

Fishery Management Report No. 10-31

Kitoi Bay Hatchery Annual Management Plan, 2010

by

Steve Schrof

and

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July 2010

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative Code	AAC	fork length	FL
deciliter	dL			mid eye to fork	MEF
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid eye to tail fork	METF
hectare	ha			standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.		
liter	L	at	@	Mathematics, statistics	
meter	m			<i>all standard mathematical signs, symbols and abbreviations</i>	
milliliter	mL	compass directions:		alternate hypothesis	H _A
millimeter	mm	east	E	base of natural logarithm	e
		north	N	catch per unit effort	CPUE
Weights and measures (English)		south	S	coefficient of variation	CV
cubic feet per second	ft ³ /s	west	W	common test statistics	(F, t, χ^2 , etc.)
foot	ft	copyright	©	confidence interval	CI
gallon	gal	corporate suffixes:		correlation coefficient	
inch	in	Company	Co.	(multiple)	R
mile	mi	Corporation	Corp.	correlation coefficient	
nautical mile	nmi	Incorporated	Inc.	(simple)	r
ounce	oz	Limited	Ltd.	covariance	cov
pound	lb	District of Columbia	D.C.	degree (angular)	°
quart	qt	et alii (and others)	et al.	degrees of freedom	df
yard	yd	et cetera (and so forth)	etc.	expected value	E
		exempli gratia	e.g.	greater than	>
Time and temperature		(for example)		greater than or equal to	≥
day	d	Federal Information Code	FIC	harvest per unit effort	HPUE
degrees Celsius	°C	id est (that is)	i.e.	less than	<
degrees Fahrenheit	°F	latitude or longitude	lat. or long.	less than or equal to	≤
degrees kelvin	K	monetary symbols		logarithm (natural)	ln
hour	h	(U.S.)	\$, ¢	logarithm (base 10)	log
minute	min	months (tables and figures): first three letters	Jan,...,Dec	logarithm (specify base)	log ₂ , etc.
second	s	registered trademark	®	minute (angular)	'
		trademark	™	not significant	NS
Physics and chemistry		United States (adjective)	U.S.	null hypothesis	H ₀
all atomic symbols		United States of America (noun)	USA	percent	%
alternating current	AC	U.S.C.	United States Code	probability	P
ampere	A	U.S. state	use two-letter abbreviations (e.g., AK, WA)	probability of a type I error (rejection of the null hypothesis when true)	α
calorie	cal			probability of a type II error (acceptance of the null hypothesis when false)	β
direct current	DC			second (angular)	"
hertz	Hz			standard deviation	SD
horsepower	hp			standard error	SE
hydrogen ion activity (negative log of)	pH			variance	
parts per million	ppm			population	Var
parts per thousand	ppt, ‰			sample	var
volts	V				
watts	W				

FISHERY MANAGEMENT REPORT NO. 10-31

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by

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July 2010

Kitoy Bay Hatchery operations are funded by Kodiak Regional Aquaculture Association (KRAA). In addition, all evaluations of hatchery salmon stocking programs are funded by KRAA.

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm>. This publication has undergone regional peer review.

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This document should be cited as:

Schrof, S. and A. Aro. 2010. Kitoi Bay Hatchery annual management plan, 2010. Alaska Department of Fish and Game, Fishery Management Report 10-31, Anchorage.

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ABSTRACT

The Kitoi Bay Hatchery (KBH) is located on Afognak Island approximately 48 kilometers (30 miles) north of the city of Kodiak. Salmon production at the facility is financed and operated by the Kodiak Regional Aquaculture Association. Currently, KBH incubates and rears a single stock each of pink *Oncorhynchus gorbuscha*, chum *O. keta*, coho *O. kisutch*, and sockeye *O. nerka* salmon. This management plan describes the activities to be undertaken at KBH in 2010.

Approximately 148 million pink salmon fry (sizes range from 0.1 to 0.5 g at release) will be released in 2010. The adult return from the 2009 fry releases into Kitoi Bay is expected to be approximately 6 million pink salmon. Hatchery personnel will collect 185 million pink salmon eggs this season and plan to release approximately 154 million fry into Kitoi Bay in 2011.

KBH plans to release approximately 21 million chum salmon fry into Kitoi Bay in 2010. The adult return from prior releases is expected to be about 273 thousand adult chum salmon. Hatchery personnel will collect 28 million eggs this season for a chum salmon release of 22 million fry in 2011.

About 1.05 million coho salmon smolt (sizes range varies usually 10.0 to 25.0 g, release time occurs in May and June) will be released into Big Kitoi Bay in 2010. A total of approximately 400 thousand fingerlings (sizes range from 0.5 to 5.0 g at release) will be released into Jennifer, Ruth, and Crescent Lakes and 34 thousand coho salmon eyed eggs will be transferred to Pillar Creek Hatchery for release into Katmai Lake this year. The forecast for adult returns of coho salmon to the Kitoi Bay area is approximately 160 thousand adults. About 2.3 million coho salmon eggs will be collected for eventual releases of 395 thousand fingerlings. From the eggs collected, 34 thousand eyed eggs will transferred to Pillar Creek Hatchery in 2011 and 1 million coho salmon smolt will be held over for an additional year for release in 2012.

Approximately 393 thousand sockeye salmon smolt will be reared for 2 to 3 weeks in net pens to imprint in Little Kitoi Lake (LKL), then released into Little Kitoi Bay. In addition, approximately 100 thousand sockeye salmon presmolt (sizes range from 5.0 to 15.0 g at release) will be released into LKL this fall. About 570 thousand sockeye salmon eggs are currently incubating and will be reared to smolt at KBH, imprinted in LKL, and released into Little Kitoi Bay in the spring of 2011. Approximately 71 thousand adult sockeye salmon are forecasted to return to LKL in July and August.

Key words: Kitoi Bay Hatchery, Kodiak Regional Aquaculture Association, sockeye salmon, pink salmon, chum salmon, coho salmon, broodstock, stocking, fry, fingerling, presmolt, smolt, harvest management, cost recovery, management plan, Kodiak management area, AMR

INTRODUCTION

The Kitoi Bay Hatchery (KBH) annual management plan (AMP) remains in effect until superseded by the next year's plan. The AMP serves as an instruction manual for hatchery operations and adult return management. It is incumbent upon the local Alaska Department of Fish and Game (ADF&G) and hatchery staff to share information with each other regularly for successful adherence to this plan. Anticipated departures from the plan should be communicated as soon as possible to ADF&G in the event an amendment is necessary. Unintended and unexpected changes should be disclosed immediately. The ADF&G Private-non-profit Hatchery Coordinator will advise as to whether an amendment, exception report, or other action is warranted.

ADF&G recognizes that the methods used to estimate eggs, fry, and adult numbers are approximate and it is not unusual to have slight deviations above or below the goals and limits specified in this plan. So long as these deviations are within accepted ranges, the operator will not be considered out of compliance and no amendment to the management plan will be necessary. As a guideline for accepted deviation, the 5-year average at the respective life stage

should be consulted. If a consistent pattern of exceeding the approved numbers in the AMP occurs, this will need to be addressed.

This annual management plan outlines the activities associated with KBH for 2010. The plan contains 1) projected releases of juvenile salmon in 2010; 2) egg take goals in 2010 and projected releases in 2011 and 2012); 3) salmon (enhanced stocks) harvest management in 2010; 4) additional measures for wild stock protection in 2010; and 5) evaluation plans for 2010. Inseason assessments and project alterations by the KRAA or ADF&G may result in changes to this management plan in order to reach or maintain program objectives.

KBH is located on Afognak Island (58°11.04' N lat., 152°21.04' W long.) on the west side of Izhut Bay approximately 48 km (30 miles) north of the city of Kodiak in southcentral Alaska (Figure 1). The hatchery infrastructure was constructed in 1954 by the United States Department of the Interior, Fish and Wildlife Service (FWS), but was destroyed in the 1964 earthquake and rebuilt by the ADF&G in 1965. The hatchery was initially designed as a sockeye salmon *Oncorhynchus nerka* research facility. By 1976 hatchery production priorities switched to pink salmon *O. gorbuscha* enhancement. The present goal of the facility is to provide enhanced salmon fishing opportunities for the Kodiak Management Area (KMA) commercial fishermen by increasing the returns of pink, chum *O. keta*, coho *O. kisutch*, and sockeye salmon primarily to the Kitoi Bay area (Figures 2 and 3). KBH was designed to increase salmon production for KMA commercial seine and set gillnet fisheries. Secondary user groups (in terms of the number of salmon harvested) of hatchery production include subsistence and recreational fishermen. KBH has the capacity to produce 178 million juveniles of all life stages (fry, fingerling, presmolt, and smolt). Funding for the hatchery was provided exclusively by ADF&G prior to fiscal year (FY) 1987, and was provided jointly by ADF&G and Kodiak Regional Aquaculture Association (KRAA) from FY 1987 to FY 1991. The hatchery has been fully funded by KRAA since FY 1992.

