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KITOI BAY HATCHERY
ANNUAL MANAGEMENT PLAN, 1996

By

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INTRODUCTION

Kitoy Bay Hatchery is located on Afognak Island (58°11'04" N. latitude, 152°21'04" W. longitude) on the west side of Izhut Bay (Figure 1).

The primary user group served by the hatchery is the Kodiak commercial purse seine salmon fishers. Approximately 385 purse seine and 30 beach seine permits are registered in Kodiak. Set gillnet fishers also benefit as a result of the relocation of ~30-40% of the purse seine fleet to target Kitoy fish. Sport and subsistence fishermen comprise the secondary user groups, harvesting fish produced from stocking in other locations in the Kodiak area.

The main goals of the Kitoy Bay Hatchery are to increase the number of returning adult pink, chum, sockeye, and coho salmon available to the Kodiak area fisheries, and to increase the commercial harvest in areas that historically did not produce good or sustained catches, i.e. cape fisheries in the Duck Bay/Izhut Bay areas. The hatchery provides coho salmon fingerlings for programs designed to create recreational salmon fisheries near Kodiak's remote villages. A subsistence fishery has been created in the Port Lions and Ouzinkie villages from stocking coho in barren lakes.

A pilot project using 0-check sockeye was initiated in 1989 and continued in 1994. The original goal was to rear fry to the target size of 2-3 gram smolt for release each summer. This project was expected to produce several hundred thousand sockeye for harvest. Due to returns at less than projected levels, however, this project was modified in 1993 to produce primarily 4-5 gram presmolt and 8.0 gram yearling smolt. A coho smolt production program was also started in 1992 which will continue to contribute several thousand adults to the harvest each year.

RELEASE SITES FOR 1996

A. Big Kitoy Bay Release (Table 1):

1. Species: Pink Salmon
2. Eggs taken: 203.0 million (135,630 females, 40,698 males, 176,328 total adults);
3. Big Kitoy brood stock (BR 95)
4. Number To Be Released (May, June): 156.0 million 0.2 g fry (88%)
5. Expected Return: (July and August, 1997) 4.7 million (3.0%)
6. FTP # 81A-0241 (expires 6/30/96)

Pink salmon fry will be released in Kitoy Bay adjacent to the hatchery. All pink salmon fry (156 million) will be short-term net pen reared in Kitoy Bay.

B. Big Kitoy Bay Release:

1. Species: Chum Salmon
2. Eggs taken: 29.0 million (14,618 females, 8,771 males, 23,389 total adults);
3. Big Kitoy brood stock (BR 95)

4. Number To Be Released (May): 22.0 million 2.0 g fry (76%)
5. Expected Return: (June and July, 1999-2001) 440,000 (2%)
6. FTP #: 81A-0156 (expires 6/30/96)

Chum salmon fry will be reared until they reach a size of 2.0 grams, then released adjacent to the Kitoi Bay Hatchery.

C. Crescent and Katmai Lakes Releases (see Table 1):

1. Species: Coho Salmon
2. Eggs taken: 200,000 (67 females, 32 males, 99 total adults)
3. Little Kitoi brood stock (BR 95)
4. Number To Be Released (Crescent, June; Katmai, September): 180,000 1.5-5.0 g fingerlings (94%)
5. Expected Return: (August and September, 1998-1999) 5,500 (3,500 Crescent; 2,000 Katmai) (2-7%)
6. FTP #: 92A-0079, 92A-0081 (permits expire 12/31/2002)

Coho fingerlings (BR 95) will be released into Crescent Lake. Coho pre-smolts (BR 95) will be released into Katmai Lake adjacent to the village of Ouzinkie in late fall.

D. Big Kitoi Bay Release:

1. Species: Coho Salmon
2. Eggs taken: 1,557,000 (558 females, 335 males, 893 total adults)
3. Little Kitoi brood stock (BR 94)
4. Number To Be Released (June): 900,000 (70%) 20.0g smolt
5. Expected Return: (August and September, 1997-1998) 90,000 (10%)
6. FTP #: 94A-0063 (expires 6/30/2000)

Coho salmon smolt (BY 94) will be reared to 20.0 grams and held in net pens adjacent to the hatchery for one or two weeks prior to release.

E. Little Kitoi Bay Release:

1. Species: Sockeye Salmon
2. Eggs taken: 746,000 (400 females, 197 males, 597 total adults)
3. Little Kitoi brood stock (BR 94)
4. Number To Be Released (May): 567,000 (76%) 10.0 g smolt
5. Expected Return: (July and August, 1998-1999) 85,000 (15%)
6. FTP #: 93A-0117 (expires 11/30/96; amend to 1 million release)

F. Little Kitoi Lake release:

1. Species: Sockeye Salmon
2. Egg Take Goal: 205,000 (135 females, 163 males, 298 total adults)
3. Little Kitoi brood stock (BR 95)

4. Number To Be Released (October): 150,000 (75%) 6.0 g pre-smolt
5. Expected Return: (July and August, 1999-2000) 15,000 (10%)
6. FTP #: 93A-0116 (expires 11/30/96)

Pre-smolt will be released into Little Kitoi Lake in late October or early November, just prior to freeze up, to minimize the likelihood of plankton cropping.

Sockeye salmon smolt will be reared in UV treated water until May. The smolt should weight about 8.0 g and will then be salt water challenged; when feasible, blood samples will be collected to measure sodium levels. When sodium levels are ≤ 170 microequivalents per liter the smolt will be released into net pens for 48 hours in the estuary; near the outlet of Little Kitoi Creek, then released into the estuary.

EGG TAKE GOALS BY SPECIES AND BROOD SOURCE LOCATION FOR 1996

Egg take goals and release numbers may be adjusted in-season in response to lake studies and available space for incubation and rearing.

A. Big Kitoi Creek egg takes (Table 2):

1. Species: Pink Salmon
2. Egg Take Goal: 215 million (145,000 females, 50,000 males, 250,000 total)
3. Expected Release: (May and June, 1997) 182.0 million (89%) 0.5 and 0.2 g fry in Big Kitoi Bay
4. Expected Return: (July and August, 1998) 5.5 million (3.0%)
5. FTP #: 81A-0241 (expires 6/30/96)

Pink Salmon 195,000 brood stock, 6,000 escapement plus 55,000 for mortality and strays.

