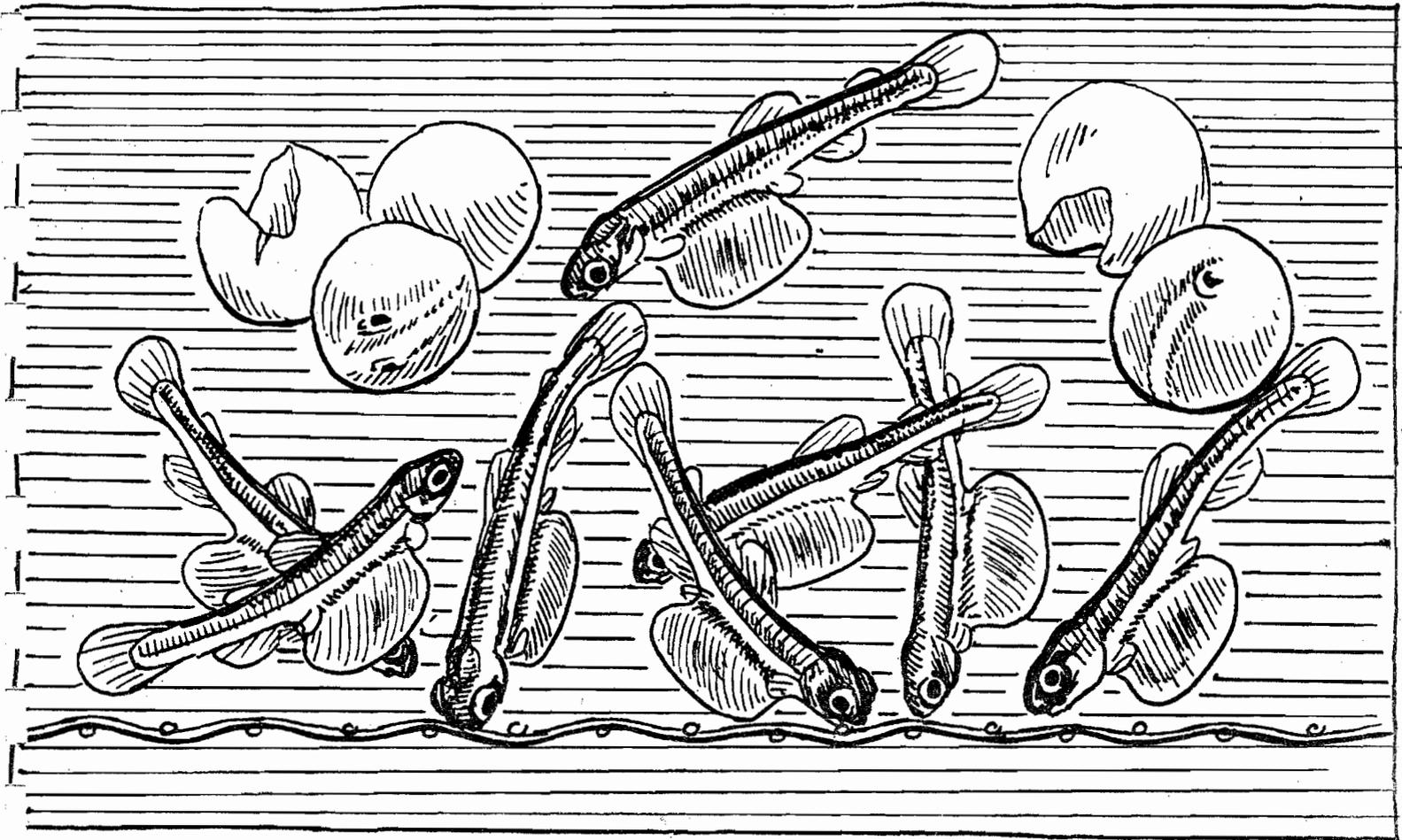


FRED



ANNUAL REPORT

Division of Fisheries Rehabilitation,
Enhancement, and Development (FRED)
1980

Alaska Department of Fish and Game

PUBLICATION ABSTRACT

<p>TITLE/SUBTITLE Annual Report, 1980 -- Division of Fisheries Rehabilitation, Enhancement and Development (FRED)</p>	<p style="text-align: center;">CONFIDENTIALITY</p> <p><input checked="" type="checkbox"/> AVAILABLE TO PUBLIC <input type="checkbox"/> AVAILABLE TO LEGISLATURE ONLY</p>
<p>ABSTRACT (100 words maximum)</p> <p>FRED's major objectives are the rehabilitation, enhancement, development, protection, and maintenance of the salmon, trout, sheefish, and grayling resources of the State for the use of all Alaskans. To accomplish these, FRED utilizes hatcheries and fishways as its basic tools. Hatcheries are about eight times more efficient in converting eggs to fish than the natural environment, and fishways open new spawning areas to anadromous fishes. FRED's research into genetics, pathology, limnology, biology, and fish culture is providing important information about the State's fish resources. FRED encourages rehabilitation efforts by private non-profit aquaculture corporations.</p> <p>During 1980, FRED released 53 million young salmon and planted 4.1 million eyed salmon eggs in streams. Approximately 168 million fish eggs were taken for incubation during the year. At least 879,000 hatchery-bred salmon returned to the state's fisheries and hatcheries, one-fourth more than in 1979.</p>	<p style="text-align: center;">SUBJECT CATEGORY</p> <p><input checked="" type="checkbox"/> NATURAL RESOURCES <input type="checkbox"/> EDUCATION <input type="checkbox"/> SOCIAL SERVICES <input type="checkbox"/> HEALTH <input type="checkbox"/> TRANSPORTATION <input type="checkbox"/> LAW ENFORCEMENT <input type="checkbox"/> COMMERCE & INDUSTRY <input type="checkbox"/> GENERAL GOVERNMENT <input type="checkbox"/> LOCAL GOVERNMENT <input type="checkbox"/> OTHER</p>
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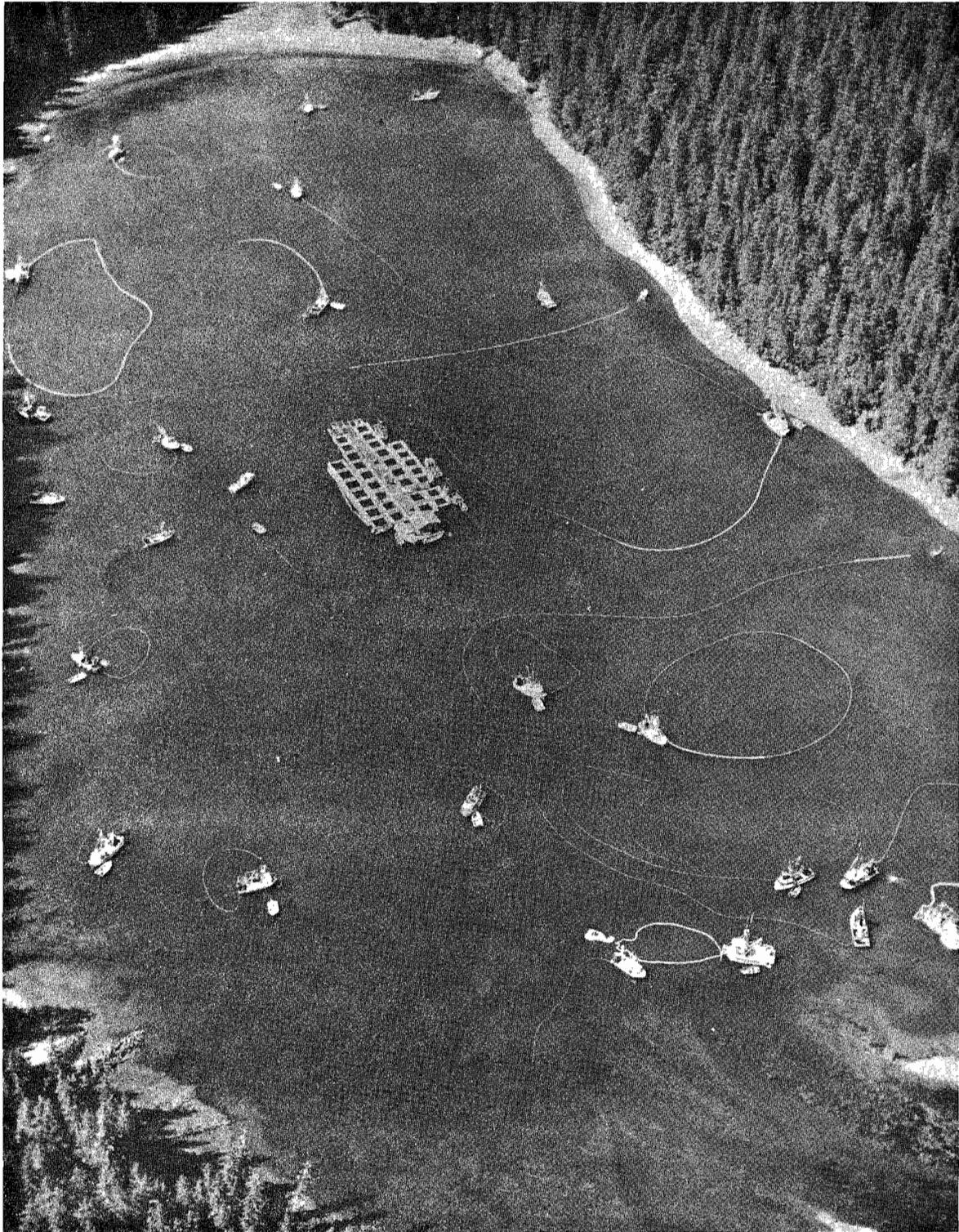
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Seiners fish during a special opening in Tutka Bay Lagoon, where hatchery returns of pink salmon broke the cycle of weak even-year runs. An estimated 80% of all pinks returning to the Tutka District during 1980 were hatchery fish. The connecting squares near the center of the picture are the fry rearing and adult holding pens of the nearby hatchery. (ADF&G photo by Mark Kissel)

1980 FRED PRODUCTION REPORT

Adult Salmon Returns

More than 879,000 salmon released from Alaska Department of Fish and Game hatcheries returned as adults during 1980 (Table 1). This number is a low estimate, because the catch of hatchery fish cannot be evaluated in all fisheries without considerable cost. This estimate is, however, one-fourth higher than last year's return of approximately 688,000. A comparison of adult returns over the past 6 years is in Figure 1. Numbers for 1980 are preliminary pending mark-tag analysis.

The leading producer in 1980 was the Kitoi Bay Hatchery on Afognak Island near Kodiak. An estimated 360,000 adult pink salmon returned to the Kitoi evaluation area this year from a 1979 release of 17.4 million fry. A total of 125,000 pink salmon were taken during four special commercial openings inside Kitoi Bay. The return represents a marine survival of 1.62% for fry released as they emerged from the incubators, and 2.81% for fry that were fed for a month before their release.

An estimated 17,000 Beaver Falls chum salmon returned to the Ketchikan area during 1980, 70% more than last year. Nearly eight million eggs were taken from the 7,242 chum salmon that returned to the hatchery, and the carcasses were given away to local residents. Biologists estimated that about 10,000 Beaver Falls chum salmon were caught in the commercial fisheries of Districts 1, 2, 3, 4, and 6.

Another leader in adult returns was the Tutka Bay Lagoon Hatchery near Homer, where an estimated 315,000 hatchery-bred adult pink salmon returned to the fishing district. Hatchery fish comprised more than 82% of the total pink salmon catch in the Tutka District, and fueled a major sport fishery in which 5,000 fish were taken.

The 1980 Tutka return surpassed all even-year returns there since 1964, when the even-year runs represented the strong half of the two-year cycle. The 1980 return was near the level of the strong odd-year runs, showing that a hatchery can eliminate the alternate "boom and bust" years typical of some pink salmon stocks. This return was from a 1979 release of 9.7 million fry.

At the new Cannery Creek Hatchery in Prince William Sound, 125,300 pink salmon returned to the evaluation area from a 1979 release of 2.1 million fry. This represented an ocean survival of 6%, a high survival that was common this year among pink salmon stocks throughout Prince William Sound. Most of the Cannery Creek fish were initially incubated at the Prince William Sound Aquaculture Corporation's (PWSAC) Port San Juan Hatchery and then transferred to Cannery Creek. This help from PWSAC gave Cannery Creek an early start in building its brood stock to the level of full production. Another 651,000 fry were released from streamside incubators at Cannery Creek. However, none of these fry were marked, and so their contribution to the return is unknown.

These major pink and chum salmon returns were largely of benefit to commercial fishermen. Far fewer fish, however, are necessary to establish a good sport fishery, especially when king and coho salmon are involved. At Whittier, for example, a return of 5,000 hatchery-bred coho salmon supported a vigorous sport fishery. At Seward, a return of nearly 5,500 hatchery-bred coho salmon again supplemented the sport fishery and the famous Seward Silver Salmon Derby. In addition, nearly 608 hatchery-bred king salmon returned to Crooked Creek, leading the Sport Fish Division to propose reopening the mouth of Crooked Creek to king fishing. The Whittier, Seward, and Crooked Creek salmon were products of the Anchorage Area Hatcheries. The Crystal Lake Hatchery in Petersburg produced a return of more than 10,000 adult king salmon, most of which were caught in sport and commercial troll fisheries throughout Southeast Alaska. An estimated 8% of all king salmon caught by sportsman in the Juneau area were products of the Crystal Lake Hatchery and the National Marine Fisheries Service's Little Port Walter Hatchery, to which FRED provides some operational funds. Two thousand coho salmon returned to Ketchikan's Deer Mountain Hatchery, and another 2,200 of them were taken in the local fisheries. This return was enough to meet the egg requirements of Deer Mountain and allow FRED to supply one million eggs to the Metlakatla hatchery on the Annette Island Indian Reservation.

Table 1 does not completely reflect the hatchery contribution to sport fisheries. Catches of hatchery-bred rainbow trout, grayling, and coho salmon that were stocked in land-locked lakes and Interior streams are not reported as returns.

Many hatchery fish were provided to subsistence users. For example, ADF&G issued approximately 80 subsistence permits specifically to harvest a return of 14,000 hatchery-bred sockeye salmon at China Poot Creek in the Homer area. Carcasses of hatchery-bred chum salmon, used in egg takes at the Beaver Falls Hatchery in Ketchikan, were given free to townspeople. About 30 tons of fish were distributed. At Crystal Lake Hatchery in Petersburg, about 4 tons of king salmon were given away.

Projected 1981 Returns

A projection of 1981 hatchery salmon returns, based upon standard estimates of marine survival, is presented in Table 2. This projection of 697,300 is conservative, because actual marine survivals of hatchery-bred pink and chum salmon have been averaging above the standard estimates.

Fish Releases

During 1980, FRED released nearly 53 million young salmon, about 2.5 million fewer than last year (Table 3). Production was 32.2 million pink salmon, 9.8 million chum salmon, 9.2 million sockeye salmon, 1.8 million coho salmon, and 0.5 million king salmon. This does not include the 4.1 million eyed sockeye eggs that were incubated at the Karluk Lake stream-side incubation site and planted into the gravel of the Thumb River. Figure 2 shows the number of fish released from 1974 through 1980. Appendix A is a computer printout of all fish planted by FRED during 1979, including the dates, waters stocked, average weight of the fish, and marks. This is a final accounting of 1979 releases, which was presented in preliminary form in the 1979 annual report.

Outbreaks of Infectious Hematopoietic Necrosis Virus (IHNV) hurt sockeye salmon production in the Big Lake, East Creek, and Kitoi Bay Hatcheries. Approximately 10 million sockeye salmon alevins and fry died as a result of the IHNV epizootics. The disease is found among three species of wild salmonids; sockeye salmon, however, are particularly susceptible to it. The three hatcheries were disinfected and have resumed production. (see also Pathology)

About 493,000 rainbow trout were released from the Anchorage Area Hatcheries during 1980 (Table 4). In addition, 55,000 catchable-sized coho salmon were planted to supplement the 47,250 catchable-sized rainbow trout placed in Anchorage-area lakes. Cohos were used this year to make up for a temporary shortage of rainbow trout eggs caused in part by the theft of some breeding stock at the hatchery last year. The combined release added up to over 100,000 catchable fish -- the largest-ever release of catchable-sized fish in Alaska.

FRED also planted 5,356 steelhead trout and 51,273 grayling during the year (Table 4).

Hatchery Production Summaries

FRED seeks the highest possible survival of eggs and fry in its hatcheries while at the same time producing quality fish that will survive well in the wild. Standard egg and fish survivals have been set by the FRED Division, and data in Tables 5 through 17 compare actual survivals within FRED hatcheries with these standards. These tables provide a record of each brood stock used in FRED hatcheries and a basis for evaluating and improving hatchery procedures.

Overall survivals from green egg to release increased during the 1979-80 season for three of the five salmon species. Chum survivals increased from 54% for fish released in 1979 to 61% for fish released in 1980; coho salmon survivals increased from 64% to 78%; and king salmon survivals rose from 45% to 55%. Pink salmon survivals dropped from 77% in 1979 to 73% in 1980, and sockeye salmon survivals dropped from 47% to 42%. The sockeye salmon loss was due to IHNV epizootics at three hatcheries. Even the lowest of these survival percentages, however, is at least four times greater than the average survival of naturally spawned and incubated eggs and fish.

The causes of low survivals in hatcheries are usually apparent. Many egg takes for new hatcheries are conducted at remote sites away from the facility. The extra time and handling involved often kills a percentage of eggs. Holding and ripening adults in salt water lowers egg survival, but the alternative of freshwater holding is often prohibitively expensive. Hatchery water supplies are sometimes the cause of low survivals. If silt enters the system, it can clog incubators and suffocate eggs. Additionally there is the problem of disease, which is of special concern at sockeye hatcheries because of the susceptibility of sockeye salmon to IHNV. Most other fish diseases can be arrested before they cause large losses.

The technology is available to achieve FRED's survival standards for fish and eggs in hatcheries. However, the necessity of collecting and moving eggs from remote locations and of refining hatchery water supply systems contributes to these lower-than-desired survivals. FRED expects these survival percentages to improve as the hatcheries expand into routine operations.

Egg Takes

During 1980, FRED took approximately 168 million salmon eggs for incubation. This was 77 million eggs more than were taken during 1979. In addition, FRED took eggs from rainbow and steelhead trout and sheefish, bringing the total to more than 169 million fish eggs (Table 18). This was 26 million below the revised egg take goal for FY 81; at the same time, it was more eggs than FRED had ever taken before in one year. Salmon egg takes from 1974 through 1980 are illustrated in Figure 3.

Leading the state hatcheries in eggs taken was the Kitoi Bay Hatchery, with nearly 34 million salmon eggs. Several new hatcheries made significant gains in building their brood stocks during 1980. At the Russell Creek Hatchery, fish culturists took 19 million eggs, and at Cannery Creek, they took more than 20 million. About 16.3 million sockeye salmon eggs are being incubated at the Kasilof Hatchery, and 15.9 million chum salmon eggs at the Beaver Falls Hatchery. The Hidden Falls Hatchery is incubating 9.9 million chum salmon eggs.

For the first time, FRED took large numbers of eggs from species other than the pink salmon. In 1980, nearly a third of the eggs taken were chum salmon. This is significant because chum salmon are larger and more valuable than pink salmon.

The numbers of eggs incubated at state hatcheries will increase as brood stocks are developed. Egg takes planned for 1981 are listed in Table 19. The plan to take 270 million eggs assumes that brood stocks will be available in the expected numbers.

The expected adult return from salmon eggs taken during 1980 is 1.48 million (Table 20). These adults will return over the course of several years beginning in 1982. Chum salmon, for example, return as three, four, and five-year-olds, so 1980 brood year chums will return from 1983 through 1985.

Table 1. Preliminary count of salmon and steelhead trout produced at FRED facilities that returned as adults to the fisheries and facilities in 1980.

Project	General location	King	Coho	Sockeye	Pink	Chum	Steelhead
Beaver Falls	Ketchikan	-	-	-	-	17,000	-
Big Lake	Wasilla	-	1,463	2,057	-	-	-
Cannery Creek	Prince William Sd.	-	-	-	125,300	-	-
Crystal Lake	Petersburg	10,138	82	-	-	-	50
Deer Mountain	Ketchikan	163	4,200	-	-	-	-
East Creek	Dillingham	-	-	1,500	-	-	-
Fish Creek	Juneau	251	-	-	-	-	-
Fritz Creek	Homer	-	500	-	-	-	-
Halibut Cove	Homer	250	400	-	-	-	-
Hidden Falls	Baranof Island	-	-	-	-	20	-
Hidden Lake	Kenai Peninsula	-	-	10,897	-	-	-
Kasilof	Kasilof	608	-	-	-	-	-
Kitoi Bay	Afognak Island	-	-	-	359,205	-	-
Leisure Lake	Homer	-	-	14,000	-	-	-
Seward	Seward	-	5,476	-	-	-	-
Snettisham	Juneau	-	-	-	-	278	-
Starrigavan	Sitka	295	5,849	-	-	-	-
Tustumena Lake	Kenai Peninsula	-	-	Unassessed	-	-	-
Tutka Bay	Homer	-	-	-	315,000	-	-
Whittier	Whittier	-	4,500	-	-	-	-
TOTAL:		11,705	22,470	28,454	799,505	17,298	50
GRAND TOTAL:		879,482					

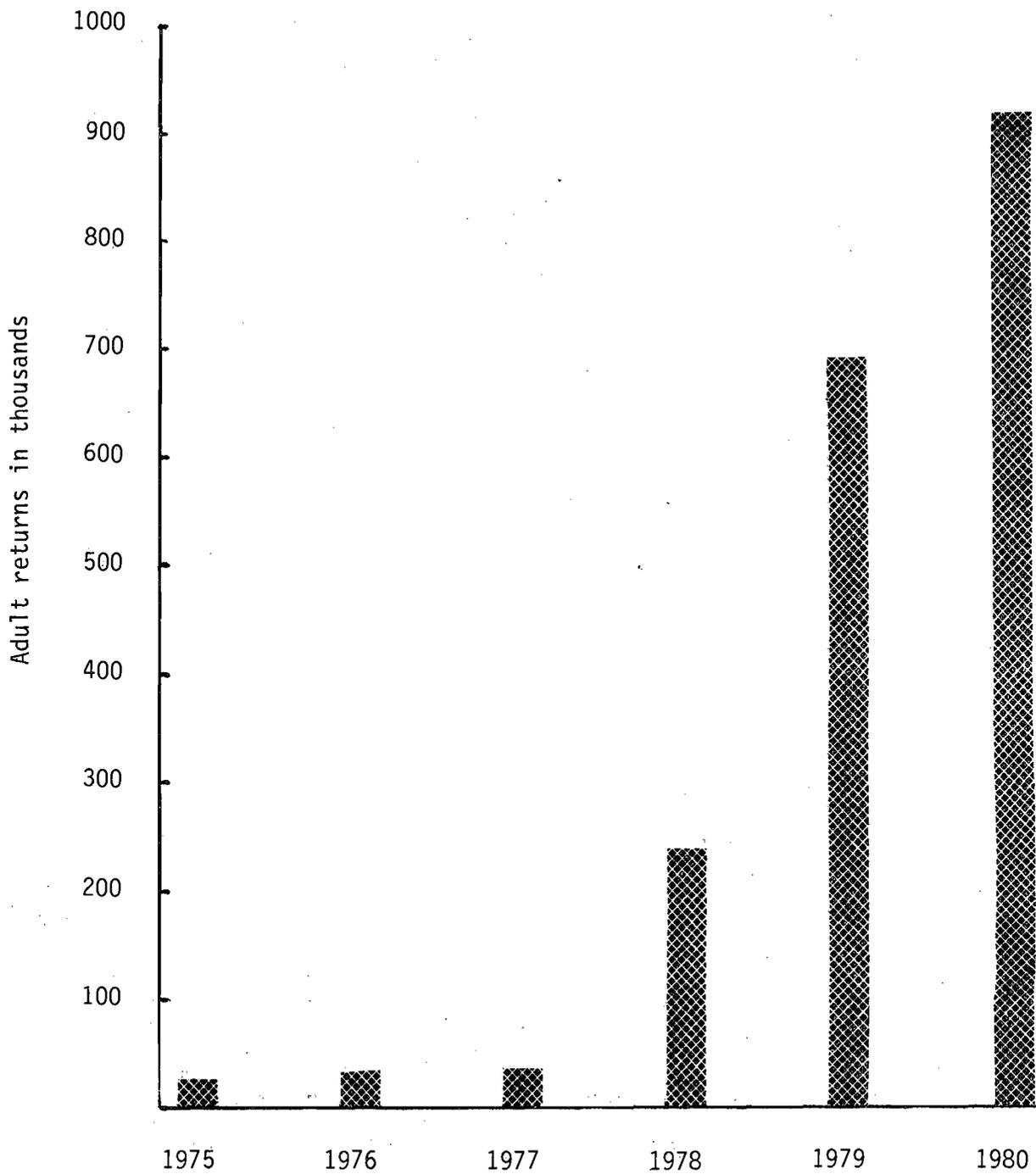


Figure 1. Number of salmon produced at FRED hatcheries that returned as adults to the hatcheries and fisheries from 1975 through 1980. Figure for 1980 is preliminary.

Table 2. A projection^{a/} of the numbers of hatchery-bred salmon expected to return to FRED hatcheries and projects in 1981.