Big Kitoi Lake (BKL) supplies KBH with water through two (2) deep and one (1) shallow 35.6-cm diameter pipelines. The two deep pipelines extend 457 m and 732 m into BKL, drawing water from depths of 15.2 m and 22.9 m, respectively. These deep pipelines join downstream of the dam and supply one pipeline extending to the hatchery with water temperatures ranging from 2.0°C to 6.0°C. The shallow pipeline draws water from a depth of 1.5 m, supplying water with temperatures ranging from 0.5°C to 19°C. These pipelines connect to a manifold allowing the hatchery to control water temperatures in any part of the hatchery. Excess lake water drains from BKL through Big Kitoi Creek (BKC; Figure 4). BKC contains a barrier falls approximately 503 m upstream from salt water and 183 m downstream from BKL that prevents adult salmon from entering the lake. A weir is installed at the mouth of the creek and adjacent to the KBH fish ladder to facilitate collection of pink, chum, and coho salmon eggs from returning adults. Coho and chum salmon ascend a fish ladder at the weir and enter two raceways adjacent to the hatchery facility where they are utilized for egg takes. Pink salmon are unable to ascend the fish ladder to the broodstock raceways in sufficient numbers and are collected from the lower section of the ladder during egg takes.

Little Kitoi Lake (LKL) is located approximately 0.40 km north of KBH (Figure 4). LKL drains through concrete raceways and a fish pass system located at the lake outlet. All returning adult salmon must pass through this system before entering the lake. The raceways are designed to control movement of both returning adults and outmigrating smolt, enabling the single system to

monitor escapement and outmigration simultaneously. While the adult and smolt systems are capable of operating at the same time, smolt can be injured traveling down the fish pass; therefore, the fish pass is shut down during the smolt outmigration. Smolt outmigrate through the smolt compound and into a 20.4-cm (8 inch) pipeline bypass adjacent to the adult fish pass. The fish pass and outmigration pipeline drain directly into Little Kitoi Bay.

The development of a pink salmon brood source began at the hatchery in 1972 using donor stock from BKC (Honnold and Aro 2005). Pink salmon are the only salmon species indigenous to BKC. The program expanded from an egg collection of approximately 500 thousand eggs in 1972 to 215 million eggs in 1989. Recent increases in green-egg to eyed-egg survival have lowered the pink salmon egg-take requirement to approximately 185 million eggs. All pink salmon eggs are collected from broodstock returning to BKC and are incubated at KBH. The resultant fry are reared in saltwater net pens adjacent to the hatchery for a period of 3 to 8 weeks prior to release into Big Kitoi Bay (BKB).

A chum salmon broodstock program using Sturgeon River (Kodiak Island) stock was initiated in 1980 (Honnold and Aro 2005). The first chum salmon egg take occurred at the hatchery in 1986; returns have been adequate since then to meet broodstock needs, but the hatchery's current production goal of 28 million eggs (a 22-million fry release) was not consistently achieved until 1999 as run sizes increased and broodstock collection techniques improved. In 1991, an infectious hematopoietic necrosis virus outbreak resulted in a complete brood year (BY) failure. After the infectious hematopoietic necrosis virus outbreak, ultraviolet light units were installed in the hatchery to sterilize all chum incubation water in an effort to prevent further disease outbreaks. No outbreaks of infectious hematopoietic necrosis virus in chum fry have occurred since the units were installed. In 2008, new ultraviolet light sterilization units were installed to improve both the quality of depuration and the energy efficiency of the system. Chum salmon fry produced at the hatchery are reared in saltwater net pens adjacent to the hatchery for a period of 10 to 12 weeks prior to release into BKB.

A coho salmon stocking project using Buskin Lake and LKL wild stocks was started at KBH in 1982 (Honnold and Aro 2005). Coho salmon fry were released into a number of Kodiak road system lakes and a portion were stocked into Buskin Lake (brood source) and LKL (broodstock; Figure 1). In 1990 coho salmon fingerlings were released into Kitoi Bay (wild LKL stock) to develop a hatchery broodstock returning to BKC and to increase the commercial harvest in the Kitoi Bay area. Since 1993, coho salmon runs have been adequate for hatchery egg takes and have provided enough eggs to reach production goals (about 2.3 million eggs). The majority of juvenile coho salmon are released from the hatchery into Big Kitoi Bay at the smolt life stage; however, some juveniles are released as fingerlings into Jennifer and Ruth lakes in the Kitoi Bay area (Figure 4). Coho salmon fingerlings are also stocked into Crescent Lake, adjacent to the village of Port Lions, and presmolt are stocked into Katmai Lake, adjacent to the village of Ouzinkie (Figure 5). In 2009, the Katmai Lake release strategy was altered due to low numbers of adult coho salmon that returned that year. Presmolt were transferred to Pillar Creek Hatchery (PCH) where they are aerially released in a manner similar to the Spiridon Lake sockeye salmon releases (Finkle and Byrne 2009). In 2010, Big Kitoi Creek stock coho salmon eyed eggs, collected at KBH, were transferred to PCH for incubation, rearing, and eventual outstocking as fall presmolt in the same manner as the release in 2009. These projects have contributed coho salmon to the subsistence fisheries for the villages of Port Lions and Ouzinkie. Local school students assist with the Katmai Lake stocking program as part of their school curriculum.

KBH collected eggs from an age-0. component of the late-run Upper Station Lake sockeye salmon stock from 1988 through 1994 to develop a late-run sockeye salmon broodstock that would return to LKL (Figure 1; Honnold and Aro 2005; Hall et al. 1997). Age-0. fish spend only a few weeks rearing in Upper Station Lake (lower Olga Lake) before migrating to the ocean; thus, the adults return sooner than those fish that rear for the typical 1 to 2 years in freshwater. The intent of this project was to create a return of sockeye salmon to LKL that could be used as an egg source for PCH with resultant fry being stocked into Spiridon Lake (Figure 1). The survival of age-0. juveniles from these releases were poor, resulting in modifications to the project in 1993. Changes in the program included the stocking of age-0. presmolt (late fall releases) into LKL and age-1. smolt (late spring releases) into Little Kitoi Bay.

Previously, salmon stocking into LKL had been avoided because the lower depths of the lake contained a high concentration of hydrogen sulfide. This layer was the result of saltwater intrusion during the 1964 earthquake (Schrof et al. 2000). The layer was a “nutrient sink,” reducing the ability of the lake to support zooplankton, which are the primary food source for juvenile sockeye salmon. In 1995, a 20.4-cm pipeline was sunk into the lake and most of the hydrogen sulfide-laden water was siphoned off. Although a small amount of hydrogen sulfide remained, the zooplankton levels immediately increased.

The enhancement strategies initially used to develop a LKL sockeye salmon run relied on the late-run Upper Station stock as a brood source. However, research by the ADF&G concluded that the Saltery Lake sockeye salmon was the preferred stock for the Spiridon Lake project and LKL stockings (Clevenger et al. 1997; Honnold 1997). The earlier run timing of Saltery Lake sockeye salmon (about 3 weeks earlier than the late-run Upper Station sockeye stock) was expected to improve returns to Little Kitoi Lake and make broodstock collection easier. Additionally, the earlier run timing was expected to reduce the incidental harvest of Spiridon River pink and chum salmon stocks during the terminal fishery targeting returns in Telrod Cove. Therefore, in 1997 Saltery Lake sockeye salmon were chosen for the broodstock development program at LKL.

Several direct release strategies into LKL were implemented in an attempt to maximize the survival and reduce holdover of the Saltery Lake sockeye smolt. In addition, nutrients were added to LKL during 2000–2001 to improve zooplankton productivity (Schrof and Honnold 2003), and although zooplankton production did increase, the resulting smolt emigrations were still inadequate in producing returns large enough for an egg take to occur at LKL. Regardless of release method and fertilization, LKL was unable to support the required amount of juveniles to make the broodstock development project successful. Limnological data continues to show that LKL is a marginal environment for successfully rearing sockeye salmon due to its low plankton productivity and high turnover rate. Consequently, releases have been reduced to match the estimated carrying capacity of LKL, which has reduced the number of outmigrating smolt.