1. Species: Chum Salmon
2. Egg Take Goal: 25.0 million (15,000 females, 9,000 males, 24,000 total adults)
3. Expected Release: (May, 1997) 22.0 million (88%) 1.5 g fry in Big Kitoi Bay
4. Expected Return: (June and July, 2000, 2001, 2002) 440,000 (2%)
5. FTP #: 81A-0156 (expires 6/30/96)

Chum Salmon 25,000 brood stock, 1,000 escapement requirement.

1. Species: Coho Salmon
2. Egg Take Goal: 650,000 (217 females, 200 males, 417 total adults)
3. Expected Release: (Crescent, Ruth, Jennifer, and Little Kitoi: June, 1997; Katmai, September, 1997) 499,000 (77%) 1.5-5.0 g fingerlings in Crescent, Katmai, Jennifer, Ruth, and Little Kitoi Lakes
4. Expected Return: (August and September, 1999-2000) 11,170 (2-7%)
5. FTP # 92A-0079 (Crescent Lake expires 12/31/2002), 92A-0081 (Katmai Lake expires 12/31/2002), 92A-0080 (Jennifer Lake expires 12/31/2002), 92A-0083 (Ruth Lake permit expires 6/30/2002), 92A-0089 (Little Kitoi Lake expires 12/31/2002),

1. Species: Coho Salmon
2. Egg Take Goal: 1.0 million (350 females, 350 male, 700 total adults)
3. Expected Release: (June, 1997) 750,000 (75%) 20 g smolt in Big Kitoi Bay
4. Expected Return: (August and September, 1999, 2000) 75,000 (10%)
5. FTP #: 94A-0036 (expires 6/30/2000)

Coho Salmon 1,120 brood stock, no escapement requirement.

B. Little Kitoi Lake egg takes:

1. Species: Sockeye Salmon
2. Egg Take Goal: 1.0 million (600 females, 450 males, 1,050 total adults)
3. Expected Release: (May, 1998) 880,000 (75%) 10 g smolt in L.Kitoi Bay
4. Expected Return: (July and August, 2000, 2001) 132,000 (15%)
5. FTP #: 93A-0117 (expires 11/30/96, amend to 1 million release)

Little Kitoi late run 1,250 brood stock. An escapement of 10,000 would meet the egg take requirements of Kitoi Bay and Pillar Creek Hatcheries, and allow 4,000 spawners.

Little Kitoi Lake is the primary late run sockeye salmon egg take location for both hatcheries. If escapement into Little Kitoi Lake is not sufficient, the 1996 backup egg take site is Upper Station Lake.

1. Species: Sockeye Salmon
2. Egg Take Goal: 200,000 (80 females, 80 males, 160 total adults)
3. Expected Release: (October, 1997) 150,000 (75%) 6.0 g pre-smolt in Little Kitoi Lake
4. Expected Return: (July and August, 1999-2000) 15,000 (10%)
5. FTP #: 93A-0016 (expires 6/30/2000)

EXTENDED HATCHERY REARING IN 1996

A. Big Kitoi Creek egg take (BR 95):

1. Species: Coho Salmon
2. Eggs Taken: 1.1 million (434 females, 326 males, 760 total adults)
3. Expected Release: (June, 1997) 700,000 (75%) 20 g smolt in Big Kitoi Bay
4. Expected Return: (August and September, 1998, 1999) 70,000 (10%)
5. FTP #: 94A-0036 (expires 6/30/2000)

B. Upper Station egg take (BR 95)

1. Species: Sockeye Salmon
2. Eggs Taken: 738,000 (237 females, 166 males, 403 total adults)
3. Expected Release: (May, 1997) 600,000 (81%) age-one 10.0g smolt in L. Kitoi Bay.
4. Expected Return: (July and August, 1998-1999) 90,000 (15%)
5. FTP #: 93A-0117 (expires 11/30/96)

HARVEST MANAGEMENT

A. Estimated Run, Brood, and Harvest Numbers for 1996:

Location	Species	Total Run	Harvest
<i>Kitoi Bay</i>	Pink	2,543,000	2,273,000
	Chum	153,000	128,000
	Coho	39,000	36,500
<i>Little Kitoi</i>	Sockeye	49,700	34,700
<i>Crescent Lake</i>	Coho	3,500	3,500
<i>Katmai Creek</i>	Coho	2,000	2,000

B. General Conditions:

1. The primary objective of the Kitoi Bay Hatchery is to provide fish to the common property fishery. It is recognized that a joint effort between ADF&G and KRAA is necessary to continue the operation of the hatchery at full production levels.
2. Operation of the hatchery will maintain the genetic diversity of pink salmon and chum salmon brood stocks at Kitoi Bay Hatchery and allow future harvest in the common property fishery (see page 8).
3. The ADF&G Area Management Biologist in Kodiak will manage the fishery to ensure adequate brood stock and an orderly common property fishery.

C. Special Harvest Area (SHA) Description and Conditions

All waters of the Kitoi Bay Section, north of a line from the regulatory markers located at the entrance of Kitoi Bay, are designated as the SHA (the Kitoi Bay Section as described in the 1995 Commercial Finfish Regulation book).

D. Harvest Strategies

1. Funds received from the cost recovery in 1989 will be used to operate the hatchery in FY97. The common property fishery will harvest all excess pink salmon over the brood stock needs. An early fishery to harvest excess male pink salmon is expected to occur after July 25 in the Kitoi Bay Section.

2. Incidental Species Catch.

Due to the harvest location, incidental species catch will be insignificant.

3. Contingency.

Priority will be given to the brood stock capture of the pink salmon run to Kitoi Bay Hatchery. In the event that surplus fish are available, the SHA will be opened by emergency order. Brood stock collection will take precedent over other operations if a smaller than predicted run of pink salmon occurs.

4. Catch Monitoring.

Fish harvested in those areas known to contain hatchery fish will be monitored by ADF&G fish tickets.

