FRED Reports

FRED 1984 ANNUAL REPORT
TO THE ALASKA STATE LEGISLATURE

Edited by
Jeffrey A. Hansen
Number 42

Alaska Department of Fish & Game
Division of Fisheries Rehabilitation,
Enhancement and Development

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Alaska Department of Fish and Game
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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 utilized 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, limnology, biology, fish culture, and pathology is providing important information about the state's fish resources. FRED encourages rehabilitation efforts by private nonprofit aquaculture corporations and provides technical services to them.

During 1984, FRED released more than 302 million young salmon, an increase of 46 million over 1983 releases. FRED personnel also planted over 3.2 million trout, sheefish, and grayling statewide in 1984. Over 441 million eggs were taken for incubation during the year, representing an increase of over 40 million eggs from 1983. More than 3.1 million hatchery-bred salmon returned to the state's hatcheries and fisheries in 1984.

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INTRODUCTION

The Fisheries Rehabilitation, Enhancement and Development (FRED) program comprises a part of the State's salmon management program. It contributes knowledge gained from tagged fish studies and technological research; it mitigates fish losses from foreign interceptions and environmental disruptions; it contributes fish to existing but depressed fisheries; and creates new opportunities for commercial, sport, and subsistence fisheries.

Statute Authorities

The mission of FRED is to plan and implement a program that ensures the perpetual and increasing production and use of Alaska's fishery resources (AS 16.05.092). In addition, members of the Division, with approval of the Commissioner's office, coordinate the rehabilitation and enhancement activities of the Department and Regional Aquaculture Associations (AS 16.10.380) and process fish transport permits and applications for private nonprofit hatcheries (AS 16.10.440). The Division also technically assists the nonprofit hatcheries to the extent possible (AS 16.10.443) and cooperates in the development of regional salmon plans (AS 16.10.375).

FRED's duties (AS 16.10.092) include the annual presentation of a comprehensive report to the Legislature. This report, along with a detailed budget request, satisfies these reporting requirements.

Functions and Services

The Division operates 20 hatcheries to produce salmon and trout for subsistence, commercial, and sport fisheries. Twenty-three fishpasses statewide provide spawning and rearing habitat that would otherwise be unattainable to salmon stocks. Many of these fishpasses are maintained cooperatively with the U.S. Forest Service. The strategies of lake fertilization, habitat improvement, and fish stock introduction provide improved freshwater survival and new production opportunities for salmon stocks.

The Division operates four biological laboratories that serve the Department and other agencies. The Fish Pathology and Genetics Laboratories provide diagnostic services and brood-stock evaluations for State and private nonprofit fisheries programs. The Limnology Laboratory provides supervision of all lake enrichment projects and analyses of water, plankton, and aquatic insects sampled for lake productivity studies. The Tag Recovery Laboratory decodes metal tags implanted in fish and supplies resultant information for hatchery and natural stock evaluation, as well as for the evaluation of United States/Canada salmon interceptions.

The Private Nonprofit (PNP) Hatchery Program is administered by the Division. One of the responsibilities of administering this program is to organize the regional salmon planning teams, which are comprised of Department and Regional Aquaculture Association members. The PNP office coordinates the review of private non-profit hatchery applications, and the permitting process, which includes hatchery and fish transport permits.

FRED provides engineering services to the Department. Projects include field facilities, hatcheries, and coordination with consultants, contractors, and land owners.

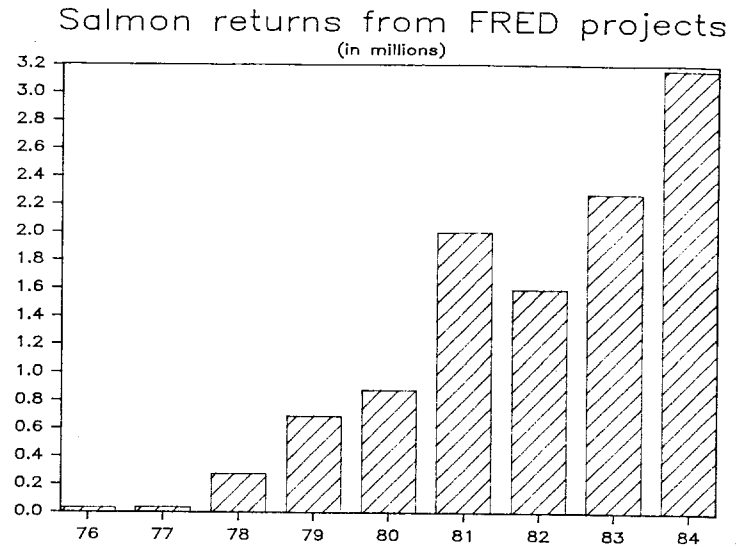
PRODUCTION RESULTS, 1984

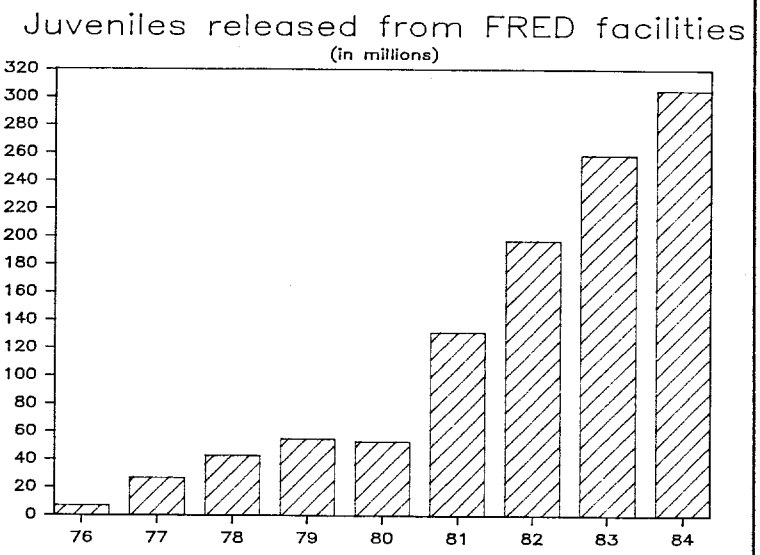
More adult salmon returned in 1984 as a result of FRED projects than ever before. Nearly 3.2 million FRED salmon returned, compared to 2.3 million in 1983 and 1.6 million in 1982. Of those 3.2 million, at least 2.3 million were harvested by commercial fishermen and an estimated 26,700 were taken by sport fishermen. FRED hatchery returns by species and facility appear in Table 1.

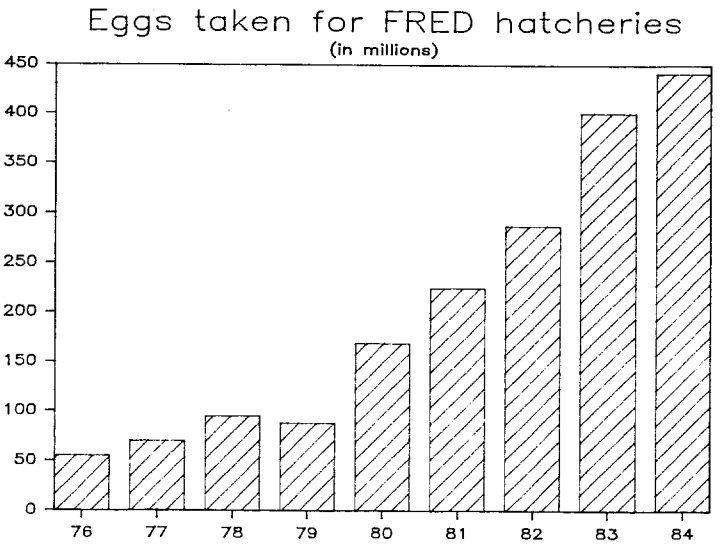
Releases of fish by FRED projects during 1984 totaled over 305 million, 45 million more than in 1983. Pink salmon was the predominant species (180 million fish). Releases by area, facility, and species appear in Tables 2 and 3. Hatchery survivals for all fish released in 1984 are shown in the tables in Appendix A, and release locations by species appear in Appendix B.

During 1984, FRED personnel took over 441 million eggs, 40 million more than were taken in 1983. The predominant species were pink salmon (197 million eggs), chum salmon (133 million eggs), and sockeye salmon (83 million eggs). Egg takes by area, facility, and brood stock are shown in Table 4.

Returns, releases, egg takes, and a description of the projects are discussed in greater detail in the area summaries that follow.







SOUTHEAST

Summary of FRED Projects

The FRED Division maintains four area offices throughout Southeastern. Area biologists are responsible for various enhancement and rehabilitation projects for which the hatcheries supply fishes. In Southeastern, as in other regions of the State, FRED employs the strategies of hatchery production and direct release to estuaries; development and rehabilitation of lake and stream stocks; stock enhancement through use of fishpasses and the improvement of stream habitat; and stock expansion through lake fertilization.

Most cultured fishes in Southeast are released at the hatcheries. However, program plans include increased numbers of rehabilitation projects wherein coho, chinook, and sockeye salmon are to be stocked in lakes and streams for advanced rearing.

Figure 1 shows the location of the six state-operated salmon/trout hatcheries in Southeast. Three of those: (1) Snettisham, near Juneau; (2) Hidden Falls, on Chatham Strait at Baranof Island; and (3) Klawock, at Klawock, feature chum salmon. Each facility has a design capacity of about 70 million eggs; the intended returns will amount to about 1 million chums per year for each facility. The Snettisham and Hidden Falls Hatcheries, along with the Crystal Lake Hatchery at Petersburg and the Deer Mountain Hatchery at Ketchikan, also feature chinook salmon. This species is of special interest in Southeast, and program funding has been adjusted to emphasize chinook salmon brood stock development and increased production.

The Beaver Falls Hatchery at Ketchikan was taken out of chum salmon production in 1983 and was reconstructed as a sockeye salmon facility. The resulting sockeye fry will be released into lakes that are being treated with commercial fertilizer for the purpose of increasing sockeye production.

Southeast Highlights

- Chums returning to Hidden Falls contributed at least 540,000 adults to the commercial fisheries.
- Over 74 million chum eggs were taken.
- Over 4.3 million chinook eggs were taken in 1984. Four million of these eggs resulted from returns to Crystal Lake and Deer Mountain.
- The winning fish in the 1984 Ketchikan Fishing Derby was a 50 pound, 3 ounce chinook salmon released from Deer Mountain Hatchery in 1980.

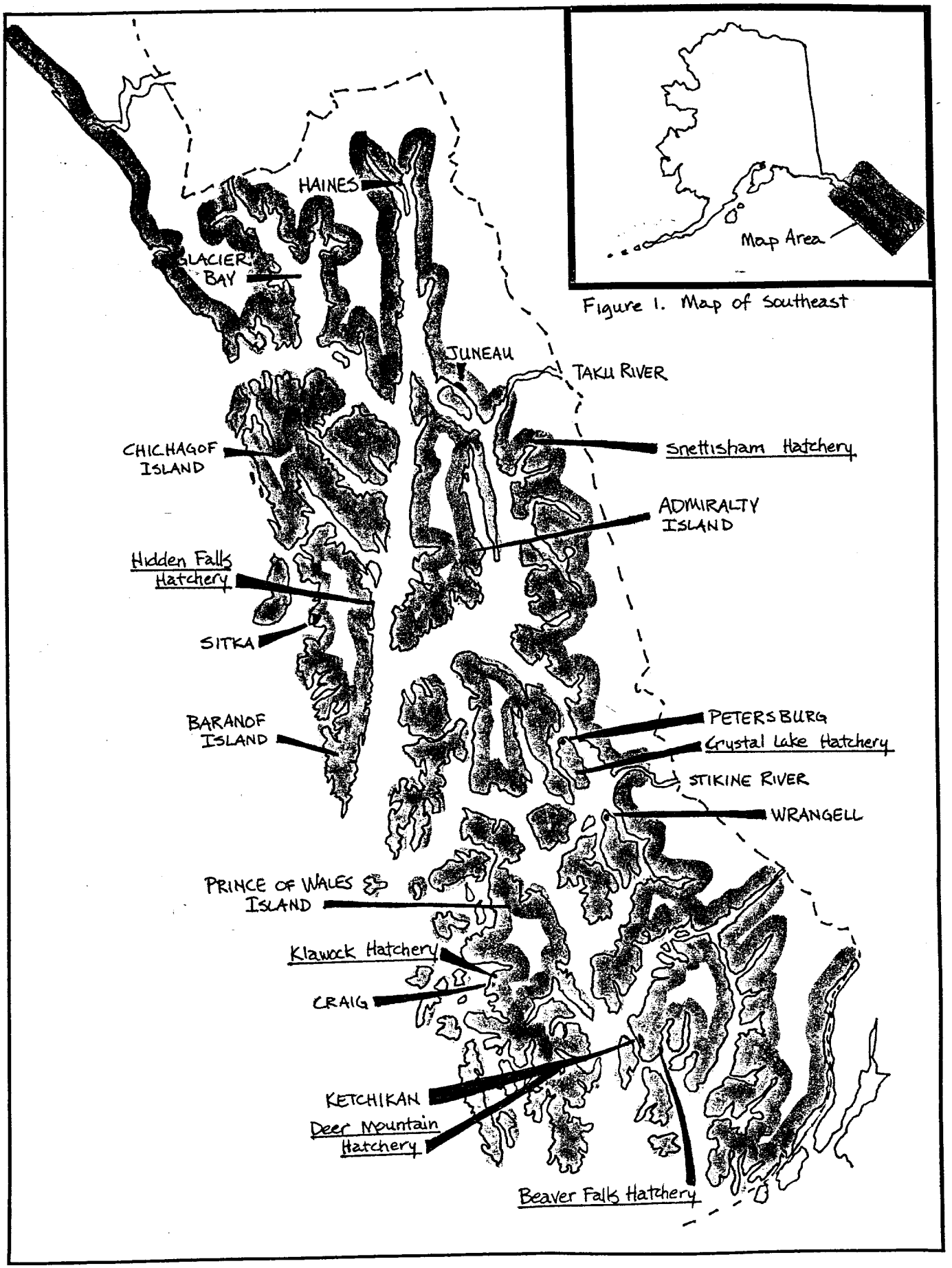


Figure 1. Map of Southeast

- Hidden Falls released 28.5 million chum and took 36 million eggs in 1984. This is the largest release and egg take of chum salmon in the state.

- The estimated return of 25,000 Crystal Lake coho represents an ocean survival of around 6%.

Southeast Returns

The return of FRED hatchery-produced salmon to Southeast Alaska in 1984 exceeded three quarters of a million fish, which is nearly 4 times the number that returned in 1983 (Table 1). The largest increase was chum salmon, and the main contributor was Hidden Falls Hatchery. At least 540,000 adult chum were harvested in Chatham Strait and in Kasnyku Bay during a series of terminal fisheries at the hatchery. This is a very significant number of fish when you consider that the average catch of chum salmon in all of Northern Southeast over the past 10 years has been only 523,000 fish. Another 124,000 adult chum returned in 1984 as a result of operations at Beaver Falls, Klawock, and Snettisham Hatcheries.

The chinook return in 1984 was another success story for the hatcheries in Southeast. Preliminary tag recovery information suggests that 15% of the chinook salmon delivered to Petersburg during the winter troll fishery are provided by Crystal Lake Hatchery. Crystal Lake Hatchery chinook salmon also contributed an estimated 14% of the total Petersburg marine sport harvest of chinook and 10% of the chinook salmon landed in the 1984 Juneau Golden North Salmon Derby.

Chinook salmon from Deer Mountain Hatchery also contributed to the commercial and sport harvests in the Ketchikan area. Five of the top 10 chinook landed during the Ketchikan Fishing Derby were from Deer Mountain Hatchery, including the $10,000 first prize winning fish of 50 pounds, 3 ounces. In addition, the return of brood stock to Crystal Lake and Deer Mountain Hatcheries provided a surplus of chinook eggs that were sent to 5 other facilities in Southeast Alaska.

Nearly twice as many hatchery-produced coho returned in 1984 than in the previous year. Crystal Lake Hatchery was the major producer, accounting for a return of over 25,000 coho including 19,000 to the commercial fisheries and an estimated 2,200 to sports fishermen. Coho also returned to Deer Mountain, Klawock, and Snettisham Hatcheries, which contributed an estimated total of 12,400 to the commercial fisheries.

Southeast Releases

Nearly 42 million juvenile chum salmon were released from southeastern hatcheries in 1984 (Table 2). Hidden Falls Hatchery released over 20 million chum fingerling and nearly 8.5 million

emergent fry. Another 13.4 million chum fingerling were released from Klawock and Snettisham. Crystal Lake released 56,000 fingerling and planted 189,000 eyed chum eggs into Crystal Creek. Because Crystal Lake Hatchery was able to reach maximum capacity with chinook eggs, there was no longer any spare room at the facility to handle chum fry this spring; therefore, the eyed eggs were planted into Crystal Creek.

About 1.3 million chinook smolts were released from 4 facilities in southeast. Additionally, 109,000 chinook fry were planted into Brennan Lakes, and 23,000 fry were released back into the Farragut River. The fry stocking into Brennan Lakes will supply information regarding the feasibility of using lakes for rearing hatchery chinook. Crystal Lake Hatchery released a total of 666,000 smolt, while Snettisham released 286,000, and Hidden Falls released about 70,000 chinook smolt. Another 305,000 chinook from 1983 brood year were released by the Deer Mountain Hatchery into Thomas Basin in Ketchikan.