In 2003 the broodstock development program was modified in response to the low number of outmigrants and poor zooplankton levels in LKL (Honnold and Aro 2003). A modest number (100 thousand) of presmolt were released (Saltery Lake broodstock) into LKL in the fall, as in previous years, but a portion of the juveniles were reared at KBH through the winter. These fish (initially 190 thousand) were transferred into net pens in LKL during the second week of May at an average size of about 18.0 grams. After two and a half weeks of lake rearing, the sockeye salmon smolt were siphoned out of the net pens directly into Little Kitoi Bay. This release coincided with the peak of the resident sockeye salmon smolt outmigration. The experimental

strategy was very successful in its first year, and a Permit Alteration Request (PAR) was approved to continue the rearing strategy and expand the number of pen reared juveniles in 2006. Additional raceways at KBH were installed in 2005 to accommodate the production of 500 thousand sockeye salmon presmolt. Approximately 400 thousand juveniles are annually reared in net pens and 60 thousand LKL resident sockeye salmon smolt are produced annually (assumed 40% smolt survival from 100 thousand fall outstocking and an additional 20 thousand from the LKL escapement), which should provide adequate numbers of returning adults to achieve the broodstock development goal. PCH has released Saltery Lake sockeye salmon juveniles in LKL in the past, but no release is planned for 2010.

In 2009 a camera system was installed at the entrance of LKL to enumerate adult sockeye salmon escapement to the system. An aluminum funnel was fabricated to hold a camera in place and was slid into the dam board slot at the lake entrance. The camera was powered by a 12-volt battery, and the memory stick was retrieved each day to bring back to the hatchery and count the adults that entered on each high tide. The camera system enabled identification and enumeration by species and sex as the adults entered LKL. The 2009 preseason salmon escapement forecast into LKL of 6,000 sockeye salmon was easily surpassed when 8,962 adults were counted through the fish pass escaping into LKL.

As part of the Spiridon Lake broodstock development program, enough sockeye salmon escaped into LKL for KRAA to execute an egg take in 2009. Analysis of in-season zooplankton samples suggested that Spiridon Lake could accommodate substantially more juvenile sockeye salmon. However, with the uncertainty of access to adults at LKL, an egg take was conducted at Saltery Lake and LKL to ensure that adequate numbers of eggs were secured for the recommended increase in outstocking levels. Beach seining for adults at LKL was difficult in the past and seining efforts yielded only 869 (less than 10%) of the adult sockeye salmon escapement in 2009. High water levels, temporary loss of the weir during a flood event, and late escapement (adults were most likely residing deeper in the lake instead of in shallower areas close to the influents) all contributed to the lack of success, but we are investigating additional measures to be implemented in 2010 to achieve brood stock collection goals at LKL.

RELEASES IN 2010 AND PROJECTED RETURNS

PINK SALMON: BIG KITOI CREEK STOCK

KBH plans to release approximately 148 million pink salmon fry at an average weight of 0.65 g in 2010 (Tables 1 and 2). Unusually high mortality from a flood event in October of 2009, required extensive incubator cleaning to remove mud from incubating eggs, and mortality continued through the winter as eggs were hatching. The fry will swim out of the hatchery into saltwater net pens via a pipeline, reared in net pens for a period of 3 to 8 weeks, and then released in the Inner Kitoi Bay section.

Based on an estimated stocking-to-adult survival of 7.1% for even-year pink salmon, approximately 10.5 million adult pink salmon are expected to return to KBH in 2011 from this release (Tables 2 and 3; average marine survival). The pink salmon run should begin in late July, peak in early August, and end in late August (Figure 6).

CHUM SALMON: BIG KITOI CREEK STOCK

Approximately 21 million chum salmon fry at an average weight of 2.0 g will be released directly into Big Kitoi Bay in 2010 (Table 2). All of the BY 2009 chum fry will be ponded from Nopad™¹ and Kitoi Box™ incubators during the first 3 weeks of March. This will be the fifth year of ponded releases of chum salmon fry intended to increase the rearing time in saltwater resulting in larger fry at release and increasing marine survival. Fry are reared in saltwater net pens for approximately 10 to 12 weeks.

Non-volitional release is a common technique used at Alaska hatcheries and allows the fry to navigate through the pipeline to the rearing pens. This technique is used primarily on chum salmon, but also for pink salmon fry. The technique requires the use of a Nopad™ incubator, which is a stackable incubator that can be moved to facilitate the non-volitional release. The fry are sampled prior to release to determine the percent of yolk sac to body weight. When the yolk sac approaches 3% to 5% of the fry's body weight, the fry are ready to enter saltwater. At this point the incubators are lifted with an electric forklift, brought to a tank, submerged, and emptied of all fry and incubator substrate. The water upwells over a bar grate and into another fry tank situated below. The fry fall through the grate and flow by gravity to saltwater net pens. The substrate is separated from the fry by the bar grates and removed for cleaning.

Non-volitional release will allow all chum salmon fry to enter saltwater between the last week in February and the middle of March, which is approximately 4 weeks earlier than the previous volitional method allowed. This is made possible by recent improvements in the UV water manifold, which allows warmer shallow water to be used for accelerating egg development during chum salmon incubation. Egg development of later egg-take lots will be accelerated to equal the earliest lots so that all fry will be ready to enter saltwater at the same time. The extended rearing period is expected to increase chum salmon fry size by approximately 40% or more. The marine survival of chum salmon fry of this size is expected to range from 2.0% to 4.0% compared to the average survival of 1.3% for prior KBH releases.

A conservative stocking-to-adult survival estimate of 2.0% was applied to the number of chum salmon fry released, resulting in approximately 416 thousand adult salmon returning from the 2010 release for 2012. Another 316 thousand chum salmon (3 years ocean residence) are expected to return in 2013 (Tables 2 and 3). Chum salmon runs into Kitoi Bay usually begin in early June, peak in mid June to early July, and end in late August (Figure 6).

COHO SALMON: BIG KITOI CREEK STOCK

Hatchery personnel will release approximately 1.05 million coho salmon smolt at an average weight of 18.0 g (BY 2008, BKC broodstock) into Big Kitoi Bay in 2010 (Table 2). Initial imprinting will occur prior to transfer into saltwater, while smolt are still in the hatchery freshwater raceways. The smolt will be transferred from the hatchery via pipelines into saltwater net pens and reared for about 4 weeks to provide additional time for imprinting and adjusting to ocean salinity (osmoregulation). The saltwater net pens will be located in the vicinity of the BKC discharge (KBH water source), which is intended to provide further imprinting to BKC. Approximately 159 thousand adults (assuming a 15.1% survival) are projected to return in 2011 as a result of the 2010 coho salmon smolt release (Tables 2 and 3).

¹ Product names used in this report are included for scientific completeness, but do not constitute a product endorsement.

Additional coho salmon (BY 2009 BKC broodstock) releases in 2010 in the Kitoi Bay area will include 200 thousand fingerlings averaging 0.7 g into Lower Jennifer Lake and 30 thousand fingerlings averaging 0.7 g into Ruth Lake (Table 4; Figure 4). From these releases, approximately 4 thousand adult salmon are projected to return to the Jennifer Lakes outlet and 600 adults to the Ruth Lake outlet in 2012 (Table 4). All returning adult salmon to Jennifer and Ruth lakes will be available for harvest due to stream barriers (waterfalls) near tide water preventing further migrations into freshwater. Coho salmon runs into Kitoi Bay usually begin in early August, peak in mid to late August and end in early September (Figure 6).

A remote release (BY 2009 BKC broodstock) of 165 thousand coho salmon fingerlings at an average weight of 0.7 g into Crescent Lake (Port Lions; Table 5; Figure 5) will occur in 2010. Previously, 28 thousand coho salmon presmolt at an average weight of 7.5 g were released into Katmai Lake (Ouzinkie; Figure 5), but due to deteriorating road conditions accessing the lake, this release was modified in 2009 and will be changed again in 2010 (Table 4). The new release strategy will entail the transfer of 34,000 BKC coho salmon eyed eggs to PCH in the winter. PCH staff will rear the fish to the presmolt stage and aerial outstock approximately 30,000 juvenile coho salmon in conjunction with their fall Spiridon Lake sockeye releases.

Adult coho salmon returns from these releases are projected to be about 3.3 thousand fish (2.0% survival) to Crescent Lake in 2012 and 1.5 thousand fish (5.0% survival) to Katmai Lake in 2012 (Tables 4 and 5). Primary harvest of these salmon occurs by sport and subsistence fishing by residents from the local villages. A portion of the Crescent Lake run may contribute to the commercial harvest in the Northwest Kodiak District (Figure 2) and be available for additional commercial harvest in the Settler Cove Special Harvest Area (SHA; Figure 5; 5 AAC 18.364, 5 AAC 40.085 (5)).

The coho salmon stocking capacities of Ruth, Jennifer, Crescent, and Katmai lakes are based upon the surface area of each lake. Release numbers are adjusted, if needed, in response to zooplankton biomass trends at each lake. All juvenile coho salmon stocked into lakes are transported to each site by floatplane using transfer tanks.