E. Return Site: Kitoi Bay

Overview

Kitoi Bay Hatchery's long term goal has been to increase fishing opportunities in those management units adjacent to the hatchery which are regulated for hatchery production. Hatchery operations are being modified to maximize the facilities capacity to provide increased and diverse returns over an extended time period. Annual returns of four species involving five stocks (listed below) occurring from early June through early September will yield increased fishing time in the Kitoi Bay, Izhut Bay and Duck Bay management units (Figure 2). The Alaska Board of Fisheries approved Eastside Afognak Management Plan identifies a common property harvest strategy for Kitoi Bay Hatchery returns (Table 3).

Inseason management of Kitoi Hatchery returns is complicated because of over lapping run timing between stocks and the escapement priority given to brood stock requirements. Brief inseason adjustments in fishing opportunities in any or all management units, may be necessary to achieve brood stock goals. These compromises may occur more frequently in the Kitoi Bay Section and least frequently in the Duck Bay Section, and should occur in a manner which maintains normal run timing of hatchery returns. During the brood stock collection period (identified below), the burden of achieving adequate brood stock escapements while maintaining high quality harvests on

hatchery-bound returns will be shared by the Commercial Fisheries Management Biologist and the Kitoi Bay Hatchery manager.

Implementation of the Eastside Afognak Management Plan can be aided by clarifying brood stock collection activities, which are planned to be completed as follows:

Early-run sockeye returning to Little Kitoi Lake - 09 June through 15 June.

Early-run chum returning to Big Kitoi Lake - 15 June through 20 July.

Late-run sockeye returning to Little Kitoi Lake - 20 July through 15 August.

Mid-run pink returning to Big Kitoi Lake - 8 August through 20 August.

Mid-run coho returning to Big Kitoi Lake - 20 August through 5 September.

Pink Salmon

Pink salmon produced at Kitoi Bay hatchery are taken in purse and beach seine fisheries and contribute to the commercial catch in the Kitoi, Izhut, and Duck Bay sections. Natural stocks of pink salmon destined for the westside of Kodiak Island and other Afognak systems may also contribute to the harvest.

A pink salmon cost recovery fishery will not be held in Kitoi Bay in 1996. Fishing periods are coordinated between the hatchery manager and salmon area management biologist to assure escapement and brood fish. Brood fish are retained by a net enclosure in the estuary. Big Kitoi Creek escapement is monitored at a weir. Coordinated management of the fisheries and brood stock collection has been effective at Kitoi for the past 15 years.

The Kitoi Bay (252-32) Section will be managed under the guidelines in the East Afognak Management Plan, with an opening to harvest excess males which usually arrive in the early portion of the run. Additional openings in this area, to harvest pink salmon in excess of the hatchery needs, may occur. It is an annual objective that the hatchery brood fish provide at least 60% females to allow for egg take goals, and for salmon to be available to spawn over a four week period, to assure the maintenance of genetic diversity.

Depending on run strength and timing, the Kitoi Bay Section may close to commercial salmon fishing from August 6 through August 10. If further closures are needed to insure adequate brood stock, the Izhut Bay and Duck Bay Sections may also close to commercial salmon fishing.

Chum Salmon

Chum salmon returns to Kitoi Bay hatchery are expected to total 150,000 adults in 1996. Approximately 30,000 adults will be needed for brood stock. The salmon area management biologist and the hatchery manager will coordinate openings in Izhut Bay and Duck Bay, statistical areas 252-30 and 252-31 to harvest chum salmon during the June sockeye and early July pink salmon fisheries. Most of the chum salmon are expected to be in inner Kitoi Bay by late July. No additional closure time in the June sockeye fisheries in Duck Bay, statistical area 252-31, is

expected this year. The incidental harvest of hatchery bound chum salmon has been estimated to be as high as 50% of the run in some years. The major areas of interception have been Duck Bay (252-31), Izhut Bay (252-30) and Kitoi Bay (252-32). Commercial salmon fishing in these areas, prior to July 10, is expected and will be carefully monitored to determine the run timing and strength and to insure the hatchery brood stock. A targeted fishery on early run chum salmon may occur inside Kitoi Bay this year.

Coho Salmon

Coho salmon returning to Little Kitoi Lake will be protected from the commercial fishery by a 500 yard closure seaward from the stream mouth. Some coho will be harvested incidental to the pink salmon fishery in the Kitoi area as well as in the September coho fishery. Hatchery brood stock will be collected from the returns to Kitoi Hatchery. The closure should be sufficient to meet brood stock and escapement requirements. Fishing periods by emergency order can be enacted if necessary to protect the run or harvest excess fish.

Sockeye Salmon

The sockeye run to Little Kitoi Lake, from late run Upper Station donor stock, is projected to be approximately 50,000 salmon. The commercial salmon fishery will be managed to allow the collection of brood stock inside Little Kitoi Bay. Adults are expected to enter the fishery in July and August peaking in early August. The brood stock will be protected by proportional bay closures in coordination with the pink salmon harvest. Fishing time will be driven by the strength and timing of the pink salmon run. Fishing periods by emergency order may be enacted to protect brood stock in inner Kitoi or harvest excess fish. An escapement of 10,000 salmon will meet the needs for both Pillar and Kitoi hatcheries.

The development of an early run sockeye fishery in the Izhut Bay area is planned using Afognak stock. The run timing would allow a fishery in early June slightly ahead of the chum salmon return with some overlap. A small run is expected in 1996; insufficient to require a directed commercial common property fishery.

- F. Return Sites: Crescent Lake, Jennifer Lake, Ruth Lake, Katmai Creek, and Little Kitoi Lake.

Coho Salmon

Crescent Lake, near the city of Port Lions, has an approved management plan. Coho stocking was reduced to facilitate sockeye stocking in the lake. Katmai Creek, near the city of Ouzinkie, is being stocked with pre-smolt to facilitate a sport/subsistence fishery. This fishery will provide harvestable coho for all user groups. Stocking of Jennifer and Ruth lakes, both located in close proximity to the hatchery, will supplement the commercial fishery in the Kitoi area. Fry stocked into the Little Kitoi Lake system will supplement natural production. Smolt released from the hatchery will produce a commercial coho fishery in Kitoi Bay.