Hatchery or return site	Numbers by species				
	King	Coho	Sockeye	Chum	Pink
Beaver Falls	-	-	-	28,800	-
Deer Mountain	400	5,600	-	-	-
Klawock	-	1,300	-	900	-
Crystal Lake	3,000	8,700	-	-	-
Hidden Falls	-	-	-	5,300	-
Snettisham	100	15,700	-	4,000	-
Starrigavan Creek	1,900	-	-	100	-
Fish Creek	900	-	-	-	-
Cannery Creek	-	-	-	-	7,000
Hobo Creek	-	-	-	-	11,900
Big Lake	-	-	-	-	-
Fish Creek	-	3,000	5,900	-	-
Meadow Creek	-	-	5,300	-	-
Nancy Lake	-	-	6,100	-	-
Wasilla Lake	-	3,900	-	-	-
Crooked Creek	-	-	-	-	-
Tustumena Lake	-	-	30,000	-	-
Leisure Lake	-	-	4,900	-	-
Tutka Bay	-	-	-	-	228,000
Paint River	-	-	-	-	5,000
Fort Richardson	-	-	-	-	-
Homer	-	1,000	-	-	-
Halibut Cove	-	-	-	-	-
Seward	-	10,000	-	-	-
Whittier	-	2,200	-	-	-
Crooked Creek	3,200	-	-	-	-
Kitoi Bay	-	-	-	-	280,700
East Creek	-	-	12,500	-	-
TOTALS:	9,500	51,400	64,700	39,100	532,600
GRAND TOTAL:	697,300				

^{a/} The projection is based on standardized assumptions of marine survival.

Table 3. Numbers of salmon released during 1980 that were produced at FRED hatcheries.

Hatchery	Brood year, Stock, Species	Number of salmon released
CENTRAL REGION		
Anchorage Area Complex	1979 Crooked Creek king	409,180
	1979 Seward coho	488,051
	1979 Ship Creek coho	56,861
	1978 Seward coho	56,578
Big Lake	1979 Fish Creek coho	760,822
	1979 Meadow Creek sockeye	805,180
	1979 Nancy Lake sockeye	682,566
Cannery Creek	1979 Siwash and Jonah Bays chum	469,124
	1979 Cannery Creek pink	999,261
	1979 Jonah Bay pink	1,695,412
Clear AFS	1979 Delta River chum	270,000
East Creek	1979 Francis Creek sockeye	1,000,000
Kasilof	1979 Glacier Flat sockeye	3,216,591
	1979 Bear Creek sockeye	2,466,474
Kitoi Bay	1979 Chignik king	93,259
	1979 Lower Thumb River sockeye	1,070,149
	1979 Kizhuyak chum	43,348
	1979 Big Kitoi Creek pink	22,493,387
Russell Creek	1979 Russell Creek chum	3,200,000
Tutka Bay	1979 Tutka Creek chum	5,874
	1979 Tutka Creek pink	<u>6,268,963</u>
CENTRAL REGION TOTAL:		46,551,080

-Continued-

Table 3. Continued.

Hatchery	Brood year, Stock, Species	Number of salmon released
SOUTHEAST REGION		
Beaver Falls	1979 Beaver Falls chum	1,866,448 ^{a/}
Crystal Lake	1979 Andrews Creek king	13,676
	1978 Duncan Salt Chuck coho	10,969
	1979 Duncan Salt Chuck coho	15,468
	1979 Crystal Creek coho	57,119
Deer Mountain	1978 Cripple Creek king	72,064
	1978 Ketchikan Creek coho	55,677
Hidden Falls	1979 Kadashan Creek chum	3,419,891
	1979 Clear River chum	179,493
Klawock	1978 Klawock River coho	13,319
	1979 Klawock River sockeye	18,364
	1979 Klawock River chum	120,203
Snettisham	1978 Speel Lake coho	155,540
	1979 Limestone Creek chum	160,788
	1979 Prospect Creek chum	37,745
SOUTHEAST REGION TOTAL:		6,196,764
GRAND TOTAL:		52,747,844

^{a/} An additional 4,000 fish were sent to Wildlife Vaccines.

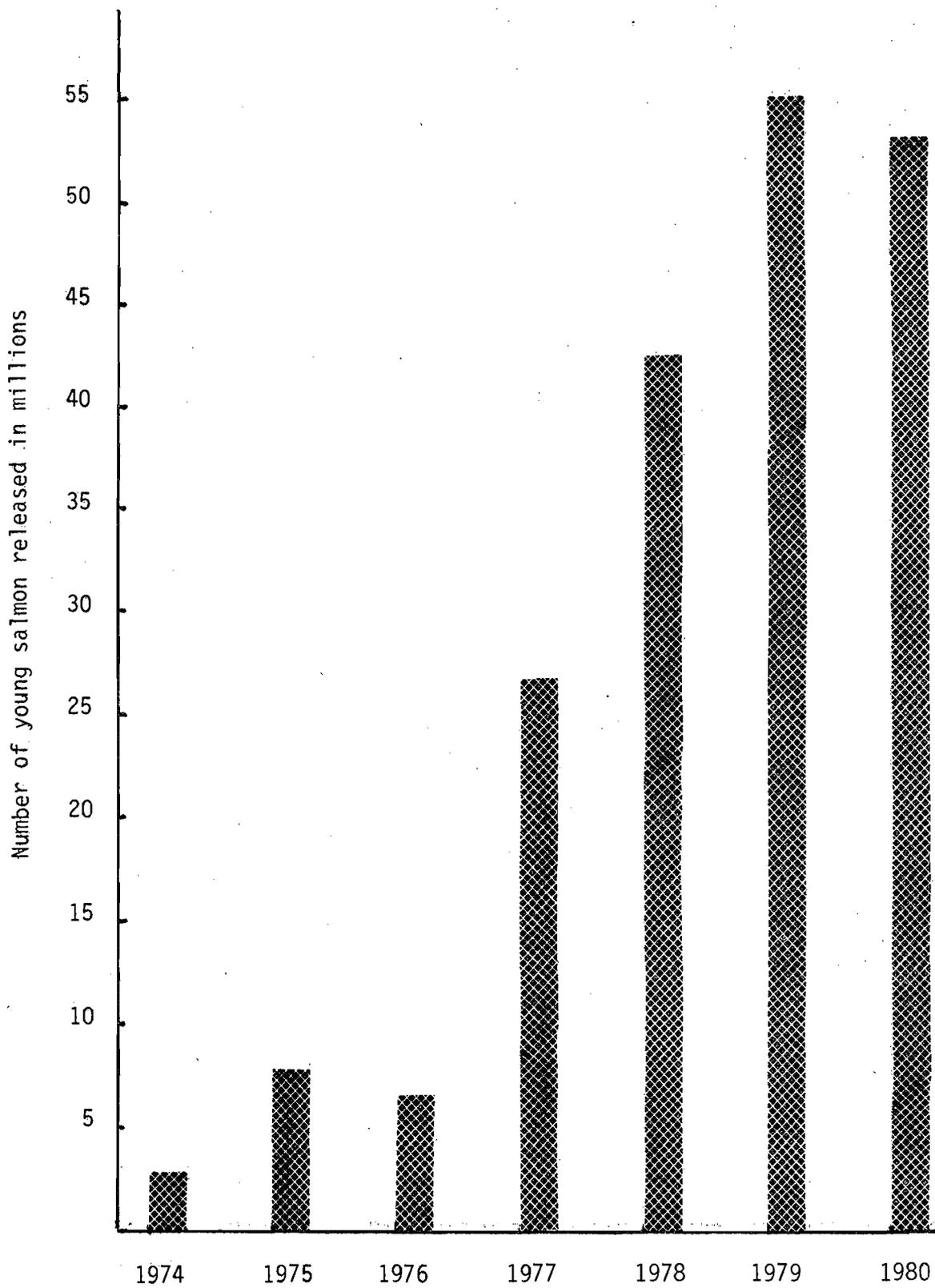


Figure 2. Number of young salmon released by FRED from 1974 through 1980. Figure for 1980 is preliminary.

Table 4. Numbers of rainbow trout, steelhead trout, and grayling planted by FRED during 1980.

Species	Brood stock	Size	Number planted	Location planted
Rainbow trout				
	1979 Swanson River (dom)	sub-catchable	55,000	Anchorage area, Fairbanks area, Matanuska - Susitna Valley
	1979 Talarik	catchable	46,263	
	1980 Talarik	fingerling	124,000	
	1980 Swanson River (dom)	fingerling	<u>268,100</u>	
		Rainbow trout total:	493,363	
Steelhead trout				
	1978 Ketchikan Cr.	smolt	2,748	Ketchikan & Ward Cr. Klawock River
	1979 Klawock River	smolt	<u>2,608</u>	
		Steelhead trout total:	5,356	
Grayling				
	1979 Tolsona Lake	fry	51,273	Tolsona Lake

Table 5. Summary of king salmon production from Central Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year,	Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)					Smolts (80%)
			Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	
Fort Richardson	1979	Crooked Creek	672,200	537,900 (80%)	527,100 (98%)	516,600 (98%)	356,500 ^{a/} (99%)	258,280 ^{b/} (72%)
Ship Creek ^{c/}	1979	Crooked Creek					154,900 (99%)	150,900 ^{b/} (97%)
Kitot Bay	1979	Chignik	146,884	124,411 (84.7%)	120,146 (96.6%)	99,494 (82.8%)	93,259 ^{b/} (93.7%)	

a/ 154,900 transferred to Ship Creek rearing ponds.

b/ Released.

c/ The Ship Creek Rearing Facility and the Ft. Richardson Hatchery are called the Anchorage Area Hatchery Complex.

Table 6. Summary of king salmon production from Southeast Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)					Smolts (80%)
		Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	
Crystal L.	1979 Andrews Creek	149,693	82,763 ^{a/} (55.3%)	78,941 (95.4%)			13,676 ^{b/c/}
Deer Mt.	1978 Cripple Creek	<u>d/</u>	115,793	112,184 (96.9%)			72,064 ^{b/} (64.2%)

a/ Poor survival probably caused by white spot disease.

b/ Released.

c/ 41,522 remain on hand and will be released in 1981.

d/ Unknown. Eggs transferred from Little Port Walter.

Table 7. Summary of coho salmon production from Central Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)						
		Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	Smolts (80%)	
		(Percent survival goals from previous stage to this stage)						
Fort Richardson	1979 Seward	730,800	685,500 ^{a/} (97%)	270,567 (98%)	267,888 (99%)	265,236 ^{b/} (99%)		
				402,200 (98%)	388,200 (96.5%)	368,400 (95%)	222,815 ^{b/} (61%)	
	1978 Seward	2,180,750	2,085,600 (96%)	1,683,500 (81%)	1,681,900 (99%)	1,671,300 ^{c/} (99%)	58,716 ^{d/} (66%)	
	1979 Ship Creek	63,000	59,228 (94%)	58,641 (99%)	58,061 (99%)	56,861 ^{b/} (98%)		
Big Lake	1979 Fish Creek	929,295	860,283 (92.6%)	782,548 (91%)	760,822 ^{b/} (97.2%)			

a/ Group separated for fingerling and smolt production.

b/ Released.

c/ Planted 1,052,312 as fingerlings in 1979.

d/ 56,578 released as catchable-sized fish to supplement the rainbow trout lake stocking project. Survival from smolt stage was 96%.

Table 8. Summary of coho salmon production from Southeast Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)					
		Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	Smolts (80%)
Crystal L.	1978 Duncan Salt Chuck	454,842	420,318 (92.4%)	174,035 (41.4%)			139,645 ^{a/b/} (80%)
	1979 Duncan Salt Chuck	146,037	83,607 (57.3%)	49,860 (59.6%)			15,468 ^{a/c/}
	1979 Crystal Creek	848,644	735,719 (86.7%)	645,846 (87.8%)			57,119 ^{a/d/}
Deer Mt.	1978 Ketchikan Creek	63,131	61,886 (98.0%)	58,184 (94.0%)			55,667 ^{a/} (95.7%)
Klawock	1978 Klawock River	19,319	17,625 (91.2%)	16,009 (89.3%)			13,319 ^{a/} (83.2%)
Snettisham	1978 Speel Lake	189,824	184,524 (97.2%)	184,256 (99.9%)		9,042 ^{e/}	155,540 ^{a/} (88%)

a/ Released.

b/ 128,676 of these smolts were released in 1979.

c/ 29,384 remained on hand for release in 1981.

d/ 570,681 remained on hand for release in 1981.

e/ Released into First Lake as part of a lake stocking experiment.

Table 9. Summary of sockeye salmon production from Central Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock		Number produced/(Actual percent survivals from previous stage to this stage)				
			Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)
Kasilof	1979	Glacier Flat	3,530,591	3,334,711 (93.2%)	3,217,053 (96.4%)	3,217,022 (99.9%)	3,216,591 ^{a/} (99.9%)
	1979	Bear Creek	3,550,613	3,219,384 (90.7%)	2,495,697 (77.5%)	2,475,690 (99%)	2,466,474 ^{a/} (99.6%)
Big Lake	1979	Meadow Creek	4,905,799	4,226,006 (86.1%)	3,666,102 (86.8%)	805,180 ^{b/} (22%)	
	1979	Nancy Lake	921,748	694,532 (75.3%)	684,427 (95.9%)	682,566 ^{a/} (99.7%)	
Kitoi Bay	1979	Lower Thumb R.	2,385,937	1,984,455 (83.2%)	1,226,789 (61.8%)	1,076,299 ^{a/} (87.7%)	
	1979	Upper Thumb R.	3,107,420	2,408,546 ^{c/} (77.5%)			
East Creek	1979	Francis Creek	6,327,338	5,522,641 (87.3%)	1,931,488 (35%)	1,000,000 ^{b/} (52%)	
	1979	East Creek	271,882	251,714 (92.6%)	5,035 ^{d/} (3%)		

a/ Released.

b/ Released. High mortality was caused by IHNV epizootic.

c/ 1,444,700 eyed eggs planted in Upper Thumb River. Remaining 2.5 million were returned to Kitoi because of flooding at Thumb River, contracted IHNV, and were destroyed.

d/ All died in IHNV epizootic.

Table 10. Summary of sockeye salmon production from Southeast Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)				
		Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)
Klawock	1979 Klawock River	71,930	67,614 (94%)	43,328 (64%)	33,200 ^{a/} (77%)	

^{a/} Six thousand of these were released inadvertently into Klawock River, 14,840 were shipped to Wildlife Vaccines, and 12,360 were released as scheduled.

Table 11. Summary of chum salmon production from Central Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)					
		Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	Smolts (80%)
Tutka Bay	1979 Tutka Creek	6,000		5,874 ^{a/} (97%)			
Kitoy Bay	1979 Kizhuyak	77,678	47,470 (61.1%)	43,348 ^{b/} (91.3%)			
Russell Cr.	1979 Russell Cr.	7,137,000	4,639,050 (65%)		3,200,000 ^{a/} (69%)		
Clear AFS	1979 Delta River	308,900	293,146 (94.9%)	270,000 ^{a/} (92.1%)			
Cannery Cr.	1979 Siwash Bay	603,111	465,320 (77%)		469,124 ^{c/a/} (98%)		
	1979 Jonah Bay	12,369	12,128 (98%)				

a/ Released.

b/ Severe land otter predation made actual number released unknown.

c/ Combined figure: Siwash and Jonah Bay.

Table 12. Summary of chum salmon production from Southeast Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)				
		Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)
Beaver Falls	1979 Beaver Falls	3,038,897	2,306,938 (75.9%)	1,909,244 (82.8%)	1,866,448 ^{a/b/} (97.8%)	
Hidden Falls	1979 Kadashan	4,046,169	3,571,427 (88.3%)	3,512,253 (98.3%)		3,419,891 ^{a/} (97.4%)
	1979 Clear River	209,785	176,043 (83.9%)	182,798 (103.8%) ^{c/}		179,493 ^{a/} (98.2%)
Klawock	1979 Klawock River	294,155	237,876 (80.9%)	125,106 ^{d/} (52.6%)		120,203 ^{a/} (96.1%)
Snettisham	1979 Prospect Creek	42,486	41,015 (96.5%)	38,603 (94.1%)		37,745 ^{a/} (97.8%)
	1979 Limestone Creek	171,121	167,099 (97.6%)	166,719 ^{e/} (99.8%)		143,603 ^{a/} (96%)

a/ Released.

b/ In addition, 4,000 were sent to Wildlife Vaccines.

c/ Counting error.

d/ A clogged incubator filter caused the suffocation of 110,000 alevins.

e/ Of these, 17,185 were released as emergent fry.

Table 13. Summary of pink salmon production from Central Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock		Number produced/(Actual percent survivals from previous stage to this stage)					
			Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	Smolts (80%)
Cannery Cr.	1979	Cannery Creek	1,243,559	948,352 (75%)	999,261 ^{a/} (105%) ^{b/}			
	1979	Jonah Bay	2,315,908	1,649,694 (71%)	1,695,412 ^{a/} (103%) ^{b/}			<i>Hobo Creek Release</i>
Tutka Bay	1979	Tutka Creek	10,000,000	6,900,000 (69%)	6,992,389 (100.3%)	6,268,963 ^{a/} (89.6%)		
Kittoi Bay	1979	Big Kittoi Cr.	29,324,855	25,010,168 (85.3%)	22,493,387 ^{a/} (89.9%)			

a/ Released.

b/ Previous count was wrong.

Table 14. Summary of pink salmon production from Southeast Region FRED Division facilities, 1979.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)					
		Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	Smolts (80%)
Starrigavan	1979 Irish Creek	465,157	417,516 ^{a/} (89.8%)				

^{a/} Planted as eyed eggs into Irish Creek in 1979. These data were not reported last year.

Table 15. Summary of rainbow trout production from Central Region FRED Division facilities, 1980.

Facility	Brood year,	Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)						
			Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)	Sub-catchables	Brood stock
Fort Richardson	1979	Swanson R. (dom.)	825,044	676,500 (82%)	405,900 (60%)	304,400 (75%)	274,000 ^{a/} (90%)	55,000 ^{b/} (80%)	-
	1979	Swanson R. (wild)	52,920	33,800 (64%)	33,500 (99%)	30,500 (91%)	26,900 (88%)	21,800 (81%)	15,000 (69%)
	1979	Talarik	342,700	291,300 (85%)	78,700 ^{c/} (27%)	74,700 (95%)	68,000 ^{d/} (91%)	46,263 ^{e/} (98%)	
	1980	Talarik	200,900	140,376 (70%)	129,200 (92%)	127,900 (99%)	124,000 ^{b/} (97%)		
	1980	Swanson R. (dom.)	36,900	3,600 (10%)	-0- ^{f/}				
	1980	Swanson R. (wild)	79,600	56,871 (71%)	60,900 (107%) ^{g/}	54,800 (90%)	44,400 (81%)		
Ship Creek	1980	Swanson R. (dom.)	1,068,000	679,000 (64%)	591,500 (87%)	561,900 (95%)	397,500 ^{h/} (71%)		

a/ About 205,000 released in fall of 1979.

b/ Released.

c/ High mortality caused by power interruption.

d/ 20,607 released as fingerlings.

e/ Released as catchables.

f/ Eggs were from two-year-old brood stock, apparently immature.

g/ Previous count was wrong.

h/ 268,100 of these were released. 129,400 remain on hand.

Table 16. Summary of steelhead trout production from Southeast Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)				
		Green eggs	Eyed eggs (90%) (Percent survival goals from previous stage to this stage)	Emergent (95%)	Fry (95%)	Fingerlings (95%)
Deer Mt.	1978 Ketchikan Creek	12,850	11,850 (92.2%)	11,559 (97.5%)		2,748 ^{a/b/} (78%)
Klawock	1979 Klawock River	25,663	5,878 ^{c/} (22.9%)	3,742 (63.7%)		2,608 ^{a/} (69.7%)

^{a/} Number released.

^{b/} Another 6,318 fish are being held for 1981 release.

^{c/} Low survival probably caused by poor fertilization in cold water.

Table 17. Summary of grayling production from Central Region FRED Division facilities showing survivals in those stocks from which fish were released during 1980.

Facility	Brood year, Brood stock	Number produced/(Actual percent survivals from previous stage to this stage)				
		Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerlings (95%)
		(Percent survival goals from previous stage to this stage)				
Fort Richardson	1979 Tolsona	75,100			51,273 ^{a/} (68%)	

a/ Released.

Table 18. Estimates of the number of eggs taken for incubation by FRED during 1980 by facility, brood stock, and species, including the number of fish killed during spawning and the number allowed to escape upstream.

Facility	Brood stock	Species	Eggs taken	Fish killed during spawning	Escapement ^{a/}
SOUTHEAST REGION					
Beaver Falls	Beaver Falls return	chum	7,550,958	7,242 ^{b/}	0
	Disappearance Creek	chum	8,380,410	4,209	31,000
Crystal Lake	Andrews Creek	king	234,556	79	514
	Crystal Creek	king	474,895	208	666
	Crystal Creek	chum	42,570	32	494
	Crystal Creek	steelhead	55,000	0	45
	Crystal Creek	coho	75,000 ^{c/}	130	2
Deer Mountain	Cripple Creek	king	188,770	76	845
	Ketchikan Creek	steelhead	5,790	0	50
	Ketchikan Creek	coho	203,205	120	1,263 ^{d/}
Hidden Falls	Kadashan	chum	9,797,056	5,048	25,054
	Seal Bay	chum	132,140	65	3,000
Klawock	Klawock River	chum	5,700,000	3,655	7,584
	Klawock River	pink	1,000,000	205	415,875
	Klawock River	steelhead	14,361	5	
	Klawock River	coho	49,056 ^{c/}	21	1,473
Snettisham	Neka Bay	chum	2,508,000	1,981	14,000
	Snettisham return	chum	100,000	139	0
	Situk River	king	66,100	31	1,125
	Speel Lake	coho	19,600	8	736
SOUTHEASTERN TOTAL:			36,597,467		

-continued-

Table 18. Continued

Facility	Brood stock	Species	Eggs taken	Fish killed during spawning	Escapement ^{a/}
CENTRAL REGION					
Anchorage Area	Swanson (wild)	rainbow	79,600	0	
	Swanson (domestic)	rainbow	1,068,000	0	
	Talarik	rainbow	200,900	0	
	Bear Creek	coho	2,200,000	315	2,500
	Crooked Creek	king	533,350	165	2,180
	Ship Creek	king	60,000	24	146
Big Lake	Meadow Creek	sockeye	558,000	387	18,513
	Nancy Lake	sockeye	755,851	665	6,300
	Fish Creek	sockeye	4,141,733	3,065	28,435
	Fish Creek	coho	543,100	306	8,494
Cannery Creek	Eaglek Bay	chum	2,607,115	2,542	708
	Siwash Bay	chum	673,116	582	5,570
	Cannery Creek	pink	17,299,478	19,136	18,000
Clear	Koyokuk	sheefish	388,000	0	ND
	Delta River	chum	400,000	160 ^{e/}	8,000
East Creek	Killian Creek	sockeye	27,000	21	2,337
	Francis Creek	sockeye	2,334,080	843	70,000
	East Creek	sockeye	2,780,070	1,486	0
Gulkana River	Gulkana River	sockeye	6,228,000	4,100	15,200
Karluk Lake	Upper Thumb River	sockeye	5,570,000	2,750	2,500
Kasilof	Bear Creek	sockeye	10,036,600	3,690	125,384
	Glacier Flat	sockeye	6,364,400	2,340	14,490

-continued-

Table 18. Continued.

Facility	Brood stock	Species	Eggs taken	Fish killed during spawning	Escapement ^{a/}
Kitoi Bay	Kitoi Creek	pink	32,420,900	71,700 ^{b/}	8,700
	Sturgeon River	chum	107,457	129	84,000
	Chignik	king	158,500	32	1,750
Russell Creek	Russell Creek	chum	14,600,000	7,840	28,400
	Russell Creek	pink	4,400,000	3,977	35,700
Tutka Bay	Tutka Creek	pink	16,154,515	15,050	17,250
	Tutka Creek	chum	25,088	20	25
CENTRAL TOTAL:			132,714,853		
GRAND TOTAL:			169,312,320		

a/ Does not include fish used in egg take.

b/ Terminal harvest. Includes excess males not used for spawning.

c/ Still in progress.

d/ As of 12/19/80. Fish used for Metlakatla egg take and those killed and given to the public are included.

e/ Females only. Males were spawned and released.