SOCKEYE SALMON: SALTERY LAKE STOCK

KBH will release 393 thousand sockeye salmon presmolt at 20.0 g (BY 2008) into net pens at LKL in 2010 (Table 6). The BY 2008 juveniles will be transported to LKL in a tank, and pumped from the tank into net pens to short term rear for approximately two weeks to imprint on the waters of LKL. Presmolt will be siphoned out of the nets and travel through a pipe that feeds into the LKL estuary. The non-volitional release will occur during the peak outmigration of the resident sockeye salmon smolt, which usually occurs around the last week in May or first week in June. In addition, about 100 thousand BY 2009 presmolt will be released directly into LKL in October 2010 (Table 6). The 2010 releases are expected to produce approximately 66 thousand adults returning to LKL from 2012 through 2016 (Table 6), with the majority of the returns in 2013 and 2014. The run timing is expected to be later than for Saltery stock sockeye and similar to the return the last few years, beginning in early July, peaking in late July, and ending in mid August (Figure 6).

EGG TAKES IN 2010 AND RELEASES IN 2011 AND 2012

PINK SALMON: BIG KITOI CREEK STOCK

About 350 thousand adult pink salmon returning to KBH will be needed for broodstock in 2010 (Tables 7 and 8). Approximately 185 million pink salmon eggs will be collected in 2010 to provide for the release of 154 million pink salmon fry at an average weight of 0.7 g into Big Kitoi Bay (BKB) in 2011. The actual number of eggs collected may be more depending on how many chum salmon eggs are collected and their eyed-egg survival. If the maximum chum salmon egg take occurs (28 million green eggs), incubation space will not be available for an increased number of pink salmon eggs. KBH is permitted to collect up to 215 million pink salmon eggs, if additional incubation becomes available. The 2011 release is expected to result in approximately 4.2 million (assuming a 3.8% survival) adult pink salmon returning to KBH in 2012 (Tables 3 and 8).

CHUM SALMON: BIG KITOI CREEK STOCK

Approximately 30 thousand chum salmon adults returning to KBH in 2010 will be needed for broodstock to achieve an egg-take goal of 28 million eggs (Tables 7 and 8). Approximately 22 million chum salmon fry at an average weight of 2.5 g will be released into BKB in 2011 using a non-volitional release technique for all of the chum salmon fry. Applying an average of 2.0% stocking-to-adult return survival to the 2011 release, about 440 thousand adult chum salmon are expected to return from 2013 through 2015 (Tables 3 and 8). The majority of the chum salmon return (334 thousand) are expected in 2014 (age 0.3 chum salmon).

COHO SALMON: BIG KITOI CREEK STOCK

Approximately 6 thousand of the 160 thousand adult coho salmon forecasted to return to KBH in 2010 will be used for broodstock (Table 7). About 1 million BY 2009 juvenile coho salmon are being raised at KBH and will be released as approximately 20.0 g smolt into BKB in 2011 (Table 8). The 2011 smolt release should result in approximately 151 thousand adults returning in 2012 (Table 8). A total of 2.3 million (1.3 million for BKB releases and 1.0 million for lake releases) coho salmon eggs will be collected from Big Kitoi Creek in 2010 for future releases into BKB, Jennifer, Ruth, Crescent and Katmai lakes (Tables 8-10). Approximately 1.3 million green eggs will provide for 1 million coho salmon smolt to be released at an average weight of 20.0 g into BKB in 2012 (Table 8). This release is expected to produce 151 thousand (assuming a 15.1% survival) adults returning in 2013. Approximately 360 thousand eggs will be collected for future juvenile releases at Jennifer (200 thousand fingerlings) and Ruth (30 thousand fingerlings) lakes in 2011 (Table 9; Figure 4). These releases are expected to produce 4.6 thousand adults (assuming a 2.0% survival) returning in 2013 (Tables 3 and 9). The remaining 640 thousand coho salmon eggs collected are planned for future releases into Crescent (165 thousand fingerlings) and Katmai Lakes (30 thousand presmolt) in 2011 (Table 9 and 10; Figures 1 and 5). Approximately 3.3 thousand adults (assuming a 2.0% survival) should return to Settlers Cove in 2012 as a result of these releases, and 1.5 thousand (assuming a 5.0% survival) adults should return to the village of Ouzinkie in 2013 as a result of the eyed-egg transfer to PCH and their release into Katmai Lake (Tables 3, 9-10).

SOCKEYE SALMON: SALTERY LAKE STOCK

In 2010, sockeye salmon eggs (375 broodstock; 550 thousand eggs) will be collected from LKL for the eventual release of 100 thousand presmolt at an average weight of 9.0 g in October 2011 and a release of 400 thousand sockeye salmon smolt (23.0 g) into LKL for June 2012 (Table 11). Saltery Lake sockeye salmon will be a secondary (back-up) brood source for an egg take if there is not an adequate number of adults that escape into LKL for an egg take to occur. Approximately 68 thousand adult sockeye salmon are expected to return from 2012 through 2015 from these two releases assuming a 7.5% survival for fall presmolt and 15% survival for spring smolt (Tables 3 and 11). KBH will briefly rear and release approximately 400 thousand sockeye salmon presmolt (BY 2010) at an average weight of 23.0 g into LKL in 2011, which should result in approximately 67 thousand adults returning from 2012 through 2015 (Table 11).

The broodstock development program initiated at LKL was intended to provide sockeye salmon juveniles for annual stockings into Spiridon Lake. Sockeye salmon eggs have been collected at Saltery Lake to develop the program. The 2010 forecast of approximately 71 thousand sockeye salmon returning to LKL should provide an adequate number of adults for an egg take to occur (Table 7). KRAA estimates that 12,000 adult sockeye salmon are needed to yield a minimum of 3,000 adults for an egg take. If hatchery personnel are unable to pass 12,000 adult sockeye salmon into LKL, the egg take will take place at Saltery Lake. The decision to collect broodstock at LKL will be made by the middle of August based on escapement levels. Several changes were made in 2009 to the LKL fish pass to improve escapement and monitoring of adults entering the lake, but some additional measures will be taken in 2010 to improve the system. The weir which was installed in the LKL estuary to help direct adults to the fish pass entrance and to prevent them from straying to the base of the cement compound will be improved as some fish reached the compound on the extreme 10 foot plus high tides. The camera system installed at the lake entrance worked well and improved the enumeration of escapement while allowing the fish pass to remain open at all times. The weir at Elk Creek will need to be reconstructed to handle more extreme flooding events (similar to last year) when some adults entered the creek and were not accessible during the egg take. PCH personnel will collect the brood stock and conduct an egg take at LKL and/or Saltery Lake in 2010.

SALMON HARVEST MANAGEMENT

ADULT SALMON FORECASTS FOR 2010

Approximately 6.0 million pink salmon, 274 thousand chum salmon, 160 thousand coho salmon, and 71 thousand sockeye salmon are expected to return to Kitoi Bay in 2010, based on previous releases of juvenile salmon from KBH (Table 7). Once broodstock and escapement needs are met, we anticipate approximately 5.6 million pink salmon (350 thousand for brood stock), 242 thousand chum salmon (30 thousand for brood stock), 154 thousand coho salmon (6 thousand for brood stock), and 65 thousand sockeye salmon (6 thousand for brood stock) will be available for harvest in the Kitoi, Izhut, and Duck Bay sections in 2010. The majority of these returning fish will be available to the common property fishery. KBH, under the direction of the KRAA Board of Directors, plans to harvest approximately 1.16 million pink salmon (4.35 million pounds) for cost recovery during the 2010 fishery.

KITOI BAY

The Kitoi Bay harvest strategy, as described in the Eastside Afognak Management Plan (5 AAC 18.365) is designed to increase fishing opportunities for the commercial salmon net fishery in the Duck, Izhut, and Kitoi Bays sections (Figure 3) while providing for adequate broodstock returns to KBH. Inseason management of KBH salmon runs is complicated because of the broodstock priorities and overlapping run timing between species (Figure 6). Therefore, inseason adjustments to fishing periods in any or all management units may be necessary. These adjustments may occur more frequently in the Kitoi Bay sections (Kitoi Bay SHA) and less frequently in the Duck and Izhut Bay sections. During the broodstock collection periods, every effort will be made by the Kodiak Salmon Area Management Biologist (AMB) and the Kitoi Bay Hatchery Manager to secure the required number of fish to achieve the egg take goals while maintaining a high quality product for harvests on hatchery bound returns. However, the AMB has the authority to open and close the salmon fisheries.

A one-time cost recovery fishery was conducted in Kitoi Bay to harvest returning salmon due to the island wide commercial fishing closures from the Exxon Valdez oil spill. The revenue generated from the cost recovery fishery was put into the Kitoi Bay Hatchery Fund established in 1989 as a revenue source for KRAA to sustain operations at KBH. In 1993, KBH operations were transferred from ADF&G to KRAA. In 2003, a cost recovery fishery at Kitoi Bay was re-instituted for continued funding of hatchery operations and to supplement declining revenues in the Kitoi Bay Hatchery Fund.