The Crystal Lake Hatchery divided a release of over 500,000 coho smolt between Crystal Creek and Ohmer Creek. The releases into Ohmer Creek are designed to increase commercial harvests and to create a second terminal harvest area for hatchery returns. Crystal Lake Hatchery also stocked coho fry into Sumner, Ohmer, Crystal, and Irish Creeks. The 780,000 coho fry stocked throughout the Irish Creek drainage represents the second of four consecutive annual plants designed to create returning adults that will spawn above the newly completed fishway. Major releases of coho smolt also occurred at Klawock Hatchery where 855,000 smolt were released, and at Snettisham Hatchery with a release of 234,000 smolt.

Deer Mountain Hatchery released about 38,000 coho fry into the Ward Lake/Ward Creek drainage in order to enhance the sport fishery at this Ketchikan roadside site. Over 22,000 steelhead smolt were released from Klawock and Crystal Lake Hatcheries, and 1,900 Dolly Varden trout were stocked from Snettisham Hatchery (Table 3). The 7-inch trout were planted into Twin Lakes, a very popular fishing spot for young anglers in the Juneau area.

Southeast Egg Takes

Over 74 million chum salmon eggs were taken for Southeastern facilities in 1984 (Table 4). Nearly 36 million eggs came from the chum salmon returning to Hidden Falls. At Klawock Hatchery, 16.4 million chum eggs were taken from the Klawock River, and over 12 million were shipped in from Beaver Falls Hatchery. Since Beaver Falls no longer raises chum salmon, the eggs from the adults returning there were made available to Klawock Hatchery. Snettisham ended up with nearly 10 million eggs from Neka River and chum returning to the hatchery. The eggs from Neka River were fertilized by males that had returned to Snettisham.

For the first time, sufficient chinook eggs were available from hatchery returns to supply the needs of facilities in Southeast. The main contributors were Crystal Lake and Deer Mountain Hatcheries. At Crystal Lake, nearly 2.8 million chinook eggs were taken, of which 1 million were sent to Snettisham. Additionally, 57,000 eggs were shipped to Hidden Falls, 96,000 to Sheldon Jackson in Sitka, and 216,000 chinook eggs to the Northern Southeast Regional Aquaculture Association facility located at Medvejie Creek (also near Sitka). Deer Mountain Hatchery collected 730,000 eggs for their use, and an additional 500,000 went to the Tamgas Hatchery, near Metlakatla, all of which were taken from chinook returning to the hatchery. The remainder of the 4.3 million chinook eggs taken in Southeast in 1984 came from three remote locations in northern Southeast. Eggs taken from the Tahini and Farragut Rivers were incubated in isolation at Crystal Lake Hatchery, and the resulting fry will be returned to the river of origin. Another 190,000 chinook eggs were taken from King Salmon River to Snettisham Hatchery where they will be released in 1986 for brood stock development.

Nearly 3 million coho eggs were taken from 3 facilities in Southeast; Crystal Lake accounted for nearly 1.7 million. The resulting juvenile coho will be used to continue the fry planting programs as well as smolt releases from Crystal and Ohmer Creeks. The coho resulting from the eggs taken in 1984 at Snettisham and Klawock will be released as smolts in 1986. Steelhead eggs were also taken in 1984 for incubation at Crystal Lake, Klawock, and Snettisham Hatcheries.

PRINCE WILLIAM SOUND

Summary of FRED Projects

The FRED Division maintains a field office at Cordova; it operates two hatcheries in the northwest part of the Sound and one sockeye streamside incubation facility on the Upper Copper River (Figure 2). Biologists from the Cordova office participate in determining potential for sockeye and coho salmon production by means of lake enrichment along the Copper River as well as in the Sound. Other studies deal with the development of salmon sport fisheries at Whittier and Valdez as well as the Copper River Flats.

The Main Bay and Cannery Creek Hatcheries produce chum and pink salmon primarily for the commercial fisheries. Fishery contributions by these stocks are evaluated by the biological staff, which also cooperates with the U.S. Forest Service in constructing and operating fishpasses to introduce salmon stocks in habitat above waterfalls.

The Copper River sockeye facility produces fish for the commercial fishery off the River's Delta and supplies fish to the upstream subsistence and personal use fisheries.

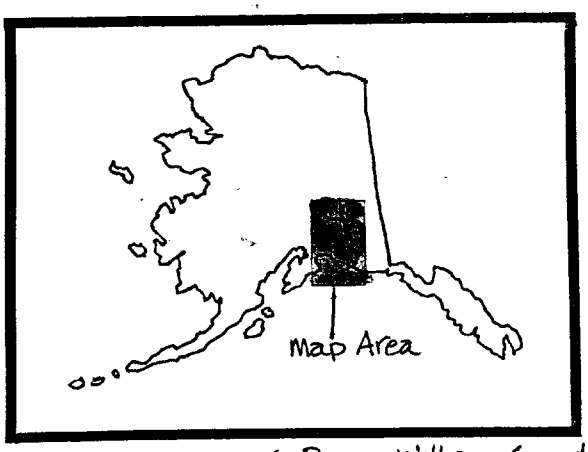


Figure 2. Map of Prince William Sound.

SUMMIT LAKE

Gulkana Facility

PAXSON LAKE

GULKANA RIVER

GLENNALLEN

COPPER RIVER

VALDEZ

Cannery Creek Hatchery

WHITTIER

Main Bay Hatchery

PRINCE WILLIAM SOUND

CORDOVA

HINCHINBROOK ISLAND

MONTAGUE ISLAND

Prince William Sound Highlights

- Main Bay and Cannery Creek contributed a minimum of 800,000 pink salmon to commercial catches in PWS in 1984.
- More sockeye eggs were taken at Gulkana than anywhere in the state since the early 1900's.
- More than 140 million salmon eggs were taken in 1984 for incubation at the three state facilities in the PWS area.
- Over 1 million salmonids of 4 species were stocked into waters in the PWS area to enhance the sport fisheries.

Prince William Sound Returns

The FRED Division operates 2 hatcheries in Prince William Sound (PWS) and 1 streamside incubation facility for sockeye on the upper Copper River. These projects provided a commercial harvest of at least 815,000 adults (Table 1). In addition, juvenile coho and chinook are transported from Cook Inlet hatcheries for release in urban areas of PWS. Previous releases into the Whittier area resulted in the 1984 harvest of over 900 chinook and 2,000 coho by the local sports fishermen.

About 1 million pink salmon and 52,000 chum salmon were taken in the commercial fishery in the vicinity of Cannery Creek Hatchery. Of these, 493,000 pink and all of the chum are attributed to hatchery returns. At Main Bay, 606,000 pink salmon returned to the terminal area. This figure is an understatement of the total return of salmon, since Main Bay pinks certainly contributed to the record catch of pink salmon in western Prince William Sound in 1984. There was no mark or recovery program, so it is impossible to estimate the contribution of Main Bay pinks to these fisheries.

The Gulkana streamside incubation project produced an estimated 25,000 adult sockeye in 1984, including 15,000 in the commercial harvest.

Prince William Sound Releases

Over 73 million pink salmon fry and 16.6 million juvenile chum were released by Cannery Creek and Main Bay Hatcheries in 1984 (Table 2). Of those releases, nearly 2 million pink fry were transported from Cannery Creek and planted into streams in Eaglek Bay in an effort to augment low, odd year pink production there. As part of a cooperative project with Prince William Sound Aquaculture Corporation (PWSAC), almost 7.4 million chum fry were transported from Main Bay and released into Lake Bay, on Esther Island, in order to build a brood stock for PWSAC's proposed Esther Lake Hatchery.

Four species of salmonids were transported and released into the PWS area in 1984 to enhance the sport fisheries. Smolt were released into Cove Creek at Whittier as in past years; 118,000 chinook and 42,000 coho were transported from Elmendorf Hatchery at Anchorage. Another 20,000 chinook fingerling were transferred from Trail Lakes Hatchery and released into South Jans Lake. An additional 67,000 coho from 3 hatcheries were stocked in the PWS area. A total of 610,000 grayling were transported from Clear Hatchery and stocked into 16 sites in the PWS area, and 14 lakes were stocked with 178,000 rainbow trout fingerlings from Elmendorf Hatchery. For a listing of the number of fish released at each location, see Appendix B.

Prince William Sound Egg Takes

Over 140 million salmon eggs were taken for the 3 facilities in PWS in 1984 (Table 4). Nearly 79 million pink salmon eggs were taken at Cannery Creek Hatchery. Main Bay Hatchery is switching pink salmon brood stock from the Port San Juan stock that they have had in the past to Cannery Creek brood stock. Therefore, the pink salmon eggs taken at Cannery Creek were shared with Main Bay, and no eggs were taken from the pink salmon returning to the Main Bay Hatchery.

For the second year, chum eggs were taken at Wells River in a cooperative effort between the Main Bay Hatchery and Prince William Sound Aquaculture Corporation. In 1984, about 33.6 million chum eggs were taken to Main Bay Hatchery for incubation, and the resulting fry will be released equally from the proposed Esther Lake site and Main Bay Hatchery. At Cannery Creek, 800,000 eggs were taken from chum salmon returning to the hatchery.

Last year, the capacity of the Gulkana streamside incubation project was expanded to 30 million eggs. In the first year of its expanded capacity, 26.8 million sockeye eggs were taken, which is more than double any previous egg take at the site. This is also the largest number of sockeye eggs taken in the state since the early 1900's, and it should produce about 200,000 adults for the Copper River fisheries.

COOK INLET

Summary of FRED Projects

The FRED Division maintains biological field offices at Big Lake, Soldotna, and Homer and operates six hatcheries throughout the Cook Inlet drainage (Figure 3). The biological staff is involved in chinook, coho, and sockeye rehabilitation projects in upper and central Cook Inlet, which include determination of waters to be stocked, brood-stock acquisition, and evaluation of hatchery releases. In addition, the biological staff supervises fishery

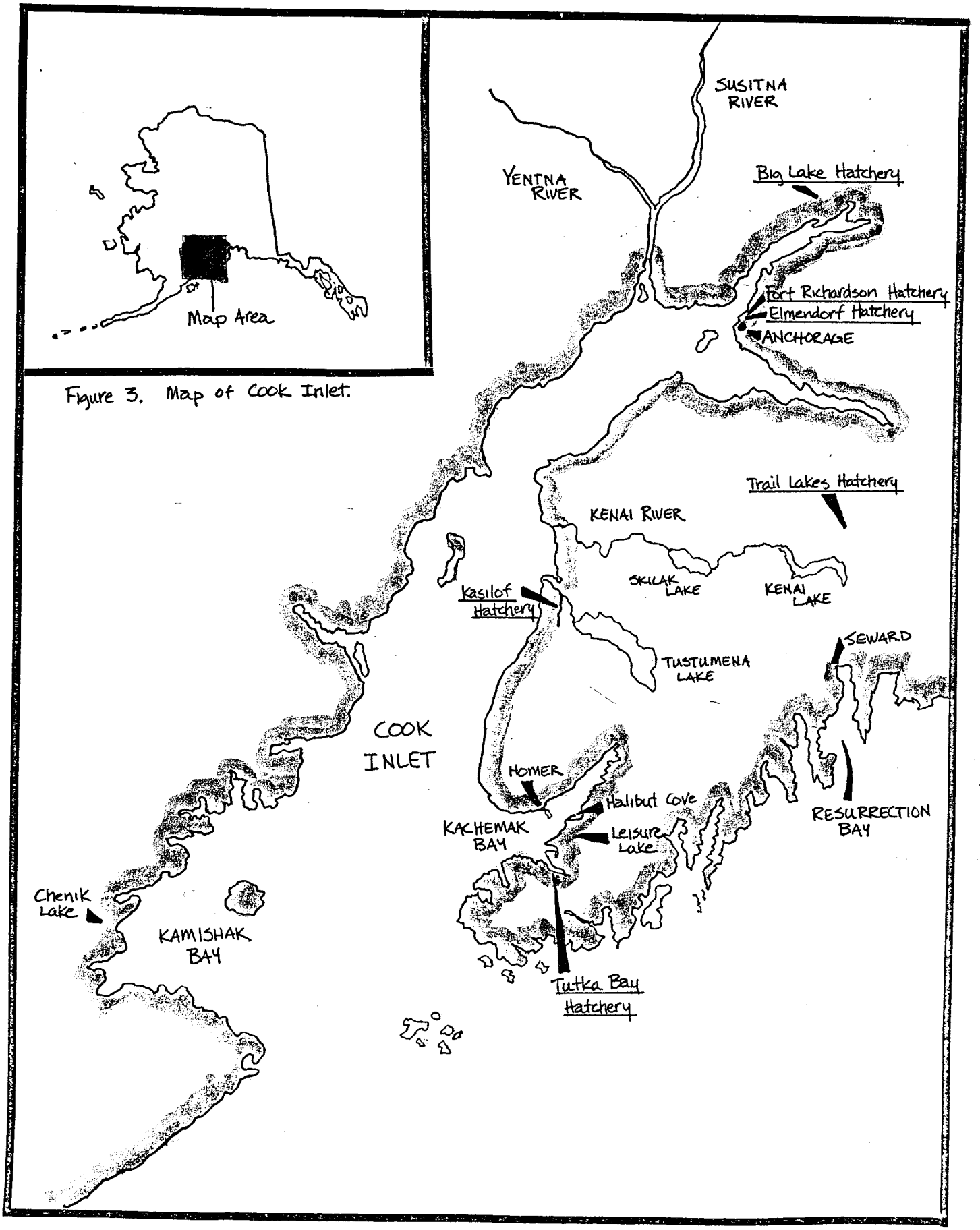


Figure 3. Map of Cook Inlet.

enhancement projects that feature smolt releases for the creation of saltwater sport fisheries and fishpass development. Stocking studies to determine the feasibility of introducing chinook, coho, and sockeye salmon in unoccupied lakes also shows promise for production increases. Finally, the biological and engineering staffs are involved in special studies of the Kenai River system. The feasibility of expanded steelhead production on the Kenai Peninsula is also being investigated.

The 6 hatcheries serving the Cook Inlet area all provide fish for subsistence, sport, and commercial fisheries. The Big Lake Hatchery, near Wasilla, produces sockeye salmon for the Big Lake and Nancy Lake systems. Many of these fish are caught by Cook Inlet gillnetters. The hatchery also produces coho salmon, which are stocked in Knik Arm streams as well as the Little Susitna River and are targeted for harvest in the sport fisheries. The Fort Richardson Hatchery at Anchorage operates on water heated by the military power plant. This new facility is coming on line and will feature rainbow trout for placement in over 75 lakes in Southcentral and Interior Alaska. Coho and chinook salmon smolts produced by this facility will be stocked at locations near Homer and Seward as well as Whittier and Valdez in Prince William Sound. The Elmendorf Hatchery carried the rainbow trout program, in 1984, but the program will be shifted to the Fort Richardson facility in 1985. Chinook and coho salmon produced at Elmendorf are presently stocked in the Kasilof River (Crooked Creek), Kachemak and Resurrection Bays, and Whittier.

Three of the six salmon hatcheries in Cook Inlet are located on the Kenai Peninsula. The newest facility is at Trail Lakes, near Moose Pass. This facility can culture several species and/or stocks of salmonids without transfer of disease. Presently, sockeye, coho, and chinook salmon are the target species for stocking into Kenai Peninsula streams, such as Sixmile Creek. The Kasilof Hatchery is the only sockeye facility that has not experienced IHN virus mortalities. This facility deals largely with Tustumena Lake sockeyes but provides sockeyes to other lakes such as Packers, Chenik, and Leisure; all are located in central and lower Cook Inlet. Chinook salmon eggs taken at this facility are utilized by the Elmendorf Hatchery for Cook Inlet projects. The third Kenai Peninsula hatchery is located at Tutka Bay, on the eastern shore of Kachemak Bay. This facility annually provides 50% or more of the total pink salmon seine fishery harvest in the lower Inlet. In addition, sport anglers catch about 5,000 pinks per year from this hatchery stock.

Cook Inlet Highlights

- Sockeye returns to Leisure Lake represent a marine survival of 42%.

- Leisure Lake returns made up 44% of the total lower Cook Inlet sockeye salmon harvest.

- Sports fishermen harvested over 7,600 chinook salmon from Halibut Cove Lagoon and Crooked Creek.

- The chinook return to Crooked Creek was the highest ever recorded for that system.

- Tutka Hatchery provided about 36% of the lower Cook Inlet commercial pink salmon catch.

- Sockeye salmon smolt emigration from Tustumena Lake was about 14 million in 1984, a record for the system. About 27% were estimated to be from hatchery releases made in 1982 and 1983.

- Nearly 8.5 million coho eggs were taken for 4 hatcheries in Cook Inlet.

- Nearly 1.5 million rainbow trout were stocked from Elmendorf Hatchery in 1984.