SPECIAL STUDIES/RESEARCH

Sockeye

The sockeye salmon development program will focus on rearing and release of yearling smolt and pre-smolt. The zero-age smolt program will not be continue due to less than predicted returns. A portion of the sockeye salmon releases will continue to be marked by fin clipping to assist with determining the success of a given rearing strategy (Table 4). This will be accomplished by assessing returns for age, lengths, and marks at the Little Kitoi fish ladder and for marks at weirs at Pauls Bay and Afognak Lake. The weir/fish ladder compound will be used to pass and count sockeye into the lake from May 15 to August 25. Sockeye will be sampled for age and lengths. A total of 20% of the returning fish at Little Kitoi Lake will be inspected for marks. All brood fish spawned at Little Kitoi will be examined for marks. A total of 13,000 and 7,500 sockeye will be the target number to inspect for marks at Paul's and Afognak Lakes, respectively, each year, for four years. All marked fish will be aged and measured from mid-eye to tail fork. A total of 600 salmon will be sampled from fisheries in Duck Bay, Izhut Bay, and Kitoi Bay sections for age and length data as well as checking for marks.

In addition, sockeye smolt will be sampled, at Little Kitoi outlet, weekly, and one sample will be collected at Jennifer Lakes for growth information. An electronic counter will be used to estimate the smolt outmigration from Little Kitoi Lake.

Lake limnological surveys will be continued at Sorg, Little Kitoi, Jennifer, and Ruth Lakes as part of the Kitoi enhancement evaluation program.

Chum

A total of 600 chum salmon will be sampled for age and length in 1996 at the spawning rack at the hatchery. This data is necessary to ascertain year-class survival, as more extensive rearing appears to be increasing survival.

Coho

Coho salmon smolt will be sampled for condition and length frequency prior to release to determine survival relationship.

ADDITIONAL INFORMATION

The following information is provided in Appendix A: Description of Kitoi Bay Hatchery facilities, proposed and historical egg takes at Upper Station and Little Kitoi Lakes, Kitoi Bay Hatchery and standard marine survival estimates.

Table 1. Kitoi Bay Hatchery stocking levels, locations, and projected adult returns, 1996.

Species	Stock Used	Adults	Eggs (x 10 ⁶)	Stocking (x 10 ⁶)		Return
				No.	Location	
Pink	B.Kittoi Creek	176,000	178.0	156.0	B.Kittoi Bay	4.7
Chum	B.Kittoi Creek	23,000	29.0	22.0	B.Kittoi Bay	0.44
Coho	L.Kittoi Lake	893	1.55	.900	B.Kittoi Bay (BR 94)	0.090
	L.Kittoi Lake	84	0.175	0.165	Crescent Lk.	0.004
	L.Kittoi Lake	15	0.025	0.015	Katmai Lk.	0.002
Totals		992	1.750	1.08		0.0960
Sockeye	L. Kittoi Lake	597	0.746	0.567	L. Kittoi Bay (BR 94)	0.085
	L.Kittoi Lake ^a	298	0.205	0.150	L.Kittoi Lake	0.015
Totals		895	0.951	0.717		0.100
All Species	Totals	200,887	209.701	179.797		5.336

^a BY95 presmolt.

Table 2. Planned egg takes, projected stocking numbers and locations, and adult returns, 1996.

Species	Stock Used	Adults	Eggs (x 10 ⁶)	Stocking (x 10 ⁶)		Projected Return
				No.	Location (1996)	
Pink	B.Kitoi Creek	250,000	215.0	182.0	B.Kitoi Bay	5.5
Chum	B.Kitoi Creek	25,000	25.0	22.0	B.Kitoi Bay	0.440
Coho	L.Kitoi Lake	700	1.0	0.75	B.Kitoi Bay (1997)	0.075
	L.Kitoi Lake	141	0.220	0.168	Crescent Lk.	0.004
	L.Kitoi Lake	13	0.020	0.016	Katmai Lk.	0.002
	L.Kitoi Lake	141	0.220	0.165	Jennifer Lk.	0.002
	L.Kitoi Lake	48	0.075	0.060	Ruth Lk.	0.001
	L.Kitoi Lake	74	0.115	0.090	L.Kitoi Lk.	0.003
Totals		1,117	1.650	1.249		0.087
Sockeye	Upper Station/ L.Kitio Lk	1,050	1.000	0.880	L.Kitio Bay (1998)	0.132
	Upper Station/ L.Kitoi Lk	160	0.200	0.150	L.Kitoi Lk	0.015
Totals		1,210	1.200	1.030		0.147
All Species	Totals	277,327	242.850	206.279		6.174

Table 3. Primary management species and fishery chronology of the Eastside Afognak Management Plan for the Kodiak Management Area, 1995.

TARGETED SPECIES BY SYSTEM AND TIME FOR SPECIFIC MANAGEMENT UNITS ^{1/}

S.E. AFOGNAK SECTION (Seine)	LITNIK SOCKEYE	LITNIK SOCKEYE	LITNIK SOCKEYE	LOCAL PINK	LOCAL COHO	
DUCK BAY SECTION (Seine)	EARLY HATCHERY CHUM AND/OR SOCKEYE			HATCHERY & LOCAL PINK	LOCAL COHO	
IZHUT BAY SECTION (Seine)	EARLY HATCHERY CHUMS AND/OR SOCKEYE			CLOSED UNTIL COST RECOVERY ASSURED	HATCHERY & LOCAL PINK LOCAL COHO & HATCHERY SOCKEYE	
KITOI BAY SECTION ^{2/} (Seine) Broodstock				a		
PINK: Cost Recovery				b		
Common Property				c		
CHUM &/OR Broodstock EARLY SOCKEYE	d					
Common Property	e					
COHO & Broodstock SOCKEYE:					f	
Common Property					g	
	6/9	6/14	6/20	7/1 7/3 7/6	7/18 7/20 7/25	8/1 8/8 8/15 8/20 8/24 9/1

⊗ - fishing time dependant upon sockeye escapement into Litnik system.