For 2010, KRAA will derive funds from the cost recovery fisheries to supplement hatchery operations in a similar fashion as in previous years. Cost recovery fisheries previously occurred in the Kitoi Bay Section from 1987 to 1989 and from 2003 to 2009. The harvest goal for 2010 cost recovery will be approximately 4.35 million pounds of pink salmon. Vessels will again be contracted to catch and deliver the fish to processors with bids approved by the KRAA Board of Directors. Contract vessels may use atypical purse seine gear in the Kitoi Bay SHA upon approval of ADF&G. Kitoi Bay SHA has been established (5 AAC 40.085(1)) as the Inner and Outer Kitoi Bay sections consisting of all waters of Kitoi Bay west of a line from 58°09.50' N lat., 152°18.70' W long. to 58°10.58' N lat., 152°17.56' W long. (Jackson and Dinnocenzo 2010; Figure 4).

Pink Salmon

Pink salmon produced at KBH are harvested in commercial purse seine fisheries in the Duck, Izhut, and Kitoi Bay sections (Figures 3 and 4). Pink salmon return begins in mid July, peaks in early to mid-August, and ends in late August to early September (Figure 6). The initial fishery opening for pink salmon is expected in late July and is designed to harvest excess males, which arrive during the early portion of the run (Jackson and Dinnocenzo 2010). Broodstock will be collected throughout the run, once it is composed of at least 55% female fish. Spawning pairs will be randomly selected during the egg takes to maximize genetic variability.

In order to harvest pink salmon in excess of the hatchery broodstock needs (350 thousand adults; Table 7), additional openings may occur. Depending on run strength and timing, the Inner and Outer Kitoi, Izhut, and Duck Bay sections may close to commercial salmon fishing from July 20 through September 25 to allow for pink salmon broodstock collection and cost recovery fisheries (Jackson and Dinnocenzo 2010; Figure 3). The cost recovery operations will most likely occur between August 1 and August 16, due to the lower harvest level in 2010, but may begin sooner

depending on run timing. The common property fishery will remain open during the beginning of the pink return to assess run timing and strength before the cost recovery fishery is opened. This is intended to maximize common property fishing opportunities at the beginning and end of the run and result in a condensed and efficient cost recovery fishery. The pink salmon broodstock collection typically begins in mid August and continues through the third week. Once the pink salmon broodstock is collected and contained behind the barrier net enclosure, additional commercial fishing time may be allowed inside Kitoi Bay SHA depending on the progress of the cost recovery fishery (Figure 4). Fishing periods are coordinated between the Kitoi Bay Hatchery Manager and the Kodiak AMB to ensure adequate broodstock while maintaining an orderly cost recovery and commercial fisheries. Escapement goals have not been formally established for Big Kitoi Creek; however, pink salmon escapement is monitored by KBH staff, and the annual escapement objective is 15 thousand pink salmon (Table 7).

Chum Salmon

Chum salmon produced at KBH are taken in commercial purse seine fisheries in the Izhut, Duck, and Kitoi Bay sections (Figure 3). The chum salmon run begins in early June, peaks in late June to early July, and ends in early August (Figure 6). The initial chum salmon commercial opening in the Kitoi, Izhut, and Duck bays will occur on June 9, 2010 (Jackson and Dinnocenzo 2010). In order to harvest adults in excess of hatchery broodstock needs, additional openings in these sections may occur as run strength is determined. Typically, the Inner and Outer Kitoi and Izhut Bay sections will shut down for chum broodstock collection around June 30th, with the Duck Bay section remaining open throughout the chum fishery. Most of the chum salmon needed for broodstock (30 thousand adults; Table 7) are expected to be in the Inner Kitoi Bay Section by mid-July (Figures 3 and 4). Broodstock are retained by a barrier net enclosure in BKB (Figure 4). Once all chum salmon broodstock are contained behind the barrier net, additional commercial fishing time may be allotted in the Kitoi Bay SHA. The chum salmon egg take is expected to occur from the middle of July through early August. The Hatchery Manager and the Kodiak AMB will coordinate openings in the Duck, Izhut, and Kitoi Bay sections to minimize the harvest of chum salmon during the late July pink salmon fisheries. Escapement goals have not been formally established for Big Kitoi Creek; however, chum salmon escapement is monitored by KBH staff, and the escapement objective is 2,000 chum salmon annually (Table 7).

Coho Salmon

Coho salmon produced at KBH are harvested in commercial purse and beach seine fisheries in the Duck, Izhut, and Kitoi Bay sections (Figure 3 and 4). The coho salmon run is expected to start in late July, peak in late August, and continue through the beginning of September (Figure 6). The majority of the coho salmon will be harvested incidental to the pink salmon fishery in the Kitoi Bay area, as well as in directed coho fisheries in late August and early September. Hatchery broodstock (6,000 adults; Table 7) will be collected throughout the coho salmon run. In the past, a specific commercial fishing closure has not been necessary to ensure adequate broodstock. The run strength in 2009 is estimated to be substantially larger than broodstock requirements; therefore, specific commercial fishing closures are not expected to occur (Jackson and Dinnocenzo 2010). Coho salmon broodstock are incidentally collected during the pink broodstock collection and after the commercial fisheries are generally over and do not require the use of the barrier net.

There are three (3) distinct areas where fishing is either prohibited year-round or restricted between August 15 and September 30 (Figures 3 and 4; 5 AAC 18.350(a); 5 AAC 64.022(b)). These closures are intended to improve broodstock collection efforts near the hatchery and are used to resolve potential conflict between hatchery broodstock needs and subsistence and recreational fisheries. All coho salmon returning to Jennifer or Ruth lakes will also be harvested during commercial fisheries in Duck, Izhut, and Outer Kitoi Bay sections (Figure 3 and 4). The fish pass at LKL will be opened at the beginning of September to provide for coho escapement (approximately 500 salmon; Table 7) and to prevent straying to wild systems.

Sockeye Salmon

The sockeye salmon run should begin in late June and continue through mid-August with the peak occurring during the first two (2) weeks of July (Figure 6). The 2010 run (Saltery Lake stock) is forecast to be stronger than in past years with the primary components of the return coming from releases of predominantly net pen reared fish (in LKL). Based on the forecasted run of 71,000 sockeye salmon, the run should provide enough returning adults to LKL for broodstock collection for the Spiridon Lake enhancement program. However, an inseason assessment will be conducted, and commercial fishery closures inside the Kitoi Bay SHA will occur to allow LKL bound sockeye salmon access to the lake (Jackson and Dinnocenzo 2010).

CRESCENT LAKE

Coho Salmon

The purpose of the Crescent Lake coho salmon stocking project is to provide supplemental coho salmon for harvest (as directed in 5 AAC 18.364) as they return to Crescent Lake (Figure 5). Most of the 2010 coho salmon run will be harvested in the local sport and subsistence fishery; however, a portion of the run should be available for harvest in the common property fishery. The commercial harvest of Crescent Lake coho salmon is expected to occur during normal fishing periods targeting coho salmon in the Northwest Kodiak District (Figure 2). Special openings are not expected to occur within the Settler Cove SHA (Figure 5; 5 AAC 40.085). Natural barriers prevent salmon access to Crescent Lake, so all returning coho salmon will be available for harvest. Some fish may escape into the lower portion of the outlet stream but will be utilized by villagers from Port Lions for subsistence purposes. Harvest information will be obtained from the ADF&G subsistence permit and commercial fish ticket programs to provide harvest information from the stocking project.

KATMAI LAKE

Coho Salmon

The purpose of the Katmai Lake coho salmon stocking project is to provide adult returns for harvest by sport and subsistence fishermen near the village of Ouzinkie (Figure 5). Most coho salmon returning to Katmai Lake will be harvested in the local sport and subsistence fishery. Some may also be harvested in commercial fisheries in the Northwest Kodiak District (Figure 2). Natural barriers prevent salmon access to Katmai Lake, so all returning coho salmon will be available for harvest (Table 7). Fish that congregate in the outlet stream are prevented from straying since the villagers of Ouzinkie utilize the entire escapement for subsistence purposes. Harvest information will be obtained from the ADF&G subsistence permit and commercial fish ticket programs to estimate contributions from the stocking project.

ADDITIONAL MEASURES FOR WILDSTOCK PROTECTION

GENETICS POLICY

The ADF&G Genetics policy is designed to ensure that stocking projects do not negatively impact the genetic integrity of wild stocks². The policy addresses three primary areas: 1) stock transport; 2) protection of wild stocks; and 3) maintenance of genetic variability. This policy, as described in the 2001 KBH annual management plan (McCullough and Aro 2001), will be followed in 2010 for all projects.

To protect wild stocks and maintain genetic variability, adults produced from hatchery stocking projects must be prevented from straying into stream and lake systems supporting wild stocks. A management strategy targeting enhanced production is required by the ADF&G to ensure compliance with state regulations for PNP salmon hatcheries (5 AAC 40.005 (f)). This strategy must address the ADF&G PNP permitting requirements for salmon straying concerns and include detailed actions required when harvest of enhanced production is delayed or abandoned.