Cook Inlet Returns

Over 220,000 sockeye returned to Cook Inlet in 1984 as a result of Kasilof Hatchery operations (Table 1). The Leisure Lake project continues to exceed all expectations dealing with ocean survival. About 117,000 sockeye returned as a result of fry plants into Leisure Lake, which amounts to a 42% ocean survival.

The estimated 114,000 that were commercially harvested represents 44% of the total lower Cook Inlet sockeye harvest. An additional 2,500 sockeye were taken in the personal use dipnet and sport fisheries. Approximately 15% of the 700,000 adult sockeye returning to Tustumena Lake can be attributed to the fry planted from Kasilof Hatchery. Fry stocked from Kasilof into Chenik Lake in past years contributed to the return of 32,000 sockeye. This was the largest return to Chenik Lake since the 1930's and allowed a special commercial fishery that harvested 16,500 sockeye, which was about 68% of the Kamishak area catch.

Chinook salmon returned to Crooked Creek and Halibut Cove Lagoon in numbers large enough to support substantial sport fisheries. Over 2,600 chinook were harvested by 3,700 anglers at Halibut Cove Lagoon, where a total of over 3,000 chinook returned. The 1984 adult chinook salmon return to Crooked Creek of 9,101 was the highest on record for the system. Of this return, 6,530 chinook were a result of hatchery production. A record high of 5,050 chinook salmon were harvested by sports fishermen in 1984.

The return of 280,000 pink salmon of Tutka Hatchery origin represents a marine survival of 1.9%. Although this survival rate is lower than previous years, the returns still contributed substantially to the commercial fisheries of lower Cook Inlet. The harvest of 237,000 Tutka Hatchery pink salmon provided about 36% of the lower Cook Inlet pink catch, 74% of the southern district catch, and 95% of the Tutka subdistrict catch.

Cook Inlet Releases

A total of 27.8 million juvenile sockeye were released from Cook Inlet facilities in 1984. Kasilof Hatchery stocked over 17 million fingerling into Tustumena Lake and 2.1 million fry into Leisure Lake (Table 2). The Big Lake Hatchery provided 7.4 million fry to Meadow Lake, and 1.2 million sockeye fingerling were released into Hidden Lake from Trail Lakes Hatchery.

In 1984, about 700,000 chinook fingerling were released by Trail Lakes Hatchery. Of these, 425,000 were stocked into 15 landlocked lakes throughout Cook Inlet and 1 lake in Prince William Sound. These are to provide for increased land-based sport fisheries in the Cook Inlet area. Elmendorf Hatchery was responsible for stocking 747,000 chinook smolts into 7 locations: Crooked Creek, Cove Creek in Whittier, Ship Creek in Anchorage, Halibut Cove Lagoon, Homer Spit, and 2 sites in Resurrection Bay. A total of 110,000 smolt were released into waters that drain into Resurrection Bay to enhance the sport fisheries in the Seward area. Kasilof Hatchery released an additional 68,000 chinook smolts into Crooked Creek.

Elmendorf also released nearly 1.5 million rainbow trout (Table 3) into 98 lakes in the Cook Inlet, Kodiak, Prince William Sound, and Interior areas (Appendix B). In 1984, the only releases of pink and chum salmon in Cook Inlet came from Tutka Hatchery. The release of 19.6 million pink fry was the largest ever for this Kachemak Bay facility. About 140,000 juvenile chum were also released from Tutka.

Big Lake Hatchery was again the leading producer of juvenile coho in the Cook Inlet area with releases totaling nearly 1.8 million fish. These fish were released at 8 locations in upper Cook Inlet. Trail Lakes Hatchery released nearly 1.3 million coho fingerling into lakes in central and lower Cook Inlet, and Elmendorf planted a total of 559,000 coho into 9 locations, including Seward Lagoon and Cove Creek in Whittier.

Cook Inlet Egg Takes

Over 40 million sockeye eggs were taken in Cook Inlet in 1984, with Kasilof Hatchery taking 19.6 million, Big Lake Hatchery taking 17 million, and Trail Lakes accounting for nearly 3.8 million (Table 4).

Almost 1.6 million chinook eggs were taken from Crooked Creek for incubation at Elmendorf and Trail Lakes Hatcheries. Another 124,000 eggs were taken for Elmendorf from Ship Creek. About 760,000 chinook eggs were taken from the Willow Creek drainage for incubation and rearing at Ft. Richardson Hatchery. The resulting smolt will be released back into the Willow Creek system.

Tutka Hatchery had its largest egg take ever in 1984: 29.6 million pink and 28,000 chum salmon eggs.

Coho egg takes at Fish Creek, Cottonwood Creek, Meadow Creek, and Little Susitna River totaled nearly 5.2 million. Big Lake Hatchery has 4.5 million of those, and Fort Richardson has 675,000 for smolt releases back into the system of origin. Trail Lakes Hatchery took over 2.6 million coho eggs from 3 sources in central Cook Inlet. Many of the resulting fingerling will be used for the coho landlocked lake stocking program. Another 680,000 coho eggs are being incubated at Fort Richardson and Elmendorf to continue release programs in Cook Inlet and Prince William Sound.

A total of 258,000 rainbow trout eggs were taken in 1984 for the Fort Richardson Hatchery, and 4.5 million were taken for Elmendorf. All of the resulting fingerling from Elmendorf were stocked in 1984.

KODIAK AND ALASKA PENINSULA

Summary of FRED Projects

The FRED Division maintains an area office at Kodiak and operates a 100-million-egg salmon hatchery at Kitoi Bay on Afognak Island. This facility also stocks salmon and trout at a variety of locations accessible to sports anglers.

In addition, a streamside salmon egg incubation system is an integral part of the Karluk Lake sockeye rehabilitation project. The famous Frazer Lake fishpass on Kodiak Island and six other fishpasses on Afognak Island provide salmon with access to stream spawning and lake rearing areas.

The FRED Division operates a chum salmon hatchery at Russell Creek, near Cold Bay. That facility was originally intended to release about 45 million fed fry each year, which would return about 700,000 chum salmon to the fishery. However, major mechanical problems are preventing that hatchery from handling more than 20 million chum salmon eggs per year.

The FRED Division has closed its biological field office at Cold Bay; consequently, most biological evaluations of the Russell Creek chum salmon project are no longer accomplished.

Figures 4 and 5 show where these projects are located.

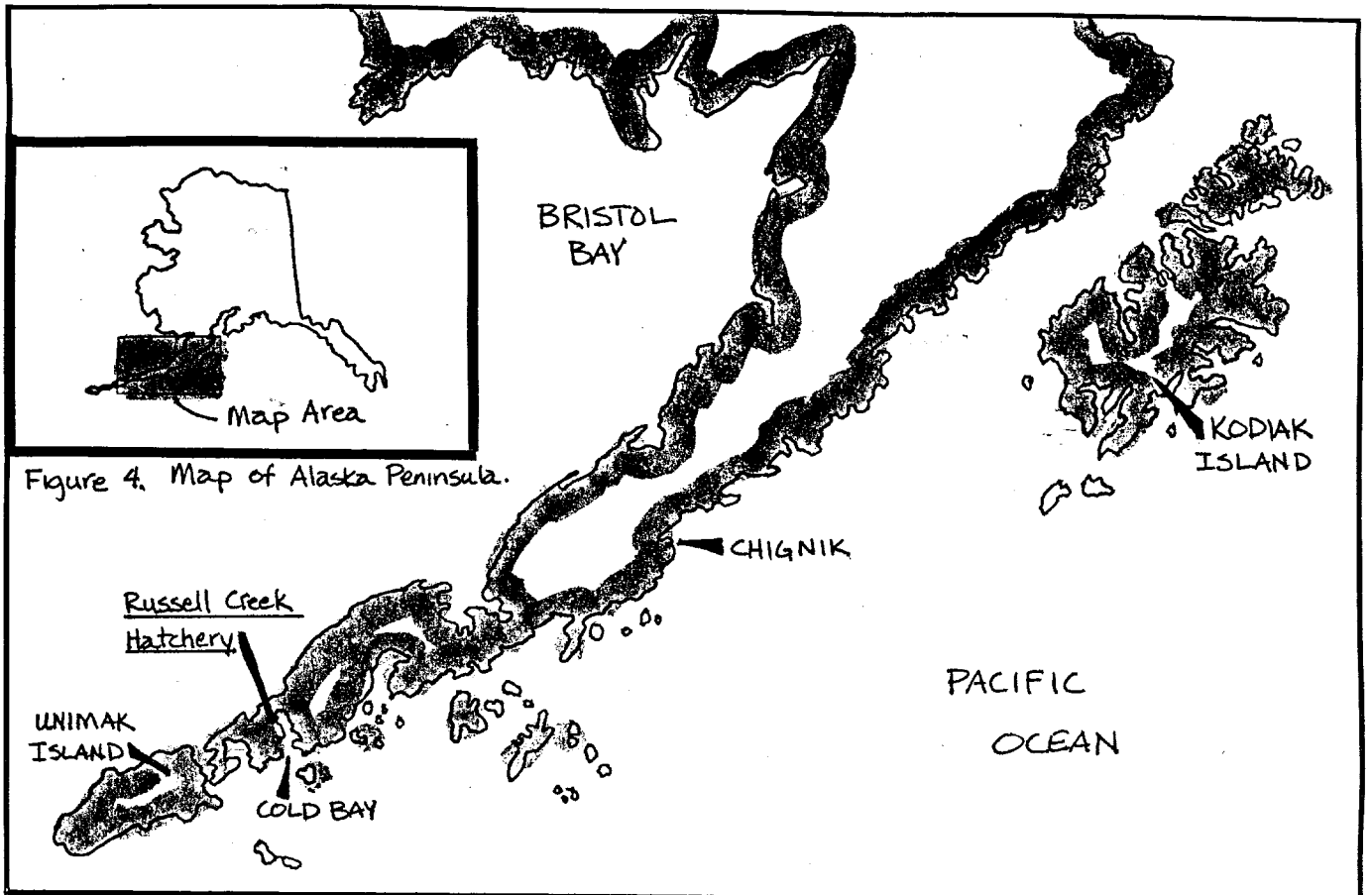


Figure 4. Map of Alaska Peninsula.

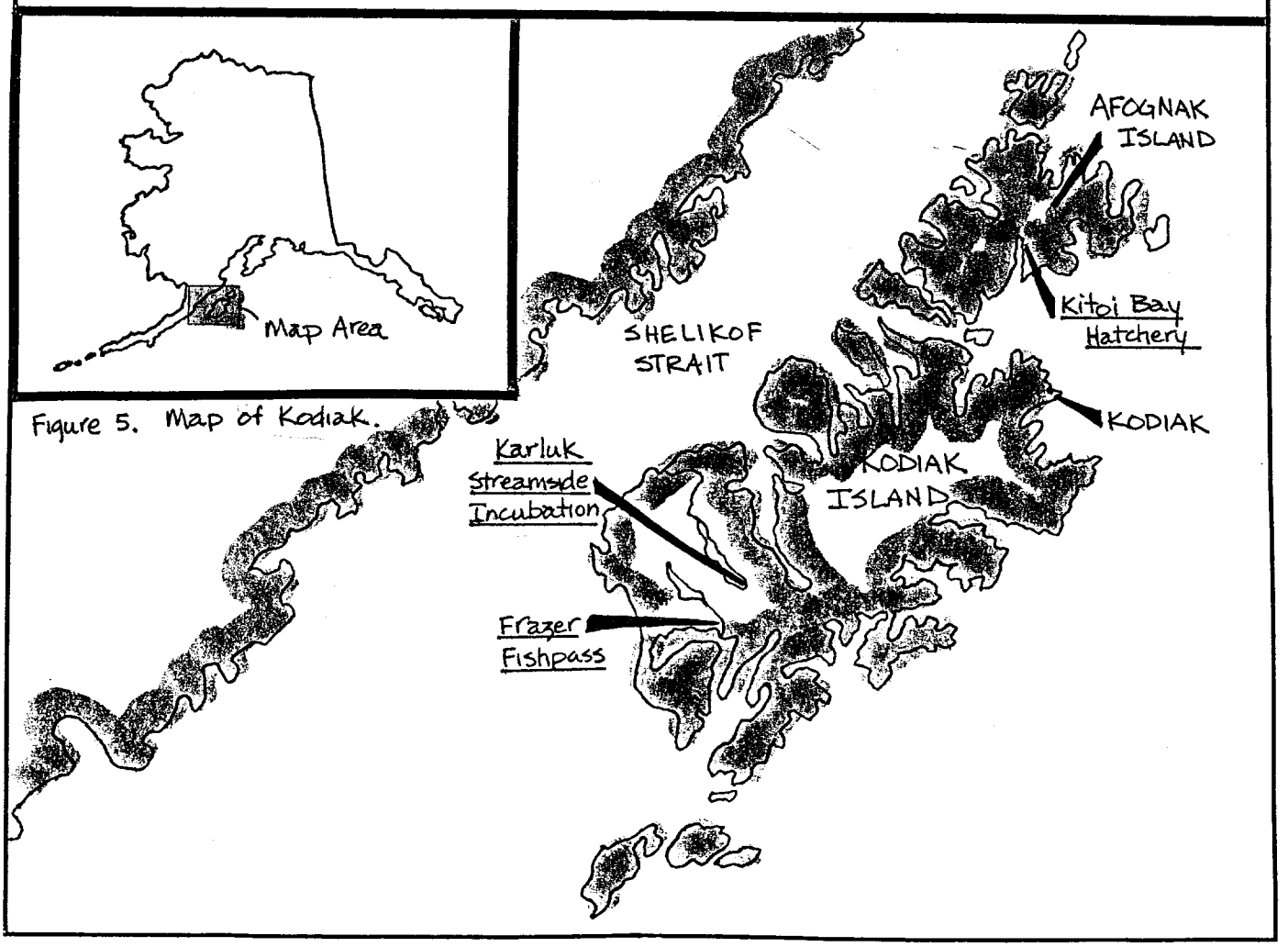


Figure 5. Map of Kodiak.

Kodiak and Alaska Peninsula Highlights

- Over 90 million eggs from 4 salmon species were taken for Kitoi Hatchery in 1984.
- The sockeye return to the Upper Thumb River in 1984 was the highest recorded since statehood.
- Modifications to the water-intake source at Russell Creek Hatchery increased the survival rate of chum eggs there by providing a source of clean water.

Kodiak and Alaska Peninsula Returns

Nearly 500,000 adult pink salmon returned in 1984, which includes an estimated contribution of 335,000 to the commercial fisheries (Table 1). This represents a survival of less than 1% of the fry that were released in 1983. Poor survival may be attributed to the heavy predation on released fry by herring. This is based upon stomach contents of herring captured during the pink fry emigration and upon differential return data between volitionally released fry (vulnerable to herring predation) and fed fry (much less vulnerable to predation). Even though the returns were less than expected, Kitoi Hatchery salmon sustained the pink salmon fisheries of the Afognak Island area.

The sockeye returns to the Karluk streamside incubation project contributed to the best sockeye return to the Upper Thumb River that has been recorded since statehood. The Karluk incubation site is located along the Upper Thumb River, which drains into Karluk Lake.

The Russell Creek Hatchery was expected to produce nearly 100,000 adult chum salmon in 1984, but since evaluation studies have ended there, the hatchery contribution to the total chum return was not estimated.

Fishpasses on Kodiak and Afognak Islands contributed approximately 50,000 salmon to the commercial fisheries in 1984. About 18,000 of those were sockeye from Frazer returns, and the remainder were contributed by the Afognak fishpasses.

Kodiak and Alaska Peninsula Releases

Kitoi Hatchery released more juvenile salmon than any other state facility again in 1984. Along with the release of 87 million reared and emergent pink salmon fry, the hatchery personnel also released four other species of salmonids (Tables 2 and 3). The majority of these other species were stocked to enhance the Kodiak roadside sport fishery. Over 300,000 coho fingerling were released at 17 locations, and 77,000 chinook were stocked into Lake Rose Tead. A total of 62,000 rainbow, most of which came from Elmendorf Hatchery, were placed into 17 lakes, and 125,000 grayling fry from Clear Hatchery were stocked into seven lakes in the Kodiak area.

The only other release that took place in the Kodiak area was the 13.2 million eyed sockeye eggs that were planted into the Upper Thumb River as a result of the Karluk streamside incubation project. No chum salmon fry were released from Russell Creek Hatchery in 1984 because of an outbreak of IHN virus. The few fry that survived were destroyed so that there was no risk of the disease spreading. The hatchery was disinfected, and the water supply system was altered before eggs were taken in 1984.

Kodiak and Alaska Peninsula Egg Takes

The pink salmon egg take at Kitoi Hatchery was the largest from any state-operated facility in 1984. In addition to the 89 million pink salmon eggs, Kitoi personnel also collected 975,000 chum eggs and a total of 319,000 chinook and coho eggs to continue the sport-fish stocking program for Kodiak (Table 4). For the second year in a row, over 15 million sockeye eggs were collected for the Karluk streamside incubation project.

In past years, the egg capacity at Russell Creek Hatchery has been limited to about 14 million eggs because of the poor quality of the water supply and flooding conditions. In 1984, before the eggs were taken, modifications were made to the water-intake source, which enabled the hatchery to obtain a supply of clean water for the first time. The result was 95% green-egg-to-eyed-egg survival rate for the chum eggs taken in 1984. During the previous 4 years of operation, the survival rate ranged from 79% to 88%.