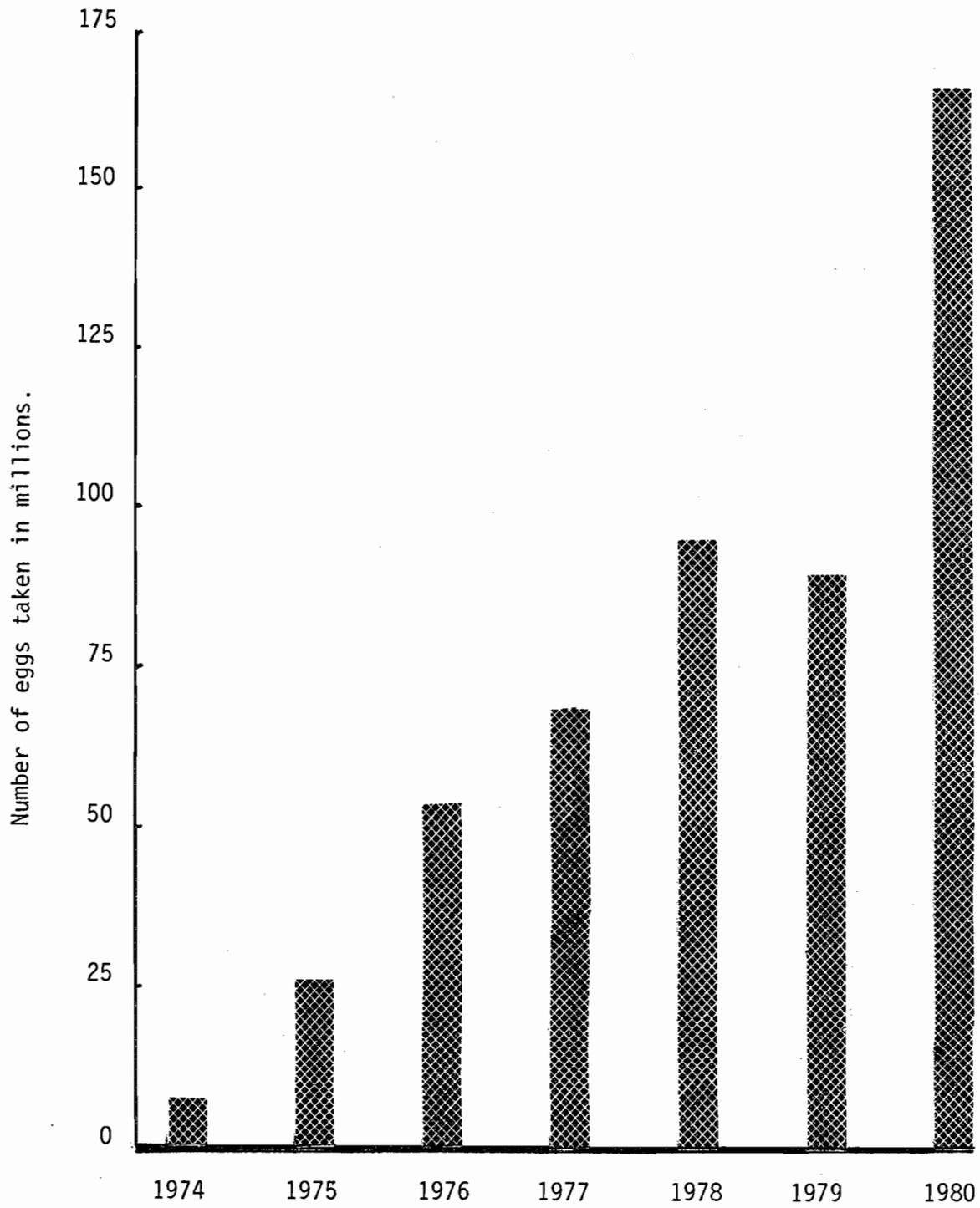


Figure 3. Number of salmon eggs taken for incubation at State hatcheries from 1974 through 1980. Figure for 1980 is preliminary.

Table 19. FRED Division egg take objectives for 1981.

Incubation site	Brood stock, Species	Number of eggs
CENTRAL REGION		
Anchorage Area Hatcheries	Crooked Creek, king	1,000,000
	Swanson River and Talarik River, rainbow trout	2,500,000
	Seward, coho	2,250,000
	Tolsona, grayling	1,000,000
Big Lake	Meadow Creek, Nancy Lake, and Fish Creek, sockeye	16,000,000
	Fish Creek, coho	4,000,000
Cannery Creek	Cannery Creek, pink and Siwash Creek, Eaglek, chum	25,000,000
	(Undetermined), coho	200,000
Clear	Delta River, chum	520,000
	Clear Creek and Salcha River, king	125,000
	Clear Creek, coho	50,000
	Tolsona Lake, grayling	950,000
	Koyukuk, sheefish	400,000
	Swanson River, rainbow trout	100,000
East Creek	Francis Creek and Lake Nunavaugaluk, sockeye	15,000,000
	Nushagak River, chum	1,000,000
Gulkana River	Gulkana River, sockeye	6,000,000
Karluk	Thumb River, sockeye	20,000,000
Kasilof	Tustumena Lake, sockeye	20,000,000

-continued-

Table 19. Continued.

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Incubation site	Brood stock, Species	Number of eggs
Kitoi Bay-	Kitoi Creek, pink	28,000,000
	Chignik, king	300,000
	(Undetermined), chum	2,000,000
Kotzebue	Noatak River, chum	2,000,000
Main Bay	Cannery Creek, pink and Wells River, chum	10,000,000
Russell Creek	Russell Creek, pink and chum	20,000,000
Tutka Bay Lagoon	Tutka Creek, pink and chum	<u>20,000,000</u>
	Central Region Total:	198,395,000
SOUTHEAST REGION		
Beaver Falls	Beaver Falls return and Disappearance Creek, chum	20,000,000
Crystal Lake	Andrews Creek and Crystal Creek, king	1,000,000
	Crystal Creek, coho	850,000
	Crystal Creek, chum	300,000
	Crystal Creek, steelhead	50,000
Deer Mountain	Cripple Creek, king	200,000
	Ketchikan Creek, coho	200,000
	Ketchikan Creek, steelhead	20,000

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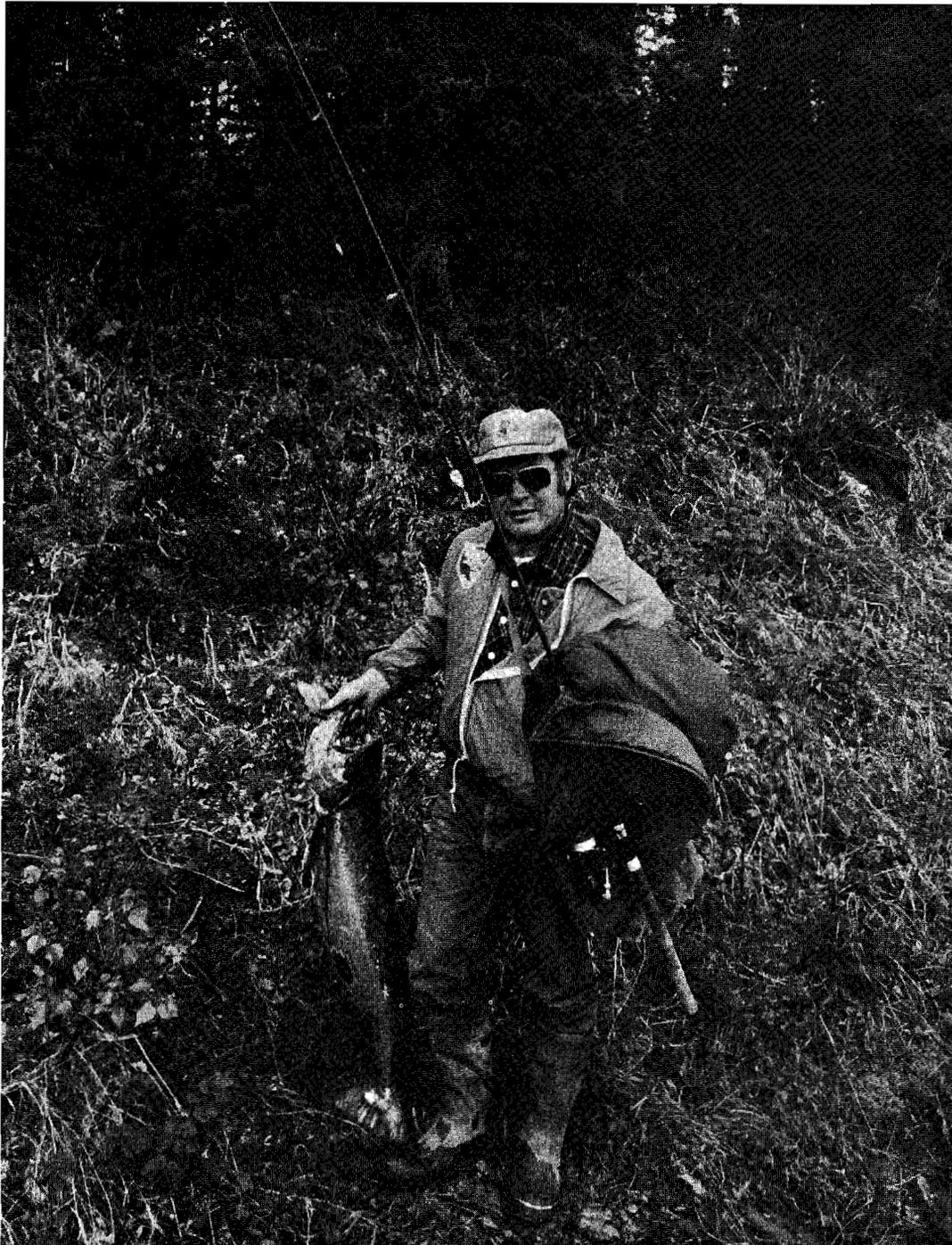
Table 19. Continued.

Incubation site	Brood stock, Species	Number of eggs
Hidden Falls	Kadashan, pink and chum, Clear River, Seal Bay, and Hidden Falls return, chum	20,000,000
	Little Port Walter, king and coho	200,000
Klawock	Klawock River, pink and chum	20,000,000
	Klawock River, coho	200,000
	Klawock River, steelhead	10,000
Snettisham	Neka Bay, Limestone Creek, and Snettisham return, chum	10,000,000
	King Salmon River, Situk River, and Chilkat River, king	650,000
	Snettisham return, coho	<u>1,400,000</u>
	Southeast Region Total:	75,080,000
	Grand Total:	273,475,000

Table 20. A projection of the numbers of adult salmon expected to result from eggs taken by FRED during 1980.^{a/}

Fishing area	Numbers by species				
	King	Coho	Sockeye	Chum	Pink
Southeastern	17,767	21,412		455,295	5,990
Prince Wm. Sound			37,368	24,479	138,396
Cook Inlet	10,680	56,250	131,139	203	129,238
Kodiak	486		27,850	870	226,946
Alaska Peninsula				116,800	35,200
Bristol Bay			41,129		
Interior				3,200	
Totals:	28,933	77,662	237,486	600,847	535,770
Grand Total:		1,480,698			

^{a/} These adults will return over several years, beginning in 1982. Projections are based on standard ocean survival rates which appear to underestimate actual survival of pink and chum salmon.



A sport fisherman shows off the king salmon he pulled from the Kasilof River in 1980. (ADF&G photo by Mark Kissel)

MEANS OF SALMONID ENHANCEMENT

State Hatcheries

The FRED Division operates 17 hatcheries throughout the state and will operate three more before the end of FY 82. A list of all state hatcheries, present and planned, is presented in Table 21 along with their locations, primary production species, and egg capacities. Figure 4 illustrates the general locations of these 20 hatcheries on a map of Alaska. The total operational capacity of state hatcheries as of the end of 1980 is approximately 400 million eggs. By the end of 1981, with completion of the Clear and Snettisham Hatcheries, the egg capacity will be 470 million; by the end of 1982, with the completion of the Main Bay, Trail Lakes, and Kotzebue Hatcheries, FRED's operational egg capacity will be 624.5 million.

The Gulkana River Hatchery, formerly operated by the Division of Commercial Fisheries, was turned over to FRED in July 1980. This hatchery, which consists of stream-side incubation boxes with a capacity of 6.5 million eggs, has produced sockeye salmon fry since 1974. The new Karluk Lake Hatchery, which also consists of stream-side incubation boxes, began producing eyed sockeye salmon eggs this year for the Thumb River, a tributary of Karluk Lake.

Hatcheries are used as a production base for salmon rehabilitation and enhancement programs because they are roughly eight times more efficient in converting eggs to fish than the natural environment. The hatchery process increases survivals over the natural environment in four major ways:

- 1) Artificial spawning ensures the fertilization of nearly 100% of the ripe eggs.
- 2) A steady flow of water through specially designed incubators provides oxygen to all eggs and prevents suffocation.
- 3) Eggs and alevins in hatcheries are protected from freeze-ups and predation.
- 4) Feeding fish at a hatchery increases their size before they are released into the wild to fend for themselves.

The efficiency of hatchery production shortens the time required to rehabilitate depleted stocks, and provides the only way to meet the demands of anglers and maintain sport fisheries in the more heavily populated areas of Alaska.

Fishways

By providing fish access to new or underutilized spawning areas, fishways are an effective tool of salmon enhancement. FRED, often in cooperation with the U.S. Forest Service, is involved in the construction and maintenance of 18 fishways throughout the state. A list of fishways, species, and total numbers of salmon that utilize them is presented in Table 22. Figure 5 illustrates the general location of these fishways on a map of Alaska.

One of the most successful fishways in the world is located on the Frazer River on Kodiak Island. The fishway is a steep pass system that allows salmon to pass a 33-foot waterfall and reach the spawning gravel of Frazer Lake. More than 405,000 sockeye salmon were counted through the Frazer fishway during 1980, along with small numbers of other salmon species. This is all the more astounding when one realizes that Frazer Lake was inaccessible to anadromous fishes before the original fishway was built in 1962.

The Russian River fishway on the Kenai Peninsula is contained in a tunnel drilled through 270 feet of rock. It allows salmon to swim around a 30-foot cataract when high water forms a velocity barrier that prevents them from ascending to the spawning grounds. During 1980, the entire early run of sockeye salmon and 85% of the late run used the fishway. The Russian River fishway protects the commercial fishery and one of the world's most unique sockeye salmon sport fisheries. The Anan Creek fishway in Southeastern is also drilled through rock, and passes an average of 125,000 salmon annually.

Most of the fishways in Alaska are steep passes, culvert-like tunnels of aluminum. Inside the steep pass are a series of baffles that turn the energy of the flowing water against itself, decreasing the velocity enough to allow fish to ascend. The steep pass is lightweight and can be flown in sections to remote locations and assembled at the site.

Other types of fishways provide a path around a barrier, or consist of pools within a cataract to provide a resting area for the migrating fish. These types are effective, but usually involve more construction than a steep pass and have limited application in areas away from established road systems.

Habitat Alteration

FRED's first lake fertilization, in cooperation with the Southern Southeast Regional Aquaculture Association (SSRAA), was accomplished during 1980. Between June and October, 5,000 gallons of fertilizer were sprayed on Hugh Smith Lake, located in Boca de Quadra near Ketchikan. The fertilizer is used by algae during photosynthesis; the algae are eaten by tiny animals called zooplankton, which are eaten by the young sockeye salmon that rear in the lake. FRED and SSRAA hope the project will produce more and larger sockeye salmon smolts from Hugh Smith Lake. Many other lakes throughout Alaska are being considered for similar lake fertilization projects. (see also Limnology)

A 49-acre pond was connected by an artificial channel to the Chilkat River near Haines to provide more rearing space for young coho salmon. The project was planned and conducted jointly by FRED, the Division of Commercial Fisheries, the Upper Lynn Canal Fish and Game Advisory Committee, and the Youth Conservation Corps. The pond has the potential to feed enough coho juveniles to produce a return of 1,200 adults annually. The results will be studied with an eye toward connecting more ponds to the fast-flowing river.

On Kodiak Island, FRED personnel breached two beaver dams, allowing an estimated 25,000 pink salmon to move upstream and spawn. FRED personnel also breached three beaver dams on Lake Creek, in the Palmer area, allowing sockeye salmon spawners access to Nancy Lake.

Predator Control

Two char impoundment projects continued in 1980 to limit predation on out-migrating salmon smolts and fry. At the Agulowak River in the Wood River system, 4,249 Arctic char were netted and impounded during the sockeye salmon smolt emigration. FRED biologists estimated that the project saved some 646,000 sockeye salmon smolts from being eaten by the char. The char were released unharmed as the smolt out-migration ended. A similar method was employed with Dolly Varden at the Russell Creek Hatchery in Cold Bay. The creek's population of Dolly Varden char spends winter in the adult holding pond of the hatchery. Hatchery personnel merely close a gate on them, keeping them in until the natural out-migration of pink and chum salmon fry is over. In this way, an estimated 35,000 Dolly Varden char were kept from preying on the young salmon.

Table 21. Status of state hatcheries in Alaska, 1980.

Year on line	Facility	Location	Primary species	Egg capacity (millions)	Status
FY 62	Ft. Richardson ^{a/}	Anchorage	rainbow/coho	8.6	operational/expanding
FY 72	Crystal Lake	Petersburg	king/coho	5.8	operational
FY 73	Gulkana River ^{b/}	Paxson	sockeye	6.5	operational
FY 73	Halibut Cove Lagoon	Halibut Cove	king/coho		changed over to release station
FY 76	Beaver Falls	Ketchikan	chum	20.0	operational
FY 77	Deer Mountain ^{c/}	Ketchikan	king/coho/steelhead	1.0	operational
FY 77	Big Lake	Wasilla	sockeye/coho	20.0	operational
FY 77	Kasilof	Kasilof	sockeye	20.0	operational
FY 77	Tutka Lagoon	Kachemak Bay	pink/chum	20.0	operational/expanding
FY 77	Kitoi Bay	Afognak Is.	pink/chum	30.0	operational
FY 78	Ship Creek	Anchorage	king	2.0	operational/upgrading
FY 79	East Creek	Dillingham	sockeye	15.0	operational
FY 80	Russell Creek	Cold Bay	chum/pink	52.0	operational/shakedown
FY 80	Hidden Falls	Baranof Is.	chum/coho	65.0	operational/shakedown
FY 80	Klawock	Klawock	chum/coho	78.0	operational/shakedown
FY 81	Cannery Creek	Prince William Sound	chum/pink	39.0	construction/brood stock development
FY 81	Clear AFS	Anderson	chum/king/grayling/sheefish	1.8	construction/brood stock development
FY 81	Snettisham	Juneau area	chum/coho	75.8	construction/brood stock development
FY 81	Karluk Lake ^{d/}	Kodiak Island	sockeye	12.0	operational
FY 82	Main Bay	Prince William Sound	chum	65.0	construction/brood stock development

-continued-

Table 21. Continued.

Year on line	Facility	Location	Primary Species	Egg capacity (millions)	Status
FY 82	Trail Lakes	Moose Pass	sockeye/king/coho	77.0	design
FY 82	Sikusuilag Springs	Kotzebue area	chum	<u>10.0</u>	design
TOTAL:				624.5	

- a/ Also known as the Anchorage Area Complex when combined with the Ship Creek facility. A third Anchorage area hatchery, Fire Lake, no longer operates.
- b/ Stream-side incubation boxes, not a hatchery building. Operated by Division of Commercial Fisheries until FY 81.
- c/ Owned by the City of Ketchikan, operated by FRED.
- d/ Stream-side incubation boxes, not a hatchery building.

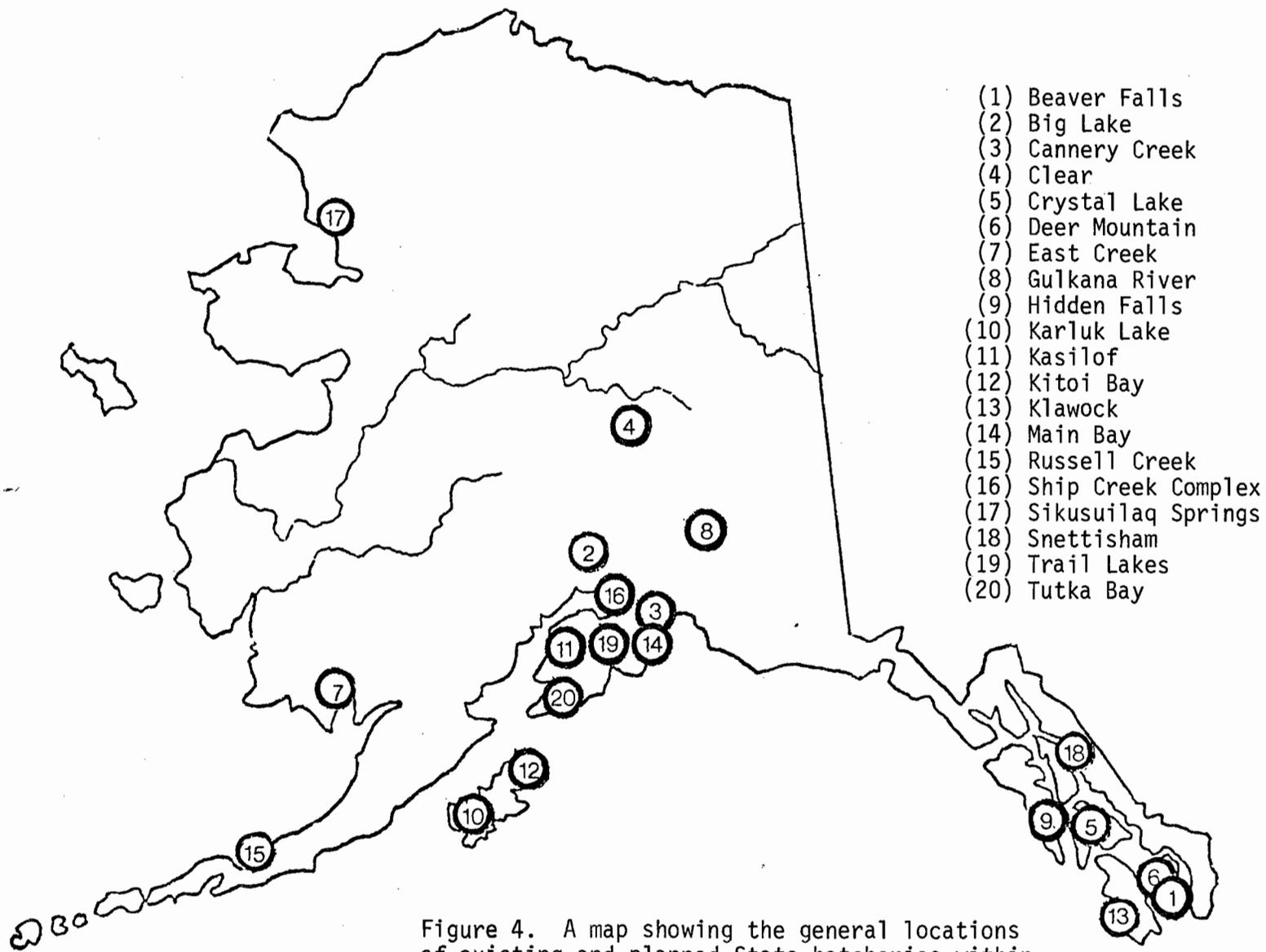


Figure 4. A map showing the general locations of existing and planned State hatcheries within Alaska, 1980.

Table 22. Fishways in Alaska in 1980 and the numbers and species using them.

Area	Location	Species	Approximate number of fish utilizing fishway
Southeastern	Anan Creek	pink, chum, coho, sockeye	125,000
	Bakewell Creek	coho	unassessed
	Falls Creek	pink, coho	unassessed
	Ketchikan Creek	pink, chum, coho, sockeye, king	10,000
	Navy Creek	pink, chum, coho	25,000
	Pavlof Creek	pink, chum, coho, sockeye	1,500
	Survey Creek		not operating
Kodiak	Frazer Lake	chum, sockeye, king	400,000
	Little Kitoi Creek	pink, coho, sockeye	1,000
	Pauls/Laura Lake	coho, sockeye	55,000
	Portage River	pink, coho, sockeye	15,000
	Seal Bay Creek	pink, coho	1,000
	Waterfall Creek	pink, coho	16,000
Prince William Sound	Billy's Hole	sockeye	4,000
	Control Creek	pink, chum	20,000 ^{a/}
	Hobo Creek	pink	0 ^{b/}
	Shrode Creek	pink	40,000
Cook Inlet	Russian River	coho, sockeye, king	<u>100,000</u>
Total			813,500

a/ Fishway used only by odd year pinks.

b/ First stocked last year. No returns expected until 1981.