These actions were detailed in an unplanned cost recovery operational plan as part of the PCH annual management plan in 2003 and included cost recovery fisheries in the Terminal Harvest Areas (THAs currently SHAs; Honnold and Clevenger 2003). If commercial fishing does not occur for some reason in 2010, salmon returning to the Kitoi Bay SHA will be harvested using the guidelines described in the unplanned cost recovery operational plan.

POLICIES AND GUIDELINES FOR HEALTH AND DISEASE CONTROL

The State of Alaska Pathology Review Committee has developed a long range goal of preventing dissemination of infectious finfish (and shellfish) disease within or outside the borders of Alaska (McGee 1995). This goal is intended to protect stocks without constraining aquaculture or stock renewal programs. The policy and guidelines discourage transplanting wild finfish stocks between geographic zones to minimize risk of transporting disease from one zone to another. This policy also includes hatchery stocks, consistent with the genetics policy. Some exceptions may be made on a case by case basis. The policy and guidelines for health and disease control, as described in the 2001 Kitoi Bay Hatchery Annual Management Plan (McCullough and Aro 2001), will be followed in 2010 for all projects.

EVALUATION

In FY 2003 the responsibilities of the biological evaluation program at KBH were transferred from ADF&G to KRAA personnel at KBH. The primary responsibilities were the sampling and sockeye salmon monitoring operations at LKL. In an effort to maintain the objectives of the evaluation program, KRAA staff will continue to 1) collect scales to determine the age structure of chum salmon returning to the hatchery; 2) collect baseline age and growth data from juvenile sockeye salmon pen reared at LKL; 3) estimate the number of sockeye salmon smolt outmigrating from LKL; 4) estimate the survival of the sockeye salmon presmolt stocked into LKL; 5) collect biological data to estimate the average age, weight, and length (AWL) composition of the sockeye

² McGee, S. G. 1995. The hatchery program and protection of wild salmon in Alaska: policies and regulations. Alaska Department of Fish and Game, Division of Commercial Fisheries, Draft Report (compilation), Juneau.

salmon smolt outmigrating from LKL; and 6) collect samples to determine zooplankton density and biomass levels in Little Kitoi, Upper and Lower Jennifer, and Ruth lakes.

CHUM AND COHO SALMON

Size (fork length), sex, and age (scales) data will be collected throughout the chum salmon run to maintain a representative sample of the chum salmon age classes returning to KBH. Age, fork length, and sex data will be collected from broodstock entering hatchery raceways (600 adults) and from the Kitoi Bay area commercial harvest (600 adults; McCullough and Aro 2002). These data will be used to assign ages to the adult chum salmon run and estimate overall survival by release year. Prior to saltwater rearing, coho salmon smolt will be sampled for weight and evaluated for their ability to osmoregulate (ability to maintain proper water and electrolyte balance in saltwater). The latter assessment will be to hold a small number of juveniles in saltwater net pens to monitor their adaptation to the saltwater and record the mortalities. This will be repeated until mortality is minimal (<1%), at which point, the remaining smolt will be transferred to the net pens for saltwater rearing.

SOCKEYE SALMON

The sockeye salmon evaluation program will continue to focus on assessing production from LKL presmolt releases. We will rear 393 thousand presmolt (BY 2008) in net pens to allow them to imprint in LKL. The release will coincide with the peak outmigration of the resident sockeye salmon smolt. We will also collect 90 random scale samples (15 per pen) prior to non-volitional release from net pens into Little Kitoi Bay. These presmolt should average about 22.0 g and have significantly different scale patterns than the presmolt released into LKL in the fall of 2009. Approximately 100 thousand fall presmolt (BY 2009) will also be released into LKL at the beginning of October and 5% of the sockeye salmon released will be marked by clipping the left ventral fin to determine survival and age composition of future emigrations from LKL (Table 6).

All sockeye salmon caught in the LKL fish pass, cost recovery or sport fisheries, or the hatchery raceways will be sexed, length measured, and a scale will be taken. Scales taken from adults without marks will be aged and their patterns compared to LKL sockeye scale patterns. These scale data will be used to reconstruct age components of the yearly returns.

ACKNOWLEDGMENTS

The authors would like to acknowledge the managerial oversight of KRAA director Kevin Brennan and the hard work of all the KRAA permanent and seasonal personnel at Kitoi Bay Hatchery. We also acknowledge ADF&G personnel who contributed to the management plan, including Lisa Marcato for her publication expertise and peer reviewers Carrie Worton, Aaron Poetter, Bill Gaeuman, and Matt Nemeth for their editorial comments.

REFERENCES CITED

- Clevenger C., S. G. Honnold, and J. N. McCullough. 1997. Pillar Creek Hatchery annual management plan, 1997. Alaska Department of Fish and Game, Division of Commercial Fisheries, Management and Development, Regional Information Report 4K97-31, Kodiak. <http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.4K.1997.31.pdf>
- Finkle, H. and G. Byrne. 2009. Pillar Creek Hatchery annual management plan, 2009. Alaska Department of Fish and Game, Fishery Management Report No. 09-35, Anchorage. <http://www.sf.adfg.state.ak.us/FedAidpdfs/FMR09-35.pdf>
- Hall A., S. G. Honnold, and J. N. McCullough. 1997. Kitoi Bay Hatchery annual management plan, 1996. Alaska Department of Fish and Game, Division of Commercial Fisheries, Management and Development, Regional Information Report 4K97-36, Kodiak. <http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.4K.1997.36.pdf>
- Honnold, S. G. 1997. The results of sockeye salmon (*Oncorhynchus nerka*) stocking into Spiridon Lake in the Kodiak National Wildlife Refuge: juvenile and adult production, commercial harvest, and ecosystem effects, 1987-1996. Alaska Department of Fish and Game, Division of Commercial Fisheries, Management and Development, Regional Information Report 4K97-47, Kodiak. <http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.4K.1997.47.pdf>
- Honnold, S. G., and A. W. Aro. 2005. Kitoi Bay Hatchery annual management plan, 2005. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report No. 05-42, Anchorage. <http://www.sf.adfg.state.ak.us/FedAidpdfs/fmr05-42.pdf>
- Honnold, S. G., and A. W. Aro. 2003. Kitoi Bay Hatchery annual management plan, 2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K03-39, Kodiak. <http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.4K.2003.39.pdf>
- Honnold, S. G., and C. Clevenger. 2003. Pillar Creek Hatchery annual management plan, 2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K03-38, Kodiak. <http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.4K.2003.38.pdf>
- Jackson, J. and J. Dinnocenzo. 2010. Kodiak management area harvest strategy for the 2010 commercial salmon fishery. Alaska Department of Fish and Game, Fishery Management Report No. 10-16, Anchorage. <http://www.sf.adfg.state.ak.us/FedAidpdfs/fmr10-16.pdf>
- McCullough, J. N., and A. W. Aro. 2002. Kitoi Bay Hatchery annual management plan, 2002. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K02-41, Kodiak.
- McCullough, J. N., and A. W. Aro. 2001. Kitoi Bay Hatchery annual management plan, 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K01-42, Kodiak.
- Schrof, S. T., and S. G. Honnold. 2003. A summary of salmon enhancement, rehabilitation, evaluation, and monitoring efforts conducted in the Kodiak Management Area through 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K03-41, Kodiak. <http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.4K.2003.41.pdf>
- Schrof, S. T., S. G. Honnold, C. Hicks, and J. Wadle. 2000. A summary of salmon enhancement, rehabilitation, evaluation, and monitoring efforts conducted in the Kodiak Management Area through 1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K00-57, Kodiak. <http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.4K.2000.57.pdf>

TABLES AND FIGURES

Table 1.–The Kitoi Bay Hatchery annual management plan executive summary for pink, chum, coho, and sockeye salmon stocking plans, egg-take goals, and fish transport permit information for 2010.