ARCTIC-YUKON-KUSKOKWIM

Summary of FRED Projects

The FRED Division maintains an area project office at Fairbanks and fish hatcheries on the Tanana and Noatak Rivers. The Noatak facility is testing the feasibility of producing chum salmon, and if successful, could eventually be able to double the annual catch of chum salmon in Kotzebue Sound. The hatchery on the Tanana River is located near Anderson and is studying the feasibility of producing grayling, sheefish, and rainbow trout, in addition to chinook, chum, and coho salmon. Salmon tagged and released by the hatchery may provide important information on migration of Yukon River salmon stocks when those tags are recovered from high seas and coastal fisheries.

Figure 6 is a map showing the Noatak and Yukon River drainages and the locations of the Sikusuilaq and Clear Hatcheries.

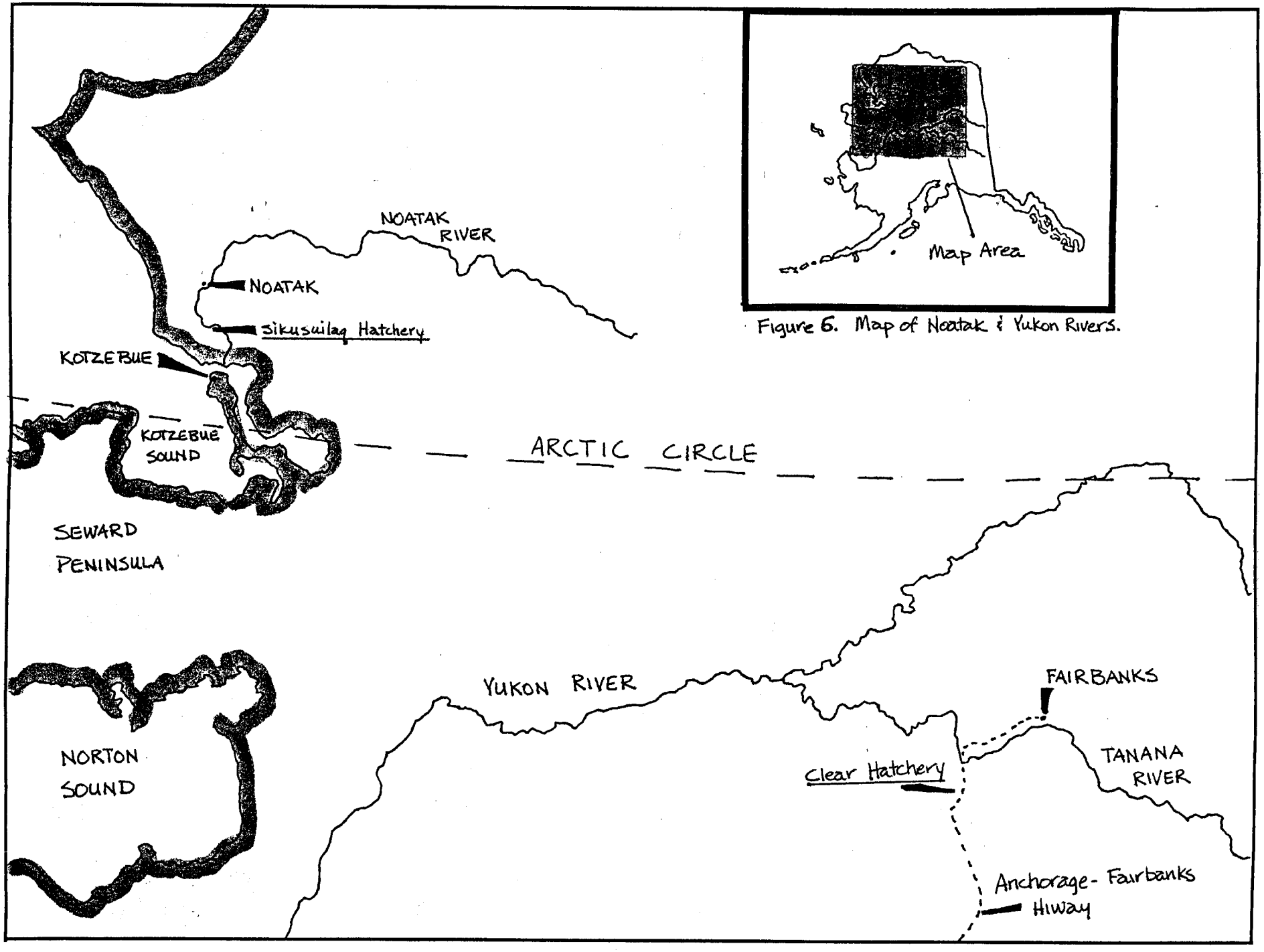


Figure 6. Map of Noatak & Yukon Rivers.

Arctic-Yukon-Kuskokwim Highlights

- Clear Hatchery personnel took over 5.3 million eggs in 1984.
- The first returns of hatchery-produced coho returned to Clear Hatchery.
- Over 2 million salmonids of four species were stocked for sport fisheries throughout central Alaska as a result of Clear Hatchery operation.
- Over 2.5 million chum eggs were collected for the Sikusuilaq Hatchery.

Arctic-Yukon-Kuskokwim Returns

About 1,100 adult chum have returned so far and another 400 are expected as a result of releases from Clear Hatchery (Table 1). The hatchery also experienced the first returns of coho when about 2,000 returned to the release site. This return of coho is very encouraging, as it represents a fingerling-to-adult survival rate of over 2%. Some additional but unknown number of coho was taken by the commercial fisheries. The returning coho in excess of escapement and hatchery needs were distributed to charity organizations. A total of 2,200 coho (11,000 pounds) was distributed. Sikusuilaq Hatchery, which is located along the Noatak River, expects the first returns of three-year-old chum salmon in 1985.

Arctic-Yukon-Kuskokwim Releases

Clear Hatchery released six species of juvenile salmonids in 1984, totaling nearly 2.9 million (Tables 2 and 3). Over 1.5 million of those were grayling fry that were stocked in 60 locations from Kodiak to Fairbanks. (For a complete listing of the stocking locations, see Appendix B.) Clear Hatchery personnel also released chinook, coho, chum, rainbow trout, and sheefish. At the Sikusuilaq Hatchery, approximately 1.4 million fed chum fry were released into the Noatak River. This is nearly three times the number of fry released in 1983.

Arctic-Yukon-Kuskokwim Egg Takes

Over 5.3 million eggs were taken for Clear Hatchery in 1984 (Table 4). This includes over 2 million eggs taken from both chum salmon and grayling. The grayling egg take provided the fry that were stocked throughout the central region in 1984. Chinook, coho, and sheefish eggs were also collected for incubation at Clear Hatchery.

Sikusuilaq Hatchery personnel collected more than 2.5 million chum salmon eggs last year. That is the current capacity of the state's northernmost hatchery. If the program is successful and returning adults can be attracted to the facility, the site could be a candidate for expansion in the future.

Table 1. Estimates of the numbers of salmon, produced at FRED hatcheries, that returned as adults to the fisheries and facilities in 1984.

Hatchery or project	Species	Commercial catch	Sport catch	Brood stock/ escapement	Total
SOUTHEAST					
Beaver Falls	chum	75,000	--	14,700	89,700
Crystal Lake	chinook	1,000	720	2,580	4,300
	coho	19,000	2,250	4,000	25,250
Deer Mountain	chinook	1,000	400	1,500	2,900
	coho	3,500	70		3,570
Hidden Falls	chum	540,000	--	60,000	600,000
Klawock	coho	3,600		1,000	4,600
	chum	1,000	--	16,100	17,100
Snettisham	chum	7,500	--	9,700	17,200
	coho	5,300	230	1,280	6,810
	chinook	100	190	30	320
AREA TOTALS:		657,000	3,860	110,890	771,750
PRINCE WILLIAM SOUND					
Cannery Creek	pink	493,000	--	75,000	568,000
	chum	51,400	--	500	51,900
Gulkana	sockeye	15,000	--	10,000	25,000
Main Bay	pink	306,000	--	300,000	606,000
AREA TOTALS:		865,400	-0-	385,500	1,250,900
COOK INLET					
Big Lake	coho	4,000	--	4,000	8,000
	sockeye	38,000		30,000	68,000
Crooked Creek	chinook	--	5,050	1,480	6,530
Tustumena	sockeye	70,200	--	34,800	105,000
Leisure Lake	sockeye	114,300	2,500	500	117,300
Chenik Lake	sockeye	15,500	--	15,500	31,000
Elmendorf					
Halibut Cove	chinook	220	2,640	140	3,000
Whittier	coho	--	2,000	--	2,000
	chinook		900		900
Seward Lagoon	coho		440	690	1,130
Bear Lake	coho		950	3,370	4,320
Grouse Lake	coho		310	560	870
Tutka Bay	pink	230,000	8,000	42,000	280,000
AREA TOTALS:		472,220	22,790	133,040	628,050
KODIAK-AK. PENINSULA					
Kitoi Bay	pink	335,600	--	151,400	487,000
Karluk	sockeye	2,000	--	20,000	22,000
AREA TOTALS:		337,600	-0-	171,400	509,000
ARCTIC-YUKON-KUSKOKWIM					
Clear	chum	1,000	--	1,080	2,080
	coho			2,000	2,000
AREA TOTALS:		1,000	-0-	3,080	4,080
STATEWIDE TOTALS:		**2,333,220**	**26,650**	**803,910**	**3,163,780**

Table 2. Salmon released during 1984 that were produced at FRED facilities.

Facility	Brood year, Stock, Species	Salmon released
SOUTHEAST		
Beaver Falls	1983 Ketchikan Creek, chinook	109,000
Crystal Lake	1982 Andrew Creek, chinook	416,000
	1982 Crystal Creek, chinook	250,000
	1983 Faragut River, chinook	23,000
	1982 Crystal Creek, coho	502,000
	1983 Crystal Creek, coho	1,390,000
	1983 Crystal Creek, chum	56,000
	1984 Crystal Creek, chum (eyed egg)	189,000
Deer Mountain	1983 Ketchikan Creek, chinook	305,000
	1983 Ketchikan Creek, coho	38,400
Hidden Falls	1982 Andrew Creek, chinook	70,000
	1983 Hidden Falls, chum	28,500,000
Klawock	1982 Klawock River, coho	855,000
	1983 Klawock River/Disappearance Beaver Falls, chum	5,050,000
Snettisham	1982 Speel Lake/Snettisham, coho	234,000
	1982 King Salmon River, chinook	65,000
	1982 Andrew Creek, chinook	221,000
	1983 Neka River/Snettisham, chum	8,340,000
	SOUTHEAST REGION TOTAL:	46,613,400
PRINCE WILLIAM SOUND		
Cannery Creek	1983 Cannery Creek, pink	31,200,000
	1983 Cannery Creek, chum	1,796,000
Gulkana	1983 Gulkana River, sockeye	10,900,000
Main Bay	1983 Main Bay, pink	41,900,000
	1983 Wells River, chum	14,800,000
	PRINCE WILLIAM SOUND TOTAL:	100,596,000
COOK INLET		
Big Lake	1983 Meadow Creek, sockeye	7,360,000
	1983 Little Susitna, coho	430,000
	1983 Meadow Creek, coho	740,000
	1983 Fish Creek, coho	602,000
	1983 Cottonwood Creek, coho	18,000
Elmendorf	1983 Ship Creek, chinook	150,000
	1983 Crooked Creek, chinook	789,000
	1982 Crooked Creek, coho	42,000
	1982 Seward-Bear Creek, coho	75,000
	1983 Seward-Bear Creek, coho	581,000

-Continued-

Table 2. Continued

Facility	Brood year, Stock, Species	Salmon released
Ft. Richardson	1983 18 Mile Creek, coho	61,000
Kasilof	1983 Bear Creek, sockeye	9,410,000
	1983 Glacier Flats, sockeye	9,750,000
Trail Lakes	1983 Crooked Creek, chinook	482,000
	1983 Kenai River, chinook	5,700
	1983 Quartz Creek, chinook	219,000
	1983 Crooked Creek, coho	510,000
	1983 Hidden Lake, sockeye	1,240,000
Tutka	1983 Tutka Creek Lagoon, pink	19,600,000
	1983 Tutka Creek Lagoon, chum	140,000
	COOK INLET TOTAL:	52,204,700
KODIAK & AK. PENINSULA		
Karluk	1983 Thumb River, sockeye(eyed egg)	12,300,000
Kitoi Bay	1983 Chignik River, chinook	71,000
	1983 Pasagshak River, chinook	5,900
	1983 Buskin River, coho	43,000
	1983 Little Kitoi, coho	264,000
	1983 Kitoi Bay, pink	87,000,000
	1983 Sturgeon River, chum	630,000
	KODIAK & AK. PENINSULA TOTAL:	100,313,900
ARCTIC-YUKON-KUSKOKWIM		
Clear	1983 Salcha River, chinook	166,000
	1983 Wood Creek, coho	339,000
	1983 Wood/Delta, chum	523,000
Sikusuilaq	1983 Noatak River, chum	1,350,000
	ARCTIC-YUKON-KUSKOKWIM TOTAL:	2,378,000

SPECIES TOTALS

Chinook:	3,347,600
Coho:	6,724,400
Sockeye:	50,960,000
Chum:	61,374,000
Pink:	179,700,000
Total Salmon Release:	302,106,000

Table 3. Numbers of fish, other than salmon, planted by FRED in 1984.

Species	Hatchery	Brood stock	Number
Rainbow trout	Elmendorf	1984 Elmendorf	1,380,000
	Elmendorf	1983 Elmendorf	219,000
	Elmendorf	1983 Swanson	39,000
	Clear	1983 Big Lake	29,000
	Kitoi	1984 Big Kitoi	8,600
Steelhead	Klawock	1983 Klawock River	18,900
	Crystal Lake	1982 Falls Creek	3,300
Dolly Varden	Snettisham	1981 Crescent Lake	1,900
Grayling	Clear	1984 Moose Lake	1,280,000
	Clear	1984 Jack Lake	19,000
Sheefish	Clear	1983 Koyukuk & Yukon	229,000

Table 4. Estimates of the number of eggs taken by FRED division during 1984.

Facility	Broodstock	Species	Eggs Taken
SOUTHEAST			
Beaver Falls	Hugh Smith Lake	sockeye	756,000
Crystal Lake	Tahini River	chinook	112,000
	Farragut River	chinook	53,000
	Crystal Creek	chinook	1,727,000
	Crystal Creek	chum	212,000
	Crystal Creek	coho	1,683,000
	Crystal Creek	steelhead	77,000
Deer Mountain	Ketchikan Creek	chinook	1,232,000
Hidden Falls	Hidden Falls	chum	35,900,000
	Crystal Creek	chinook	52,000
Klawock	Beaver Falls	chum	11,600,000
	Klawock River	chum	16,500,000
	Klawock River	coho	1,300,000
	Klawock River	steelhead	62,000

-Continued-

Table 4. Continued

Facility	Broodstock	Species	Eggs Taken
Snettisham	Snettisham	chum	3,980,000
	Snettisham/Neka River	chum	5,880,000
	Crystal Creek	chinook	998,000
	King Salmon River	chinook	189,000
	Snettisham	chinook	4,600
	Snettisham	coho	750,000
	Peterson Creek	steelhead	9,500
		SOUTHEAST TOTAL	83,077,100
PRINCE WILLIAM SOUND			
Cannery Creek	Cannery Creek	pink	78,800,000
		chum	804,000
Gulkana	Gulkana River	sockeye	26,800,000
Main Bay	Wells River	chum	33,600,000
		PRINCE WILLIAM SOUND TOTAL	140,004,000
COOK INLET			
Big Lake	Meadow Creek	sockeye	7,300,000
	Fish Creek	sockeye	9,670,000
	Cottonwood Creek	coho	35,000
	Meadow Creek	coho	2,810,000
	Fish Creek	coho	312,000
	Little Susitna	coho	1,350,000
Elmendorf	Crooked Creek	chinook	1,090,000
	Ship Creek	chinook	124,000
	Crooked Creek	coho	209,000
	Elmendorf	rainbow	4,730,000
Ft. Richardson	Willow Creek	chinook	763,000
	Swanson River	rainbow	78,000
	Big Lake	rainbow	180,000
	Little Susitna	coho	675,000
	18 Mile Creek	coho	475,000
	Anchor River	steelhead	50,000
Kasilof	Bear Creek	sockeye	9,540,000
	Glacier Flats	sockeye	10,100,000
Trail Lakes	Tonsina	chum	534,000
	Crooked Creek	chinook	482,000
	Hidden Lake	sockeye	3,770,000
	Crooked Creek	coho	1,280,000
	Quartz Creek	coho	737,000
	Bear Creek	coho	616,000

-Continued-

Table 4. Continued

Facility	Broodstock	Species	Eggs Taken
Tutka	Tutka Creek Lagoon	pink	29,500,000
	Tutka Creek Lagoon	chum	28,000
		COOK INLET TOTAL	63,538,000
KODIAK & AK. PENINSULA			
Karluk	Thumb River	sockeye	15,100,000
Kitoi Bay	Kitoi Bay	pink	89,200,000
	Stugeon River	chum	964,000
	Big Kitoi	chum	11,000
	Lake Rose Tead	chinook	125,000
	Little Kitoi	coho	175,000
	Buskin River	coho	39,000
	Big Kitoi	rainbow	32,000
Russell Creek	Russell Creek	chum	18,200,000
		KODIAK & AK. PENINSULA TOTAL	123,846,000
ARCTIC-YUKON-KUSKOKWIM			
Clear	Moose Lake	grayling	2,070,000
	Jack Lake	grayling	63,000
	Taheatna Lake	grayling	34,000
	Salcha River	chinook	106,000
	Wood Creek	chum	2,000,000
	Wood Creek	coho	606,000
	Clear Hatchery	sheefish	149,000
	Yukon River	sheefish	364,000
Sikusuilaq	Noatak River	chum	2,540,000
		ARCTIC-YUKON-KUSKOKWIM TOTAL	7,932,000
	Egg Totals by Species:	Chinook:	7,057,600
		Chum:	132,753,000
		Coho:	13,052,000
		Pink:	197,500,000
		Sockeye:	83,036,000
		Grayling:	2,167,000
		Rainbow:	5,020,000
		Steelhead:	198,500
		Sheefish:	513,000
		STATE TOTAL:	441,297,100

PROGRAM PROJECTIONS, 1985

The FRED Division utilizes several strategies to increase the abundance of salmon that are available to users: operation of fish ladders to allow salmon into unutilized spawning areas, lake fertilization, habitat improvement, and fish stocking programs as well as hatchery production. For some of these strategies, especially fish ladders and habitat improvement, it would be very difficult and cost prohibitive to estimate the increased number of fish attributable to the project. Since hatchery production is the most quantifiable strategy, it is often used as the standard by which the effectiveness of fisheries enhancement is measured. For this same reason, the projections shown in Tables 5 and 6 are based only upon hatchery production of salmon. The evaluation of nonsalmon species such as rainbow, grayling, etc. that are planted into lakes and streams by FRED Division is done by the Division of Sport Fisheries.