- 1 Included in this management plan are the harvest strategies for current natural and hatchery production as well as future hatchery production.
- 2 The management plan required for the Kitoi Bay Section is rather complicated in order to achieve broodstock, cost recovery, and common harvest requirements. This is further complicated by the multispecies production currently occurring at Kitoi Bay hatchery. The diagram shown attempts to approximate dates for when specific management strategies should be implemented to insure achievement of hatchery goals and an orderly harvest of quality common property fish.
 - a Hatchery pink salmon broodstock captured.
 - b Hatchery pink salmon cost recovery fishery when necessary.
 - c Hatchery pink salmon common property fishery.
 - d Hatchery chum and/or early sockeye salmon broodstock captured.
 - e Hatchery chum and/or early sockeye salmon common property fishery.
 - f Hatchery coho and late sockeye salmon broodstock captured.
 - g Hatchery coho and late sockeye salmon common property fishery.

Table 4. Marking of sockeye salmon for Kitoi Bay evaluation, past, present and proposed.

	Early Run (ER)	Late Run (LR)	Comment
<u>BR 1991</u>			
Life Stage	Zero-Age	N/A	Net pen reared and released in L. Kitoi Bay
Brood stock	Afognak	N/A	
# Stocked	182,000	N/A	ER from Pillar
# Marked	30,000 LV	N/A	
<u>BR 1992</u>			
Life Stage	Zero-Age^a	Zero-Age^a	
Brood Stock	Afognak	Upper Station	
# Stocked	0	0	
# Marked	0 LV	0 LV	
Life Stage	Pre-Smolt^a	Pre-Smolt^a	Moved to (LR) smolt program
Brood Stock	Afognak	Upper Station	
# Stocked	0	0	
# Marked	0 RV	0 Ad RV	
Life Stage	Age 1. Smolt	Age 1. Smolt	Increased (LR) by 150,000
Brood Stock	Afognak	Upper Station	
# Stocked	0	326,500	
# Marked	0 Ad LV	19,968 RV	

-Continued-

Table 4. (page 2 of 3)

	Early Run (ER)	Late Run (LR)	Comment
<u>BR 1993</u>			
Life Stage	Zero-Age	Zero-Age	Early run from Pillar Hatchery.
Brood Stock	Afognak	Upper Station	
# Stocked	293,000	1,700,000	
# Marked	20,106 LV	40,950 LV	
Life Stage	Pre-Smolt	Pre-Smolt	Early run from Pillar Hatchery
Brood Stock	Afognak	Upper Station	
# Stocked	183,000	10,108	
# Marked	10,103 RV	10,108 Ad RV	
Life Stage	Age 1. Smolt	Age 1. Smolt	
Brood Stock	Afognak	Upper Station	
# Stocked	0	975,000	To be released in May 1995
# Marked	0 Ad LV	59,950 Ad LV	
<u>BR 1994</u>			
Life Stage	Zero-Age	Zero-Age	Early run from Pillar Hatchery.
Brood Stock	Afognak	Upper Station	
# Stocked	0	266,952	
# Marked	0 LV	10,000 LV	

-Continued-

Table 4. (page 3 of 3)

	Early Run (ER)	Late Run (LR)	Comment
Life Stage	Pre-Smolt	Pre-Smolt	Early run from Pillar Hatchery
Brood Stock	Afognak	L. Kitoi	
# Stocked	150,000	84,861	
# Marked	10,000 RV	10,000 Ad RV	
Life Stage	Age 1. Smolt	Age 1. Smolt	The marked fish are included in the # stocked total
Brood Stock	Afognak	L. Kitoi	
# Stocked	0	567,000	
# Marked	0 Ad LV	40,000 Ad LV	
BR 95			
Life Stage	Pre Smolt	Pre Smolt	
Brood Stock	Afognak	Little Kitoi	
# Stocked	150,000	150,000	
# Marked	10,000 RV	10,000 Ad RV	
Life Stage	Age 1. Smolt	Age 1. Smolt	
Brood Stock	Afognak	Upper Station	Release in Little Kitoi Estrary in 1997
# Stocked	0	600,000	
# Marked	0	45,000 Ad LV	

^a All these fish were lost to IHNV.