New Projects for 2010:

1. Construct new duplex residence
2. Conduct cost recovery fishery with reduced harvest goal of 4.35 million pounds.

Stocking Location (Broodstock)	2010 Projected Enhanced Run	2010 Stocking Plan		2010 Egg-Take Goals			Fish Transport Permits			
		Releases	Brood Year	2010 Eggs	2011 Stocking	Lifestage	Number	Expiration	Maximum Eggs	Maximum Juveniles
Kitoi Bay pink (BKC)	6,000,000	148,000,000	2009	185,000,000	154,000,000	fry	06A-0073	31-Aug-11	215,000,000	182,000,000
Kitoi Bay chum (BKC)	273,000	20,800,000	2009	28,000,000	22,000,000	fry	06A-0072	31-Aug-11	28,000,000	22,000,000
Kitoi Bay coho (BKC)	155,000	1,054,000	2008	1,300,000	1,000,000	smolt	02A-0007	01-May-12	1,300,000	1,000,000
Jennifer Lake coho (BKC)	4,000	200,000	2009	300,000	200,000	fingerling	02A-0009	01-May-12	300,000	250,000
Ruth Lake coho (BKC)	600	30,000	2009	60,000	30,000	fingerling	02A-0011	01-May-12	60,000	50,000
Crescent Lake coho (BKC)	3,300	165,000	2009	600,000	165,000	fingerling	02A-0008	15-May-12	600,000	500,000
Katmai Lake coho (BKC)	1,400		2009	40,000		presmolt	02A-0010	01-May-12	40,000	30,000
Saltery Lake sockeye	71,000	393,000	2008	600,000	400,000	presmolt	10A-0007	01-Jan-14	600,000	600,000
Saltery Lake sockeye		100,000	2009		100,000	presmolt	10A-0007	01-Jan-14	600,000	600,000
Little Kitoi Lake sockeye (SL)							10A-0008	01-Jan-14	600,000	600,000
Little Kitoi Lake sockeye (SL)							10A-0008	01-Jan-14	600,000	600,000

Notes: Brood stocks: Big Kitoi Creek – BKC (Kitoi Bay Hatchery – KBH); Saltery Lake – SL.

Katmai coho salmon releases will be conducted by Pillar Creek Hatchery (PCH). KBH staff will conduct the egg take, incubate, pick, and ship approximately 34,000 eyed-eggs to PCH annually in February.

KBH obtained new FTPs for sockeye salmon eggs collected from either Little Kitoi Lake or Saltery Lake in 2010.

Table 2.–Kitoi Bay Hatchery pink, chum, and coho salmon egg takes in 2008 and 2009, juvenile releases planned for Big Kitoi Bay in 2010 and 2011, projected adult returns, and fish transport permit information.

<u>Fish Species</u>	<u>Pink Salmon</u>	<u>Chum Salmon</u>	<u>Coho Salmon</u>	<u>Coho Salmon</u>
Brood Year	2009	2009	2008	2009
Broodstock	Big Kitoi Creek	Big Kitoi Creek	Big Kitoi Creek	Big Kitoi Creek
<u>Egg take</u>				
Eggs	173,540,833	25,762,479	1,200,000	1,200,000
Adults	327,837	52,237	3,120	3,120
<u>Releases</u>				
Location	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay
Number	148,000,000	20,800,000	1,054,000	1,000,000
Average size (g)	0.7	2.0	18.0	20.0
Lifestage	fed fry	fed fry	smolt	smolt
Date	27-May-10	27-May-10	04-Jun-10	04-Jun-11
<u>Adult Returns</u> ^a				
2011	10,448,800	0	159,154	0
2012	0	49,920	0	151,000
2013	0	316,160	0	0
2014	0	49,920	0	0
2015	0	416	0	0
Total	10,448,800	416,416	159,154	151,000
<u>Fish Transport Permit</u>				
Number	06A-0073	06A-0072	02A-0007	02A-0007
Expires	31-Aug-11	31-Aug-11	01-May-12	01-May-12
Max. no.	215,000,000	28,000,000	1,300,000	1,300,000
Lifestage ^b	G.eggs	G.eggs	G.eggs	G.eggs
Number	06A-0073	06A-0072	02A-0007	02A-0007
Expires	31-Aug-11	31-Aug-11	01-May-12	01-May-12
Max. no.	182,000,000	22,000,000	1,000,000	1,000,000
Lifestage	Fry	Fry	Smolt	Smolt

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b G. eggs = green eggs

Table 3.–Salmon survival and age assumptions used to estimate returns for Kitoi Bay Hatchery. Survival assumptions are based on Kitoi Bay Hatchery juvenile releases and adult return data.

Species	Stocking		Survival	Age-at-return Proportions (%)												
	Year	Life Stage ^a		Avg. Size (g)	Stocking-to-adult return	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	0.5	2.3
Pink	even	F	0.7	3.8%	1.00											
	odd	F	0.7	7.1%												
Chum	all	F	2.8	2.0%		0.12		0.76				0.12				0.00
Coho	all	FG	0.7	2.0%												1.00
Coho	all	FPS	7.5	5.0%				1.00								
Coho	all	S	20	15.1%				1.00								
Sockeye	all	FPS	9	7.5%				0.01		0.31	0.01		0.39	0.24		0.05
Sockeye	all	SPS	20	15.0%				0.02		0.55			0.44			

^a F = fry, FG = fingerling, FPS = fall presmolt, S = smolt, and SPS = spring presmolt.

Table 4.–Kitoi Bay Hatchery coho salmon egg takes in 2009, juvenile releases planned for Jennifer, Ruth, and Crescent Lakes in 2010, projected adult returns, and fish transport permit information.

Fish Species	Coho Salmon	Coho Salmon	Coho Salmon	Totals
Brood Year	2009	2009	2009	
Broodstock	Big Kitoi Creek	Big Kitoi Creek	Big Kitoi Creek	
<u>Egg take</u>				
Eggs	275,500	55,100	553,100	883,700
Adults	1,600	300	3,200	5,100
<u>Releases</u>				
Location	Jennifer Lake	Ruth Lake	Crescent Lake	
Number	200,000	30,000	165,000	395,000
Average size (g)	0.7	0.7	0.7	
Lifestage	fingerling	fingerling	fingerling	
Date	07-Jul-10	07-Jul-10	07-Jul-10	
<u>Adult Returns^a</u>				
2011	0	0	0	0
2012	4,000	600	3,300	7,900
2013	0	0	0	0
Total	4,000	600	3,300	7,900
<u>Fish Transport Permit</u>				
Number	02A-0009	02A-0011	02A-0008	
Expires	01-May-12	01-May-12	15-May-12	
Max. no.	300,000	60,000	600,000	
Lifestage ^b	G.eggs	G.eggs	G.eggs	
Number	02A-0009	02A-0011	02A-0008	
Expires	01-May-12	01-May-12	15-May-12	
Max. no.	250,000	50,000	500,000	
Lifestage	Fingerlings	Fingerlings	Fingerlings	

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b G. eggs = green eggs

Table 5.–Kitoi Bay Hatchery coho salmon egg takes and egg transfer to Pillar Creek Hatchery in 2009 and 2010, resultant juvenile releases planned for Katmai Lake, projected adult returns, and fish transport permit information.

Fish Species	Coho Salmon	Coho Salmon	Totals
Brood Year	2009	2010	
Broodstock	Big Kitoi Creek	Big Kitoi Creek	
<u>Egg take</u>			
Eggs	40,000	40,000	80,000
Adults	200	200	400
<u>Stocking</u>			
Location	Katmai Lake	Katmai Lake	
Number	30,000	30,000	60,000
Average size (g)	7.5	7.5	
Lifestage	presmolt	presmolt	
Date	05-Oct-10	05-Oct-11	
<u>Adult Returns^a</u>			
2012	1,500	0	1,500
2013	0	1,500	1,500
Total	1,500	1,500	3,000
<u>Fish Transport Permit</u>			
Number	02A-0010	02A-0010	
Expires	01-May-12	01-May-12	
Max. no.	40,000	40,000	
Lifestage ^b	G.eggs	G.eggs	
Number	02A-0010	02A-0010	
Expires	01-May-12	01-May-12	
Max. no.	30,000	30,000	
Lifestage	Presmolt	Presmolt	

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b G. eggs = green eggs

Table 6.–Pillar Creek Hatchery sockeye salmon egg takes and egg transfer to Kitoi Bay Hatchery in 2008 and 2009, juvenile releases planned for Little Kitoi Lake in 2010 and 2011, projected adult returns, and fish transport permit information.

Fish Species	Sockeye Salmon	Sockeye Salmon	Sockeye Salmon	Totals
Brood Year	2008	2009	2009	
Broodstock	Saltery Lake	Saltery Lake	Saltery Lake	
<u>Egg take</u>				
Eggs	615,274	131,685	526,742	1,273,701
Adults	360	70	282	712
<u>Stocking</u>				
Location	Little Kitoi Lake	Little Kitoi Lake	Little Kitoi Lake	
Number	393,000	100,000	400,000	893,000
Average size (g)	20.0	8.0	22.0	
Lifestage	presmolt	presmolt	presmolt	
Date	03-Jun-10	01-Oct-10	03-Jun-11	
<u>Adult Returns^a</u>				
2012	943	0	0	943
2013	32,128	38	960	33,125
2014	25,879	2,385	32,700	60,964
2015	0	4,665	26,340	31,005
2016	0	405	0	405
Total	58,950	7,493	60,000	126,443
<u>Fish Transport Permit</u>				
Number	10A-0007	10A-0007	10A-0007	
Expires	01-Jan-14	01-Jan-14	01-Jan-14	
Max. no.	600,000	600,000	600,000	
Lifestage ^b	G.eggs	G.eggs	G.eggs	
Number	10A-0007	10A-0007	10A-0007	
Expires	01-Jan-14	01-Jan-14	01-Jan-14	
Max. no.	resulting juveniles	resulting juveniles	resulting juveniles	
Lifestage	Presmolt	Presmolt	Presmolt	

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b G. eggs = green eggs

Table 7.—Forecasted returns by species, broodstock requirements, minimum salmon escapements, and potential harvest of returning salmon to the release sites as a result of releases from the Kitoi Bay Hatchery in 2010.