Even though some of the projected salmon returns are not evaluated or reported, the number of salmon that returned in 1984 exceeded the statewide projections for every species except pink salmon. The returns of both chinook and chum salmon were more than double the number projected, while coho and sockeye adult returns exceeded the projections by 10 and 60 percent, respectively. The actual pink salmon return in 1984 was probably much closer to the prediction than was reported, as contributions to some fisheries were not evaluated.

Projected Returns, 1985

A statewide total of over 5 million salmon are expected to return in 1985 from previous releases of hatchery fish (Table 5). This is an increase of nearly 1 million salmon over what was expected to return in 1984. Pink salmon again comprise the largest segment of the projected returns with nearly 4 million fish returning to the Prince William Sound, lower Cook Inlet, and Kodiak fisheries. About 700,000 chum are expected to return in 1985 with the majority returning to Southeast hatcheries. The first returns of chum salmon are expected at Main Bay and Sikusuilaq Hatcheries in 1985.

A large increase in the return of coho salmon is expected in 1985. The main contributors will be the Crystal Lake Hatchery (including the Ohmer Creek and Irish Creek projects) and Klawock Hatchery, both located in Southeast. These two facilities are expected to account for 75% of the statewide total return of hatchery coho salmon. An increased number of sockeye salmon are expected next year with the majority returning to Cook Inlet as a result of fry releases from Kasilof and Big Lake Hatcheries. Sockeye are also expected to return in 1985 from the state's two streamside incubation facilities at Gulkana River and Karluk Lake.

Nearly 12,000 chinook are expected to return to Southeast in 1985. These returning chinook from 4 hatcheries will contribute to the commercial troll and marine sport fisheries throughout Southeast Alaska. Chinook, which will contribute significantly to sport fisheries, are also expected at Whittier in Prince William Sound and Crooked Creek and Halibut Cove Lagoon, both on the Kenai Peninsula.

Hatchery Objectives, Fiscal Year 1986

Based upon hatchery objectives from the FY 86 Governor's Budget Request, state-operated facilities propose to handle about 530 million fish eggs in Fiscal Year 1986 (Table 6). This is an increase of nearly 100 million over the number of eggs taken the previous year, and it marks the first time that the statewide egg take objective for chum salmon is higher than the pink salmon objective. The anticipated chum egg take of 217 million is more than double the objective of FY 85 and should produce about 3 million adults. Sockeye salmon production continues to expand at state hatcheries, as nearly 95 million eggs are planned to be taken for six facilities statewide. The planned chinook egg take for FY 86 is over 3 times the objective for FY 85, and the coho objective for FY 86 represents a 40% increase over the previous year. The main reason for these increases is that returns to the facilities are now large enough to satisfy the brood-stock requirements at most facilities. The total expected return, as a result of FY 86 egg takes, is nearly 9 million fish, including an estimated 1.2 million rainbow, steelhead, grayling, and sheefish.

Table 5. A projection of the number of salmon expected to return in 1985 as a result of FRED hatcheries and projects (excluding fishways).

Return site	Numbers by species				
	Chinook	Coho	Sockeye	Chum	Pink
SOUTHEAST					
Beaver Falls	--	--	--	133,000	--
Crystal Lake	6,000	15,100	--	200	--
Ohmer Creek	--	17,700	--	--	--
Irish Creek	--	15,000	--	--	--
Deer Mountain	2,600	--	--	--	--
Ward Creek	--	1,000	--	--	--
Hidden Falls	600	--	--	213,000	--
Klawock	--	26,000	--	78,000	--
Snettisham	2,400	4,700	--	127,000	--
Indian Lake	--	2,500	--	--	--
AREA TOTALS:	11,600	82,000		551,200	
PRINCE WILLIAM SOUND					
Cannery Creek	--	--	--	7,600	936,000
Gulkana	--	--	40,000	--	--
Main Bay	--	--	--	--	1,257,000
Whittier	1,400	900	--	20,900	--
AREA TOTALS:	1,400	900	40,000	28,500	2,193,000
COOK INLET					
Big Lake	--	7,500	39,600	--	--
Grouse Lake	--	700	--	--	--
Crooked Creek	1,100	--	--	--	--
Tustumena	--	--	106,000	--	--
Tutka	--	--	--	4,600	390,000
Halibut Cove	3,500	--	--	--	--
Leisure Lake	--	--	45,000	--	--
Seward Lagoon	--	800	--	--	--
AREA TOTALS:	4,600	9,000	190,600	4,600	390,000
KODIAK-AK. PENINSULA					
Karluk	--	--	21,000	--	--
Kitoi	--	--	--	400	1,360,000
Pasagshak	300	--	--	--	--
Russell Creek	--	--	--	105,000	--
AREA TOTALS:	300	--	21,000	105,400	1,360,000
ARCTIC-YUKON-KUSKOKWIM					
Clear	--	3,000	--	3,000	--
Sikusuilaq	--	--	--	900	--
AREA TOTALS:	--	3,000	--	3,900	--
STATE TOTALS:	17,900	94,900	251,600	693,600	3,943,000

GRAND TOTAL: 5,001,000

Table 6. Production potential for FRED hatcheries in FY 86.

Species	Egg objectives 1985 (thousands)	Expected adult returns from 1985 eggs (thousands)a/
Sockeye salmon	94,700.0	757.3
Chum salmon	217,000.0	3,061.0
Pink salmon	184,000.0	3,634.0
Chinook salmon	10,610.0	114.7
Coho salmon	14,500.0	192.0
Steelhead	166.0	3.1
Rainbow trout	6,200.0	1,162.5
Grayling	1,700.0	15.5
Sheefish	1,500.0	7.1
TOTAL	530,376.0	8,947.2

a/ These adults will return over several years, beginning in 1987.

TECHNOLOGY AND DEVELOPMENT

General

1984 was a busy year for the Technology and Development Branch of FRED Division. More samples than ever before were processed in the tag, genetics, limnology, and pathology laboratories. Because of increasing demands for sample processing and diagnostics, the Fish Pathology Section (of which the fish pathology lab is a part) was reorganized to provide better alignment of section resources to the various client groups. The section was divided into two thrusts: Fish Health Services and Research. It is expected that this reorganization will result in the delivery of better service to all. The CWT Laboratory anticipates overhauling its data processing system. The lab will convert to a Pick System and be able to offer users easier access to stored data.

The engineering section was rebulwarked this year by the short-term employment of several engineers who had been laid off because of previous budget cuts. The appropriation of capital monies directed at hatchery completion made this possible.

The combined efforts of all FRED employees resulted in many "firsts" for the division this year. These accomplishments are mentioned in preceding sections of this report. Highlighted among those accomplishments that can be categorized as "technology and development" are:

- half-length microwire tags placed into emergent sockeye fry at Karluk;
- recirculation incubator neared development completion;
- organized and conducted a "Best Cultural Practices Workshop";
- acquired IBM microcomputers for division-wide use;
- fertilized eight lakes;
- converted Beaver Falls Hatchery to a small sockeye hatchery;
- cooperated with the Forest Service in the completion of 2 fishpasses;
- obtained rainbow brood stock for Ft. Richardson Hatchery;
- submitted budget request to establish a fish pathology laboratory in SE Alaska;
- initiated a triploid (sterile) coho experiment at Snettisham Hatchery;
- produced a record return of sockeye to the Thumb River of Karluk Lake;
- completed a study of bank erosion on the Kenai River;
- constructed an adult holding/rearing raceway at Deer Mountain Hatchery to increase chinook production;

- erected a 16' x 50' isolation incubation building at Crystal Lake Hatchery;
- improved water supply and constructed raceway at Big Lake Hatchery to expand coho and sockeye production;
- sponsored and hosted the Alaska Chapter meeting of the American Society of Microbiologists;
- refined development of ADP (Alaska Dry Pellet) fish food in cooperation with Seward Fisheries;
- launched in cooperation with NMFS a pen rearing of chinook salmon project;
- found that chinook grown to market size in pens grew excellently on a diet of ADP;
- found through tag recovery that chum salmon that were fed ADP as juveniles survived to adult at a higher rate than those fed other commercial diets;
- developed a chinook brood stock at Snettisham Hatchery that remains available to sport and commercial fishermen throughout its life;
- found that May-released chums that were fed at Hidden Falls Hatchery survived about seven times the rate of those released in April without feed;
- at Deer Mountain Hatchery, found that chinook juveniles grew much faster on ADP than on OMP;
- found that feeding salt to chinook pre-smolts did not increase their adaptability to salt water;
- initiated zero-check chinook program at Deer Mountain Hatchery;
- initiated an experiment in Kachemak Bay, near Homer, to see if chinook smolts imprinted in a hatchery to morpholine would return to their release site (Homer Spit) if morpholine was used as the attractant; and
- found that half-length coded wire tagging of pink salmon fry is plagued by high tag loss; studies are under way to rectify.

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THE PRIVATE NONPROFIT HATCHERY PROGRAM

Background

The 1974 Legislature authorized the Private Nonprofit (PNP) hatchery program, and the 1976 Legislature authorized creation of regional aquaculture associations. Regional associations are comprised of representatives of commercial fishermen and other user groups in the region, including sport fishermen, subsistence fishermen, and members of local communities. Seven regional associations have been 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)
6) Imarpik Regional Aquaculture Corporation (IRAC) Bristol Bay
7) Kodiak Regional Aquaculture Association (KRAA)

Planning

These aquaculture associations cooperate with the Alaska Department of Fish and Game (ADF&G) in developing regional salmon plans, a process funded by the state. This salmon planning progresses in stages. A comprehensive salmon plan consists of Phases I and II. Phase I sets the goals, objectives, and strategies for the area. Phase II is site specific and establishes criteria to evaluate enhancement and rehabilitation potentials of various sites. Post Phase II planning is a plan maintenance process which includes annual project performance analysis, assessment, and prioritization.

The law established Regional Planning Teams (RPTs), which are comprised of three members from the regional association and three members from ADF&G. These teams write the plans. Status of planning by region follows:

1) Northern Southeast - The Northern Southeast Regional Planning Team (NSERPT) has developed a Phase I and Phase II comprehensive salmon plan and is conducting a plan maintenance process. These plans have been approved by the Commissioner of ADF&G.

2) Southern Southeast - The Southern Southeast Regional Planning Team (SSERPT) also has approved Phase I and Phase II comprehensive salmon plans and is in the plan maintenance process.

3) Cook Inlet - The Cook Inlet Reginal Planning Team (CIRPT) developed and had approved a comprehensive salmon plan for the Cook Inlet region in 1982. This plan was different from previously approved plans because it incorporated some Phase II planning efforts with Phase I. They are presently completing Phase II planning and addressing plan maintenance activities.

4) Prince William Sound - The Prince William Sound Regional Planning Team (PWSRPT) developed and had approved in September 1983 a comprehensive salmon plan for the Prince William Sound - Copper River region. They are doing Phase II planning for districts in the region. A draft Phase II plan is scheduled for completion in May 1985.

5) Kodiak - The Kodiak Regional Planning Team (KRPT) had a regional comprehensive salmon plan approved in April 1984. Since then an outline for Phase II planning was completed, and a Phase II plan will be written during FY 85.

6) Lower Yukon/Kuskokwim - This association elected to discontinue their RPT activities during FY 84, and no formal regional comprehensive salmon planning is presently being conducted. The department is conducting a literature review and study in an attempt to quantify the value of the Yukon River's salmon resources, primarily in regard to commercial and subsistence fishing. The purpose of the study is for use in future international treaty negotiations.

7) Bristol Bay - A draft comprehensive Phase I plan will be written by May 30, 1985 with the RPT participating in plan preparation and review. Three RPT meetings will be held, and a public hearing on the plan draft will occur in late spring.

In addition to the seven regional plans, a plan for the Yakutat area, lying between the Northern Southeast and Prince William Sound regions, has been approved. Because there is not a regional aquaculture association in the Yakutat area, the plan was developed in cooperation with the local Fish and Game Advisory Committee.

Funding

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 for hatchery construction were limited to $3 million under a permit granted to a qualified regional association's nonprofit corporation or to a local nonprofit corporation approved by a qualified regional association. A loan for any other nonprofit hatchery corporation project was limited to $300,000.

The 1980 Legislature raised the loan amounts for regional associations to $6 million with a payment period of up to 30 years. In 1982, the Legislature increased the loan amount to $10 million for regional associations. Other PNPs, unless approved by the regional association, may borrow up to $1 million. Payments on the loans can be deferred from 6 to 10 years, and the interest rate is approximately 9.5%. Cumulative state loans secured for capital construction and operations, cumulative enhancement funds returned to associations, and revenues generated in 1984 by sales of fish are presented in Table 7. To date, $34 million has been borrowed by PNP corporations.

Program Implementation

Since the inception of the PNP program, 22 PNP salmon hatchery permits have been issued, and 26 applications have been denied or withdrawn. Nine applications are now pending. Fourteen of the permitted hatcheries are in operation, and 14 have had returns of adult salmon.

Hatchery Production

In 1984, PNP corporations estimated that 4.8 million adult salmon, originally released as juveniles from corporate facilities, were either harvested in common property fisheries or returned to hatchery special harvest areas. The hatchery operator's estimates of returns to their facilities are listed in Table 8. In the absence of coded wire tag recoveries, estimated contributions to fisheries should be regarded as the operator's best guess. In Prince William Sound, returns to the Port San Juan Hatchery were estimated by PWSAC to have contributed over 2.2 million pinks to the commercial fishery. SSRAA estimates its hatcheries at Neets Bay and Whitman Lake contributed over 429,000 chum and coho to common property fisheries in southeast.

Statewide production data since 1975 for combined species, including adult returns and harvests, are presented in Table 9. Preliminary estimates by the PNP corporations indicate that the common property harvest of the 1984 return was just over 3.0 million fish. An increasing portion of this season's harvest were chum salmon, which were the cumulative product of several brood years (1979 through 1981). Data from Table 10 indicate an 8 fold increase in estimated total returns of PNP hatchery chum over 1983 levels. Similar data for pink, coho, and chinook are presented in Tables 11, 12, and 13.

Egg takes and fry or smolt stocking are regulated by the department through fish transport permits (FTPs), which are administered as a part of the PNP program. During 1984, fry and smolt releases increased to 217 million juvenile fish, an increase of over 47 million or 28% from 1983 levels (Table 14). 1984 eggs takes for PNP hatcheries totaled over 372 million green eggs, up 111 million or 43% from 1983 levels. This season's largest egg

take was again at Port San Juan Hatchery where over 129 million green pink and chum eggs were taken (Table 15). This was followed by the Valdez Fisheries Development Corporation's (VFDC) Solomon Gulch Hatchery with over 69 million pink and chum eggs, and the SSRAA, Neets Bay Hatchery with over 64 million chum, coho, and chinook eggs.

Significant progress has been made in increasing hatchery-originated chinook production. Chinook egg takes this season totaled over 2.7 million green eggs, an increase of 1.9 million or nearly 3½ times over 1983 levels. Conservative estimates of returns from the 1984 brood year alone show the potential for providing an additional 30,000 harvestable chinook to the state's common property fisheries.