N/A Not applicable

LV Left Ventral fin clip

RV Right Ventral fin clip

Ad LV Adipose and Left Ventral clip

Ad RV Adipose and Right Ventral clip

TBD To be determined

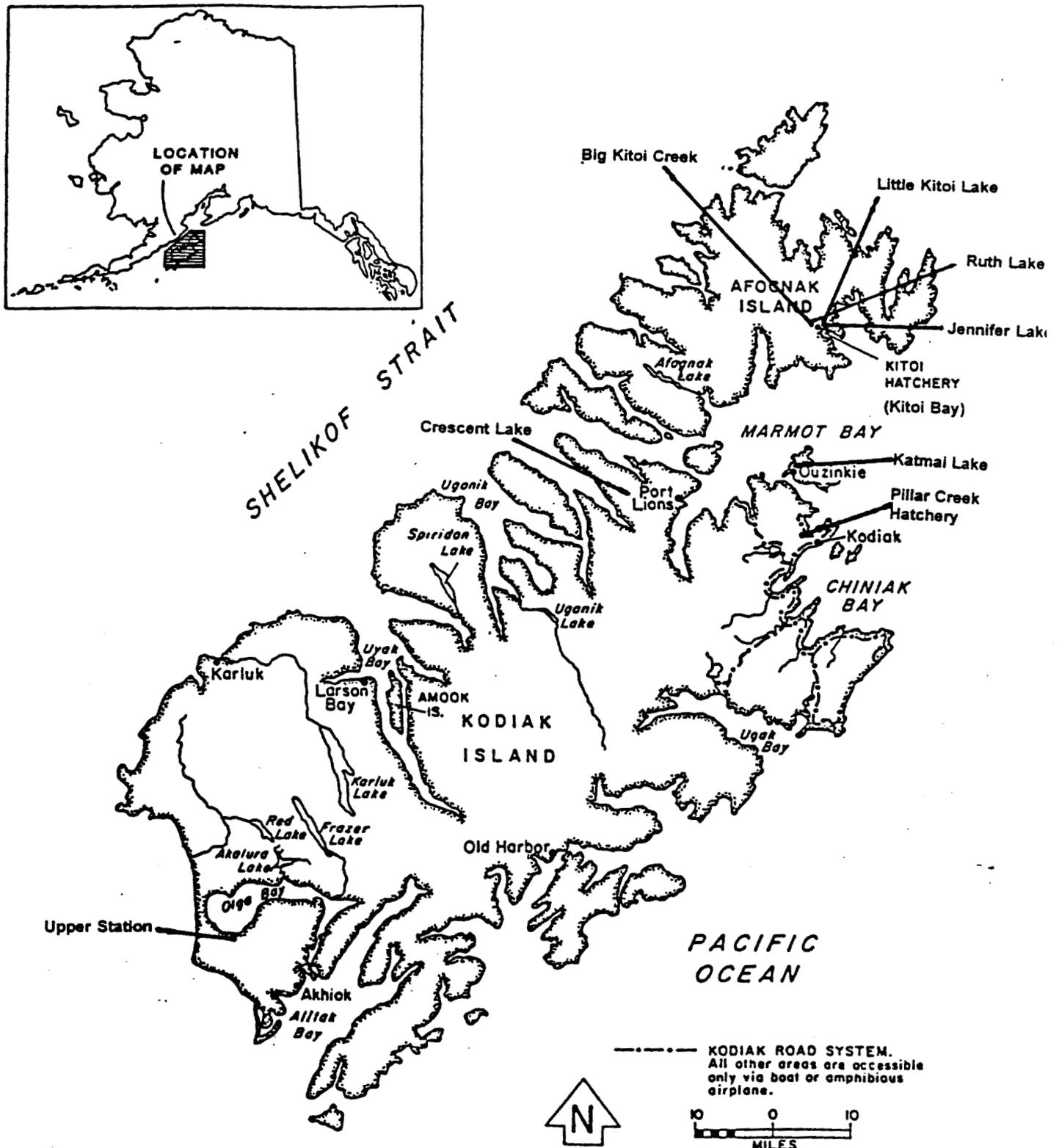


Figure 1. Map of Kodiak and Afognak Islands showing release sites: Kitoi Bay, Little Kitoi, Ruth, Crescent, and Katmai Lakes; and egg take sites: Big Kitoi Creek, Little Kitoi, and Upper Station Lakes.

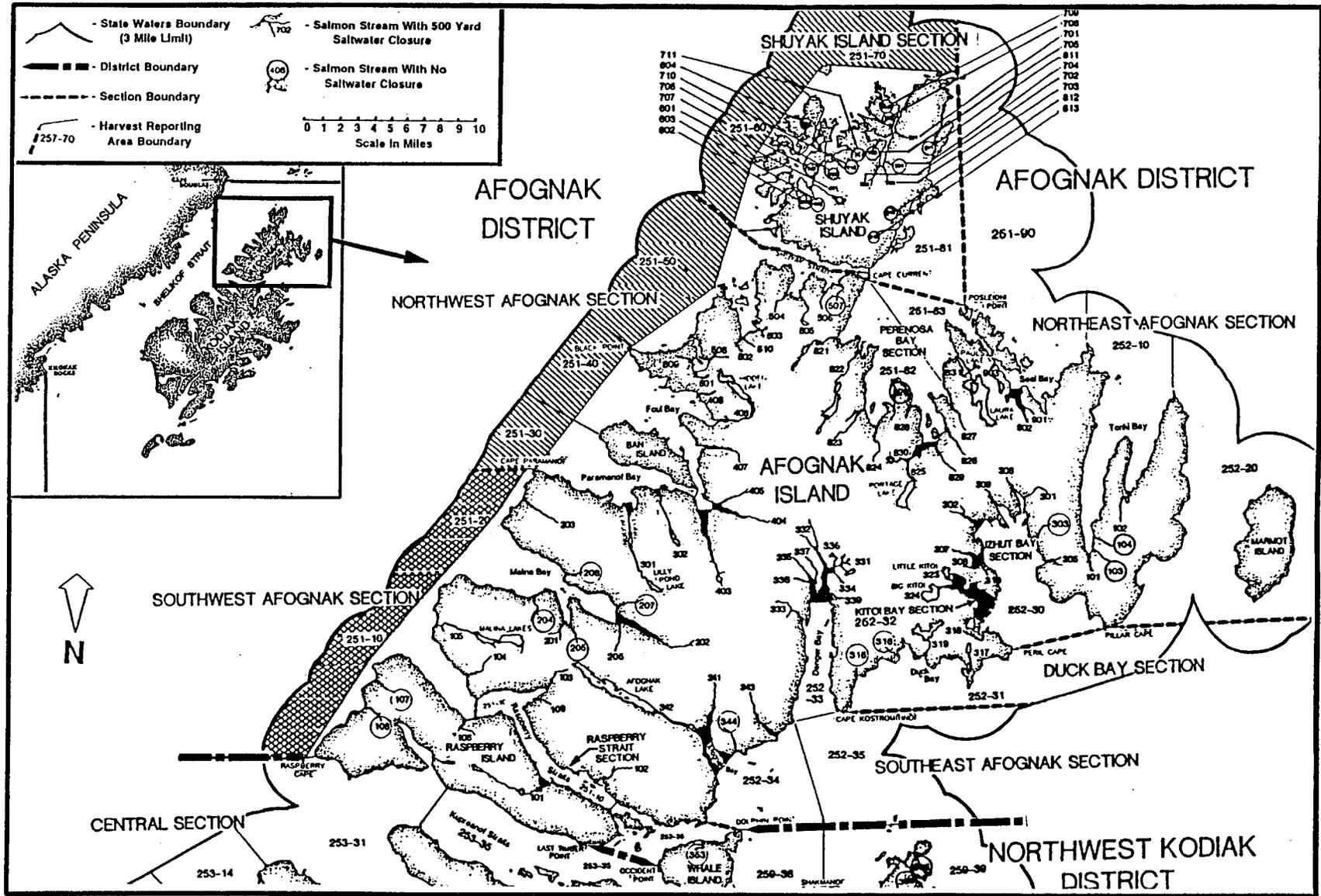


Figure 2. Afognak District of the Kodiak Management Area.