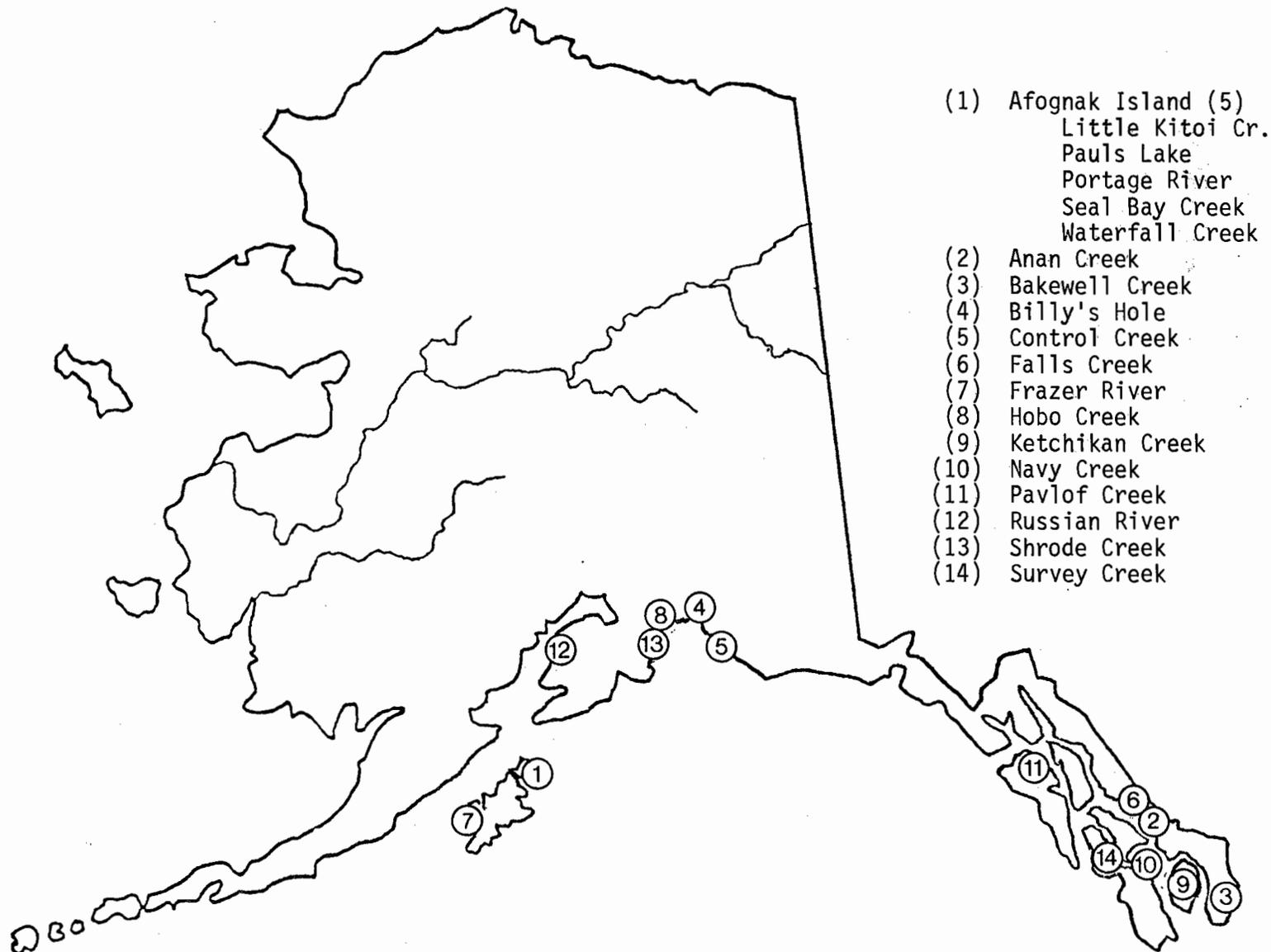


Figure 5. A map showing the general locations of fishways within Alaska, 1980.



Employees trap and enumerate coho salmon smolts as they out-migrate from Fish Creek at Big Lake. (ADF&G photo)

TECHNOLOGY AND DEVELOPMENT

The disciplines of fish culture, biology, genetics, limnology, pathology, and engineering are represented in the Technology and Development (T&D) branch of FRED. Collectively, this branch is responsible for quality control, research, development, and the continued improvement of the technology used in the FRED program. The T&D branch meshes closely with the Operations branch. Hatchery managers, for example, come under the technical supervision of T&D, but their primary job, that of running hatcheries and raising fish, is supervised and funded through Operations.

Fish Culture

FRED's fish culturists operate 17 hatcheries throughout the state representing a capital investment of approximately \$70 million. Theirs is the responsibility of breeding and raising the millions of fish that are the center of FRED's enhancement strategy. In addition, fish culturists work with biologists in developing and testing new aquaculture techniques.

The division has tested and used 18 different incubators. In 1980, FRED selected a large, efficient, aluminum incubator for use in all new hatcheries. The incubator, called S40LZ, can incubate up to 250,000 eggs per tray. The trays are normally stacked five high.

FRED continued gathering data on plastic Intalox saddle substrate for incubators. The substrate produces high quality fry and high egg-to-fry survivals. At the Kitoi Bay Hatchery, in an incubator 12 inches deep with saddle substrate, loadings as high as 35.4 eyed eggs per cubic inch were successful. The marine survival of pink salmon fry released at emergence from saddle substrate incubators was approximately 2% during 1980. Data from years of using saddle substrate were compiled and presented at the four-nation North Pacific Aquaculture Symposium in 1980. Tests began on a new type of incubation substrate, fiberglass grating, at the Hidden Falls Hatchery.

Continued testing of an electronic salmon fry counter during 1980 indicated that it is close to 100% accurate, although some problems remain in passing fry to the device. When the system is perfected FRED will have a counting method far less prone to error than the weight and volume methods now employed.

At Fort Richardson, grayling eggs were experimentally incubated in Heath trays rather than Downing jars. The Heath trays were effective in separating egg shells from hatched sac fry without manual effort. In other tests at Fort Richardson, screened deck columns and columns packed with plastic substrate stabilized the gas content of the hatchery's water supply and oxygenated it.

The standard fish diet, the Oregon Moist Pellet, must be stored frozen. A new diet that does not require freezing was tested during 1980. A small-scale study indicated that the new diet did not equal the standard diet in survival and growth of pink salmon fry. Diet studies are continuing in an effort to confirm or contradict these initial findings.

Several years of experience at the Tutka Bay Lagoon Hatchery have indicated that pink salmon adults held for ripening in salt water pens may sustain high mortalities. During 1980, freshwater holding and ripening were tried, resulting in lower adult mortality.

Coho and king salmon smolts released in salt water away from the hatchery are generally short-term reared at the release site to allow them to recover from the stress of transport as well as to imprint their homing instinct at that location. Projects at Seward and Whittier, however, indicated that such short-term rearing is not always necessary if smolts are released in fresh water. At both locations, direct releases of coho salmon smolts from transport vehicles resulted in encouraging returns.

Biology

Biologists are involved in every rehabilitation and enhancement project from the initial field surveys through the project proposals to the post-project evaluation. With 17 FRED hatcheries now releasing fish, the information gathered and interpreted by FRED's biologists becomes the basis for refining the division's enhancement techniques and for determining the direction of salmonid enhancement in Alaska.

Some of the most encouraging data from 1980 relate to survivals of hatchery-bred sockeye salmon planted in lakes. At Leisure Lake near Homer, for example, an estimated 14,000 hatchery-bred sockeye salmon returned to the vicinity of Leisure Lake, where they were harvested by sport, commercial, and subsistence fishermen. The returning adults were from a 1976 plant of 59,000 fingerlings. Both lake and ocean survivals were far above expectations, indicating the great potential of the state's barren and under-utilized lakes as nurseries for hatchery-produced sockeye and coho salmon. At Hidden Lake, in the Central Cook Inlet area, 41% of the returning sockeye salmon were hatchery fish. Smolt-to-adult survival was 18.5% at the weir. FRED biologists estimate that the actual smolt-to-adult survival, including adults taken by commercial fishermen, may have been closer to 37%, an exceptional marine survival.

Evaluations of hatchery returns in mixed hatchery and wild stock fisheries are only possible if some of the fish are marked. This is usually accomplished by clipping a fin from young salmon before they are released from the hatchery. If 10% of the hatchery fish are marked in this way, then biologists assume that each marked adult returning to the hatchery or fisheries represents 10 hatchery fish. However, data collected at the Tutka Bay Lagoon Hatchery near Homer indicate that such assumptions may grossly underestimate the returns of hatchery fish. The Tutka data casts doubt on a critical assumption--that marked fish survive at the same rate as unmarked fish. In 1978 and 1979, biologists and fish culturists at Tutka marked less than 1% of the released fry by clipping either the left or right ventral fin. In evaluation of the 1979 and 1980 returns, however, only about half of the expected number of marks were found, indicating that the marks themselves handicapped the fish's survival chances. The data indicate that the handicap factor may be as high as 50%. Clipped wild fish suffered a similar handicap. Biologists in Homer plan more research into this phenomenon, but it would appear that estimation of hatchery contribution by mark recovery alone greatly underestimates the adult return.

Extensive testing has been completed at a proposed hatchery site near Kotzebue, a spring about 30 miles up from the mouth of the Noatak River. Approximately 500 chum salmon fry were reared in the spring water without experiencing any significant mortalities. The amount of food available to salmon fry in Kotzebue Sound was studied by sampling plankton. Preliminary results indicate that natural chum fry production is limited by the availability of spawning habitat rather than by the availability of food. This means that fry from the proposed hatchery will be able to feed and grow in the natural environment without harming the natural production of fry.

Survivals from the 1979 release of pink salmon from the Cannery Creek Hatchery in Prince William Sound were nearly 6% as 125,300 adults returned to the hatchery and fisheries during 1980. These returns demonstrate the efficiency of building a brood stock before a hatchery is completed. The recently built hatchery was able to take its quota of pink salmon eggs virtually at its doorstep.

Other major projects in which FRED biologists were involved are as follows:

- 1) Cooperating with the Cook Inlet Aquaculture Association (CIAA), FRED biologists planted 500 adult chum and 2,000 adult pink salmon above a whitewater barrier on Scurvey Creek in the Lower Cook Inlet area. The fish spawned naturally. CIAA proposes to install a fishway around the rapids before the offspring begin returning as adults in 1982.
- 2) FRED biologists evaluated a release of hatchery fish in the Wasilla-Cottonwood Lake system near the Big Lake Hatchery and discovered that 44% of the out-migrant coho smolts were hatchery-bred fish.
- 3) Ten streams were surveyed as potential brood stock sources for the proposed Trail Lakes Hatchery on the Kenai Peninsula.
- 4) At the Indian Lake system near the new Snettisham Hatchery biologists demonstrated that half-length (0.5mm) coded wire tags can be used successfully in coho fry.
- 5) In the Juneau area, 54 lakes were surveyed to find candidates for coho lake stocking projects.
- 6) The first chum salmon bred at the Snettisham Hatchery near Juneau returned there in 1980, indicating that the stock has imprinted to the site. The small returns were from Snettisham's initial release of 19,000 fry in 1977.

Personnel from FRED and the National Marine Fisheries Service led an interagency plankton workshop late in 1980. The participants established standard procedures for biological sampling related to hatchery and wild salmon fry survival. This agreement will increase the amount of comparable data available to Alaskan fish biologists.

Genetics

FRED's geneticist establishes guidelines to protect the genetic diversity of wild and hatchery salmonid stocks. Such diversity is necessary to protect the reproductive potential of the fishes; scientists have found that reduced genetic variability also reduces the ability of the stock to breed and reproduce.

FRED's geneticist develops biochemical genetic profiles of salmonid stocks by examining enzymes that are formed using the genes as "templates." While not a direct measure, these profiles provide an indication of the amount of genetic variability available within and between stocks. By monitoring these profiles over several generations of fish, the geneticist can determine whether hatchery practices have reduced the genetic variability significantly below that indicated in the original profile. These data will also provide insights into the genetic structure of stocks. Profiles can, for example, serve as an indication of the amount of straying between salmon populations. During 1980, profiles were developed on 10 potential brood stocks, which are listed in Table 23.

The geneticist initiated studies in 1980 to determine the efficacy of genetically marking hatchery stocks. By selectively breeding hatchery fish for a low frequency genetic variant, FRED can increase its frequency, allowing it to be used as a mark. The genetic mark can be used to evaluate the hatchery contribution to a fishery, much as fin clips and coded wire tags are now used.

The geneticist is designing a rainbow trout brood stock development plan for FRED's Anchorage Area Hatcheries, where production of these popular sport fish is being stepped up. During 1980, the genetics staff moved from temporary quarters to a new laboratory in Anchorage.

Limnology

Since the limnology laboratory was established at Soldotna in November 1978, FRED's limnologist has taken a leading role in lake enrichment projects and lake stocking projects involving salmon. By analyzing dozens of characteristics of a lake's chemistry, the limnologist can say whether, for example, adding chemical fertilizer to the water would increase survivals of young sockeye salmon, or whether it would make a good nursery lake for young coho salmon before they swim to the ocean.

A year's work by FRED's limnologist and other scientists preceded the fertilization of Hugh Smith Lake near Ketchikan from June through October of 1980. This project was sponsored jointly by FRED and the Southern Southeast Regional Aquaculture Association (SSRAA), a private nonprofit corporation. The limnologist is also working with the Northern Southeast Regional Aquaculture Association (NSRAA) to select suitable lakes for a coho salmon lake stocking program.

Lake enrichment or limnological investigations are proceeding at Upper and Lower Russian, Hidden, Bear and Crescent Lakes in the Cook Inlet area; Thumb, O'Malley and Karluk Lakes on Kodiak Island; and Lake Nunavaugaluk near Dillingham. Also, the Alaska Department of Fish and Game (ADF&G) and the Prince William Sound Aquaculture Corporation (PWSAC) have begun a study

of lake enrichment potentials in the Copper River watershed. Summit and Paxson Lakes have been sampled so far. In Southeast Alaska, lake enrichment feasibility studies began in the Juneau-Yakutat area. Pre-fertilization studies are in progress at McDonald Lake, and feasibility studies began at four lakes in Moria Sound. Two lists of lakes and streams studied by the limnologist are in Tables 24 and 25. Table 24 lists lakes for which water studies are complete. Table 25 lists lakes for which less complete data are available.

The lakes and streams listed were sampled for a variety of projects and for a variety of agencies. FRED projects alone include hatchery evaluation, hatchery water purification design, habitat surveys, and general limnological and lake enrichment investigations. FRED's limnologist has processed samples as part of cooperative projects with other ADF&G Divisions, the NSRAA, the Cook Inlet Aquaculture Association (CIAA), the U.S. Forest Service (USFS), and the U.S. Fish and Wildlife Service (USFWS). These studies included lake enrichment work, coho lake stocking projects, fishway site selections, hatchery site selections, and human impact studies. The limnologist will also be doing analyses for the state's Division of Parks on projects to increase the recreational potential of urban lakes.

The limnology laboratory remains the backbone of this program. There, using state-of-the-art methods, scientists perform nutrient analysis to the low parts per billion level, radioactive tracer work, primary production estimates, and zooplankton analysis. A list of characteristics for which the laboratory tests is in Table 26. The scientists not only process water samples for the FRED Division, but also assist the USFS and other divisions within the department.

The limnologist participated in the North Pacific Aquaculture Symposium in the summer of 1980, and was also called upon to review technology proposals for the Alaska Council on Science and Technology. He began to write a field and laboratory manual, which will be used to standardize the collection of field data throughout the state.

Pathology

FRED's fish pathologists were involved in two major projects during 1980--controlling outbreaks of Infectious Hematopoietic Necrosis (IHN) and preparing fish disease legislation--in addition to their routine diagnostic services.

In response to IHN outbreaks at three FRED hatcheries, fish pathologists worked with hatchery personnel in an effort to control the disease. A combination of experimental treatments at the Kitoi Bay Hatchery was successful in containing the outbreak within a portion of the fish population. At the Big Lake and East Creek Hatcheries, strict procedures were initiated during 1980 egg takes to prevent further outbreaks. Most of these procedures are experimental and will be evaluated and refined. The experiments are described briefly as follows:

- 1) At the Big Lake Hatchery, pathologists are evaluating the use of a germicide called Betadine for water hardening sockeye salmon eggs. During water hardening, the eggs absorb small amounts of Betadine, which will kill the IHN virus on contact. This experiment was designed to determine the effect of various concentrations of Betadine on sockeye salmon eggs.

- 2) A follicle stimulating hormone was used on female sockeye salmon at the East Creek Hatchery to accelerate maturation in hopes of preventing transmission of IHN virus from parent to offspring.
- 3) A vaccine was administered to green female sockeye salmon at East Creek Hatchery to determine if it will protect the fish's offspring from IHN.
- 4) A heated water treatment of adult female sockeye salmon was used at East Creek Hatchery for possible reduction of the IHN virus count. Individual incubators were set up for the offspring of these experimental fish.

The "plaque assay" technique for detection of IHN virus was adopted for use in FRED's pathology laboratory. This assay provides more information than other techniques and produces results in 7 days.

FRED pathologists have also worked on incorporating disease and pathogen incidence information into hatchery stocking records. When this is completed monthly printouts will be available of historical and up-to-date information on particular stocks. This information is important to staff members who review requests to transport fish and eggs from one location to another.

Fish disease legislation was passed by the State Legislature in July 1980 clarifying the authority of the Board of Fisheries to adopt regulations for disease control and prevention. The law amends statutes to allow the board to regulate the live capture, possession, transport, or release of native or exotic fish or their eggs. FRED pathologists have taken the lead in drawing up proposed regulations, which will be presented to the board for consideration. Also under the new law, the state will provide inspections of private hatcheries by fish health specialists certified by the American Fisheries Society.

The fish pathology laboratory in Anchorage was expanded during 1980. Additional wet lab capabilities allow more experimentation in the laboratory. During 1980, pathologists incubated eggs and reared fish in their laboratory.

FRED pathologists contributed papers to the Alaska Wildlife Disease Compendium, which is being published by the University of Alaska to provide students with a background knowledge of Alaskan animal diseases. The principal pathologist delivered a paper on IHN virus at the four-nation North American Aquaculture Symposium.

In addition, the pathologists provided routine diagnostic services for all hatcheries in Alaska, including private hatcheries. They screened stocks of fish proposed for hatchery use, and investigated the occurrence and frequency of diseases in natural salmon stocks.

Bibliography

FRED scientists write reports on the progress of projects and new developments in their fields of expertise. A bibliography of FRED reports and publications is presented in Appendix B.

Table 23. Salmon stocks screened genetically during 1980.

Species	Stock	Location
chum	Crystal Creek	Southeast
	Crooked Creek	Prince Wm. Sound
	Kizhuyak River	Kodiak
	Russell Creek	Alaska Peninsula
	Delta River	Interior
sockeye	Francis Creek (adult)	Bristol Bay
	Francis Creek (juvenile)	Bristol Bay
	Snake River	Bristol Bay
	Nancy Lake	Upper Cook Inlet
	Meadow Creek	Upper Cook Inlet

Table 24. Lakes from which water quality data have been assembled by FRED's limnology staff, listed by area.

Cook Inlet	Kodiak	Prince William Sound	Southeast	
Bear	Karluk	Bering Lake	Banner	Luck
Crescent	O'Malley	Cannery Creek	Crescent	McDonald
Hidden	Thumb	Hobo Creek	Falls	Miller
Lower Russian		Johan Creek	Helm	Paul
Lower Trail		Main River	Hetta Lake	Politofski
Packers		Port San Juan	Hugh Smith	Red Bay
Tustumena		Sir Wash Creek	Johnson	Redoubt
Upper Russian			Kegan	Salmon Bay
Upper Trail				

Table 25. Lakes sampled one to four times a year from which some water quality data have been assembled by FRED's limnology staff, listed by area.

South Central- Palmer		Bristol Bay	Southeast- Baronof		Cook Inlet	Prince William Sound
Anderson	Lake 25	Nunavaugaluk	Betty	Medvejie	Arrow	Eshamy
Butterfly	Lake 020		Blanchard	Morris	Bratlie	Esther
Delyndia	Lake 105		Byron Bay	Nakvassin	Calf	Paxson
Finger	Lake 140		Cunningham	Neva Strait	Caribou	Solf
Horse I	Lake 217		Deer	Parry	Cow	Summit
Horse II	Lilly		Didrickson	Partofshikof	Crooked Creek	
Horse III	Middle		Ekaterina	Pullen Creek	Ice	
Horse IV	My		Elfendahl	Red Fish Bay	Kenai	
Horse V	North Dry		Fawn	Sashin Creek	Leisure	
Jim	Rock		Fiddle	Sea Lion Cove	Longhike	
Kings	South Dry		Gen Gen	Smiley	Middle Finger-Jigsaw	
Lake 12	Wassilla		Goon Dip	Suloia	South Finger	
Lake 13	Windy		Hidden Falls	Surprise	Vixen	
Lake 15	Yohn		Jetty	Tumakof		
Lake 16	Zero		Long	Upper Banner		
Lake 17						

Table 26. A list of characteristics for which FRED's limnology laboratory routinely tests.

Inorganic Parameters

Ammonium (NH_4^+ + NH_3)	Magnesium (Mg^{++})
Nitrite (NO_2^-)	Iron (Fe)
Nitrate (NO_3^-)	Hardness
Kjeldahl nitrogen (N)	Total Solids (TS)
Total Phosphorus (P)	Total Dissolved Solids (TDS)
Reactive Phosphorus (P)	Conductivity
Reactive Silica (Si)	pH
Inorganic Carbon (alkalinity) (C)	Color (410 nm)
Calcium (Ca^{++})	Temperature

Gases

Dissolved Oxygen (O_2)	Inorganic Carbon (free CO_2)
Hydrogen Sulphide (H_2S)	

Organic Constituents

Tannin - Lignin	Organic Carbon
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Primary Production and Productivity

Phytoplankton	
Chlorophyll <u>a</u>	Carbon-14
Phaeophytin	Wet and Dry Weight (Biomass)

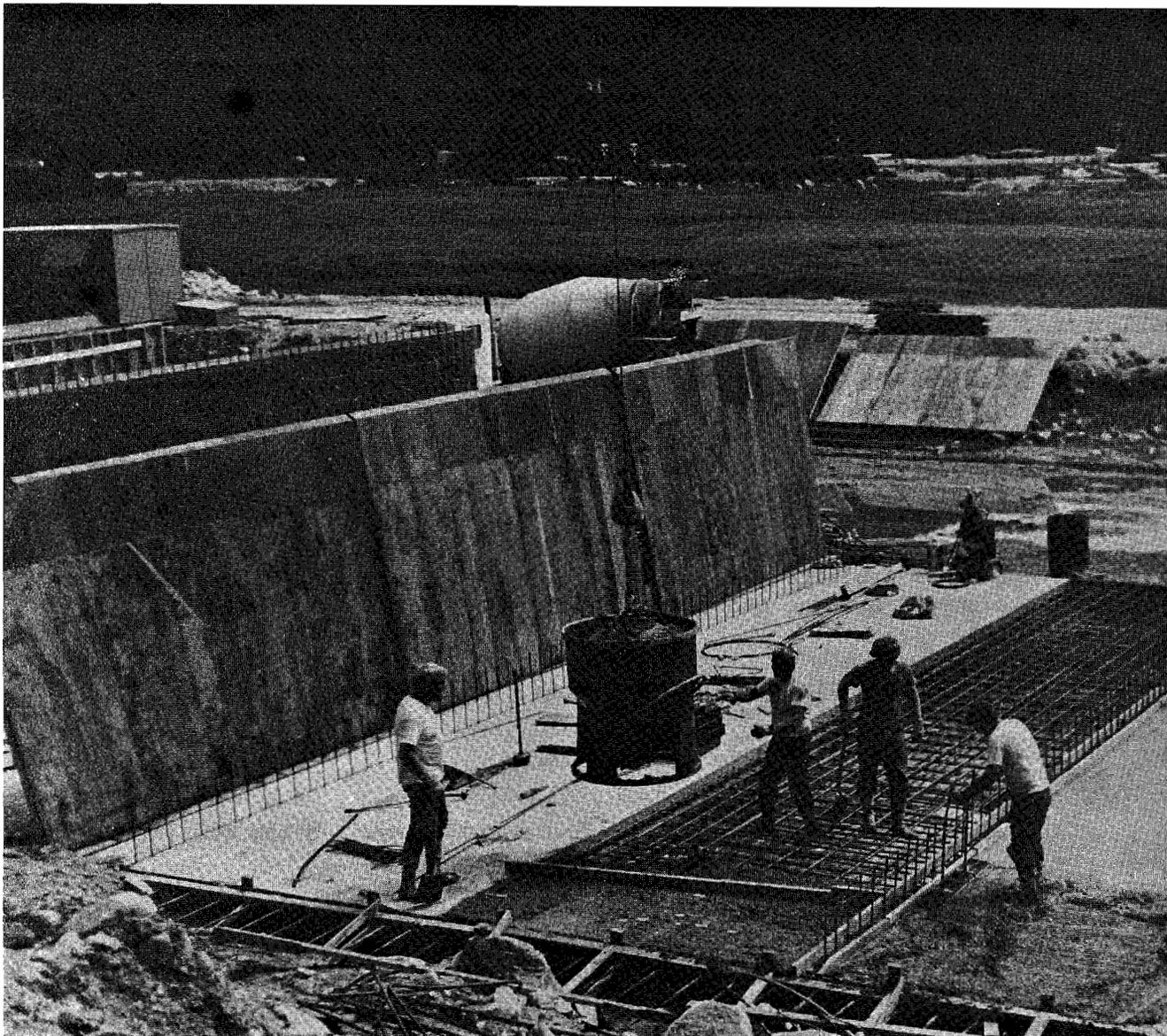
Periphyton

Secondary Production

Zooplankton	
Density estimates	Wet and Dry Weight (Biomass)
Identification	
Benthic Invertebrates	
Density estimates	Wet and Dry Weight (Biomass)
Identification	

Physical Parameters

Photosynthetically Available Radiation (P.A.R.)	Temperature
	Stream Discharge



Construction of a hatchery at Snettisham near Juneau continued through 1980. The hatchery should be completed in 1981. (ADF&G photo by Al Didier)

CAPITAL PROJECTS

Facility Development Team

Unlike other divisions within the Department of Fish and Game, FRED routinely oversees the construction and maintenance of permanent facilities, namely hatcheries and fishways. These projects require the interdisciplinary review and direction embodied in the Facility Development Team. This team comprises FRED's principal scientists in biology, fish culture, genetics, limnology, pathology, and the chief engineer.

Facility construction is dependent upon the receipt of capital improvement funds. Project planning, however, precedes and follows funding. An interdisciplinary team, subordinate to the Facility Development Team, is assigned to each project. This manner of operation ensures well-developed facility plans and communication among disciplines while the project is still in its infancy.

Engineering Projects

During 1980, FRED's engineers worked on 28 major projects that required planning, design, or construction. In addition, engineers worked on numerous minor projects. The engineering staff, a part of FRED's Technology and Development branch, provides engineering services for the entire department.