Most PNP hatcheries are currently in the process of construction or brood stock development and, consequently, have not reached their permitted capacities. Permitted capacities for PNP hatcheries now total over 1.04 billion green eggs, an increase of nearly 165 million from 1983 levels (Table 16). Some of the permitted capacity is for facilities that have not been constructed yet, such as the Esther Lake Hatchery, which has a permitted capacity of 324 million eggs. The largest single increase was from alteration of the Solomon Gulch permit by an additional 102 million to 155 million green eggs. Potential returns from statewide PNP hatchery-originated production at the 1 billion egg level could approach or exceed 14 million adults, assuming standard levels of hatchery and marine survival. Exceptional marine survival, similiar to that experienced during recent years, could boost adult production considerably over these estimates. Under the existing permits, approximately 63% of hatchery capacity is scheduled for pink salmon, 34% for chum, and 3% for sockeye, coho, and chinook.

Annual Management Plans

Annual Management Plans (AMPs) are being developed for all (state and private) hatchery facilities prior to the 1985 operating season. The AMPs are to be reviewed by both the department and the regional planning teams before final approval by the Commissioner. The AMPs detail expected operational activities, including wild and hatchery egg takes, fish and egg transport and release, anticipated adult returns, anticipated impacts on management of mixed-stock fisheries, and terminal harvest management strategies. Also included are facility brood stock requirements and, in the case of PNP facilities, hatchery cost-recovery plans that address legal gear types and number of fish required for special harvest.

Table 7. Cumulative state loans and enhancement funds returned to associations (through June 30, 1984), and fish sales for 17 private nonprofit (PNP) hatcheries (through October 31, 1984).

Region/(No. of Permits)	State Loans: For Capital Construction	State Loans: For Operations	Funds Generated by Assessments or Sale of Fish
NORTHERN SOUTHEAST			
Northern Southeast Regional Aquaculture Association (2)	2,459,209	1,093,065	2,099,583[a/] 72,090[c/]
Burro Creek Farms, Inc. (1)	191,375	92,000	4,332
Kake Nonprofit Fisheries Development Corp. (1)	364,900	288,500	-0-
Douglas Island Pink and Chum Corp. (2)	563,000	859,000	200,000[c/]
Sheldon Jackson College (1)	177,254	61,370	120,077[c/]
Tlingit and Haida Fisheries Development Corp. (1)	1,553,860	-0-	-0-
Armstrong-Keta, Inc. (1)	474,045	230,000	-0-
SOUTHERN SOUTHEAST			
Southern Southeast Regional Aquaculture Association (2)	10,156,342	1,785,600	3,119,545[a/] 854,687[c/]
Alaska Aquaculture Foundation, Inc. (1)	778,230	469,295	923[c/]
Meyers Chuck Aquaculture Association (1)	8,392	-0-	-0-
PRINCE WILLIAM SOUND			
Prince William Sound Aquaculture Corp. (2)	6,972,539	-0-	3,273,330[b/] 416,604[c/]
Valdez Fisheries Development Corp. (1)	2,607,530	1,165,000	9,613[c/]
COOK INLET			
Cook Inlet Regional Aquaculture Association (1)	1,348,881	444,755	1,539,659[d/] 74[c/]
STATEWIDE TOTALS	**27,637,557**	**6,488,585**	**11,710,517**

a/ 3% mandatory assessment tax collected from fishermen.
b/ 2% voluntary assessment tax collected from fishermen.
c/ Revenue from sales of fish harvested at hatchery in 1984.
d/ 2% mandatory assessment tax collected from fishermen.

Table 8. 1984 estimated adult returns, by species, to PNP hatcheries (including common property harvests), as reported by operators.

Region/Facility	Pink	Chum	Coho	Chinook	
SOUTHEAST					
SSRAA - Whitman Lake	-	119,414	14,587	3,256	Note 1
- Neets Bay	-	819,819	81,900	400	Note 1
NSRAA - Salmon Creek	3,000	8,100	11,485	-	Note 1
- Medvejie Creek		1,040	12,987	-	Note 1
AAFI - Burnett Inlet	80,000	3,600	-	-	Note 3
SJC - Indian River	169,945	465	153	-	Note 2
BCF - Burro Creek	7,000	18	-	-	Note 3
DIPAC - Sheep Creek	287,587	8,074	-	-	Note 2
- Kowee Creek	65,933	0	-	-	Note 2
SOUTHEAST TOTALS	614,525	960,530	121,112	3,656	
PRINCE WILLIAM SOUND					
PWSAC - Port San Juan	2,800,000	33,410	-	-	Note 4
VFDC - Solomon Gulch	223,402	6,162	-	-	Note 4
NERKA - Perry Island	1,000	-	-	-	Note 2
PRINCE WM. SD. TOTALS	3,023,402	39,572	-	-	
COOK INLET					
CIAA - Eklutna	-	1,347	-	-	Note 2
COOK INLET TOTALS	-	1,347			
STATEWIDE TOTALS	**3,637,927**	**1,001,449**	**121,112**	**3,656**	

Note 1: estimation based on coded wire tag recoveries.
Note 2: estimation based on assumed marine survival rates.
Note 3: estimation based on assumed interception rate in fisheries.
Note 4: estimation based on data provided by Division of Commercial Fisheries.

Table 9. 1984 summary of statewide salmon production (all species) from PNP hatcheries as reported by operators.

Year	Eggs taken	Fry or Smolt released	Total return	Special harvest	Hatchery revenue
1975	8,091,395				
1976	16,622,881	3,719,741			
1977	37,008,186	12,360,354	160,147	108,718	$130,726
1978	37,346,167	26,796,238	160,967	114,188	$141,799
1979	54,295,879	29,131,774	356,501	244,555	$309,612
1980	125,740,500	35,587,200	1,506,466	346,168	$436,171
1981	223,600,000	101,600,000	2,563,913	850,293	$1,274,640
1982	234,390,000	126,990,000	5,340,720	1,370,110	$1,165,608
1983	261,310,000	170,375,000	4,285,989	744,767	$669,838
1984	372,880,000	217,730,000	4,764,144	1,048,701	$1,668,788

Cumulative hatchery revenue from special harvest: $5,797,182

Table 10. Summary of chum salmon production from PNP hatcheries.

Year	Eggs taken	Fry or Smolt released	Total return	Special harvest	Hatchery revenue
1975	77,000				
1976	347,275	66,075			
1977	1,614,574	264,068			
1978	1,684,930	1,064,000	543		
1979	6,782,864	924,400	3		
1980	26,850,000	3,340,000	1,588		
1981	32,400,000	21,900,000	20,518	6,115	$24,460
1982	46,130,000	23,590,000	22,133	378	$302
1983	68,790,000	41,770,000	126,783	35,099	$37,120
1984	122,170,000	54,780,000	1,001,449	436,617	$690,393

Table 11. Summary of pink salmon production from PNP hatcheries.

Year	Eggs taken	Fry or Smolt released	Total return	Special harvest	Hatchery revenue
1975	8,002,395				
1976	16,251,456	3,653,666			
1977	35,383,112	12,093,184	160,147	108,718	$130,726
1978	34,851,807	25,732,238	160,397	114,188	$141,799
1979	46,582,015	28,204,674	356,498	244,555	$309,612
1980	98,030,000	31,690,000	1,504,878	346,168	$436,171
1981	188,000,000	78,800,000	2,491,345	838,037	$1,200,000
1982	185,170,000	102,550,000	5,253,378	1,354,732	$1,084,806
1983	185,520,000	126,890,000	14,086,552	701,399	$613,618
1984	241,760,000	159,340,000	3,637,927	583,185	$741,673

Table 12. Summary of coho salmon production from PNP hatcheries.

Year	Eggs taken	Fry or Smolt released	Total return	Special harvest	Hatchery revenue
1975	12,000				
1976	24,150	8,000			
1977	10,500	3,102			
1978	809,430	0	27		
1979	931,000	2,700	0		
1980	666,500	557,200	0		
1981	2,800,000	900,000	52,050	6,141	$50,000
1982	2,870,000	700,000	61,709	11,500	$80,500
1983	6,200,000	1,570,000	71,781	7,396	$19,100
1984	6,300,000	3,230,000	121,112	27,310	$233,466

Table 13. Summary of chinook salmon production from PNP hatcheries.

Year	Eggs taken	Fry or Smolt released	Total return	Special harvest	Hatchery revenue
1980	194,000				
1981	400,000				
1982	220,000	150,000	3,500	3,500	N/A
1983	800,000	140,000	872	872	N/A
1984	2,730,000	380,000	3,656	1,589	$3,256

Table 14. 1984 releases from PNP hatcheries in millions.

REGION/LOCATION	Pink	Chum	Coho	Chinook
SOUTHEAST				
SSRAA - Whitman Lake	-		0.31	
- Neets Bay		27.42	1.71	0.35
NSRAA - Salmon Creek	4.81	3.31	0.93	-
- Medvejie Creek	-	2.56	0.19	0.03
AAFI - Burnett Inlet	3.29	1.36	-	-
A-K - Port Armstrong	7.00			
BCF - Burro Creek	1.40	0.89		
DIPAC - Kowee Creek	6.25	0.30	-	-
- Sheep Creek	32.01	0.92	-	-
KNFC - Gunnuk Creek	0.10	0.06	-	-
SJC - Indian River	14.54	0.55	0.05	-
THCC - Sandy Bay	4.80	0.48		
SOUTHEAST TOTALS	74.20	37.85	3.19	.38
PRINCE WILLIAM SOUND				
PWSAC - Port San Juan	76.75	7.65	-	-
- Esther Lake		7.47		
VFDC - Solomon Gulch	8.39	0.90	0.0	-
PRINCE WM. SD. TOTALS	85.14	16.02	0.0	0.0
COOK INLET				
CIAA - Eklutna		0.91	0.04	
COOK INLET TOTAL	-	0.91	0.04	-
STATEWIDE TOTAL	**159.34**	**54.78**	**3.23**	**0.38**

Table 15. 1984 egg takes for PNP hatcheries in millions.

REGION/LOCATION	Pink	Chum	Coho	Chinook	Sockeye
SOUTHEAST					
SSRAA - Whitman L.		7.50	1.00	0.70	0.00
- Neets Bay		59.71	3.49	1.70	
NSRAA - Salmon Cr.	0.00	0.00	0.00		
- Medvejie Cr.		6.72	1.34	0.16	
AAFI - Burnett In.	2.57	1.31	0.02		
A-K - Port Armstrong	11.16	2.26		0.00	
BCF - Burro Creek	1.52	0.57			
DIPC - Kowee Cr.	4.31	0.00			
- Sheep Cr.	15.84	4.58			
KNFC - Gunnuk Cr.	0.00	2.00			
SJC - Indian R.	12.25	2.82	0.10	0.07	
THCC - Sandy Bay	9.25	0.74			
SOUTHEAST TOTALS	56.90	88.26	5.95	2.63	0.00
PRINCE WILLIAM SOUND					
PWSAC - Port San Juan	117.77	12.07			
- Esther Lake	0.00	16.80	0.00	0.00	
VFDC - Solomon Gulch	66.65	2.66	0.30	0.00	
PRINCE WM. SD. TOTALS	184.42	31.53	0.30	0.00	
COOK INLET					
CIAA - Eklutna	0.44	2.35	0.05	0.10	
COOK INLET TOTALS	0.44	2.35	0.05	0.10	0.0
STATEWIDE TOTALS	**241.76**	**122.17**	**6.30**	**2.73**	**0.00**

Table 16. Permitted egg capacities, in millions, of PNP hatcheries within the planning regions, 1984.

Region	Pink	Chum	Coho	Chinook	Sockeye	Total
Southern Southeast						
Association Facility	0.00	91.80	8.40	2.40	2.50	105.10
Nonassociation Facilities	21.00	27.00	1.10			49.10
Total	21.00	118.80	9.50	2.40	2.50	154.20
Northern Southeast						
Association Facility	13.00	37.00	4.10	0.30		54.40
Nonassociation Facilities	107.50	40.00	1.70	0.15		149.35
Total	120.50	77.00	5.80	0.45	0.00	203.75
Prince William Sound						
Association Facility	361.00	124.00	1.00	1.00		487.00
Nonassociation Facilities	146.00	28.00	1.00	0.05		175.05
Total	507.00	152.00	2.00	1.05	0.00	662.05
Cook Inlet						
Association Facility	10.00	10.00	1.10	0.10		21.20
Total	10.00	10.00	1.10	0.10	0.00	21.20
STATEWIDE TOTAL	**658.50**	**357.80**	**18.40**	**4.00**	**2.50**	**1,041.20**

PROGRAM EXPENDITURES

Fiscal Year 1985 Operating Budget

The FRED Division, as a Budget Request Unit (BRU), requests operating funds in four components. About 95% of the FY85 authorized budget is in the FRED component, which includes nearly all the division's operational, technical, and administrative functions. The other BRU components are Data and Word Processing, Special Projects, and C.I.P. costs. Special Projects are those which are contracted from federal agencies such as the U.S. Forest Service, and C.I.P. costs are those incurred to implement in-house construction projects. The total FY85 authorized budget for the FRED Division BRU was $15,607,500.

The FRED Division can be partitioned into functions for the purpose of examining the BRU's involvement in the state's fisheries program. Table 17 presents a breakdown of the various services the FRED Division performs for Alaska's fisheries enhancement program.

Fiscal Year 1986 Operating Request

The Governor's FY86 request for the FRED BRU is $16,647,600, representing an increase of slightly over $1 million above FY85. Nearly half of this amount will fund the increased hatchery operational costs associated with capital improvement projects in FY85. This increase will also fund statewide hatchery production increases amounting to nearly 100 million eggs over FY85 levels. The planned hatchery production associated with this budget request is explained in more detail in the program projection section (page 29) of this report.

Table 17. FRED Division operating budget, FY 85.

Function	Budget (x1,000)	Percent
Management/Administration (headquarters & regional offices)	$1,630.8	10.5
Private Nonprofit Hatchery Coordination & Regional Planning	197.9	1.3
Hatchery Production, Statewide (facility operating budgets)	7,324.4	47.0
Biological Projects/Staff (plans, operations, assessments)	1,309.9	8.4
Fish Introduction/Stocking (new opportunities)	271.9	1.7
Lake/Stream Improvement (fishpasses, Kenai River studies)	473.8	3.0
Technical Supervision/Quality Control (biology, fish culture, engineering, maintenance, library)	1,104.6	7.1
Fish Pathology Laboratory (statewide services)	601.9	3.9
Genetics Laboratory (statewide services)	180.8	1.2
Limnology (principal scientist and project leaders)	299.2	1.9
Lake Fertilization/Stocking (field projects statewide and limnology laboratory)	619.3	4.0
Lake Fertilization Grants (pass-through to regional aquaculture associations)	388.5	2.2
Tagged Fish Recovery Laboratory (statewide-U.S./Canada concerns)	234.7	1.5
Biometrics/Data Processing	512.8	3.3
Special Projects (cooperative funding)	289.0	1.9
C.I.P. Costs	178.0	1.1
Total	$15,607.5	100.0

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APPENDICES

APPENDIX A

Life-Stage Survival Summaries for Fish Released in 1984

Table 1. Survival summary of chinook salmon released in 1984 from Southeast Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fingerling (90%)	Smolt (72%)
			(percent survival goals from previous stage)			
Beaver Falls	1983 Ketchikan Creek	852,000	492,000a/ (57.7%)	111,000 (96.1%)	109,000b/ (98.4%)	
Crystal Lake	1982 Crystal Creek	451,000	299,000 (66.3%)	283,000 (94.8%)		250,000b/ (88.3%)
	1982 Andrew Creek	772,000	680,000 (88.0%)	488,000 (71.8%)		416,000b/ (85.3%)
	1983 Faragut River	50,100	32,100 (64.1%)	28,900 (90.1%)	36,100c/ (89.2%)	
	1983 Tahini River	107,000	98,100d/ (91.4%)	11,600 (24.4%)		
Deer Mountain	1983 Ketchikan Creek		376,000a/	291,000 (77.4%)		305,000b/ (105%)
Hidden Falls	1982 Andrew Creek	81,600	75,700 (92.8%)	74,800 (98.7%)		70,000b/ (93.7%)
Snettisham	1982 Andrew Creek	322,000	255,000 (79.1%)	245,000 (96.2%)		221,000b/ (90.3%)
	1982 King Salmon River	83,400	76,100 (91.2%)	68,600 (90.1%)		65,200b/ (95.1%)

a/ 376,000 eyed eggs were sent to Deer Mountain Hatchery from Beaver Falls Hatchery.
b/ Number released.
c/ 22,300 were returned to Faragut River as fingerlings.
d/ 50,600 eyed eggs were sent to Hidden Falls Hatchery.