APPENDIX

Appendix A.1. Description of Kitoi Bay Hatchery facilities.

The hatchery is powered by two (2) 75 kw line generators mounted on Perkins diesel engines run on alternate weeks. A third 30 kw line generator, mounted on a Duetz diesel engine, serves as a back-up power source with automatic switch gear to prevent power failure. The bunkhouse and hatchery buildings are heated by four (4) diesel fired multi-temperature furnaces, as well as utilizing waste heat from the gensets as an auxillary source.

A metal frame and urethane insulated hatchery building, constructed in 1965 after being destroyed during the 1964 earthquake, provides for an office, shop, incubation facility and heated storage area. In 1990, the asbestos insulation in the building was removed and replaced by urethane foam with a cement fire barrier.

A wood frame bunkhouse provides for a staff apartment, and living quarters for 17 staff. Three single family homes were constructed in 1984 to provide housing for permanent staff.

A 30 ft. by 40 ft. storage building was constructed in 1986 to safeguard the boats and other equipment used at the hatchery.

Two 70 ft. aluminum raceways were installed in 1988 along with a tailrace, transport channel and two steepass ladders. Two more 50 foot raceways were installed in 1990. Modification of the fish pass ladder was completed in 1991 to ease the passage of pink salmon to a shore based spawning system.

A sea water pump was installed in 1989 to supply seawater to the hatchery incubation area for fungus control, replacing the necessity for chemical treatment.

A sockeye salmon incubation module was installed at the facility in 1989, providing capacity to incubate over 3.6 million sockeye salmon eggs. Also, ten aluminum raceways (20' x 3' x 3'), capable of either short-term rearing of 4.2 million fry or 2.6 million fingerlings (2.5 g) or 600,000 (10.0 g) smolt and 150,000 pre-smolt (6.0 g) were installed in 1994.

The hatchery utilizes 22 - 40' x 40' x 12' and 15 - 20' x 20' x 12' net pens for saltwater rearing of pinks, chum, coho and sockeye salmon.

An additional incubation building completed in 1989 increased the pink salmon incubation capacity by 80 million eyed eggs.

A carcass disposal/fry release line was installed in 1991 which provides for the transport of carcasses to the main dock for disposal. A fish lift was purchased and installed in 1992 to remove carcasses from the spawning operation in the creek.

-Continued-

Since 1992, a 30 ft. x 16 ft. aluminum barge has been used for salmon carcass removal. The barge eliminated the cost of a carcass removal contract and allowed disposal during normal working hours.

Water for the hatchery and domestic use is supplied from Big Kitoi Lake by two 14 inch pipelines 1,600 feet in length, with approximately 100 feet of head between the facility and the lake. All water received is screened through 1/8 inch Johnson wire at the intake structure. Process water in the hatchery is again filtered through double canister filters utilizing 0.01 inch mesh commercial stainless steel screen inserts. Cold water used to incubate chum salmon eggs and the early stages of pink salmon egg incubation is supplied by a second 14 inch pipeline installed in 1986, which draws water from 55 foot depth in the lake. In 1992, an additional cold water delivery plastic pipe 20" in diameter was installed in Big Kitoi Lake providing for the capability of supplying cold water to the entire hatchery. An ultra-violet (UV) light disinfection system was installed in 1991 to treat chum and sockeye salmon incubation water. Domestic water is also filtered through a canister filter and is treated by UV light prior to use. With the complete installation of the 20 inch deep water intake, approximately 25 CFS of water is available for use at the hatchery.

Appendix A.2. Upper Station sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1988	120	0.2	KBH	0.15 - 1989	Kitoi Bay
1989	3,000	5.0	PCH/KBH	0.26 - 1990 0.8 - 1990 0.3 - 1990	Spiridon Lake L. Kitoi Bay L. Kitoi Lake
1990	3,700	4.5	PCH	3.5 - 1991	Spiridon Lake
		1.5	KBH	1.25 - 1991	L. Kitoi Bay
1991	3,800	4.0	PCH	2.2 - 1992	Spiridon Lake
		2.3	KBH	1.8 - 1992	L. Kitoi Bay
1992	6,816	9.8	PCH	4.2 - 1993	Spiridon Lake
		1.9	KBH	0.05 - 1993 0.3 - 1994	L. Kitoi Lake L. Kitoi Bay
1993	5,551	7.8	PCH	5.0 - 1994 0.3 - 1994	Spiridon Lake Jennifer Lake
		2.0	KBH	1.6 - 1994	L. Kitoi Bay
1994	120	0.3	PCH	0.0 - 1995 0.2 - 1995	Spiridon Lake Jennifer Lake
	120	0.3	KBH	0.0 - 1995 0.3 - 1995 0.3 - 1995	L. Kitoi Bay Jennifer Lake ^a L. Kitoi Bay ^a
1995	3,668	7.3	PCH	4.5 ^a - 1996 0 - 1996	Spiridon Lake Jennifer Lake
1996	597	.746	KBH	0.6 - 1997	L. Kitoi Bay

^a Stocking level will be finalized in season after review of 1995 limnological data from Spiridon Lake.

^b Will be stocked at either Jennifer Lake or Little Kitoi Lake; determined in season based on lake evaluation at Jennifer Lake.

Appendix A.3. Little Kitoi Lake sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1992	1,011	0.59	KBH	0.0 - 1993	L. Kitoi Bay
1993	1,050	1.1	KBH	0.88 - 1995	L. Kitoi Bay
1994	600	1.5	KBH	0.0 - 1995 0.15 - 1995 0.88 - 1996 0.3 - 1995	L. Kitoi Bay L. Kitoi Lake L. Kitoi Bay Jennifer Lake
1995	155	.191	KBH	0.0 - 1996 0.15 - 1996	L. Kitoi Bay L. Kitoi Lake
1996	1,210	1.2	KBH	0.15 - 1996 0.88 - 1997	L. Kitoi Lake L. Kitoi Bay
	5,400	7.3	PCH	5.5 - 1997 0.3 - 1997	Spiridon Lake Jennifer Lake

^a The run size to Little Kitoi Lake is not expected to provide for egg take goal, however, collection of eggs is preferred at this site (U.Station will provide for remainder of eggs). In season limnology data will be used to finalize the eggtake and fry stocking goals.

