	NSE/Sheep Cr.	Operational
12		Burro CR. Frms	NSE/Burro Cr.	Operational
13		Armstrong-Keta	NSE/Port Armstrong	Operational
14	*	NSRAA	NSE/Salmon Cr. Hat	Inactive
15		VFDA	PWS/Valdez	Operational
16		NSRAA	NSE/Medvejie Cr.	Operational
17		CIAA	CI/Eklutna	Operational
18	*	Angoon AA Inc	NSE/Favorite Bay	Inactive
19		SSRAA	SSE/Neets Bay	Operational
20		PWSAC	PWS/WHN	Operational
21		Gro-Fish	SSE/Santa Anna Cr.	Inactive
22		Aquacltr Inc	SSE/Crittenden Cr.	Inactive
23		NSRAA	NSE/Port Camden	Operational
24	$	SSRAA	SSE/Beaver Falls	Operational
25		DIPAC	NSE/Gastineau Chan.	Operational
26	$	PWSAC	PWS/Cannery Cr.	Operational
27	$	CIAA	CI/Trail Lks	Operational
28	$	NSRAA	NSE/Hidden Falls	Operational
29	$	KRAA	KOD/Kitoi Bay	Operational
30		American AC	SSE/Bell Island	Inactive
31	$ #	PWSAC	PWS/Main Bay	Operational
32	$ #	CIAA	CI/Tutka	Operational
33		Port Graham	CI/Port Graham	Operational
34		L. Garrison	NSE/Haines	Operational

Notes: * Permit issued, facility does not exist.
$ State owned, operated by RAA under contract
# Permit number reserved, but not issued.

PNP Operated Hatcheries without Permits:

Organization	Location	Status
City of Klawock	SSE/Klawock Lk	Operational
PWSAC	PWS/Gulkana	Operational
CIAA	CI/Crooked Cr.	Operational
KRAA	KOD/Pillar Cr.	Operational
AE Borough	AKPEN/Russell Cr.	Inactive

State Operated Hatcheries:

ADF&G/CFM&D	SSE/Deer Mtn	Operational
ADF&G/CFM&D	SSE/ Crystal Lk	Operational
ADF&G/CFM&D	NSE/Snettisham	Operational
ADF&G/CFM&D	INT/Clear	Operational
ADF&G/CFM&D	AYK/Sikusuilaq	Operational
ADF&G/CFM&D	CI/Big Lake	Closed
ADF&G/SF	CI/Elmendorf	Operational
ADF&G/SF	CI/Ft Richardson	Operational

Federal Hatcheries:

NMFS	SSE/L Port Walter	Operational
NMFS	SSE/Auke Cr.	Operational