Table 2. Survival summary of chinook salmon released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fingerling (90%)	Smolt (72%)
			(percent survival goals from previous stage)			
Clear	1983 Salcha River	200,000	165,000 (82.5%)	169,000	166,000a/ (98.2%)	
Trail Lakes	1983 Crooked Creek	605.000	529,000 (87.4%)	522,000 (98.7%)	482,000a/ (92.3%)	
	1983 Kenai River	108,000	64,000 (59.3%)	66,000	61,500b/ (93.2%)	
	1983 Quartz Creek	381,000	271,000 (71.1%)	232,000 (85.6%)	219,000a/ (94.4%)	
Elmendorf	1983 Ship Creek	172,000	165,000 (95.9%)	156,000 (94.5%)	150,000a/ (96.2%)	
	1983 Crooked Creek	1,010,000	900,000 (89.1%)	852,000 (94.7%)	789,000a/ (92.6%)	
Kitoi Bay	1983 Chignik River	87,000	75,000 (86.2%)	73,000 (97.3%)	71,000a/ (97.3%)	
	1983 Pasagshak River	15,000	9,400 (62.7%)	8,800 (93.6%)	5,900a/ (67.0%)	
Kasilof	1982 Crooked Creek	163,000	153,000 (93.9%)	147,000 (96.1%)		67,800a/ (46.1%)

a/ Number released.
b/ 5,700 were released as fingerlings in 1984. The remainder are still being reared.

Table 3. Survival summary of coho salmon released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fingerling (90%)	Smolt (72%)
			(percent survival goals from previous stage)			
Clear	1983 Wood Creek	432,000	365,000 (84.5%)	352,000 (96.4%)	339,000a/ (96.3%)	
Big Lake	1983 Little Susitna	547,000	534,000 (97.6%)	468,000 (87.6%)	426,000a/ (91.0%)	
	1983 Meadow Creek	922,000	876,000 (95.0%)	830,000 (94.8%)	740,000a/ (89.2%)	
	1983 Fish Creek	743,000	708,000 (95.3%)	642,000 (90.7%)	602,000a/ (93.8%)	
	1983 Cottonwood Creek	26,000	24,000 (94.5%)	24,000 (100%)	18,000a/ (75.0%)	
Elmendorf	1982 Crooked Creek	621,000	558,000 (89.9%)	623,000	534,000b/ (85.7%)	42,000 (58.3%)
	1982 Seward-Bear Creek	1,180,000	876,000 (74.2%)	846,000 (96.6%)	377,000c/ (44.6%)	75,000a/ (42.1%)
	1983 Seward-Bear Creek	1,140,000	1,010,000 (88.4%)	979,000 (96.9%)	957,000d/ (97.8%)	
Ft. Richardson	1983 18 Mile Creek	76,000	70,000 (92.6%)	70,000 (100%)	61,000a/ (87.1%)	

-Continued-

Table 3. Continued.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Smolt (72%)
			(percent survival goals from previous stage)			
Kitoi Bay	1983 Buskin River	45,000	44,000 (97.7%)	43,000 (99.2%)	43,000a/ (100%)	
	1983 Little Kitoi	283,000	277,000 (97.7%)	266,000 (96.1%)	264,000a/ (99.2%)	
Trail Lakes	1983 Crooked Creek	989,000	824,000 (83.3%)	807,000 (98.0%)	667,000e/ (82.7%)	
	1983 Quartz Creek	881,000	815,000 (92.5%)	789,000 (96.8%)	740,000a/ (93.8%)	

a/ Number released.
b/ 462,000 fry were stocked in 1983 from Trail Lakes Hatchery. The remaining fry were shipped to Elmendorf.
c/ 199,000 were released as fingerling in 1983.
d/ 581,000 were released in 1984. The rest are still being reared.
e/ 510,000 fingerling were stocked from Trail Lakes Hatchery. The remaining fry were shipped to Elmendorf.

Table 4. Survival summary of coho salmon released in 1984 from Southeast Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Smolt (72%)
			(percent survival goals from previous stage)			
Crystal Lake	1982 Crystal Creek	3,319,000	3,030,000 (91.3%)	2,846,000 (93.9%)	2,665,000b/ (93.6%)	502,000a/ (92.1%)
	1983 Crystal Creek	2,340,000	2,213,000 (94.5%)	2,192,000 (99.0%)	2,134,000c/ (97.4%)	
Deer Mountain	1983 Ketchikan Creek	79,500	40,000 (50.4%)	38,700 (96.7%)	38,400a/ (99.2%)	
Klawock	1982 Klawock River	1,291,000	1,206,000 (93.4%)	1,157,000 (96.0%)		855,000a/ (73.8%)
Snettisham	1982 Speel/Snettisham	392,000	351,000 (89.7%)	345,000 (98.3%)		234,000a/ (71.8%)

a/ Number released.
b/ 2,120,000 fry were stocked in 1983. The remainder were reared to smolt.
c/ 1,389,000 fry were stocked in 1984. The remainder are being reared to the smolt stage.

Table 5. Survival summary of pink salmon released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerling (90%)
			(percent survival goals from previous stage)			
Cannery Creek	1983 Cannery Creek	34,300,000	32,600,000 (95.0%)	31,200,000a/ (95.7%)	1,950,000b/	
Kitoi Bay	1983 Kitoi Bay	105,000,000	94,500,000 (90.0%)	87,400,000c/ (92.5%)	12,200,000b/ (97.2%)	
Main Bay	1983 Main Bay	55,000,000	50,900,000 (92.5%)	41,900,000b/ (82.3%)		
Tutka	1983 Tutka Creek/Lagoon	26,800,000	20,300,000 (75.7%)	19,600,000d/ (96.6%)	11,000,000b/ (99.7%)	

a/ 29,300,000 were released as emergent fry. The remainder were reared for a short time.
b/ Number released.
c/ 74,800,000 were released as emergent fry. The remainder were short term reared.
d/ 8,600,000 were released as emergent fry. The remainder were short term reared.

Table 6. Survival summary of chum salmon released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerling (95%)
			(percent survival goals from previous stage)			
Cannery Creek	1983 Cannery Creek	1,900,000	1,740,000 (91.5%)	1,810,000a/	394,000b/ (96.6%)	
Clear	1983 Delta River	495,000	408,000 (82.4%)			
	1983 Wood Creek	262,000	222,000 (82.4%)	533,000 (84.6%)		523,000b/ (98.1%)
Kitoi Bay	1983 Sturgeon River	826,000	739,000 (89.5%)	637,000 (86.2%)		630,000b/ (98.9%)
Main Bay	1983 Wells River	21,600,000	15,400,000 (71.2%)	15,200,000c/ (98.7%)	6,800,000d/ (98.7%)	3,190,000b/ (92.5%)
Russell Creek	1983 Russell Creek	14,000,000	12,300,000 (88.2%)	2,070,000e/ (16.8%)		
Sikusuilaq	1983 Noatak River	2,210,000	1,650,000 (74.6%)	1,330,000 (80.6%)		1,350,000b/
Tutka Bay	1983 Tutka Creek Lagoon	152,000	145,000 (95.1%)	143,000 (98.6%)	140,000b/ (97.9%)	

a/ 1,402,000 were released as emergent fry. The remainder were reared for a short time.
b/ Number released.
c/ 7,355,000 were released at Lake Bay for PWSAC and 952,000 at Main Bay.
d/ 3,350,000 were released as fed fry.
e/ The remaining fry were destroyed due to an IHN virus outbreak. No salmon were released.

Table 7. Survival summary of chum salmon released in 1984 from Southeast Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerling (95%)
			(percent survival goals from previous stage)			
Crystal Lake	1983 Crystal Creek	65,700	59,500 (90.6%)	58,000 (98.3%)		56,000a/ (96.5%)
Hidden Falls	1983 Hidden Falls	31,780,000	30,760,000 (96.8%)	29,380,000b/ (95.5%)		20,100,000a/ (95.8%)
Klawock	1983 Klawock River, Beaver Falls, Disappearance, Neets	5,340,000	5,035,000 (94.3%)	5,340,000c/		5,050,000a/ (94.6%)
Snettisham	1983 Neka River/ Snettisham	12,190,000	11,630,000 (95.5%)	9,902,000 (85.1%)		8,340,000a/ (84.2%)

a/ Number released.
b/ 8,400,000 were released as emergent fry. The remainder were released as fingerling.
c/ Sampling error.

Table 8. Survival summary of sockeye salmon released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (95%)	Fry (95%)	Fingerling (90%)
			(percent survival goals from previous stage)			
Big Lake	1983 Meadow Creek	16,100,000	10,000,000 (62.2%)	7,740,000 (77.1%)	7,360,000a/ (95.1%)	
Gulkana	1983 Gulkana River	13,000,000		10,900,000a/ (92.5%)		
Karluk	1983 Thumb River	15,300,000	12,300,000b/ (80.5%)			
Kasilof	1983 Bear Creek	10,300,000	9,820,000 (95.7%)	9,410,000c/ (80.4%)		
	1983 Glacier Flats	11,300,000	10,600,000 (93.9%)	9,750,000c/ (92.0%)		
Trail Lakes	1983 Hidden Lake	1,930,000	1,380,000 (71.6%)	1,340,000 (96.9%)	1,240,000a/ (92.5%)	

a/ Number released.
b/ These were planted back into the Thumb River as eyed eggs.
c/ This number was released as fed fry.

Table 9. Survival summary of rainbow trout released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (90%)	Fingerling (77%)	Catchable (72%)
			(percent survival goals from previous stage)			
Clear	1983 Big Lake	41,000	31,000 (76.4%)	30,000 (96.3%)	29,000a/ (96.7%)	10,000b/ (98.0%)
Elmendorf	1983 Swanson	56,000	47,000 (83.8%)	40,000c/ (85.1%)	39,000b/ (97.5%)	
	1983 Elmendorf	5,510,000	4,110,000 (74.5%)	3,560,700 (86.6%)	1,773,400d/ (49.8%)	219,000b/ (33.1%)
	1984 Elmendorf	4,730,000	3,590,000 (75.9%)	3,080,000 (85.8%)	1,380,000b/ (44.8%)	
Kitoi	1984 Big Kitoi	32,000	24,000 (74.7%)	19,000 (98.3%)	9,700e/ (51.1%)	

a/ 19,000 were released as fingerlings. The rest were reared to catchable size.
b/ Number released.
c/ These were transfered from Clear Hatchery.
d/ 1,111,000 were released in 1983.
e/ 8,600 were released in 1984.

Table 10. Survival summary of steelhead trout released in 1984 from Southeast Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs (90%)	Emergent (90%)	Fry (85%)	Smolt (72%)
			(percent survival goals from previous stage)			
Crystal Lake	1982 Falls Creek	13,300	4,100 (31.0%)	4,100 (98.9%)		3,300a/ (81.2%)
Klawock	1983 Klawock River	22,100	21,400 (96.8%)	20,900 (97.6%)		18,900a/ (90.2%)

a/ Number released.

Table 11. Survival summary of grayling released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs	Emergent (75%)	Fry (75%)	Fingerling (70%)
			(percent survival goals from previous stage)			
Clear	1984 Moose Lake	2,070,000		1,950,000a/ (94.2%)	1,280,000b/ (65.6%)	
	1984 Jack Lake	63,000		50,000 (79.4%)	28,000c/ (56.0%)	
	1984 Taheatna Lake	34,000		12,000d/ (35.3%)		

a/ 90,000 were released as emergent fry.
b/ Number released.
c/ 19,000 were released in 1984.
d/ None were released.

Table 12. Survival summary of sheefish released in 1984 from Central Region FRED Division facilities.

Facility	Brood year, Brood stock	Green eggs	Eyed eggs	Emergent (50%)	Fry (70%)	Fingerling (50%)
			(percent survival goals from previous stage)			
Clear	1983 Koyukuk River	190,000		40,000 (21.1%)		
	1983 Yukon River	572,000		377,000 (65.9%)	316,000a/ (75.8%)	

a/ 229,000 were released in 1984.

APPENDIX B

Stocking Location by Species for Fish Released in 1984

Table 1. Pink salmon stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
ADF&G Stream #273	PWS	Cannery Creek	Emergent Fry	318,000
ADF&G Stream #276	PWS	Cannery Creek	Emergent Fry	318,000
ADF&G Stream #277	PWS	Cannery Creek	Emergent Fry	159,000
ADF&G Stream #278	PWS	Cannery Creek	Emergent Fry	159,000
ADF&G Stream #282	PWS	Cannery Creek	Emergent Fry	477,000
ADF&G Stream #283	PWS	Cannery Creek	Emergent Fry	479,000
Cannery Creek	PWS	Cannery Creek	Emergent Fry	29,300,000
Main Bay	PWS	Main Bay	Emergent Fry	41,900,000
Tutka Bay	LCI	Tutka	Emergent Fry	18,600,000
Tutka Bay	LCI	Tutka	Fed Fry	4,000,000
Kitoi Bay	KOD	Kitoi	Emergent Fry	74,800,000
Kitoi Bay	KOD	Kitoi	Fingerling	12,220,000

Table 2. Chum salmon stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Crystal Creek	SEA	Crystal Lake	Fingerling	56,000
Kasnyku Bay	SEA	Hidden Falls	Emergent Fry	8,400,000
Kasnyku Bay	SEA	Hidden Falls	Fingerling	20,100,000
Klawock River	SEA	Klawock	Fingerling	5,050,000
Speel Arm	SEA	Snettisham	Fingerling	8,340,000
Cannery Creek	PWS	Cannery Creek	Emergent Fry	1,402,000
Cannery Creek	PWS	Cannery Creek	Fed Fry	394,000
Main Bay	PWS	Main Bay	Unfed Fry	952,000
Main Bay	PWS	Main Bay	Fed Fry	3,350,000
Main Bay	PWS	Main Bay	Fingerling	3,190,000
Lake Bay	PWS	Main Bay	Emergent Fry	7,355,000
Tutka Bay	LCI	Tutka	Emergent Fry	52,000
Tutka Bay	LCI	Tutka	Fed Fry	87,200
Kitoi Bay	KOD	Kitoi	Fingerling	630,000
Wood Creek	AYK	Clear	Fingerling	523,000
Noatak River	AYK	Sikusuilaq	Fed Fry	1,350,000

Table 3. Chinook salmon stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Brennan Lake	SEA	Beaver Falls	Fingerling	109,000
Crystal Creek	SEA	Crystal Lake	Smolt	566,000
Farragut River	SEA	Crystal Lake	Fingerling	22,800
Gen Gen Lake	SEA	Crystal Lake	Fingerling	4,400
Ohmer Creek	SEA	Crystal Lake	Smolt	100,000
Ohmer Creek	SEA	Crystal Lake	Fingerling	8,990
Thomas Basin	SEA	Deer Mountain	0 check smolt	305,000
Kasnyku Bay	SEA	Hidden Falls	Smolt	70,000
Speel Arm	SEA	Snettisham	Smolt	286,000
Cove Creek	PWS	Elmendorf	Smolt	118,000
South Jans Lake*	PWS	Trail Lakes	Fingerling	20,000
Clunie Lake*	UCI	Trail Lakes	Fingerling	10,000
Echo Lake*	UCI	Trail Lakes	Fingerling	2,000
Lucille Lake*	UCI	Trail Lakes	Fingerling	72,000
Memory Lake*	UCI	Trail Lakes	Fingerling	8,000
Prator Lake*	UCI	Trail Lakes	Fingerling	10,000
Rocky Lake*	UCI	Trail Lakes	Fingerling	6,000
Ship Creek	UCI	Elmendorf	Fingerling	178,000
Ship Creek	UCI	Elmendorf	Smolt	150,000
Victor Lake*	UCI	Trail Lakes	Fingerling	1,000
Centennial Lake*	CCI	Trail Lakes	Fingerling	7,000
Cooper Lake*	CCI	Trail Lakes	Fingerling	126,000
Crooked Creek	CCI	Crooked Creek	Smolt	68,000
Crooked Creek	CCI	Elmendorf	Smolt	196,000
Engineer Lake*	CCI	Trail Lakes	Fingerling	46,000
Loon Lake*	CCI	Trail Lakes	Fingerling	11,000
Lowell Creek (Seward)	CCI	Elmendorf	Smolt	39,000
Portage Lake*	CCI	Trail Lakes	Fingerling	6,000
Rogue Lake*	CCI	Trail Lakes	Fingerling	2,000
Scout Lake*	CCI	Trail Lakes	Fingerling	28,000
Six Mile Creek	CCI	Trail Lakes	Fingerling	230,000
Strelna Lake*	CCI	Trail Lakes	Fingerling	70,000
Thumb Cove (Seward)	CCI	Elmendorf	Smolt	71,000
Upper Summit Lake	CCI	Trail Lakes	Fingerling	51,000
Halibut Cove Lagoon	LCI	Elmendorf	Smolt	84,000
Homer Spit	LCI	Elmendorf	Smolt	89,000
Lake Rose Tead	KOD	Kitoi Bay	Fingerling	77,000
Wood Creek	AYK	Clear	Fingerling	166,000

* Land Locked

Table 4. Sockeye salmon stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Gulkana River	PWS	Gulkana	Emergent Fry	6,160,000
Summit Lake	PWS	Gulkana	Emergent Fry	4,740,000
Meadow Creek	UCI	Big Lake	Emergent Fry	7,360,000
Tustumena Lake	CCI	Kasilof	Fingerling	17,050,000
Hidden Lake	CCI	Trail Lakes	Fingerling	1,240,000
Leisure Lake	LCI	Kasilof	Fed Fry	2,110,000
Upper Thumb River	KOD	Karluk	Eyed Egg	13,300,000