The following is a list of major projects of FRED engineers during 1980 by region:

Southern Southeast:

- 1) Klawock Hatchery Housing. Engineers supervised the completion of housing (2 units) at the Klawock Hatchery.
- 2) Beaver Falls Hatchery. Engineers worked on in-house plans to increase the egg incubation capacity and to construct an adult holding facility. Both projects were completed in September 1980.

Northern Southeast:

- 3) Hidden Falls Hatchery Housing. The Department of Transportation and Public Facilities (DOTPF) inspected the construction of three housing units. Construction was "basically" completed in June, but FRED engineers uncovered serious flaws in the housing footings. Repairs were effected and the houses have been accepted.
- 4) Hidden Falls Hydro-electric Plant. Engineers worked closely with the consultants developing this project. First bids were rejected in July (too high). Second bid opening resulted in the award of this project, which will begin in early 1981.

- 5) Snettisham Hatchery. Engineers worked with the consultants developing this project. A construction contract was awarded in February 1980 with construction starting in March 1980. Construction will be basically complete in December 1980.

Prince William Sound:

- 6) Cannery Creek Hatchery. Engineers supervised the final construction activities on this new Prince William Sound hatchery.
- 7) Main Bay Hatchery. Engineers worked with consultants developing plans for this hatchery. First bids were rejected (high) in July. Second bids in August led to a \$7,283,000 contract with Chris Berg Inc. Site work started in the fall of 1980.
- 8) Cordova Warehouse. Engineers designed the building and awarded a contract (\$149,900). Construction was completed in November 1980.

Cook Inlet:

- 9) Elmendorf A.F.B. Rearing Station. Engineers developed plans and specifications for a 25' x 40' support building with utilities (sewer/water) for the support building and two residences.
- 10) Fort Richardson Hatchery. Engineers conducted an underground water study (with consultants) to locate a 4,000 gpm water source (wells), and developed hatchery plans (with consultants) for a new hatchery facility. Construction is planned for 1981.
- 11) Big Lake Hatchery Expansion. Engineers supervised the final construction activities on the Big Lake Hatchery.
- 12) Tutka Lagoon Hatchery Expansion. Expansion of the hatchery building was completed January.
- 13) Tutka Lagoon Hatchery Housing. Residential construction was completed in December 1979, but clean up and outside painting continued until June 1980. A bunkhouse project was completed in-house in late 1979 along with the housing project.
- 14) Trail Lakes Hatchery. Engineers finished a ground water study that located a 3,000-4,000 gpm well field. Wells and pumps were installed. Engineers worked with the consultant developing hatchery plans, and plan to advertise for construction in December 1980.
- 15) Kasilof Hatchery. Engineers supervised installation of the process water filter system, and worked on the design and construction (\$442,580) of the new adult holding facility.
- 16) Kenai River Fish Trap. Engineers worked with consultants designing a floating fish trap. The contract was awarded (\$284,900) with the trap to be on site and usable by April 1981.

Kodiak:

- 17) Karluk Streamside Incubation. Engineers developed plans and helped with in-house construction.
- 18) Kitoi Bay Hatchery. Engineers designed water intake.

Alaska Peninsula:

- 19) Russell Creek Hatchery. Engineers provided in-house plans and advice to hatchery personnel working on modifications to the hatchery. Worked with DOTPF and state lawyers on a claim regarding hatchery design.
- 20) Russell Creek Hatchery Housing. Engineers supervised the construction of two new residences. Construction was done from February through July.
- 21) Chignik Field Station. Engineers developed plans and purchased two bunkhouse units that will be installed by spring of 1981. They designed a new bulkhead system and awarded a construction contract (\$181,000). The bulkhead will be constructed before spring of 1981.
- 22) King Salmon Warehouse Improvements. Engineers designed improvements and awarded a \$20,550 construction contract.

Bristol Bay:

- 23) East Creek Hatchery Housing. Engineers oversaw construction of the duplex residence.
- 24) East Creek Hatchery. Engineers installed a new water intake and line to the hatchery.
- 25) Lake Nunavaugaluk Access Road. Engineers developed plans for improvements to the hatchery access road.

Interior:

- 26) Clear A.F.S. Hatchery. This hatchery was designed in-house. Construction is underway, and the \$1,352,237 hatchery is to be completed in January 1981.
- 27) Kotzebue Area Hatchery. Engineers worked with consultants investigating hatchery sites at Sikusuilaq Springs and Noatak Village, both of which are on the Noatak River. Sikusuilaq Springs was chosen, so design will be in '80/'81 with construction '81.
- 28) Fairbanks Office Window Installation. Engineers designed and supervised installation of 30 windows in the Fairbanks Office Building.

In-house Projects

Many construction projects are undertaken by FRED's own maintenance staff, which performs these duties as well as routine maintenance of state hatcheries. The following is a list and brief description of in-house projects completed in 1980.

Central Region:

- 1) Fire Lake Hatchery. Disassembled and salvaged equipment before turning the old hatchery building over to another agency.
- 2) Cannery Creek Hatchery. Built and installed incubator platforms, installed and plumbed incubators; constructed separate incubation section for eggs transferred from Prince William Sound Aquaculture Assn.
- 3) Karluk Lake Hatchery. Installed stream intake (1,500 feet of 8-inch pipe down the stream) and constructed the facility.
- 4) East Creek Hatchery. Installed a new stream intake; renovated the sewers; installed a second water filter; designed and installed a high pressure wash system; installed S40LZ incubators.
- 5) Russell Creek Hatchery. Worked on the settling ponds; installed stream and pond protection; performed foundation work for the incubators; constructed a building over the intake structure.
- 6) Big Lake Hatchery. Relocated a large boiler from Fire Lake to Big Lake for heated water experiment.
- 7) Ft. Richardson Hatchery. Built aeration test tower.
- 8) Trail Lakes Hatchery. Tested well water pumps.
- 9) Elmendorf Hatchery. Cleared, graded, and landscaped the site; constructed incubation building and incubation system.
- 10) Kitoi Bay Hatchery. Repaired weir, water line, and dam; installed new rearing silos.
- 11) Anchorage Area Office. Installed cabinets and gas and water lines in the genetics laboratory.
- 12) Kasilof Hatchery. Plumbed new raceways.
- 13) Russian River Fishway. Installed fishway protection.
- 14) Cordova Warehouse. Wired new warehouse for electricity.
- 15) Tutka Bay Hatchery. Worked on new bunk house.

Southeastern Region:

- 16) Klawock Hatchery. Repaired weir; installed fuel line; completed electrical, plumbing and alarm system at the hatchery; added filters to the domestic water system.
- 17) Deer Mountain Hatchery. Installed eight 7-foot rearing tanks; repaired the apartment in the hatchery; enclosed the boiler room to meet OSHA requirements; re-installed two 17-foot raceways; made and installed new work benches, cabinets and shelving.
- 18) Beaver Falls Hatchery. Completely renovated the hatchery interior to increase the egg capacity; installed an oil furnace in the shop.
- 19) Crystal Lake Hatchery. Constructed an isolation shed and installed 200 small incubators; excavated and repaired the hatchery's water supply pipe; repainted the exterior of the hatchery and mechanical building; installed a hot water heating boiler and two 75-ton process water chillers.
- 20) Hidden Falls Hatchery. Constructed a shop, storage area, shelves and benches; installed two check and butterfly valves in the process water line; built a new float, ramp, and gangplank; repaired the float house.
- 21) Snettisham Hatchery. Installed two floating pumps in the power plant tailrace; installed walkways around the top of the rearing silos; rebuilt four submergeable pumps.
- 22) Starrigavan Hatchery. Dismantled the old Starrigavan Hatchery and removed the weir in Starrigavan Creek.
- 23) Fish Creek Rearing Facility. Dismantled the facility.
- 24) Juneau Area Office. Added partition walls and bookshelves to two offices and storage cabinets in the clerical office.
- 25) Fishways. Inspected all Southeast fishways, removed debris from them and effected minor repairs.



FRED and SSRAA personnel spray fertilizer on the waters of Hugh Smith Lake near Ketchikan in late June 1980. The project aims to increase sockeye salmon production in the 800-acre lake by providing more food for the fish as they feed grow in fresh water. (ADF&G photo by Ken Leon)

THE PRIVATE NONPROFIT HATCHERY PROGRAM

Background

The Private Nonprofit Hatchery Program was created to provide user-group participation in rebuilding Alaska's depleted salmon fisheries. The 1974 Legislature passed a statute authorizing the Alaska Department of Fish and Game (ADF&G) to issue hatchery permits to qualified private nonprofit (PNP) corporations, and the 1976 Legislature authorized the creation of Regional Aquaculture Associations.

Since then, five Regional Aquaculture Associations have formed:

- 1) Cook Inlet Aquaculture Association (CIAA)
- 2) Lower Yukon/Kuskokwim Regional Aquaculture Association (LY/KRAA)
- 3) Northern Southeast Regional Aquaculture Association (NSRAA)
- 4) Prince William Sound Aquaculture Corporation (PWSAC)
- 5) Southern Southeast Regional Aquaculture Association (SSRAA)

A sixth association, called the Aleutian/Pribilof Island Association, (A/PIA) is seeking Regional Association status.

Regional associations comprise representatives of commercial fishermen and other user groups in the region, including sport fishermen, processors, subsistence fishermen, and members of local communities.

Planning

The 1976 Legislature directed the Commissioner of ADF&G "to develop and amend as necessary a comprehensive salmon plan for each region, including provisions for both public and private nonprofit hatchery systems." Regional Planning Teams, comprising members of the regional associations and departmental staff, have the responsibility to develop plans for their regions and review preliminary hatchery permit applications from private nonprofit corporations to determine their compatibility with the plan.

Grants of \$100,000 each were given by the 1979 Legislature, through the Commissioner of ADF&G, to the four qualified Regional Associations to develop regional salmon plans in cooperation with ADF&G.

As a result of two of these grants, the Northern and Southern Southeast Regional Planning Teams have jointly produced a draft 20-year comprehensive salmon plan for Southeast Alaska. This plan is undergoing a final rewrite by the teams and will be printed after approval by the Commissioner of ADF&G.

Two other teams in Prince William Sound and Cook Inlet are in the process of developing comprehensive plans for their areas.

Additional planning funds were allocated by the 1980 Legislature and are being distributed to the regional associations for continued regional salmon planning.

Loan Fund

In 1977, a Fisheries Enhancement Revolving Loan Fund was created within the Department of Commerce and Economic Development for the purpose of making loans to permit holders for the planning, construction, and operation of hatchery facilities. At that time, loans were limited to \$3,000,000 for a hatchery constructed under a permit granted to a qualified Regional Association that has formed a nonprofit corporation, or to a local nonprofit corporation approved by a qualified Regional Association. A loan for any other nonprofit hatchery corporation project, a small "mom and pop" hatchery for example, was limited to \$300,000.

The 1980 Legislature raised the loan amounts for regional associations to \$6,000,000 with a payment period of up to 30 years. Other PNP programs may now borrow up to \$1,000,000. Payments on the loan can be deferred from 6 to 10 years. The interest rate is 9.5%.

Operational Hatcheries

Since the inception of the PNP program, 12 PNP salmon hatchery permits have been issued. Eleven of the permitted hatcheries are in operation, and five have already had returns of adult salmon. Figure 6 shows the general location of the 11 existing hatcheries. Eight preliminary or final hatchery applications are now pending. Lists of PNP hatcheries, proposed PNP hatcheries, and Scientific/Educational hatcheries are presented in Tables 27, 28, and 29. Their establishment and growth is contributing to the state's effort to rehabilitate depleted and depressed salmon fisheries.

Adult Salmon Returns

More than 1.5 million salmon released from PNP hatcheries returned as adults in 1980 (Table 30). The Port San Juan facility operated by PWSAC was the leading producer of returning fish this year. The corporation estimated that over 1,000,000 of their returning pink salmon were caught in the commercial fishery.

Returns since 1977 are presented by species in Tables 32, 33, 34 and 35. The first adults returning from PNP hatchery releases occurred in 1977. They were the result of egg takes by the only two hatcheries operating in 1975. The number of fish returning to PNP hatcheries has increased each year as new hatcheries become operational and egg capacities permitted at existing hatcheries are increased.

Hatchery Releases

During 1980, 35.7 million fish were released from PNP facilities (Table 31). That is an increase of 6.6 million fish over 1979 releases. PNP hatchery releases going back to 1975 are recorded in Tables 32, 33, 34 and 35. Several hatcheries experienced water temperature and flow problems which resulted in excessive egg and fry mortalities limiting their 1980 releases.

All of the PNP hatcheries are still developing brood stock and, therefore, have not reached their permitted egg capacities. Permitted capacities at PNP hatcheries total 185 million eggs, which can result in releases of up to 150 million fish.

Egg Takes

Egg takes for PNP hatcheries totaled over 125 million in 1980 (Table 36). That more than doubles the 1979 egg take of 54 million. By far, the largest egg take this year was at the Port San Juan facility. More eggs were taken there --94 million-- than at any hatchery in the state, public or private. Most of the other PNP hatcheries took fewer eggs than their goal during 1980. This was due mainly to shortages of available brood fish in the approved donor streams. Total numbers of eggs taken since 1975 are recorded by species in Tables 32, 33, 34, and 35.

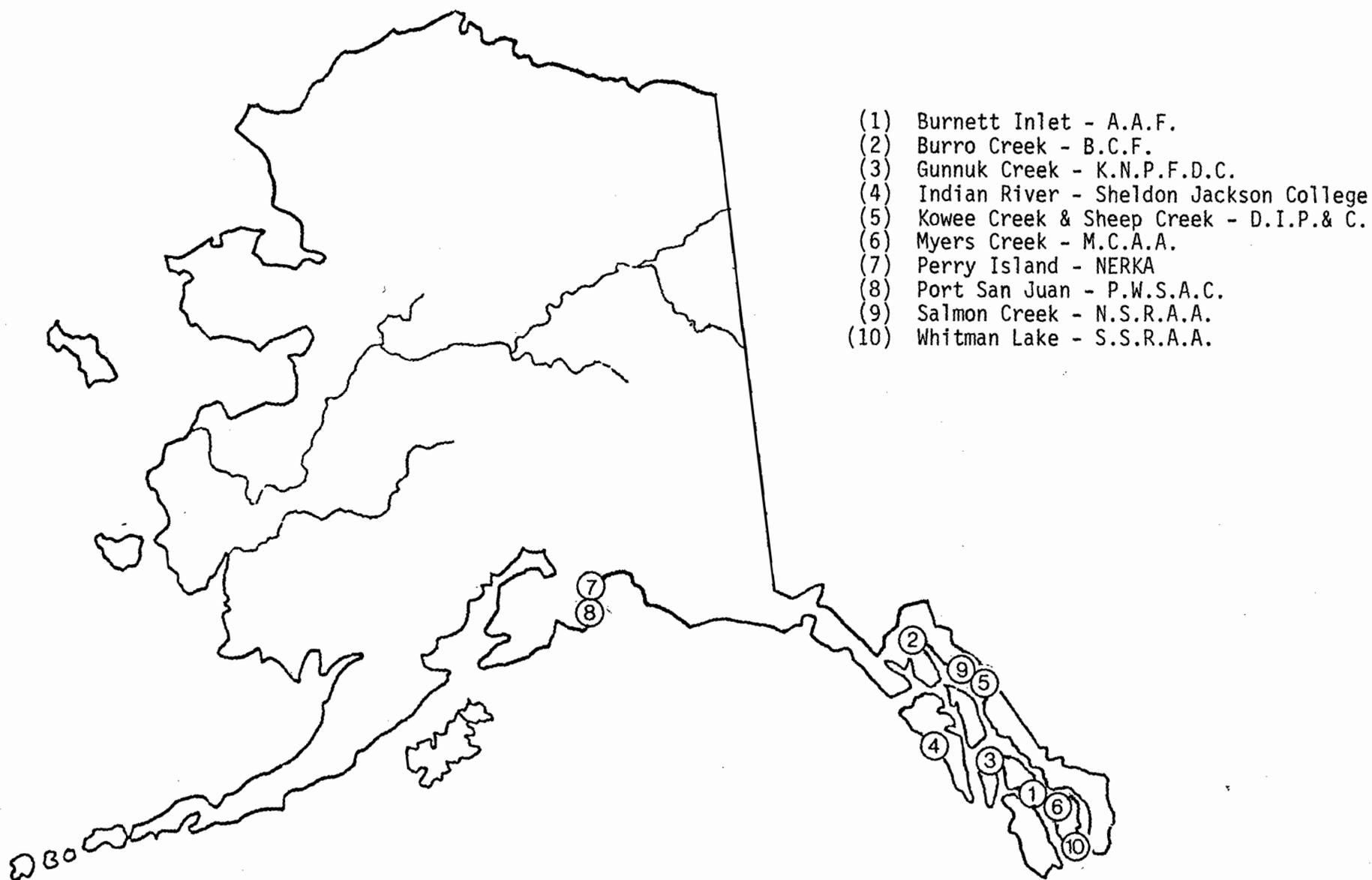


Figure 6. A map showing the general location of PNP hatcheries within Alaska, 1980.

Table 27. Permitted private nonprofit hatcheries, November 1980.

Corporation/Facility location	Status	Egg capacity
1. Southern Southeast Regional Aquaculture Association Whitman Lake, Ketchikan	PNP Permit #8, Operational Issued 3/9/78	26 million chum 2.3 million coho
2. Alaska Aquaculture Foundation, Inc. Burnett Inlet, Etolin Island, Wrangell	PNP Permit #5, Operational Issued 4/28/76	5 million pink and chum
3. Meyers Chuck Aquaculture Association Meyers Chuck, Ketchikan	PNP Permit #10, Operational Issued 7/22/79	1 million pink
4. Sheldon Jackson College Aquaculture Program Indian River, Sitka	PNP Permit #3, Operational Issued 4/29/75	15 million pink and chum 200,000 coho
5. Douglas Island Pink & Chum, Inc. Kowee Creek, Juneau	PNP Permit #6, Operational Issued 7/30/76	5 million pink 1 million chum
6. Douglas Island Pink & Chum, Inc. Sheep Creek, Juneau	PNP Permit #11, Operational Issued 9/18/79	Requested: at start-up 5 million pink and chum combined Requested: at capacity 11.25 million pink and chum combined
7. Fish Fry, Inc. (Southeast Gillnet Federation) Salmon Creek, Juneau	PNP Permit #9, Operational Issued 10/12/79	4.5 million pink and chum 500,000 coho
8. Kake Nonprofit Fishery Development Corporation Gunnuk Creek, Kake (new construction site being considered)	PNP Permit #7, Operational Issued 4/1/77	1 million pink 2 million chum

-Continued-

Table 27. Continued.

Corporation/Facility location	Status	Egg capacity
9. Tlingit & Haida Central Council Maksoutof River, Baranof Island	PNP Permit #4, Not Operational Issued 12/18/75	1 million pink 1 million chum
10. Burro Creek Farms Burro Creek, Skagway	PNP Permit #12, Operational Issued 5/23/80	Requested: at start-up 1 million pink 250,000 chum Requested: at capacity 10 million pink and chum
11. Prince William Sound Aquaculture Corporation Port San Juan, Evans Island	PNP Permit #2, Operational Issued 7/1/76	100.5 million pink and chum
12. NERKA, Inc. Perry Island, Prince William Sound	PNP Permit #1, Operational Issued 9/19/75	3 million pink and chum

Table 28. Proposed private nonprofit hatcheries, November 1980.

Organization/Facility location	Status	Requested egg capacity
1. Twin Creek Salmon Ranch, Inc. Twin Creek, Wrangell Narrows Petersburg	PNP Preliminary Application Submitted 11/1/78	At start-up: chum: 2 million pink: 1 million
2. Crittenden Creek Aquaculture, Inc. Crittenden Creek, Wrangell	PNP Preliminary Application Submitted 3/10/80	At start-up: pink: 2 million At capacity: chum: 15 million
3. Northern Southeast Regional Aquaculture Association Salmon Creek, Juneau	PNP Final Application Submitted 3/18/80	Operating Fish Fry Hatchery in 1980 At start-up: 4.5 million chum At capacity: 10 million chum
4. Armstrong-Keta, Inc. Port Armstrong, Baranof Island	Public Hearing Held 9/25/80	At start up: pink: 3 million chum: 1.1 million At capacity: chum: 10 million
5. Angoon Aquaculture Association, Inc. Favorite Bay, Angoon	PNP Preliminary Application Submitted 9/15/80	At start-up: 1.15 million coho, pink and chum combined At capacity: 15.5 million coho, pink and chum combined
6. Valdez Fisheries Development Corp. Solomon Gulch Creek, Upper Valdez Bay	PNP Preliminary Application Approved 10/16/80	pink: 50 million chum: 18 million

-Continued-

Table 28. Continued.

Organization/Facility location	Status	Requested egg capacity
7. Cook Inlet Aquaculture Association Eklutna hydroelectric project	PNP Preliminary Application Approved 9/18/80	65 million pink and chum, 5 million coho, 5 million king
8. Village Islands Sea Ranching Uganik Bay, Village Islands, Kodiak Island	PNP Preliminary Application Approved 7/1/80	chum: 10 million pink: 5 million coho: 2 million
9. Prince William Sound Aquaculture Corporation Esther Lake, Prince William Sound	PNP Preliminary Application Approved 7/13/77	At start-up: pink: 10 million chum: 2 million sockeye: 2 million coho: 2 million At capacity: pink: 40 million chum: 10 million Capacity for sockeye and coho not known at this time

Table 29. Permitted scientific/educational hatcheries, November 1980.

Organization/Facility location	Type of program	Permitted egg capacity
1. Sheldon Jackson College Aquaculture Program Indian River, Sitka	Educational	Miscellaneous species (including invertebrates)
2. Kake City Schools Gunnuk Creek, Kake	Educational	40,000 pink / 55,000 chum
3. Skagway High School Pullen Creek, Skagway	Educational	50,000 pink
4. Institute of Marine Science University of Alaska Marine Station Seward and Evans Island	Research	500 juvenile pink
5. Valdez Fisheries Development Association Crooked Creek, Valdez Robe Lake, Valdez	Educational Research	400,000 chum 360,000 pink
6. Institute of Marine Science University of Alaska, Fairbanks Evans Island	Research	juvenile pink and chum
7. Cook Inlet Aquaculture Association Eklutna hydroelectric project	Research	Incubator evaluation 150,000 pink or chum
8. Bartlett School Tyonek	Educational	4,800 pink

-Continued-

Table 29. Continued.

Organization/Facility location	Type of facility	Permitted egg capacity
9. Kodiak Area Native Association Akhiok Port Lions Ouzinkie Lake Rose Tead Creek Old Harbor	Educational Educational Educational Educational Educational	eggs from 6 chum or coho may be taken at each site
10. Sand Point JOM Parent Committee Humboldt Creek, Sand Point	Educational	200,000 pink and coho
11. Unalaska City School Unalaska	Educational	25,000 pink 58,500 coho
12. King Cove City Schools King Cove	Educational	25,000 pink 25,000 coho
13. Lower Yukon/Kuskokwim Regional Aquaculture Association Bethel Mountain Village (not operable)	Educational	250,000 coho 250,000 pink 500,000 chum

Table 30. Preliminary count of salmon produced at PNP hatcheries that returned as adults to the common property fisheries and hatcheries in 1980. a/

Facility	Pink	Chum	Coho
Burnett Inlet	800		
Indian River	5,540	200	14
Kowee Creek	5,000		
Perry Island	450		
San Juan	<u>1,493,090</u>	<u>1,390</u>	<u> </u>
Total	1,504,880	1,590	14

a/ Returns to the San Juan Hatchery include an estimation of the contribution of hatchery fish in the common property fishery.

Table 31. Numbers of salmon fry and smolts released from PNP hatcheries in 1980.

Facility	Brood year, Stock, Species		Total number of fish released
SOUTHEASTERN REGION			
Whitman Lake	1979	Carroll River, chum	1,342,000
	1979	Disappearance Creek, chum	1,330,000
	1978	Indian River, coho	549,000
Burnett Inlet	1979	Flat Creek, pink	250,000
Indian River	1979	Indian River, pink	7,883,250
	1979	Sandy Creek, chum	53,174
	1978	Indian River, coho	12,196
Kowee Creek	1979	Kowee Creek, pink	1,633,500
	1979	Fish Creek, pink	525,000
	1979	Fish Creek, chum	201,358
	1979	Sawmill Creek, chum	22,746
CENTRAL REGION			
Perry Island	1979	Mink Creek, pink	250,000
San Juan	1979	San Juan, pink	21,576,000
	1979	Sunny River, chum	395,000
Pink Total			32,117,750
Chum Total			3,344,278
Coho Total			561,196
Grand Total			36,023,224

Table 32. Summary of pink salmon production from PNP hatcheries.

Brood year	Eggs taken	Fry released ^{a/}	Total return	Special harvest ^{b/}	Value of harvest ^{c/}
1975	8,002,395	3,653,666	160,147	108,718	\$130,726
1976	16,251,456	12,093,184	160,397	114,188	\$141,799
1977	35,383,112	25,732,238	356,498	244,555	\$309,612
1978	34,851,807	28,204,674	1,504,878	346,168	\$436,171 ^{d/}
1979	46,582,015	31,763,000			
1980	97,887,168				
Totals	238,959,353	101,446,762	2,181,920	813,629	\$1,018,308

^{a/} Fry released the year following egg takes.

^{b/} Harvest by the hatchery.

^{c/} Actual dollar amount received for sale of fish and eggs.

^{d/} Estimate of ^{b/}.