Appendix A.4. Kitoi Bay Hatchery standard marine survival estimate.

Survival Estimate (%)		Freshwater Release ^a	Freshwater Release ^b	Marine Release
Species	Life Stage			
Pink	Fry (0.5g)			1.5
Coho	Fingerling (1.5g)		6.0	2.0
Coho	Pre-Smolt (5.0g)	7.0		5.0
Coho	Smolt (20g)	10.0	10.0	10.0
Chum	Fingerling (2g)			2.0
Sockeye	Fingerling (1.5g)	5.5	3.0	
Sockeye	Pre-smolt (5.0g)	12.5	10.0	
Sockeye	Smolt age 0. (3.0g)	5.0	1.5	1.0
Sockeye	Smolt age 1. (10.0g)	15.0	15.0	15.0

^a Non-competitive systems: Ruth Lake and Katmai Creek.

^b Competitive systems: Jennifer, Crescent and Little Kitoi.

Appendix A.5. Kitoi Bay Hatchery brood source and stocking flow chart for 1996 release from 1994 egg take.

Little Kitoi

Sockeye Salmon

746,000 eggs

567,000 10.0 gram age 1. smolt

1996 release into Little Kitoi Bay. FTP # 93A-0117.

Appendix A.6. Kitoi Bay Hatchery brood source and stocking flow chart for 1996 release from 1994 and 1995 egg takes.

Big Kitoi Creek
Pink Salmon

203.0 x 10⁶ eggs FTP #81A-0241
0 unfed fry Big Kitoi Bay volitional release
156 x 10⁶ fed fry Big Kitoi Bay pen reared release

Big Kitoi Creek
Chum Salmon

29.0 x 10⁶ eggs FTP #81-0156
22.0 x 10⁶ 2.0 gram Big Kitoi Bay pen reared release

Little Kitoi Creek
Coho Salmon

1.5 x 10⁶ eggs (BR 94) FTP #94A-0036
FTP #83A-1011
900,000 20.0 gram age 1. smolt - Big Kitoi Bay FTP #94A-0036
Crescent Lake 165,000 fingerlings (BR95) FTP #92A-0079
Katmai Creek 15,000 pre-smolt (BR95) FTP #92A-0081

Little Kitoi
Sockeye Salmon

.746 x 10⁶ eggs (BR 94) FTP #92A-0087
567,000 10.0 gram age 1. smolt - Little Kitoi Bay FTP #93A-0017
0.205 x 10⁶ eggs (BR95) FTP #92A-0087
0.150 x 10⁶ 6.0 gram smolt at Little Kitoi Lake
or Jennifer Lake FTP # 88A-1047
FTP # 94A-0040

Appendix A.7. Kitoi Bay Hatchery brood source and stocking flow chart for 1997 and 1998 release from 1996 egg take.

Big Kitoi Creek
Pink Salmon

215 x 10⁶ eggs (BR96) FTP #81-0241
156 x 10⁶ fed fry release in Kitoi Bay (1997)

Big Kitoi Creek
Chum Salmon

25 x 10⁶ eggs (BR96) FTP #81-0156
22 x 10⁶ 2.0 gram fingerlings release in Kitoi Bay (1997)

Big Kitoi Creek
Coho Salmon

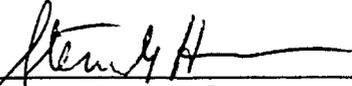
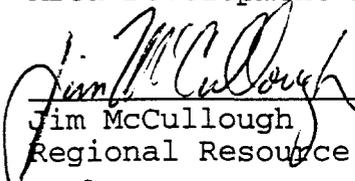
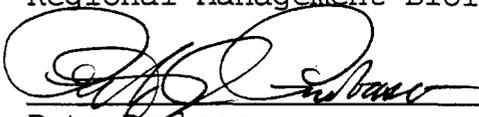
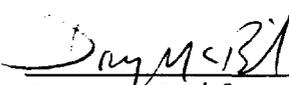
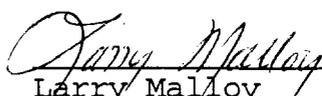
1.7 x 10⁶ eggs(BR96) FTP #94A-0036
750,000 20.0 gram smolt for release in Kitoi Bay (1998) FTP # 83A-1011
FTP #94A-0036

Crescent Lake	165,000 fingerlings	FTP #92A-0079
Katmai Creek	15,000 pre-smolt	FTP #92A-0081
Jennifer Lake	163,000 pre-smolt	FTP #92A-0080
Ruth Lake	35,000 fingerlings	FTP #92A-0083
Little Kitoi	100,000 fingerlings	FTP #92A-0089

Little Kitoi Lake/Upper Station
Sockeye Salmon

1.5 x 10⁶ eggs FTP #92A-0087
880,000 age 1. 10.0 gram smolt held for FTP #94A-0117
release in Little Kitoi Bay
150,000 6.0 gram pre-smolt release in Little Kitoi Lake FTP # 93A-0116

SIGN-OFF

 Andy Hall Hatchery Manager, Kitoi Bay, KRAA	<u>3/22/96</u> Date
 Steve Honnold Area Development Biologist, CFM&D	<u>3/22/96</u> Date
 Jim McCullough Regional Resource & Development Biologist, CFM&D	<u>3/22/96</u> Date
 Dave Prokopowich Area Management Biologist, CFM&D	<u>3/26/96</u> Date
 Wayne Donaldson Regional Management Biologist, CFM&D	<u>3/29/96</u> Date
 Pete Probasco Regional Supervisor, CFM&D	<u>4/1/96</u> Date
 Len Schwarz Area Biologist Sport Fish	<u>4/5/96</u> Date
 Doug McBride Sport Fish Regional Supervisor	<u>5/6/96</u> Date
 Larry Malloy Executive Director, KRAA	<u>3/22/96</u> Date

The 1996 Annual Management Plan for Kitoi Bay Hatchery is hereby approved:

 Robert Bosworth, Deputy Commissioner, ADF&G	<u>5-8-96</u> Date
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