Table 5. Coho salmon stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Crystal Creek	SEA	Crystal Lake	Smolt	251,000
Ohmer Creek	SEA	Crystal Lake	Smolt	251,000
Ohmer Creek	SEA	Crystal Lake	Emergent Fry	147,000
Sumner Creek	SEA	Crystal Lake	Emergent Fry	147,000
Irish Creek	SEA	Crystal Lake	Emergent Fry	777,000
Crystal Creek	SEA	Crystal Lake	Emergent Fry	318,000
Ward Lake Drainage	SEA	Deer Mountain	Fed Fry	38,400
Klawock River	SEA	Klawock	Smolt	309,000
Klawock Lake	SEA	Klawock	Smolt	546,000
Speel Arm	SEA	Snettisham	Smolt	234,000
Cove Creek	PWS	Elmendorf	Smolt	42,000
Culross Lake	PWS	Ft. Richardson	Fingerling	61,000
Little Crater Lake*	PWS	Trail Lakes	Fingerling	1,000
Moose Lake*	PWS	Clear	Fingerling	5,000
Anderson Lake*	UCI	Big Lake	Fingerling	51,000
Cornelius Lake*	UCI	Big Lake	Fingerling	23,000
Cottonwood Lake	UCI	Big Lake	Fingerling	108,000
Kings Lake	UCI	Big Lake	Fingerling	48,000
Meadow Creek	UCI	Big Lake	Fingerling	987,000
Nancy Lake	UCI	Big Lake	Fingerling	426,000
Nicklason Lake*	UCI	Big Lake	Fingerling	19,000
Wasilla Lake	UCI	Big Lake	Fingerling	122,000
Otter Lake	UCI	Elmendorf	Fingerling	10,000

* Land Locked

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Table 5. Continued.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Engineer Lake*	CCI	Kasilof	Fingerling	14,000
Grant Lake	CCI	Trail Lakes	Fingerling	699,000
Lower Summit Lake	CCI	Trail Lakes	Fingerling	30,000
Six Mile Lake	CCI	Trail Lakes	Fingerling	300,000
Tern Lake	CCI	Trail Lakes	Fingerling	37,000
Quartz Creek	CCI	Trail Lakes	Fingerling	38,000
Grouse Lake	CCI	Elmendorf	Smolt	34,000
Seward Lagoon	CCI	Elmendorf	Smolt	41,000
Bear Lake	CCI	Elmendorf	Fingerling	220,000
Trail Lake*	CCI	Elmendorf	Fingerling	47,000
Union Lake*	CCI	Elmendorf	Fingerling	82,000
Wick Lake*	CCI	Elmendorf	Fingerling	56,000
Caribou Lake	LCI	Trail Lakes	Fingerling	119,000
Seldovia Lake	LCI	Trail Lakes	Fingerling	60,000
Barry Lagoon	KOD	Kitoi Bay	Fingerling	25,000
Buskin Lake	KOD	Kitoi Bay	Fingerling	16,000
Dark Lake*	KOD	Kitoi Bay	Fingerling	8,000
Genevieve Lake	KOD	Kitoi Bay	Fingerling	23,000
Island Lake*	KOD	Kitoi Bay	Fingerling	28,000
Kalsin Lake*	KOD	Kitoi Bay	Fingerling	19,000
Little Kitoi Lake	KOD	Kitoi Bay	Fingerling	128,000
Lower Shemya Lake*	KOD	Kitoi Bay	Fingerling	3,000
Margaret Lake*	KOD	Kitoi Bay	Fingerling	4,000
Mayflower Lake*	KOD	Kitoi Bay	Fingerling	7,000
Middle Lake*	KOD	Kitoi Bay	Fingerling	2,000
Mission Lake*	KOD	Kitoi Bay	Fingerling	12,000
Monashka River	KOD	Kitoi Bay	Fingerling	10,000
Orbin Lake*	KOD	Kitoi Bay	Fingerling	8,000
Pillar Creek	KOD	Kitoi Bay	Fingerling	10,000
Pony Lake*	KOD	Kitoi Bay	Fingerling	2,000
Southern Lake*	KOD	Kitoi Bay	Fingerling	4,000
28 Mile Pit*	AYK	Clear	Fingerling	2,000
Birch Lake*	AYK	Clear	Fingerling	50,000
Chena Lake*	AYK	Clear	Fingerling	30,000
Clear Creek	AYK	Clear	Fingerling	83,000
Donnelly Cr. Pond*	AYK	Clear	Fingerling	6,000
Little Harding Lake*	AYK	Clear	Fingerling	10,000
Lost Lake*	AYK	Clear	Fingerling	5,000
Quartz Lake*	AYK	Elmendorf	Fingerling	27,000
Quartz Lake*	AYK	Clear	Fingerling	66,000
Wood Creek	AYK	Clear	Fingerling	83,000

* Land Locked

Table 6. Rainbow trout stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Blueberry Lake	PWS	Elmendorf	Fingerling	2,000
Crater Lake	PWS	Elmendorf	Fingerling	8,000
Gergie Lake	PWS	Elmendorf	Fingerling	5,000
Junction Lake	PWS	Elmendorf	Fingerling	2,000
Minnow Lake	PWS	Elmendorf	Fingerling	3,000
North Jan Lake	PWS	Elmendorf	Fingerling	17,000
Old Road Lake	PWS	Elmendorf	Fingerling	1,000
Round Lake	PWS	Elmendorf	Fingerling	1,000
Sculpin Lake	PWS	Elmendorf	Fingerling	30,000
Squirrel Creek Pit	PWS	Elmendorf	Fingerling	1,000
Three Mile Lake	PWS	Elmendorf	Fingerling	5,000
Tiny Lake	PWS	Elmendorf	Fingerling	1,000
Tolsona Lake	PWS	Elmendorf	Fingerling	23,000
Van Lake	PWS	Elmendorf	Fingerling	79,000
Barley Lake	UCI	Elmendorf	Fingerling	8,000
Beach Lake	UCI	Elmendorf	Catchable	2,000
Big No Luck Lake	UCI	Elmendorf	Fingerling	14,000
C Street Lake	UCI	Elmendorf	Catchable	5,000
Campbell Creek	UCI	Clear	Catchable	10,000
Campbell Point Lake	UCI	Elmendorf	Catchable	4,000
Canoe Lake	UCI	Elmendorf	Subcatchable	2,000
Cheney Pond	UCI	Elmendorf	Catchable	6,000
Clunie Lake	UCI	Elmendorf	Catchable	7,000
Crystal Lake	UCI	Elmendorf	Fingerling	13,000
Dairy Lake	UCI	Elmendorf	Fingerling	16,000
Dawn Lake	UCI	Elmendorf	Fingerling	5,000
Delong Lake	UCI	Elmendorf	Catchable	5,000
Derby Pond	UCI	Ft. Richardson	Broodstock	4,000
Dishno Lake	UCI	Elmendorf	Catchable	1,000
Fire Lake - lower	UCI	Elmendorf	Catchable	4,000
Fish Lake	UCI	Elmendorf	Catchable	2,000
Florence Lake	UCI	Elmendorf	Fingerling	6,000
Green Lake	UCI	Elmendorf	Catchable	4,000
Gwen Lake	UCI	Elmendorf	Catchable	4,000
Hillberg Lake	UCI	Elmendorf	Catchable	2,000
Honeybee Lake	UCI	Elmendorf	Fingerling	19,000
Irene Lake	UCI	Elmendorf	Subcatchable	3,000
Jewell Lake	UCI	Elmendorf	Catchable	15,000
Kalmbuck Lake	UCI	Elmendorf	Fingerling	13,000
Kepler-Bradly Lake	UCI	Elmendorf	Subcatchable	14,000
Kettle Rock Lake	UCI	Elmendorf	Fingerling	2,000
Knik Lake	UCI	Elmendorf	Fingerling	10,000

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Table 6. Continued.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Little No Luck Lake	UCI	Elmendorf	Fingerling	7,000
Long Lake	UCI	Elmendorf	Fingerling	22,000
Lorraine Lake	UCI	Elmendorf	Fingerling	22,000
Lynne Lake	UCI	Elmendorf	Fingerling	14,000
Marion Lake	UCI	Elmendorf	Fingerling	15,000
Matanuska Lake	UCI	Elmendorf	Fingerling	12,000
Meirs Lake	UCI	Elmendorf	Subcatchable	1,000
Mirror Lake	UCI	Elmendorf	Catchable	8,000
Otter Lake	UCI	Elmendorf	Catchable	9,000
Ravine Lake	UCI	Elmendorf	Fingerling	5,000
Reed Lake	UCI	Elmendorf	Fingerling	8,000
Sand Lake	UCI	Elmendorf	Catchable	7,000
Seymore Lake	UCI	Elmendorf	Fingerling	46,000
Six Mile Lake	UCI	Elmendorf	Catchable	1,000
South Rolley Lake	UCI	Elmendorf	Fingerling	21,000
Spring Lake	UCI	Elmendorf	Catchable	1,000
Tex Smith Lake	UCI	Elmendorf	Fingerling	5,000
Thompson Lake	UCI	Elmendorf	Catchable	1,000
Tigger Lake	UCI	Elmendorf	Fingerling	6,000
Triangle Lake	UCI	Elmendorf	Catchable	1,000
Twin Island Lake	UCI	Elmendorf	Fingerling	51,000
Walby Lake	UCI	Elmendorf	Fingerling	30,000
Weiner Lake	UCI	Elmendorf	Fingerling	4,000
"X" Lake	UCI	Elmendorf	Fingerling	20,000
"Y" Lake	UCI	Elmendorf	Fingerling	8,000
Chugach Estates	CCI	Elmendorf	Fingerling	10,000
Johnson Lake	CCI	Elmendorf	Catchable	19,000
Rainbow Lake	CCI	Elmendorf	Fingerling	5,000
Sport Lake	CCI	Elmendorf	Fingerling	15,000
Thetis Lake	CCI	Elmendorf	Fingerling	15,000
Abercrombie Lake	KOD	Kitoi Bay	Fingerling	2,000
Abercrombie Lake	KOD	Elmendorf	Fingerling	2,000
Aurel Lake	KOD	Elmendorf	Fingerling	3,000
Big Lake	KOD	Elmendorf	Fingerling	4,000
Bull Lake	KOD	Elmendorf	Fingerling	2,000
Caroline Lake	KOD	Elmendorf	Fingerling	1,000
Cascade Lake	KOD	Elmendorf	Fingerling	3,000
Cicely Lake	KOD	Elmendorf	Fingerling	1,000
Delphin Lake	KOD	Elmendorf	Fingerling	8,000
Dolgoi Lake	KOD	Elmendorf	Fingerling	10,000
Heitman Lake	KOD	Elmendorf	Fingerling	7,000
Horseshoe Lake	KOD	Elmendorf	Fingerling	1,000

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Table 6. Continued

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Jack Lake	KOD	Elmendorf	Fingerling	1,000
Jupiter Lake	KOD	Elmendorf	Fingerling	4,000
Lee Lake	KOD	Kitoi Bay	Fingerling	1,000
Lee Lake	KOD	Elmendorf	Fingerling	1,000
Lilly Pond	KOD	Elmendorf	Fingerling	1,000
Lilly Pond	KOD	Kitoi Bay	Fingerling	1,000
Long Lake	KOD	Kitoi Bay	Fingerling	2,000
Long Lake	KOD	Elmendorf	Fingerling	2,000
Saturn Lake	KOD	Elmendorf	Fingerling	1,000
Tanignak Lake	KOD	Kitoi Bay	Fingerling	1,000
Twin Lake	KOD	Elmendorf	Fingerling	3,000
Birch Lake	AYK	Elmendorf	Fingerling	269,000
Chena Lake	AYK	Elmendorf	Fingerling	48,000
Chena Lake	AYK	Clear	Fingerling	19,000
Dune Lake	AYK	Elmendorf	Fingerling	3,000
4 Mile Lake	AYK	Elmendorf	Fingerling	25,000
Geskamina Lake	AYK	Elmendorf	Fingerling	11,000
Koole Lake	AYK	Elmendorf	Fingerling	29,000
Lisa Lake	AYK	Elmendorf	Fingerling	9,000
Quartz Lake	AYK	Elmendorf	Fingerling	274,000
Rapids Lake	AYK	Elmendorf	Fingerling	1,000
Slate Lake	AYK	Elmendorf	Fingerling	2,000

Table 7. Sheefish stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Four Mile Lake*	AYK	Clear	Fingerling	3,600
Bullwinkle Lake*	AYK	Clear	Fingerling	1,000
Craig Lake*	AYK	Clear	Fingerling	3,500
Earthmover Pit*	AYK	Clear	Fingerling	200
Grayling Lake*	AYK	Clear	Fingerling	500
Harding Lake*	AYK	Clear	Fingerling	212,000
Lost Lake*	AYK	Clear	Fingerling	5,000
Nenana Pond*	AYK	Clear	Fingerling	3,000
Silver Fox Pit*	AYK	Clear	Fingerling	200
Weight Station Pond*	AYK	Clear	Fingerling	800

Table 8. Steelhead trout stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Falls Creek	SEA	Crystal Lake	Smolt	3,300
Klawock River	SEA	Klawock	Smolt	18,900

Table 9. Grayling stocked by FRED Division in 1984.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
Arizona Lake	PWS	Clear	Swimup Fry	10,000
Bear Cub Lake	PWS	Clear	Swimup Fry	10,000
Caribou Lake	PWS	Clear	Swimup Fry	8,000
Connor Lake	PWS	Clear	Swimup Fry	15,000
David Lake	PWS	Clear	Fingerling	8,000
Dick Lake	PWS	Clear	Swimup Fry	10,000
Jack Lake	PWS	Clear	Swimup Fry	90,000
Junction Lake	PWS	Clear	Swimup Fry	5,000
Mirror Lake	PWS	Clear	Swimup Fry	30,000
Moose Creek	PWS	Clear	Swimup Fry	25,000
Moose Lake	PWS	Clear	Swimup Fry	180,000
Poplar Grove Cr.	PWS	Clear	Swimup Fry	20,000
Squirrel Cr. Lake	PWS	Clear	Swimup Fry	7,000
Three Mile Lake	PWS	Clear	Swimup Fry	5,000
Tolsona Lake	PWS	Clear	Swimup Fry	180,000
Two Mile Lake	PWS	Clear	Swimup Fry	7,000
Canoe Lake	UCI	Clear	Swimup Fry	13,000
Canoe Lake	UCI	Clear	Fingerling	4,000
Johnson Lake	UCI	Clear	Swimup Fry	64,000
Long Lake	UCI	Clear	Swimup Fry	36,000
Meirs Lake	UCI	Clear	Swimup Fry	10,000
Meirs Lake	UCI	Clear	Fingerling	3,000
Wishbone Lake	UCI	Clear	Swimup Fry	15,000
Bernice Lake	CCI	Clear	Swimup Fry	90,000
Abercrombie Lake	KOD	Clear	Swimup Fry	25,000
Aurel Lake	KOD	Clear	Swimup Fry	20,000
Cascade Lake	KOD	Clear	Swimup Fry	20,000
Cicely Lake	KOD	Clear	Swimup Fry	10,000
Heitman Lake	KOD	Clear	Swimup Fry	25,000
Long Lake	KOD	Clear	Swimup Fry	25,000

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Table 9. Continued.

Stocking Location	Area	Hatchery	Life Stage	Number Stocked
29.6 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
30.6 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
31 Mile Pit	AYK	Clear	Swimup Fry	15,000
31.6 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
33.0 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
33.5 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
34.6 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
35.8 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
36.5 Steese Hwy.	AYK	Clear	Swimup Fry	15,000
Bathing Beauty Pond	AYK	Clear	Swimup Fry	15,000
Big Lake	AYK	Clear	Swimup Fry	25,000
Bolio Lake	AYK	Clear	Swimup Fry	50,000
Chena Hot Spg. 30.0	AYK	Clear	Swimup Fry	10,000
Chena Hot Spg. 30.9	AYK	Clear	Swimup Fry	10,000
Chena Hot Spg. 32.9	AYK	Clear	Swimup Fry	15,000
Chena Hot Spg. 33.3	AYK	Clear	Swimup Fry	5,000
Chena Hot Spg. 38.8	AYK	Clear	Swimup Fry	10,000
Chena Hot Spg. 42.8	AYK	Clear	Swimup Fry	10,000
Chena Hot Spg. 45.5	AYK	Clear	Swimup Fry	10,000
Chena Hot Spg. 45.6	AYK	Clear	Swimup Fry	5,000
Chena Hot Spg. 47.9	AYK	Clear	Swimup Fry	10,000
Chena Lake	AYK	Clear	Swimup Fry	37,000
Chena River	AYK	Clear	Swimup Fry	55,000
Dune Lake	AYK	Clear	Swimup Fry	50,000
Grayling Lake	AYK	Clear	Swimup Fry	15,000
Hidden Lake	AYK	Clear	Swimup Fry	15,000
Island Lake	AYK	Clear	Swimup Fry	50,000
Johnson Rd. Pit #1	AYK	Clear	Swimup Fry	15,000
Johnson Rd. Pit #2	AYK	Clear	Swimup Fry	15,000
Left O.P. Lake	AYK	Clear	Swimup Fry	15,000
Walden Pond	AYK	Clear	Swimup Fry	20,000
West Pond	AYK	Clear	Swimup Fry	15,000

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