Table 33. Summary of chum salmon production from PNP hatcheries.

Brood year	Eggs taken	Fry released ^{a/}	Total return
1975	77,000	66,075	543
1976	347,275	264,068	3
1977	1,614,574	1,064,000	1,588
1978	1,684,930	924,400	
1979	6,782,864	3,340,000	
1980	27,178,754		
Totals	37,685,397	5,658,543	2,134

^{a/} Fry released the year following egg takes.

Table 34. Summary of coho salmon production from PNP hatcheries.

Brood year	Eggs taken	Presmolts released ^{a/}	Smolts released ^{b/}	Total return
1975	12,000	8,000	3,102	27
1976	24,150		0	0
1977	10,500		2,700	14
1978	809,430		557,200	
1979	931,000			
1980	608,500			
Totals	2,395,580	8,000	563,002	41

^{a/} Fry released the year following egg takes.

^{b/} Released two years after egg take.

Table 35. Summary of king salmon production from PNP hatcheries.

Brood year	Eggs taken	Presmolts released	Smolts released	Total return
1980	153,000			
Total	153,000	0	0	0

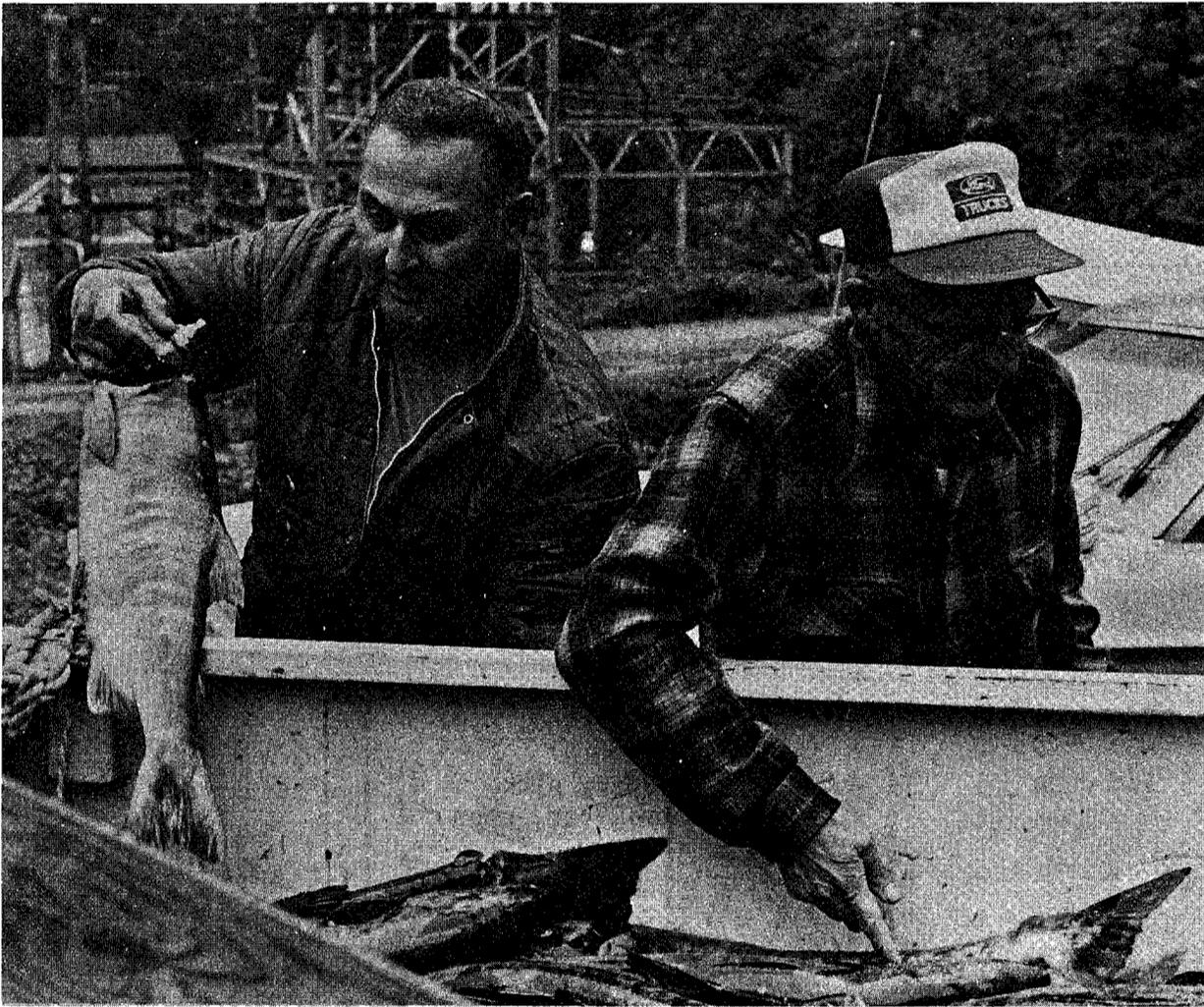
Table 36. Egg takes by PNP hatcheries in 1980.

Facility	Stock, Species	Total number of eggs taken
SOUTHEASTERN REGION		
Whitman Lake	Carroll River, chum	3,500,000
	Disappearance Creek, chum	9,000,000
	Lagoon Creek, chum	7,400,000
	Indian River, coho	576,000
	Cripple Creek, king	153,000
Meyer's Creek	Meyer's Creek, pink	25,000
Burnett Inlet	Burnett Inlet, pink	132,000
	Harding River, chum	244,000
Gunnuk Creek	Point White, pink	16,100
	Security Bay, chum	134,000
Indian River	Indian River, pink	2,252,968
	Indian River, chum	36,934
	Nakwasina River, chum	81,084
	Indian River, coho	35,500
Kowee Creek	Kowee Creek, pink	2,500,000
	Fish Creek, chum	500,000

-Continued-

Table 36. Continued.

Facility	Stock, Species	Total number of eggs taken
Sheep Creek	Sheep Creek, pink	1,000,000
	Fish Creek, chum	500,000
Salmon Creek	Salmon Creek, pink	763,000
	Salmon Creek, chum	62,500
	Sawmill Creek, chum	650,000
	Montana Creek, chum	1,100,000
Burro Creek	Sawmill Creek, pink	870,400
	Howard Bay, chum	250,000
CENTRAL REGION		
Perry Island	Perry Island, pink	307,000
San Juan	San Juan, pink	90,021,500
	Sunny River, chum	<u>3,720,236</u>
	Pink Total	97,887,168
	Chum Total	27,178,754
	Coho Total	608,500
	King Total	153,000
	Grand Total	125,827,422



Two Ketchikan residents choose from among the 30 tons of chum salmon that were given away free at the State's Beaver Falls Hatchery. The fish had been artificially spawned to begin a new generation of chum salmon at the 20-million-egg hatchery. (ADF&G photo by Mark Kissel)

THE HISTORY AND FUTURE OF FRED

Background

The Alaska Department of Fish and Game traditionally managed commercial and sport fisheries through the regulatory process. Salmon spawning and rearing environments in Alaska have remained relatively untouched by man, therefore; barring large mortalities of eggs or young fish due to extreme weather, it was the department's philosophy that the manipulation of catches to ensure spawning escapements was sufficient to perpetuate Alaska's salmon stocks.

Traditional fisheries change as human populations increase. Sport fisheries near growing communities provide examples of the increasing demands for fisheries resources. Fishermen become dissatisfied not only by perennial shortages of fish but by the year-to-year variation in numbers of fish. However, most natural salmon stocks are not identifiable and quantifiable until they reach or are near their home stream. The result is that both the ADF&G and the users must wait until all salmon have ascended to their spawning streams before they can respectively assess their management and fishing success.

Alaska salmon production fell from a historic high annual average of 80 million fish to less than 25 million fish by the late 1960's and early 1970's. The loss of this resource base hurt the salmon industry and also sport and subsistence fisheries. At the same time, scientific information originating in Washington, Oregon, and British Columbia indicated a new wave in aquaculture was building. New incubation methods, new vitamin-rich foods, and enlightened fish pathology methods served new programs that were rehabilitating salmon stocks and fisheries efficiently.

Goals

In response to a decline in salmon catches and advances in salmon aquaculture technology, the FRED Division was created in 1971. The division has the following statutory obligations:

- 1) Develop and continually maintain a comprehensive, coordinated state plan for the orderly present and long range rehabilitation, enhancement and development of all aspects of the state's fisheries for the perpetual use, benefit and enjoyment of all citizens, and revise and update this plan annually (AS 16.05.092).
- 2) Encourage the investment by private enterprise in the technological development and economic utilization of the fish resources (AS 16.05.092).
- 3) Through rehabilitation, enhancement, and development programs do all things necessary to ensure perpetual and increasing production and use of the food resources of Alaska waters and continental shelf areas (AS 16.05.092).

- 4) Coordinate the activities of the department and the regional aquaculture associations (AS 16.10.380).
- 5) Process permits and applications for private nonprofit hatcheries (AS 16.10.400).
- 6) Advise and assist nonprofit hatchery corporations in the planning, construction or operation of salmon hatcheries (AS 16.10.443).

The legislation which created the FRED Division and subsequently established the Private Nonprofit Aquaculture program in Alaska was a response to the public's desire for an active and progressive salmon program. The passage of the 1974, 1976, 1978, and 1980 bond issues for hatchery construction verified the public's interest.

Production of North Pacific salmon will become highly competitive in future years. Market conditions in 1980 already indicate this to be true. United States frozen and salted products were held in storage in Japan while fresh salmon produced at hatcheries in Northern Japan dominated the Japanese market in 1979 and 1980. However, the real question is the capacity of the North Pacific Ocean to produce salmon. Food supplies in the oceans are finite, and the 900 and 800 million salmon fry produced by Japan and Russia respectively in 1979 utilize overlapping feeding grounds inhabited by natural and hatchery salmon from Alaska, British Columbia, Washington, Oregon, and California. Therefore, our FRED program must attempt to establish proprietary rights to these open-ocean salmon feeding areas before the Japanese and Russians extend their control over them.

The FRED program provides many economic benefits to Alaskans. New jobs will become available to build and operate hatcheries. Commercial and sport fishing industries will benefit from bigger harvests, and increased earnings to salmon fishermen could result in an expansion of fishing activities to groundfish.

Long-term Objectives

The department's long-term (15-year) objectives for salmon, including harvest management, rehabilitation, and enhancement, are included in a draft "Alaska Salmon Plan" that was produced by the ADF&G in 1975. The long-term objectives for rehabilitation and enhancement are presented in Table 37.

Since the draft plan was written, the Legislature granted money to regional aquaculture associations for the development of regional salmon plans. Members of the department work with representatives of the aquaculture associations on these plans. During 1980, the first regional plan, one for the Northern and Southern Southeast Region, was prepared in draft form for review. When such plans are completed, FRED will adjust its long-term objectives as appropriate. (see also The Private Nonprofit Hatchery Program).

Program Projections

As its name states, FRED is involved in both enhancement, the supplemental production of salmon for the fisheries, and rehabilitation. Recently there has been discussion of FRED's role in terms of these two strategies, specifically, whether FRED concentrates too strongly on enhancement projects to the exclusion of rehabilitation efforts. The point, however, is that these two strategies cannot be separated neatly.

To date, FRED's hatchery production of king and coho salmon is an enhancement program, although it will lead to the rehabilitation of some natural stocks in Upper Cook Inlet. The division's sockeye salmon work can be categorized as both enhancement and rehabilitation. Tustumena Lake is stocked to maximize its potential for rearing sockeye salmon; Hugh Smith Lake is fertilized to increase its capacity to rear sockeye salmon. Other lakes, such as Nunavaugluk, Nancy, and Big, are stocked to rehabilitate, and then to enhance, the indigenous sockeye stocks.

There is a misconception that salmon enhancement is directed specifically at commercial fishermen, but coho and king salmon enhancement projects at Southeastern hatcheries are of substantial benefit to sport fishermen. Our attempt to develop or maintain sport fisheries at Whittier, Seward, Kachemak Bay, and Kodiak Island are all enhancement efforts directed at king and coho salmon anglers.

Over the next few years, the main thrusts of the FRED Division will be:

- 1) Develop brood stocks for facilities entering the operational stage.
- 2) Operate hatcheries as near to design production capacity as available brood stocks and operating budgets will allow.
- 3) Improve and intensify the evaluation of marked and tagged hatchery fish in the commercial and sport fisheries. This is essential for the analysis of hatchery cost effectiveness and aids in fisheries management.
- 4) Maintain strong pathology and genetics programs.
- 5) Emphasize natural stock rehabilitation through lake fertilization, fishway construction, and instream incubation with indigenous fish.
- 6) Emphasize our commitment to sport fishermen through trout and salmon stocking programs.
- 7) Expand the use of natural lakes to rear young hatchery-bred salmon.
- 8) Develop and verify procedures for efficient hatchery production of sockeye salmon despite the widespread presence of a killing viral disease in most natural stocks.

- 9) Improve procedures for holding and ripening adult salmon and rainbow trout intended for hatchery brood stocks.
- 10) Expand short-term rearing programs for salmon fry and fingerlings, and study adaptation of chum salmon fingerlings to ocean water.
- 11) Provide fish carcasses and surplus hatchery adults to subsistence users wherever possible.
- 12) Provide technical assistance to private aquaculture corporations.

Legislative Audit

A perspective from outside the division and department is often valuable in judging the division's progress and shortcomings. For this reason, FRED has benefited from legislative audits in 1975 and 1980.

The 1980 audit recognized improvements in the following performance categories; quotes are from the auditor's report:

- 1) "FRED has demonstrated that the 80% hatchery survival goal is a realistic assumption. ...they did have a 72% survival rate for pink/chum salmon released in 1979, with several hatcheries exceeding 80%."
- 2) "FRED has improved their data collection system by establishing standard procedures and forms for data collection and reporting in 1980. This should provide consistent, reliable data for all hatcheries. FRED also improved on estimating fish release for 1978 and 1979..."
- 3) "...they (FRED) have released over 10 million (sockeye) fry in each of the last three calendar years ('77;'78;'79)."
- 4) "FRED has developed several individual program plans..."

Several recommendations for improving performance were included in the 1980 audit report. The major recommendations along with the FRED Division's response are quoted or paraphrased below. We believe that future audits will reveal our purposeful effort to continually improve our performance.

- 1) "FRED needs to continue data collection and evaluation of salmon returns to determine the ocean survival rates as hatchery salmon are just starting to return in sufficient numbers. In addition, FRED should continue its efforts to utilize data processing for accumulating data for analysis and reporting."

COMMENT: The FRED Division will continue to emphasize the evaluation of adult returns. Our objective is to mechanize our data base and eventually develop hatchery production models.

- 2) "...we again recommend that no new sockeye facilities be constructed until FRED can prevent the (IHN virus) disease from occurring in hatcheries."

Table 37. Long-term salmon production objectives of the state's FRED program as expressed in the draft "Alaska Salmon Plan," 1975.^{a/}

Area	King salmon adults (millions)	Coho salmon adults (millions)	Sockeye salmon adults (millions)	Pink/Chum salmon adults (millions)
Southeastern	.037	.500	1.300	13.000
Prince William Sound	-	.100	.500	6.000
Cook Inlet	.100	.900	3.000	4.800
Kodiak	.010	.010	1.000	6.400
Alaska Peninsula-Chignik	-	-	-	7.000
Bristol Bay	-	-	3.000	-
Arctic/Yukon/Kuskokwim	-	-	-	Test facility and investigations in Kotzebue area.
Totals	.147	1.510	8.800	37.200

OPERATIONAL BUDGET

The FRED Division allocates operational money by project and facility. Monthly expenditures and balances are tracked by computer, and a budget printout by line item is sent to each project leader. Project and facility budget managers are required to submit exception reports to headquarters whenever monthly expenditures exceed projections in the facility or project plan. The FRED Fiscal Year 1981 (FY-81) operational budget and Fiscal Year 1982 (FY-82) budget request are presented in Table 38.

Projects are either developmental or operational, although both are included in the operational budget. Developmental projects involve the search for enhancement and rehabilitation opportunities or the investigation of new techniques. Operational projects involve the production of fish and the evaluation of their survival in fresh and salt water.

FRED's budget increases have been limited to the annual inflation rate for the past two years. Increases in hatchery production including expansion of existing facilities and the start up of new facilities, however, require additional operational funds. Price increases for such items as heating fuel and transportation also exceed annual inflation rates. This results in a drain of money away from developmental projects to fund the operation of hatcheries, which is a fiscal priority. These funding constraints also affect FRED's ability to adequately assess fresh and saltwater survivals of its released fish, information necessary for the improvement and refinement of Alaskan aquaculture techniques.

COMMENT: It is to be remembered that IHN virus is found throughout the state's natural stocks and probably causes major undetected mortalities among them. We are not contemplating requesting money for new sockeye hatcheries until we are absolutely certain of our ability to prevent IHN.

- 3) "We recommend that the FRED representative on the departmental (salmon) planning team continue to promote the completion of the comprehensive plan and to update it annually."

COMMENT: We will, as recommended, intensify comprehensive planning to the extent of available time, personnel, and funds.

- 4) "We recommend that FRED lapse to the General Fund any unused capital project funds for inactive projects."

COMMENT: The incident in question (Lower Jean Lake Project) was an oversight on our part.

- 5) "We recommend that FRED determine current ocean survival rates (for hatchery salmon), and recompute benefit/cost ratios for current hatcheries based on current survival rates."

COMMENT: FRED's initial response was that benefit/cost analyses are planning tools, useful in choosing project priorities, and that updated analyses of benefit/cost for existing hatcheries would serve no purpose. However, continued interest in them has shown that benefit/cost statements are useful also in explaining and describing FRED's program to the public, the administration, and the legislature. Consequently, FRED has begun recomputing benefit/cost ratios for existing hatcheries.

Copies of the auditor's report and FRED's responses are available on request from FRED's headquarters in Juneau.

Benefit/Cost Analyses

A benefit/cost ratio compares the dollar value of the benefits created by a hatchery with the dollar value of the costs. The ratio is expressed as one number; a hatchery with a benefit/cost of 2.4, for example, produces \$2.40 in benefits for every \$1.00 in cost.

Benefit/cost values can be computed for each salmon hatchery that produces fish primarily for the commercial fishery. It is more difficult to compute benefit/cost ratios for sport fishery production because the value of the catch cannot be described adequately in dollars, and the costs associated with harvesting sport fish are variable.

FRED plans to calculate benefit/costs by the "net present worth" method. By this method, all benefits and costs will be expressed as a ratio in 1980 dollars. The investment discount rate will be set at 10%, which we believe to be conservative given the current trends in inflation.

The ratio, of course, depends on the definitions of "benefit" and "cost" that are used. Benefits could be limited to the ex vessel salmon sales or

extended to include wholesale prices of processed salmon and roe and spin-off benefits to fishing and processing communities. This extended definition is quite justifiable because the "multiplier effect" in the fishing industry is believed to be quite high relative to other industries. For example, a study in Rhode Island indicated that each \$100 in fish landings stimulated \$424 in economic activity in the state (State of Rhode Island Coastal Management Program and Final Environmental Impact Statement, Washington DC, Department of Commerce, NOAA, Office of Coastal Zone Management, p. 61). The multiplier effect of the seafood industry in Oregon's three major fishing counties ranged between 2.7 and 3 (A Study of the Marketing Activities of the Department of Marine Resources. Augusta, Me.; Joint Standing Committee on Marine Resources. 1979; p. 13).

Consequently, FRED will compute benefit/cost using six combinations of definitions for "benefit" and "cost" and present a range of ratios which should show the minimal and maximal possible given the assumptions on fish survivals. Even by presenting such a range, there is no guarantee that actual benefit/costs will fall within it. The ratio is sensitive, especially to changes in operational costs and marine survival of hatchery fish. If a planner assumes a 2% marine survival and the hatchery actually achieves a 4% survival, the actual benefit/cost could be twice the planner's estimate.

Costs of a hatchery program include capital costs of each facility, operational costs, as well as fishing and processing costs. A well-managed harvest could result in decreased costs, just as technological advances in salmon production could increase benefits.

The revised benefit/cost analyses will be available before the end of 1981.

Table 38. FRED Division project budgets by component for FY 81 and the budget request for FY 82.

PROJECT	FY-81 Allocation	FY-82 Request
<u>ADMINISTRATION COMPONENT</u>		
Director's Office	315.8	323.8
Clerical Statewide	706.1	733.8
Private Nonprofit	90.5	91.2
sub total	<u>1112.4</u>	<u>1148.8</u>
<u>TECHNOLOGY AND DEVELOPMENT COMPONENT</u>		
Chief Technology and Development	113.8	94.0
Principal Fish Culturist	63.2	65.4
Genetics	123.8	150.8
Principal Biologist	66.2	66.1
Pathology	366.6	391.3
Engineering	477.5	488.1
Lake Fertilization/Limnology	158.2	173.0
sub total	<u>1369.3</u>	<u>1428.7</u>
<u>OPERATIONS COMPONENT</u>		
Chief of Operations	114.7	86.0
<u>SOUTHEAST REGION</u>		
Regional Management	254.4	218.1
Regional Biology	135.4	150.3
Regional Hatchery Management	99.2	105.9
Southern Southeast Project and Evaluation	132.2	153.5
Western Southeast Project Control and Evaluation	95.4	110.2
Northern Southeast Project Control and Evaluation	99.6	138.3
Regional Maintenance	64.9	80.5
Beaver Falls Hatchery	129.6	250.1
Deer Mountain Hatchery	170.2	204.8
Klawock Hatchery	343.7	402.1
Starrigavan Hatchery	11.0	closed
Hidden Falls Hatchery	407.0	467.0
Snettisham Hatchery	287.8	345.9
Crystal Lake Hatchery	404.0	414.3
Little Port Walter Hatchery	30.3	73.2
Coastwide Evaluation	56.5	85.8
State and Private Hatchery Evaluation		108.5
<u>CENTRAL/WESTWARD/AYK REGION</u>		
Regional Management	235.6	206.6
Regional Biology	117.9	131.5
Regional Hatchery Management	182.3	184.3
Regional Maintenance	142.2	163.4
Biometrics	62.2	96.2
Alaska Peninsula Project Control and Evaluation	96.6	unfunded
Bristol Bay Project Control and Evaluation	154.4	112.2

- Continued -

Table 38. Continued.

PROJECT	FY-81 Allocation	FY-82 Request
Kodiak Project Control and Evaluation	190.7	200.7
Prince William Sound Project Control and Evaluation	138.7	131.7
Upper Cook Inlet Project Control and Evaluation	217.2	204.0
Lower Cook Inlet Project Control and Evaluation	174.3	201.5
Central Cook Inlet Project Control and Evaluation	197.8	260.0
Cannery Creek Hatchery	278.2	360.0
Big Lake Hatchery	204.7	212.0
Fort Richardson Hatchery	395.3	378.9
Ship Creek Hatchery	242.4	232.3
Tutka Hatchery	311.5	312.3
Halibut Cove Hatchery	40.0	32.7
Kitoi Hatchery	281.8	291.1
Karluk Hatchery	160.5	173.4
Russell Creek Hatchery	482.5	516.0
East Creek Hatchery	288.5	327.4
Kasilof Hatchery	333.9	332.6
Clear Hatchery	165.8	308.7
Trail Lakes Hatchery	55.5	94.8
Whittier Coho Rehabilitation	6.6	30.8
Hobo Creek	6.0	15.8
Main Bay Hatchery	10.0	141.2
Hatchery Evaluation		105.9
sub total	8009.0	9152.5
<u>TOTALS</u>		
ADMINISTRATION	1112.4	1148.8
TECHNOLOGY AND DEVELOPMENT	1369.3	1428.7
OPERATIONS	8009.0	9152.5
GRAND TOTAL	10490.7	11730.0

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APPENDIX A

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FISH PLANTED IN 1979 BY KITOI BAY HATCHERY

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BR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CATCH
KS 78	CHIGNIK RIVER	FINGERLINGS	LAKE ROSE TEAD	6/07/79	87,417	88.99	NO	
H2O STOCKED TOTAL					87,417	88.99		
AGE TOTAL					87,417	88.99		
SPECIES TOTAL					87,417	88.99		
PS 78	BIG KITOI CREEK	SWIMUP FRY	BIG KITOI CREEK	5/10/79	6,427	1.72	RP	
PS 78	BIG KITOI CREEK	SWIMUP FRY	BIG KITOI CREEK	5/10/79	22,964	5.37	LP	
PS 78	BIG KITOI CREEK	SWIMUP FRY	BIG KITOI CREEK	5/10/79	47,155	12.30	RV	
PS 78	BIG KITOI CREEK	SWIMUP FRY	BIG KITOI CREEK	5/10/79	47,432	12.14	LV	
PS 78	BIG KITOI CREEK	SWIMUP FRY	BIG KITOI CREEK	5/10/79	42,730	10.93	ADRV	
PS 78	BIG KITOI CREEK	SWIMUP FRY	BIG KITOI CREEK	5/10/79	14,030,169	3,591.72	NO	
H2O STOCKED TOTAL					14,196,877	3,634.68		
AGE TOTAL					14,196,877	3,634.68		
PS 78	BIG KITOI CREEK	FINGERLINGS	KITOI BAY	5/23/79	3,090,871	2,067.79	NO	
PS 78	BIG KITOI CREEK	FINGERLINGS	KITOI BAY	5/23/79	31,789	21.26	ADLV	
H2O STOCKED TOTAL					3,122,660	2,089.05		
AGE TOTAL					3,122,660	2,089.05		
SPECIES TOTAL					17,319,537	5,723.73		
RS 73	KARLUK LAKE	FINGERLINGS	KARLUK LAKE	6/08/79	163,547	111.86	NO	
RS 78	KARLUK LAKE	FINGERLINGS	KARLUK LAKE	6/08/79	36,291	18.61	ADDO	
H2O STOCKED TOTAL					199,828	130.47		
RS 78	THUMB RIVER	FINGERLINGS	THUMB RIVER	6/08/79	266,509	54.72	NO	
RS 78	THUMB RIVER	FINGERLINGS	THUMB RIVER	6/13/79	218,200	45.84	NO	
RS 78	THUMB RIVER	FINGERLINGS	THUMB RIVER	6/13/79	10,726	2.31	AULP	
RS 78	THUMB RIVER	FINGERLINGS	THUMB RIVER	6/08/79	25,525	5.24	AULP	
H2O STOCKED TOTAL					520,960	108.11		
AGE TOTAL					720,788	238.58		
SPECIES TOTAL					720,788	238.58		
HATCHERY TOTAL					19,127,742	6,051.30		

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FISH PLANTED IN 1979 BY FIRE LAKE HATCHERY

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BR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHIND
SF 78	KOYUKUK RIVER	SAC FRY	ISLAND LAKE	5/02/79	15,917	.19	NO	
H2O STOCKED TOTAL					15,917	.19		
SF 78	KOYUKUK RIVER	SAC FRY	EIELSON COOLING POND	3/20/79	10,000	.12	NO	
H2O STOCKED TOTAL					10,000	.12		
AGE TOTAL					25,917	.31		
SPECIES TOTAL					25,917	.31		
HATCHERY TOTAL					25,917	.31		

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FISH PLANTED IN 1979 BY FT RICHARDSON HATCH.

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SR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	LR INU
GR 74	TOLSONA LAKE	SWIMUP FRY	TOLSONA LAKE	6/15/79	30,000	.54	NO	
H2O STOCKED TOTAL					30,000	.54		
AGE TOTAL					30,000	.54		
SPECIES TOTAL					30,000	.54		
KS 73	CROOKED CREEK	FINGERLINGS	CROOKED CREEK	5/30/79	39,205	733.29	NO	
H2O STOCKED TOTAL					39,205	733.29		
AGE TOTAL					39,205	733.29		
KS 79	SHIP CREEK	SMOLTS	BOX CANYON CREEK	6/05/79	34,612	467.72	NO	
KS 73	CROOKED CREEK	SMOLTS	BOX CANYON CREEK	6/01/79	26,995	349.83	ADCW	A41858
KS 78	SHIP CREEK	SMOLTS	BOX CANYON CREEK	6/07/79	26,559	344.17	ADCW	A41763
KS 73	CROOKED CREEK	SMOLTS	BOX CANYON CREEK	6/07/79	21,514	278.79	NO	
KS 73	CROOKED CREEK	SMOLTS	BOX CANYON CREEK	6/06/79	36,981	548.17	NO	
KS 75	SHIP CREEK	SMOLTS	BOX CANYON CREEK	6/06/79	32,794	486.11	NO	
KS 76	CROOKED CREEK	SMOLTS	BOX CANYON CREEK	6/05/79	39,031	527.43	NO	
H2O STOCKED TOTAL					218,486	3,002.22		
KS 76	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/04/79	5,533	84.72	NO	
KS 76	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/04/79	26,425	404.25	ADCW	A41859
KS 75	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/04/79	12,596	192.69	NO	
KS 75	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/01/79	57,954	491.98	NO	
KS 75	CROOKED CREEK	SMOLTS	CROOKED CREEK	5/31/79	55,728	889.43	NO	
KS 73	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/22/79	16,605	200.83	NO	
KS 75	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/21/79	30,615	461.33	ADCW	A41860
KS 76	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/21/79	27,641	416.89	NO	
KS 75	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/20/79	51,829	916.49	NO	
KS 78	CROOKED CREEK	SMOLTS	CROOKED CREEK	6/19/79	55,317	951.84	NO	
H2O STOCKED TOTAL					340,248	5,510.45		
KS 78	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/14/79	2,422	22.82	NO	
KS 78	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/14/79	11,035	103.96	NO	
KS 78	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/13/79	1,713	21.07	NO	
KS 78	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/13/79	7,801	95.95	NO	
KS 78	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/13/79	13,437	156.99	NO	
KS 78	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/13/79	62,101	715.17	NO	
KS 78	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/13/79	25,562	359.28	ADCW	A41861
KS 73	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/13/79	3,199	44.93	NO	
KS 78	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/13/79	9,028	126.89	NO	
KS 78	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/12/79	1,737	30.54	NO	
KS 73	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/12/79	7,915	139.15	NO	
KS 79	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/12/79	9,015	151.31	NO	
KS 78	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/12/79	41,071	689.33	NO	
KS 75	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/12/79	4,989	101.11	NO	
KS 78	CROOKED CREEK	SMOLTS	HALIBUT COVE LAGOON	6/12/79	22,727	460.61	NO	
H2O STOCKED TOTAL					223,752	3,219.11		
KS 78	SHIP CREEK	SMOLTS	SHIP CREEK	5/28/79	146,414	2,149.21	NO	
H2O STOCKED TOTAL					146,414	2,149.21		

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FISH PLANTED IN 1979 BY FT RICHARDSON HATCH.

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BP SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	WINU
AGE TOTAL					928,900	13,880.99		
SPECIES TOTAL					969,105	14,614.28		
RT 79	SWANSON RIVER	FINGERLINGS	FLORENCE LAKE	8/13/79	5,300	2.54	NO	
RT 79	SWANSON RIVER	FINGERLINGS	FLORENCE LAKE	9/07/79	5,900	7.66	AD	
H2O STOCKED TOTAL					11,200	10.20		
RT 79	SWANSON RIVER	FINGERLINGS	IRENE LAKE	9/07/79	1,920	2.49	AD	
RT 79	SWANSON RIVER	FINGERLINGS	IRENE LAKE	8/14/79	1,800	.84	NO	
H2O STOCKED TOTAL					3,720	3.33		
RT 79	SWANSON RIVER	FINGERLINGS	JOHNSON LAKE	8/14/79	3,980	1.86	NO	
RT 79	SWANSON RIVER	FINGERLINGS	JOHNSON LAKE	9/10/79	3,800	4.76	AD	
H2O STOCKED TOTAL					7,780	6.62		
RT 79	SWANSON RIVER	FINGERLINGS	KEPLER-BRADLEY LAKE	10/11/79	5,800	9.23	NO	
H2O STOCKED TOTAL					5,800	9.23		
RT 79	SWANSON RIVER	FINGERLINGS	KNIK LAKE	10/11/79	5,000	7.96	NO	
H2O STOCKED TOTAL					5,000	7.96		
RT 79	SWANSON RIVER	FINGERLINGS	MATANUSKA LAKE	8/14/79	12,775	5.96	NO	
H2O STOCKED TOTAL					12,775	5.96		
RT 79	SWANSON RIVER	FINGERLINGS	REED LAKE	8/14/79	2,000	.93	NO	
RT 79	SWANSON RIVER	FINGERLINGS	REED LAKE	9/07/79	2,145	2.79	AD	
H2O STOCKED TOTAL					4,145	3.71		
RT 79	SWANSON RIVER	FINGERLINGS	SEYMOUR LAKE	8/13/79	34,036	15.99	NO	
H2O STOCKED TOTAL					34,036	15.99		
RT 79	SWANSON RIVER	FINGERLINGS	TEX SMITH LAKE	10/10/79	4,697	3.17	NO	
H2O STOCKED TOTAL					4,697	3.17		
RT 79	TALARIK CREEK	FINGERLINGS	THREE MILE LAKE	7/26/79	1,893	1.36	NO	
H2O STOCKED TOTAL					1,893	1.36		
RT 79	SWANSON RIVER	FINGERLINGS	TIGGER LAKE	8/13/79	2,200	1.06	NO	
RT 79	SWANSON RIVER	FINGERLINGS	TIGGER LAKE	9/07/79	2,480	3.22	AD	
H2O STOCKED TOTAL					4,680	4.28		
RT 79	TALARIK CREEK	FINGERLINGS	TWO MILE LAKE	7/26/79	2,209	1.59	NO	
H2O STOCKED TOTAL					2,209	1.59		
RT 79	SWANSON RIVER	FINGERLINGS	WEINER LAKE	9/10/79	2,425	3.03	AD	
RT 79	SWANSON RIVER	FINGERLINGS	WEINER LAKE	8/14/79	2,700	1.26	NO	
H2O STOCKED TOTAL					5,125	4.29		
RT 79	SWANSON RIVER	FINGERLINGS	WISHBONE LAKE	10/12/79	5,990	9.11	NO	
H2O STOCKED TOTAL					5,990	9.11		

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FISH PLANTED IN 1979 BY FT RICHARDSON HATCH.

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BR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHTNU
RT 79 H2O STOCKED TOTAL	TALARIK CREEK	FINGERLINGS	LITTLE DONNA LAKE	9/18/79	5,000 5,000	11.18 11.18	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	QUARTZ LAKE	9/13/79	32,858 32,858	52.83 52.83	NO	
RT 79 H2O STOCKED TOTAL	TALARIK CREEK	FINGERLINGS	RAINBOW LAKE	9/18/79	10,000 10,000	22.36 22.36	NO	
RT 79 H2O STOCKED TOTAL	TALARIK CREEK	FINGERLINGS	ROBERTSON #2	9/18/79	1,029 1,029	2.30 2.30	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	ABERCROMBIE LAKE	9/13/79	1,400 1,900	1.46 1.46	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	BULL LAKE	9/13/79	1,000 1,000	.76 .76	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	DOLGOI LAKE	9/13/79	5,200 5,200	3.99 3.99	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	DRAGONFLY LAKE	9/13/79	800 800	.61 .61	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	DELPHIN BAY LAKE	9/13/79	3,695 3,695	2.84 2.84	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	LEE LAKE	9/13/79	1,400 1,400	1.07 1.07	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	LILLY POND	9/13/79	2,100 2,100	1.61 1.61	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	LONG LAKE	9/13/79	3,550 3,550	2.76 2.76	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	LUPINE LAKE	9/13/79	800 800	.62 .62	NO	
RT 79 H2O STOCKED TOTAL	SWANSON RIVER	FINGERLINGS	TANIGNAK LAKE	9/13/79	3,000 3,000	2.30 2.30	NO	
AGE TOTAL					181,382	193.49		
RT 78 H2O STOCKED TOTAL	ALASKA-ENNIS	CATCHABLES	BEACH LAKE	6/07/79	1,045	105.33	NO	
RT 78 H2O STOCKED TOTAL	ALASKA-ENNIS	CATCHABLES	BEACH LAKE	6/07/79	1,006	101.40	NO	
RT 78 H2O STOCKED TOTAL	ALASKA-ENNIS	CATCHABLES	BEACH LAKE	6/07/79	1,026	103.42	NO	
RT 78 H2O STOCKED TOTAL	ALASKA-ENNIS	CATCHABLES	BEACH LAKE	6/07/79	949	95.65	NO	
AGE TOTAL					4,026	405.80		
RT 78 H2O STOCKED TOTAL	ALASKA-ENNIS	CATCHABLES	CAMPBELL POINT LAKE	5/21/79	1,380	106.09	NO	
RT 78 H2O STOCKED TOTAL	SWANSON RIVER	CATCHABLES	CAMPBELL POINT LAKE	6/29/79	762	46.89	NO	

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FISH PLANTED IN 1979 BY FT RICHARDSON HATCH.

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SP	OR YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHWNO
RT	78	ALASKA-ENNIS	CATCHABLES	CAMPBELL POINT LAKE	6/29/79	1,843	237.96	NO	
H2O		STOCKED TOTAL				3,985	390.94		
RT	78	ALASKA-ENNIS	CATCHABLES	CLUNIE LAKE	6/26/79	1,204	136.56	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	CLUNIE LAKE	6/26/79	4,679	526.61	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	CLUNIE LAKE	5/22/79	3,092	237.71	NO	
H2O		STOCKED TOTAL				8,975	900.88		
RT	78	ALASKA-ENNIS	CATCHABLES	FISH LAKE	5/21/79	639	49.12	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	FISH LAKE	6/28/79	1,397	171.72	NO	
H2O		STOCKED TOTAL				2,036	220.84		
RT	78	ALASKA-ENNIS	CATCHABLES	GREEN LAKE	6/27/79	3,924	466.25	NO	
RT	78	SWANSON RIVER	CATCHABLES	GREEN LAKE	6/24/79	936	57.60	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	GREEN LAKE	5/22/79	2,070	159.14	NO	
H2O		STOCKED TOTAL				6,930	682.99		
RT	78	ALASKA-ENNIS	CATCHABLES	GWEN LAKE	5/22/79	1,303	100.17	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	GWEN LAKE	6/28/79	1,302	160.04	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	GWEN LAKE	6/28/79	1,422	168.23	NO	
H2O		STOCKED TOTAL				4,027	428.44		
RT	78	ALASKA-ENNIS	CATCHABLES	HILLBERG LAKE	5/28/79	2,269	278.90	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	HILLBERG LAKE	5/22/79	1,022	78.57	NO	
H2O		STOCKED TOTAL				3,291	357.47		
RT	78	ALASKA-ENNIS	CATCHABLES	JEWEL LAKE	5/21/79	3,015	231.79	NO	
RT	78	SWANSON RIVER	CATCHABLES	JEWEL LAKE	6/26/79	6,050	407.75	NO	
H2O		STOCKED TOTAL				9,065	639.54		
RT	78	ALASKA-ENNIS	CATCHABLES	LOWER FIRE LAKE	6/29/79	1,211	134.63	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	LOWER FIRE LAKE	6/24/79	4,651	517.07	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	LOWER FIRE LAKE	5/21/79	2,401	184.58	NO	
H2O		STOCKED TOTAL				8,263	836.28		
RT	78	ALASKA-ENNIS	CATCHABLES	OTTER LAKE	5/22/79	4,395	337.38	NO	
RT	78	SWANSON RIVER	CATCHABLES	OTTER LAKE	6/26/79	8,546	575.98	NO	
H2O		STOCKED TOTAL				12,941	913.86		
RT	78	SWANSON RIVER	CATCHABLES	SAND LAKE	6/26/79	2,721	183.38	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	SAND LAKE	5/21/79	1,304	100.25	NO	
H2O		STOCKED TOTAL				4,025	283.63		
RT	78	ALASKA-ENNIS	CATCHABLES	THOMPSON LAKE	5/21/79	1,355	104.17	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	THOMPSON LAKE	6/28/79	2,841	337.52	NO	
H2O		STOCKED TOTAL				4,196	441.69		
RT	78	ALASKA-ENNIS	CATCHABLES	TRIANGLE LAKE	6/26/79	1,465	173.63	NO	
RT	78	ALASKA-ENNIS	CATCHABLES	TRIANGLE LAKE	5/22/79	639	49.12	NO	
H2O		STOCKED TOTAL				2,104	222.75		
AGE TOTAL						73,864	6,725.11		

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BR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	LWINU
SPECIES TOTAL					255,246	6,919.60		
SS 78	SEWARD LAGOON	FINGERLINGS	BEAR LAKE	5/24/79	112,560	76.20	NO	
SS 78	SEWARD LAGOON	FINGERLINGS	BEAR LAKE	5/24/79	112,900	78.69	NO	
H2O STOCKED TOTAL					225,460	154.89		
SS 78	SEWARD LAGOON	FINGERLINGS	BEAR CLUB LAKE	8/23/79	5,022	29.20	NO	
H2O STOCKED TOTAL					5,022	29.20		
SS 78	SEWARD LAGOON	FINGERLINGS	"C" ST GRAVEL PIT	5/22/79	20,100	13.61	NO	
H2O STOCKED TOTAL					20,100	13.61		
SS 78	SEWARD LAGOON	FINGERLINGS	CABIN LAKE	7/24/79	15,000	55.95	NO	
H2O STOCKED TOTAL					15,000	55.95		
SS 78	SEWARD LAGOON	FINGERLINGS	CENTENNIAL LAKE	6/08/79	6,090	7.74	NO	
H2O STOCKED TOTAL					6,090	7.74		
SS 78	SEWARD LAGOON	FINGERLINGS	CHENY POND	5/21/79	20,100	13.61	NO	
H2O STOCKED TOTAL					20,100	13.61		
SS 78	SEWARD LAGOON	FINGERLINGS	ECHO LAKE	9/19/79	4,606	35.53	NO	
H2O STOCKED TOTAL					4,606	35.53		
SS 78	SEWARD LAGOON	FINGERLINGS	ENGINEER LAKE	6/08/79	34,240	43.46	NO	
H2O STOCKED TOTAL					34,240	43.46		
SS 78	SEWARD LAGOON	FINGERLINGS	FINGER LAKE	5/21/79	73,030	49.44	NO	
H2O STOCKED TOTAL					73,030	49.44		
SS 78	SEWARD LAGOON	FINGERLINGS	HALLIE LAKE	3/23/79	6,450	37.51	NO	
H2O STOCKED TOTAL					6,450	37.51		
SS 78	SEWARD LAGOON	FINGERLINGS	JOHNSON LAKE	7/24/79	19,768	74.60	NO	
H2O STOCKED TOTAL					19,768	74.60		
SS 78	SEWARD LAGOON	FINGERLINGS	KETTLE LAKE	6/15/79	2,000	2.87	NO	
H2O STOCKED TOTAL					2,000	2.87		
SS 78	SEWARD LAGOON	FINGERLINGS	LOON LAKE	5/21/79	10,800	7.31	NO	
H2O STOCKED TOTAL					10,800	7.31		
SS 78	SEWARD LAGOON	FINGERLINGS	LUCILLE LAKE	5/21/79	72,500	49.08	NO	
H2O STOCKED TOTAL					72,500	49.08		
SS 78	SEWARD LAGOON	FINGERLINGS	PADDLE LAKE	6/08/79	4,990	6.34	NO	
H2O STOCKED TOTAL					4,990	6.34		
SS 78	SEWARD LAGOON	FINGERLINGS	PEANUT LAKE	6/15/79	3,000	4.32	NO	
H2O STOCKED TOTAL					3,000	4.32		
SS 78	SEWARD LAGOON	FINGERLINGS	PORTAGE LAKE	7/24/79	5,000	18.65	NO	
H2O STOCKED TOTAL					5,000	18.65		

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FISH PLANTED IN 1979 BY FT RICHARDSON HATCH.

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SP YR	BR YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHING
	SS 78	SEWARD LAGOON	FINGERLINGS	ROCKY LAKE	5/23/79	5,900	4.11	NO	
	H2O	STOCKED TOTAL				5,900	4.11		
	SS 78	SEWARD LAGOON	FINGERLINGS	ROUND LAKE	6/15/79	500	.72	NO	
	H2O	STOCKED TOTAL				500	.72		
	SS 78	SEWARD LAGOON	FINGERLINGS	SCULPIN LAKE	8/29/79	15,246	89.81	NO	
	H2O	STOCKED TOTAL				15,246	89.81		
	SS 78	SEWARD LAGOON	FINGERLINGS	6-MILE LAKE	11/09/79	8,708	105.32	NO	
	SS 78	SEWARD LAGOON	FINGERLINGS	6-MILE LAKE	5/21/79	20,100	13.61	NO	
	H2O	STOCKED TOTAL				28,808	118.93		
	SS 78	SEWARD LAGOON	FINGERLINGS	SOUTH ROLLY LAKE	9/07/79	22,378	152.17	NO	
	H2O	STOCKED TOTAL				22,378	152.17		
	SS 78	SEWARD LAGOON	FINGERLINGS	STRELNA LAKE	5/23/79	60,450	42.13	NO	
	H2O	STOCKED TOTAL				60,450	42.13		
	SS 78	SEWARD LAGOON	FINGERLINGS	SUNKEN ISLAND LAKE	6/08/79	30,240	33.38	NO	
	H2O	STOCKED TOTAL				30,240	38.38		
	SS 78	SEWARD LAGOON	FINGERLINGS	UPPER JEAN LAKE	6/08/79	9,050	11.49	NO	
	H2O	STOCKED TOTAL				9,050	11.49		
	SS 78	SEWARD LAGOON	FINGERLINGS	VAN LAKE	8/23/79	73,955	432.95	NO	
	H2O	STOCKED TOTAL				73,955	432.95		
	SS 78	SEWARD LAGOON	FINGERLINGS	VICTOR LAKE	5/23/79	2,800	1.95	NO	
	H2O	STOCKED TOTAL				2,800	1.95		
	SS 78	SEWARD LAGOON	FINGERLINGS	JAN LAKE	9/18/79	4,010	33.56	NO	
	H2O	STOCKED TOTAL				4,010	33.56		
	SS 78	SEWARD LAGOON	FINGERLINGS	LES LAKE	7/19/79	491	1.58	NO	
	H2O	STOCKED TOTAL				491	1.58		
	SS 78	SEWARD LAGOON	FINGERLINGS	LITTLE HARDING LAKE	7/19/79	14,746	48.59	NO	
	H2O	STOCKED TOTAL				14,746	48.59		
	SS 78	SEWARD LAGOON	FINGERLINGS	LOST LAKE	7/19/79	30,049	97.05	NO	
	H2O	STOCKED TOTAL				30,049	97.05		
	SS 78	SEWARD LAGOON	FINGERLINGS	NENANA POND	7/19/79	6,030	19.47	NO	
	H2O	STOCKED TOTAL				6,030	19.47		
	SS 78	SEWARD LAGOON	FINGERLINGS	QUARTZ LAKE	9/21/79	150,095	1,203.46	NO	
	H2O	STOCKED TOTAL				150,095	1,203.46		
	SS 78	SEWARD LAGOON	FINGERLINGS	28 MILE PIT	7/19/79	1,951	6.34	NO	
	H2O	STOCKED TOTAL				1,951	6.34		

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FISH PLANTED IN 1979 BY FT RICHARDSON HATCH.

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SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHINO
SS 73 H2O STOCKED TOTAL	SEWARD LAGOON	FINGERLINGS	DARK LAKE	6/06/79	19,500 19,500	22.97 22.97	NO	
SS 78 H2O STOCKED TOTAL	SEWARD LAGOON	FINGERLINGS	ISLAND LAKE	6/06/79	19,500 19,500	22.97 22.97	NO	
SS 78 H2O STOCKED TOTAL	SEWARD LAGOON	FINGERLINGS	KALSIN LAGOON	6/06/79	13,029 13,028	17.53 17.53	NO	
SS 78 H2O STOCKED TOTAL	SEWARD LAGOON	FINGERLINGS	MAYFLOWER LAKE	6/06/79	2,000 2,000	2.35 2.35	NO	
SS 78 H2O STOCKED TOTAL	SEWARD LAGOON	FINGERLINGS	ORBIN LAKE	6/06/79	3,000 3,000	3.53 3.53	NO	
SS 73 H2O STOCKED TOTAL	SEWARD LAGOON	FINGERLINGS	PCNY LAKE	6/06/79	1,600 1,600	1.88 1.88	NO	
SS 78 H2O STOCKED TOTAL	SEWARD LAGOON	FINGERLINGS	RUSSIAN RIVER PIT	6/06/79	5,000 5,000	5.89 5.89	NO	
AGE TOTAL					1,048,483	2,983.92		
SPECIES TOTAL					1,048,483	2,983.92		
HATCHERY TOTAL					2,301,834	24,517.34		

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FISH PLANTED IN 1979 BY ELMENDORF HATCHERY

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3R SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	LWTNU
RT 73	ALASKA-ENNIS	SUBCATCHABLES	BIRCH LAKE	5/24/79	25,010	633.75	AD	
RT 78	ALASKA-ENNIS	SUBCATCHABLES	BIRCH LAKE	5/24/79	7,729	195.85	NO	
RT 78	ALASKA-ENNIS	SUBCATCHABLES	BIRCH LAKE	5/23/79	39,559	1,002.42	NO	
RT 79	ALASKA-ENNIS	SUBCATCHABLES	BIRCH LAKE	5/21/79	25,016	735.27	NO	
H2O STOCKED TOTAL					101,314	2,567.29		
AGE TOTAL					101,314	2,567.29		
SPECIES TOTAL					101,314	2,567.29		
SS 77	BEAR CREEK	SMOLTS	BEAR CREEK	5/18/79	29,295	554.46	NO	
SS 77	BEAR CREEK	SMOLTS	BEAR CREEK	5/18/79	11,207	212.13	RV	
H2O STOCKED TOTAL					40,503	766.59		
SS 77	SEWARD LAGOON	SMOLTS	FRITZ CREEK	5/25/79	24,893	503.04	NO	
SS 77	SEWARD LAGOON	SMOLTS	FRITZ CREEK	5/29/79	4,761	97.71	NO	
SS 77	SEWARD LAGOON	SMOLTS	FRITZ CREEK	5/25/79	14,343	289.51	ADCW	A41759
H2O STOCKED TOTAL					43,997	890.26		
SS 77	SEWARD LAGOON	SMOLTS	GROUSE LAKE	5/16/79	11,752	187.80	ADCW	A41757
SS 77	SEWARD LAGOON	SMOLTS	GROUSE LAKE	5/16/79	32,248	515.08	NO	
H2O STOCKED TOTAL					44,000	702.88		
SS 77	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/14/79	25,350	450.90	NO	
SS 77	HALIBUT COVE LAGOON	SMOLTS	HALIBUT COVE LAGOON	6/14/79	22,460	399.49	ADCW	A41734
H2O STOCKED TOTAL					47,810	850.39		
SS 77	SEWARD LAGOON	SMOLTS	HOMER SPIT	5/29/79	4,622	91.95	NO	
SS 77	SEWARD LAGOON	SMOLTS	HOMER SPIT	5/29/79	18,393	365.91	ADCW	A41760
H2O STOCKED TOTAL					23,015	457.86		
SS 77	SEWARD LAGOON	SMOLTS	SEWARD LAGOON	5/15/79	23,628	373.16	ADCW	A41758
SS 77	SEWARD LAGOON	SMOLTS	SEWARD LAGOON	5/15/79	25,911	409.49	NO	
SS 77	SEWARD LAGOON	SMOLTS	SEWARD LAGOON	5/14/79	48,297	763.23	NO	
H2O STOCKED TOTAL					97,836	1,545.88		
SS 77	SEWARD LAGOON	SMOLTS	WHITTIER CREEK	5/16/79	5,652	92.66	NO	
SS 77	SEWARD LAGOON	SMOLTS	WHITTIER CREEK	5/16/79	24,202	396.73	ADCW	A41761
SS 77	BEAR CREEK	SMOLTS	WHITTIER CREEK	5/19/79	4,799	78.02	NO	
SS 77	BEAR CREEK	SMOLTS	WHITTIER CREEK	5/18/79	9,235	150.13	NO	
SS 77	BEAR CREEK	SMOLTS	WHITTIER CREEK	5/18/79	29,318	479.87	NO	
SS 77	SEWARD LAGOON	SMOLTS	WHITTIER CREEK	5/16/79	8,035	130.63	NO	
H2O STOCKED TOTAL					81,241	1,328.04		
AGE TOTAL					378,402	6,541.90		
SPECIES TOTAL					378,402	6,541.90		
HATCHERY TOTAL					479,716	9,109.19		

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FISH PLANTED IN 1979 BY CRYSTAL LAKE HATCH.

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SR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	WTNO
KS 78	ANDREWS CREEK	SMOLTS	CRYSTAL CREEK	5/15/79	1,566	7.23	RV	
KS 78	ANDREWS CREEK	SMOLTS	CRYSTAL CREEK	5/15/79	390	1.75	AURV	
KS 78	ANDREWS CREEK	SMOLTS	CRYSTAL CREEK	5/15/79	14,254	65.80	ADRVCW 04-19-31	
H2O STOCKED TOTAL					16,200	74.78		
AGE TOTAL					16,200	74.78		
SPECIES TOTAL					16,200	74.78		
SS 78	DUNCAN SALT CHUCK CR	FINGERLINGS	CRYSTAL CREEK	5/30/79	4	.01	NO	
SS 78	DUNCAN SALT CHUCK CR	FINGERLINGS	CRYSTAL CREEK	5/30/79	112	.36	RV	
H2O STOCKED TOTAL					116	.37		
AGE TOTAL					116	.37		
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	21,117	122.14	ADRVLW 04-19-35	
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	1,054	6.10	ADR V	
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	74,242	429.42	ADRVLW 04-18-01	
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	167	.97	ADR V	
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	11,765	68.05	ADRVCW 04-19-37	
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	279	1.61	ADR V	
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	19,636	113.58	ADRVCW 04-19-36	
SS 78	DUNCAN SALT CHUCK CR	SMOLTS	CRYSTAL CREEK	5/30/79	300	1.74	ADR V	
H2O STOCKED TOTAL					128,560	743.61		
AGE TOTAL					128,560	743.61		
SPECIES TOTAL					128,676	743.98		
HATCHERY TOTAL					144,876	818.76		

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FISH PLANTED IN 1979 BY BEAVER FALLS

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SP	GR YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CWTNU
CS	72	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	5/21/79	193,000	77.20	NO	
CS	73	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	5/14/79	130,400	53.46	NO	
CS	74	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	5/11/79	250,500	97.70	NO	
CS	75	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	5/08/79	147,100	58.15	NO	
CS	75	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	4/26/79	97,593	41.96	NO	
CS	75	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	4/25/79	34,300	33.72	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	6/06/79	253,838	56.46	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	5/30/79	256,750	96.56	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	5/25/79	138,097	56.62	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	5/24/79	164,945	59.38	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	6/27/79	30,918	14.53	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	6/19/79	215,225	92.55	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	6/14/79	210,562	88.44	NO	
CS	78	BEAVER-DISSAPPEAR	SWIMUP FRY	GEORGE INLET	6/11/79	250,546	97.97	NO	
H2O STOCKED TOTAL						2,426,174	964.60		
AGE TOTAL						2,426,174	964.60		
SPECIES TOTAL						2,426,174	964.60		
HATCHERY TOTAL						2,426,174	964.60		

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FISH PLANTED IN 1979 BY KLAWOCK HATCHERY*

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BR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CWIND
CS 78	KLAWOCK RIVER	FEED FRY	KLAWOCK RIVER	5/24/79	82,766	67.04	NO	
CS 78	KLAWOCK RIVER	FEED FRY	KLAWOCK RIVER	5/24/79	35,299	32.19	NO	
CS 78	KLAWOCK RIVER	FEED FRY	KLAWOCK RIVER	5/24/79	73,780	77.78	NO	
CS 78	KLAWOCK RIVER	FEED FRY	KLAWOCK RIVER	5/04/79	40,934	22.31	NO	
H2O STOCKED TOTAL					232,779	199.32		
AGE TOTAL					232,779	199.32		
SPECIES TOTAL					232,779	199.32		
HATCHERY TOTAL					232,779	199.32		

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NN27 FISH PLANTED IN 1979 BY HIDDEN FALLS HATCH

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BP SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CWTNU
CS 73	KADASHAM RIVER	FINGERLINGS	KASNYKU BAY	5/22/79	819,056	925.53	NO	
CS 73	CLEAR RIVER	FINGERLINGS	KASNYKU BAY	5/20/79	210,972	348.10	NO	
CS 78	KADASHAM RIVER	FINGERLINGS	KASNYKU BAY	5/23/79	859,156	967.75	NO	
HATCHERY STOCKED TOTAL					1,889,184	2,141.38		
AGE TOTAL					1,889,184	2,141.38		
SPECIES TOTAL					1,889,184	2,141.38		
HATCHERY TOTAL					1,889,184	2,141.38		

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NN27 FISH PLANTED IN 1979 BY SNETTISHAM HATCHERY

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SR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHIND
CS 78	LIMESTONE CREEK	FINGERLINGS	PORT SNETTISHAM	4/30/79	42,812	43.91	NO	
CS 73	PROSPECT CREEK	FINGERLINGS	PORT SNETTISHAM	5/23/79	22,083	21.91	NO	
CS 72	LIMESTONE CREEK	FINGERLINGS	PORT SNETTISHAM	5/15/79	51,027	67.46	NO	
H2O STOCKED TOTAL					115,922	133.28		
AGE TOTAL					115,922	133.28		
SPECIES TOTAL					115,922	133.28		
KS 77	SITUK RIVER	SMOLTS	PORT SNETTISHAM	5/09/79	7,313	53.90	ADCW	041904
KS 77	SITUK RIVER	SMOLTS	PORT SNETTISHAM	5/09/79	59	.43	AD	
KS 77	ANDREWS CREEK	SMOLTS	PORT SNETTISHAM	5/09/79	46	.36	AD	
KS 77	ANDREWS CREEK	SMOLTS	PORT SNETTISHAM	5/09/79	11,531	90.59	ADCW	041930
H2O STOCKED TOTAL					18,949	145.28		
AGE TOTAL					18,949	145.28		
SPECIES TOTAL					18,949	145.28		
SS 79	SPEEL LAKE	FINGERLINGS	FIRST LAKE	7/31/79	246	.28	NO	
SS 75	SPEEL LAKE	FINGERLINGS	FIRST LAKE	7/31/79	8,795	10.03	ADCW	4-4-U
H2O STOCKED TOTAL					9,042	10.31		
AGE TOTAL					9,042	10.31		
SPECIES TOTAL					9,042	10.31		
HATCHERY TOTAL					143,913	288.87		

SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHINU
LS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	7/30/79	3,127	1.25	NO	
H2O STOCKED TOTAL					3,127	1.25		
AGE TOTAL					3,127	1.25		
SPECIES TOTAL					3,127	1.25		
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	4/13/79	410,215	119.37	NO	
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	3/23/79	529,236	154.01	NO	
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	4/04/79	97,956	28.52	NO	
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	3/21/79	262,834	76.49	NO	
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	4/10/79	10,478	3.05	NO	
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	4/06/79	529,937	153.92	NO	
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	3/30/79	295,654	86.04	NO	
PS 78	STARRIGAVAN CREEK	SWIMUP FRY	STARRIGAVAN CREEK	4/27/79	125,794	36.61	NO	
H2O STOCKED TOTAL					2,261,104	658.00		
AGE TOTAL					2,261,104	658.00		
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,093	1.85	OT	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,066	1.88	OT	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	5/15/79	1,092	1.81	OT	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,063	1.84	OT	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,072	2.47	NO	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,070	1.93	OT	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,071	2.19	NO	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,096	1.93	NO	
PS 78	STARRIGAVAN CREEK	FINGERLINGS	STARRIGAVAN BAY	6/15/79	1,092	2.38	OT	
H2O STOCKED TOTAL					9,715	18.28		
AGE TOTAL					9,715	18.28		
SPECIES TOTAL					2,270,819	676.28		
SS 77	SASHIN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	1,544	19.92	OTAD	
SS 77	SASHIN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	13,898	179.28	OTAD CW 04-19-34	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	67	1.20	OTAD	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	11,991	186.29	OTAD CW 04-19-26	
SS 77	SASHIN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	24,280	297.33	OT	
SS 77	SASHIN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	14,215	197.19	OT	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	14,104	285.39	OT	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	2,967	52.93	OTAD CW 04-18-09	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	18,389	269.11	OT	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	29,820	465.94	OT	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	30,750	477.74	OT	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	14,825	264.69	OT	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	14,149	201.16	OTAD CW 04-19-29	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	190	3.39	OTAD	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	4,556	81.34	OTAD CW 04-18-10	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	10,241	192.71	OT	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	2,923	45.41	OTAD	
SS 77	STARRIGAVAN CREEK	SMOLTS	STARRIGAVAN BAY	5/31/79	1,503	21.37	OTAD	
H2O STOCKED TOTAL					208,452	3,231.38		

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BR
SP YR ORIGIN

STAGE

WATER
STOCKED

TRIP
DATE

NUMBER
STOCKED

TOTAL WT
IN KG

MARKS

CWTNG

AGE TOTAL

208,452 3,231.38

SPECIES TOTAL

208,452 3,231.38

HATCHERY TOTAL

2,482,398 3,908.91

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FISH PLANTED IN 1979 BY DEER MTN. HATCHERY

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OR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	LTWNO
KS 77	CRIPPLE CREEK	SMOLTS	KETCHIKAN CREEK	5/16/79	7,258	218.62	ADCW	04-17-47
KS 77	CRIPPLE CREEK	SMOLTS	KETCHIKAN CREEK	5/16/79	318	9.58	AD	
KS 77	CRIPPLE CREEK	SMOLTS	KETCHIKAN CREEK	5/16/79	10,168	265.47	AD	04-17-46
KS 77	CRIPPLE CREEK	SMOLTS	KETCHIKAN CREEK	5/30/79	380	9.92	AD	
H2O STOCKED TOTAL					18,124	503.59		
AGE TOTAL					18,124	503.59		
SPECIES TOTAL					18,124	503.59		
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	8,815	110.15	ADCW	04-17-48
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	1,347	16.83	AD	
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	1,556	19.44	AD	
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	62,200	737.07	NO	
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	5/01/79	4,084	31.34	ADCW	04-06-05
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	790	5.57	AD	
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	100	.77	AD	
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	9,855	110.67	ADCW	04-17-50
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	1,331	16.64	AD	
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	4,890	34.49	ADCW	04-17-51
SS 77	KETCHIKAN CREEK	SMOLTS	KETCHIKAN CREEK	6/01/79	9,065	113.36	ADLW	04-17-49
H2O STOCKED TOTAL					103,033	1,196.33		
AGE TOTAL					103,033	1,196.33		
SPECIES TOTAL					103,033	1,196.33		
HATCHERY TOTAL					121,157	1,699.92		

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FISH PLANTED IN 1979 BY BIG LAKE HATCHERY

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RR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CWIND
SS 78	FISH CREEK	FINGERLINGS	COTTONWOOD LAKE	6/21/79	80,664	42.11	NO	
SS 78	FISH CREEK	FINGERLINGS	COTTONWOOD LAKE	6/21/79	5,460	2.95	RV	
H2O STOCKED TOTAL						86,124	45.06	
SS 78	FISH CREEK	FINGERLINGS	FISH CREEK	6/15/79	154,593	86.11	NO	
SS 78	FISH CREEK	FINGERLINGS	FISH CREEK	6/15/79	10,109	5.22	LV	
SS 78	FISH CREEK	FINGERLINGS	FISH CREEK	6/15/79	114,647	57.21	NO	
SS 78	FISH CREEK	FINGERLINGS	FISH CREEK	6/15/79	10,109	5.22	LV	
SS 78	FISH CREEK	FINGERLINGS	FISH CREEK	6/22/79	48,395	20.41	NO	
H2O STOCKED TOTAL						335,853	174.17	
SS 78	MEADOW CREEK	FINGERLINGS	MEADOW CREEK	6/22/79	10,000	4.62	RV	
SS 78	MEADOW CREEK	FINGERLINGS	MEADOW CREEK	6/22/79	37,442	17.60	NO	
H2O STOCKED TOTAL						47,442	22.22	
SS 78	FISH CREEK	FINGERLINGS	NIKLASON LAKE	6/22/79	2,268	1.23	RV	
SS 78	FISH CREEK	FINGERLINGS	NIKLASON LAKE	6/22/79	23,082	14.65	NO	
H2O STOCKED TOTAL						25,330	15.88	
SS 78	FISH CREEK	FINGERLINGS	WASILLA LAKE	6/24/79	111,006	57.16	NO	
SS 78	FISH CREEK	FINGERLINGS	WASILLA LAKE	6/21/79	9,996	5.40	RV	
H2O STOCKED TOTAL						121,002	62.56	
SS 78	FISH CREEK	FINGERLINGS	CORNELIUS LAKE	6/21/79	2,268	1.23	RV	
SS 78	FISH CREEK	FINGERLINGS	CORNELIUS LAKE	6/21/79	12,038	5.90	NO	
H2O STOCKED TOTAL						14,306	7.13	
AGE TOTAL					630,057	327.02		
SPECIES TOTAL					630,057	327.02		
HATCHERY TOTAL					630,057	327.02		

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FISH PLANTED IN 1979 BY TUTKA LAGOON HATCH.

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SP	ER YR	ORIGIN		STAGE	WATER STOCKED		TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	LWTNO
CS	73	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/09/79	50,644	17.01	NO	
CS	73	FORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/10/79	36,314	12.37	NO	
CS	78	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/21/79	10,797	3.62	NO	
CS	78	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/27/79	5,207	1.78	NO	
CS	79	FORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/25/79	156,376	52.54	NO	
CS	78	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/23/79	556	.19	NO	
CS	78	FORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/11/79	31,740	10.66	LV	
CS	75	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/08/79	16,945	5.69	NO	
CS	78	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/15/79	51,573	17.33	NO	
CS	73	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/17/79	39,106	13.14	NO	
CS	73	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/04/79	44,796	15.05	NO	
CS	78	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/11/79	32,431	10.89	KV	
CS	73	FORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/11/79	77,514	26.04	NO	
CS	73	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/06/79	23,015	7.75	NO	
CS	78	PORT	DICK CREEK	FEED FRY	TUTKA BAY	LAGOON CR	5/05/79	19,706	6.62	NO	
H2O STOCKED TOTAL								597,377	200.68		

AGE TOTAL

597,377 200.68

SPECIES TOTAL

597,377 200.68

PS	78	TUTKA BAY	LAGOON CR	SWIMUP FRY	TUTKA BAY	LAGOON CR	4/04/79	2,400	.55	NO	
PS	78	TUTKA BAY	LAGOON CR	SWIMUP FRY	TUTKA BAY	LAGOON CR	4/22/79	15,067	3.42	NO	
PS	78	TUTKA BAY	LAGOON CR	SWIMUP FRY	TUTKA BAY	LAGOON CR	4/18/79	7,127	1.65	NO	
PS	78	TUTKA BAY	LAGOON CR	SWIMUP FRY	TUTKA BAY	LAGOON CR	4/13/79	4,527	1.05	NO	
H2O STOCKED TOTAL								29,121	6.68		

AGE TOTAL

29,121 6.68

PS	73	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/03/79	561,900	126.98	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/09/79	10,500	2.41	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/04/79	313,788	70.92	NO	
PS	73	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/28/79	170,125	38.45	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/31/79	25,400	5.74	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/30/79	10,186	2.30	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/29/79	44,400	10.03	NO	
PS	73	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/07/79	56,125	12.91	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/25/79	23,600	5.43	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/02/79	14,625	3.31	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/01/79	14,400	4.38	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/27/79	104,500	23.62	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/25/79	148,800	33.63	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/25/79	224,155	50.66	NO	
PS	73	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/26/79	198,000	44.75	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/06/79	191,400	43.25	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/15/79	655,000	148.03	NO	
PS	73	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/09/79	278,000	62.93	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/21/79	61,725	13.95	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	5/08/79	159,795	36.11	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/05/79	11,000	2.53	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/04/79	7,375	1.69	NO	
PS	78	TUTKA BAY	LAGOON CR	FEED FRY	TUTKA BAY	LAGOON CR	6/03/79	14,000	3.22	NO	

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FISH PLANTED IN 1979 BY TUTKA LAGOON HATCH.

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BR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHIND
PS 78	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY LAGOON CR	5/05/79	128,400	29.01	NO	
PS 73	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY LAGOON CR	5/21/79	165,725	23.89	NO	
PS 78	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY LAGOON CR	5/15/79	79,350	17.93	NO	
PS 78	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY LAGOON CR	5/17/79	146,725	33.16	NO	
PS 78	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY LAGOON CR	6/06/79	19,250	4.43	NO	
PS 73	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY LAGOON CR	5/02/79	725,145	163.88	NO	
PS 78	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY LAGOON CR	5/16/79	257,400	58.17	NO	
H2O STOCKED TOTAL					4,765,804	1,077.60		
PS 73	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY	5/01/79	8,976	2.03	LV	
PS 73	TUTKA BAY LAGOON CR	FEED FRY	TUTKA BAY	6/01/79	8,771	3.48	RV	
H2O STOCKED TOTAL					17,747	5.51		
AGE TOTAL					4,763,551	1,083.11		
SPECIES TOTAL					4,812,672	1,089.79		
HATCHERY TOTAL					5,410,049	1,290.47		
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/2/79	387,734	142.68	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/3/79	474,559	143.32	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/3/79	346,311	116.71	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/3/79	269,407	113.96	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/3/79	320,388	127.92	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/3/79	274,142	114.29	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/3/79	258,036	123.98	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/3/79	351,417	150.94	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/4/79	294,294	126.40	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/4/79	312,915	124.93	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/4/79	233,958	83.95	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/4/79	326,645	117.21	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/4/79	397,184	132.45	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/4/79	353,350	115.13	NO	
PS 78	Tutka Bay Lagoon Cr.	Fed Fry	Tutka Lagoon	6/4/79	30,705	12.21	RV	
H2O STOCKED TOTAL					4,631,045	1,746.08		
AGE TOTAL					9,414,596	2,829.19		
SPECIES TOTAL					9,443,717	2,835.87		
HATCHERY TOTAL					10,041,094	3,036.55		

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FISH PLANTED IN 1979 BY EAST CREEK HATCHERY

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OR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CWING
RS 78	LAKE NUNAVAUGALUK	SWIMUP FRY	EAST CREEK	6/21/79	4,144	.52	NO	
H2O STOCKED TOTAL					4,144	.52		
AGE TOTAL					4,144	.52		
RS 78	LAKE NUNAVAUGALUK	FEED FRY	EAST CREEK	5/20/79	1,101,770	197.21	NO	
RS 78	LAKE NUNAVAUGALUK	FEED FRY	EAST CREEK	6/11/79	789,561	142.91	NO	
RS 73	LAKE NUNAVAUGALUK	FEED FRY	EAST CREEK	6/07/79	771,566	161.25	NO	
H2O STOCKED TOTAL					2,662,897	501.37		
AGE TOTAL					2,662,897	501.37		
SPECIES TOTAL					2,667,041	501.89		
HATCHERY TOTAL					2,667,041	501.89		

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FISH PLANTED IN 1979 BY CROOKED CREEK HATCH.

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SP	BR YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CWIND
RS	78	BEAR CREEK	FINGERLINGS	BEAR CREEK	6/08/79	468,878	90.02	NO	
RS	78	BEAR CREEK	FINGERLINGS	BEAR CREEK	6/08/79	468,879	90.02	NO	
RS	78	BEAR CREEK	FINGERLINGS	BEAR CREEK	6/08/79	36,095	8.01	LV	
RS	78	BEAR CREEK	FINGERLINGS	BEAR CREEK	6/08/79	468,878	90.02	NO	
RS	78	BEAR CREEK	FINGERLINGS	BEAR CREEK	6/08/79	485,685	107.82	NO	
RS	78	BEAR CREEK	FINGERLINGS	BEAR CREEK	6/08/79	485,685	107.82	NO	
RS	78	BEAR CREEK	FINGERLINGS	BEAR CREEK	6/08/79	485,685	107.82	NO	
H2O STOCKED TOTAL						2,899,785	601.53		
RS	78	BEAR CREEK	FINGERLINGS	CHENIK LAKE	5/18/79	256,525	39.99	NO	
H2O STOCKED TOTAL						256,525	38.99		
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	6/14/79	454,065	103.98	NO	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	6/14/79	454,065	103.98	NO	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	6/14/79	30,502	5.98	RV	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	6/14/79	491,889	121.98	NO	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	6/14/79	491,889	121.98	NO	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	5/09/79	804,334	102.15	NO	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	5/09/79	668,337	80.86	NO	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	5/09/79	668,337	80.86	NO	
RS	78	GLACIER CREEK	FINGERLINGS	GLACIER CREEK	5/09/79	800,775	101.69	NO	
H2O STOCKED TOTAL						4,864,193	824.46		
RS	78	HIDDEN LAKE	FINGERLINGS	HIDDEN LAKE	7/12/79	8,256	1.74	NO	
H2O STOCKED TOTAL						8,256	1.74		
AGE TOTAL						8,028,759	1,466.72		
SPECIES TOTAL						8,028,759	1,466.72		
SS	78	CROOKED CREEK	FINGERLINGS	CROOKED CREEK	6/18/79	10,740	4.48	NO	
H2O STOCKED TOTAL						10,740	4.48		
AGE TOTAL						10,740	4.48		
SPECIES TOTAL						10,740	4.48		
HATCHERY TOTAL						8,039,499	1,471.20		

10/24/80

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FISH PLANTED IN 1979 BY CANNERY CR HATCHERY

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SR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CHIND
CS 78	WELLS RIVER	FINGERLINGS	CANNERY CREEK	5/08/79	20,309	14.07	AURV	
H2O STOCKED TOTAL					20,309	14.07		
AGE TOTAL					20,309	14.07		
SPECIES TOTAL					20,309	14.07		
PS 78	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	5/08/79	121,705	28.50	LV	
PS 75	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	5/04/79	806,587	134.15	LV	
PS 75	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	4/26/79	605,458	149.19	LV	
PS 78	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	4/17/79	89,727	17.93	NO	
PS 78	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	4/14/79	35,757	7.25	NO	
PS 78	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	4/23/79	248,000	50.25	LV	
PS 78	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	4/20/79	196,500	40.20	NO	
PS 78	CANNERY CREEK	SWIMUP FRY	CANNERY CREEK	5/18/79	46,398	9.55	LV	
H2O STOCKED TOTAL					2,151,432	487.12		
AGE TOTAL					2,151,432	487.12		
SPECIES TOTAL					2,151,432	487.12		
HATCHERY TOTAL					2,171,741	501.19		

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FISH PLANTED IN 1979 BY CLEAR AFB HATCHERY

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BR SP YR	ORIGIN	STAGE	WATER STOCKED	TRIP DATE	NUMBER STOCKED	TOTAL WT IN KG	MARKS	CWTNU
CS 78	DELTA CLEARWATER R.	SWIMUP FRY	CLEAR CREEK	5/23/79	9,545	2.70	NO	
CS 78	DELTA CLEARWATER R.	SWIMUP FRY	CLEAR CREEK	5/22/79	15,205	4.50	NO	
CS 78	DELTA CLEARWATER R.	SWIMUP FRY	CLEAR CREEK	5/18/79	6,044	1.72	NO	
CS 78	DELTA CLEARWATER R.	SWIMUP FRY	CLEAR CREEK	6/04/79	29,818	8.43	NO	
CS 78	DELTA CLEARWATER R.	SWIMUP FRY	CLEAR CREEK	5/29/79	29,819	8.37	NO	
H2O STOCKED TOTAL					90,431	25.72		
AGE TOTAL					90,431	25.72		
SPECIES TOTAL					90,431	25.72		
HATCHERY TOTAL					90,431	25.72		

APPENDIX B

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