Return Location	Species	Forecasted Return			Broodstock Required	Minimum Escapement ^a	Potential Harvest ^b
		Point	Low	High			
Kitoi Bay Hatchery (Big Kitoi Creek)	Pink	5,963,777	4,411,351	7,516,204	350,000	15,000	5,598,777
	Chum	273,668	205,251	342,085	30,000	2,000	241,668
	Coho	159,776	130,609	203,239	6,000	0	153,776
Little Kitoi Lake ^c	Sockeye	71,244	47,496	94,992	6,000	0	65,244
	Coho	500			0	500	0
Crescent Lake	Coho	3,310	2,482	4,137	0	0	3,310
Katmai Creek	Coho	1,363	1022	1,704	0	0	1,363
Saltery Lake ^d	Sockeye				4,800	12,000	

^a Minimum escapement for BKC refers to the number of adults remaining in the creek after KBH has completed the egg takes. These fish are allowed to escape into the creek to spawn to perpetuate the run in case of a catastrophic event at the hatchery.

^b Projected harvest is the run minus broodstock and escapement needs.

^c An egg take may occur in 2010, if enough adults are counted through the fish pass into the lake. Returns of sockeye salmon (Saltery Lake broodstock) are not targeted for harvest. Eggs may be transferred to Pillar Creek Hatchery for stocking of Spiridon Lake in 2011. Broodstock numbers include 5,000 adults for Pillar Creek Hatchery (Spiridon Lake stocking) and 600 adults for KBH for continued broodstock development at LKL. The assumption is that only 50% of LKL escapement may be available for an egg take.

^d Saltery Lake egg take will occur, if there are insufficient adults available for a Little Kitoi egg take.

Table 8.—Proposed pink, chum, and coho salmon egg take estimates at Kitoi Bay Hatchery and projected juvenile releases planned for 2011 and 2012, projected adult returns, and fish transport permit information.

Fish Species	Pink Salmon	Chum Salmon	Coho Salmon	Coho Salmon
Brood Year	2010	2010	2009	2010
Broodstock	Big Kitoi Creek	Big Kitoi Creek	Big Kitoi Creek	Big Kitoi Creek
<u>Egg take</u>				
Eggs	185,000,000	28,000,000	1,300,000	1,300,000
Adults	350,000	30,000	3,360	3,360
<u>Releases</u>				
Location	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay
Number	154,000,000	22,000,000	1,000,000	1,000,000
Average size (g)	0.7	2.5	19.0	19.0
Lifestage	fed fry	fed fry	smolt	smolt
Date	27-May-11	27-May-11	03-Jun-11	02-Jun-12
<u>Adult Returns^a</u>				
2012	4,235,000	0	151,000	0
2013	0	52,800	0	151,000
2014	0	334,400	0	0
2015	0	52,800	0	0
2016	0	0	0	0
Total	4,235,000	440,000	151,000	151,000
<u>Fish Transport Permit</u>				
Number	06A-0073	06A-0072	02A-0007	02A-0007
Expires	31-Aug-11	31-Aug-11	01-May-12	01-May-12
Max. no.	215,000,000	28,000,000	1,300,000	1,300,000
Lifestage ^b	G.eggs	G.eggs	G.eggs	G.eggs
Number	06A-0073	06A-0072	02A-0007	02A-0007
Expires	31-Aug-11	31-Aug-11	01-May-12	01-May-12
Max. no.	182,000,000	22,000,000	1,000,000	1,000,000
Lifestage	Fry	Fry	Smolt	Smolt

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b G. eggs = green eggs

Table 9.–Proposed 2010 Kitoi Bay Hatchery coho salmon egg takes, juvenile releases planned for Jennifer, Ruth, and Crescent lakes in 2011, projected adult returns, and fish transport permit information.

Fish Species	Coho Salmon	Coho Salmon	Coho Salmon	Totals
Brood Year	2010	2010	2010	
Broodstock	Big Kitoi Creek	Big Kitoi Creek	Big Kitoi Creek	
<u>Egg take</u>				
Eggs	300,000	60,000	600,000	960,000
Adults	780	180	1,560	2,520
<u>Stocking</u>				
Location	Jennifer Lake	Ruth Lake	Crescent Lake	
Number	200,000	30,000	165,000	395,000
Average size (g)	0.7	0.7	0.7	
Lifestage	fingerling	fingerling	fingerling	
Date	20-Jun-11	20-Jun-11	20-Jun-11	
<u>Adult Returns^a</u>				
2011	0	0	0	0
2012	4,000	600	3,300	7,900
2013	0	0	0	0
Total	4,000	600	3,300	7,900
<u>Fish Transport Permit</u>				
Number	02A-0009	02A-0011	02A-0008	
Expires	01-May-12	01-May-12	15-May-12	
Max. no.	300,000	60,000	600,000	960,000
Lifestage ^b	G. eggs	G. eggs	G. eggs	
Number	02A-0009	02A-0011	02A-0008	
Expires	01-May-12	01-May-12	15-May-12	
Max. no.	250,000	50,000	500,000	800,000
Lifestage	Fingerlings	Fingerlings	Fingerlings	

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b G. eggs = green eggs

Table 10.–Proposed Kitoi Bay Hatchery coho salmon egg takes and egg transfer to Pillar Creek Hatchery, resultant juvenile releases planned for Katmai Lake in 2011 and 2012, projected adult returns, and fish transport permit information.

Fish Species	Coho Salmon	Coho Salmon	Total
Brood Year	2010	2011	
Broodstock	Big Kitoi Creek	Big Kitoi Creek	
<u>Egg take</u>			
Eggs	40,000	40,000	80,000
Adults	120	120	240
<u>Stocking</u>			
Location	Katmai Lake	Katmai Lake	
Number	30,000	30,000	60,000
Average size (g)	7.5	7.5	
Lifestage	presmolt	presmolt	
Date	03-Oct-11	03-Oct-12	
<u>Adult Returns^a</u>			
2013	1500	0	1,500
2014	0	1500	1,500
Total			3,000
<u>Fish Transport Permit^b</u>			
Number	02A-0010	02A-0010	
Expires	01-May-12	01-May-12	
Max. no.	40,000	40,000	80,000
Lifestage ^c	G. eggs	G. eggs	
Number	02A-0010	02A-0010	
Expires	01-May-12	01-May-12	
Max. no.	30,000	30,000	60,000
Lifestage	Presmolt	Presmolt	

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b FTP 02A-0060 is being amended to provide for presmolt releases at the planned levels.

^c G. eggs = green eggs

Table 11.–Proposed Pillar Creek Hatchery sockeye salmon egg takes and egg transfer to Kitoi Bay Hatchery in 2009 and 2010, juvenile releases planned for Little Kitoi Lake in 2010 and 2011, projected adult returns, and fish transport permit information.

Fish Species	Sockeye Salmon	Sockeye Salmon	Sockeye Salmon	Total
Brood Year	2010	2011	2011	
Broodstock	Saltery Lake	Saltery Lake	Saltery Lake	
<u>Egg take</u>				
Eggs	529,335	110,000	440,000	1,079,335
Adults	360	75	300	735
<u>Stocking</u>				
Location	Little Kitoi Lake	Little Kitoi Lake	Little Kitoi Lake	
Number	400,000	100,000	400,000	900,000
Average size (g)	23.0	9.0	23.0	
Lifestage	presmolt	presmolt	presmolt	
Date	03-Jun-11	10-Oct-11	03-Jun-12	
<u>Adult Returns^a</u>				
2012	960	0	0	960
2013	32,700	38	960	33,698
2014	26,340	2,385	32,700	61,425
2015	0	4,665	26,340	31,005
2016	0	405	0	405
Total	60,000	7,493	60,000	127,493
<u>Fish Transport Permit^b</u>				
Number	97A-0068	97A-0068	97A-0068	
Expires	31-Dec-08	31-Dec-08	31-Dec-08	
Max. no.	1,200,000	1,200,000	1,200,000	3,600,000
Lifestage ^c	G. eggs	G. eggs	G. eggs	
Number	05A-0078	05A-0078	05A-0078	
Expires	12-Jun-10	12-Jun-10	12-Jun-10	
Max. no.	400,000	100,000	400,000	900,000
Lifestage	Presmolt	Presmolt	Presmolt	

^a Projected returns are calculated from Table 3 survival and age assumptions.

^b FTP 02A-0060 is being amended to provide for presmolt releases at the planned levels.

^c G. eggs = green eggs

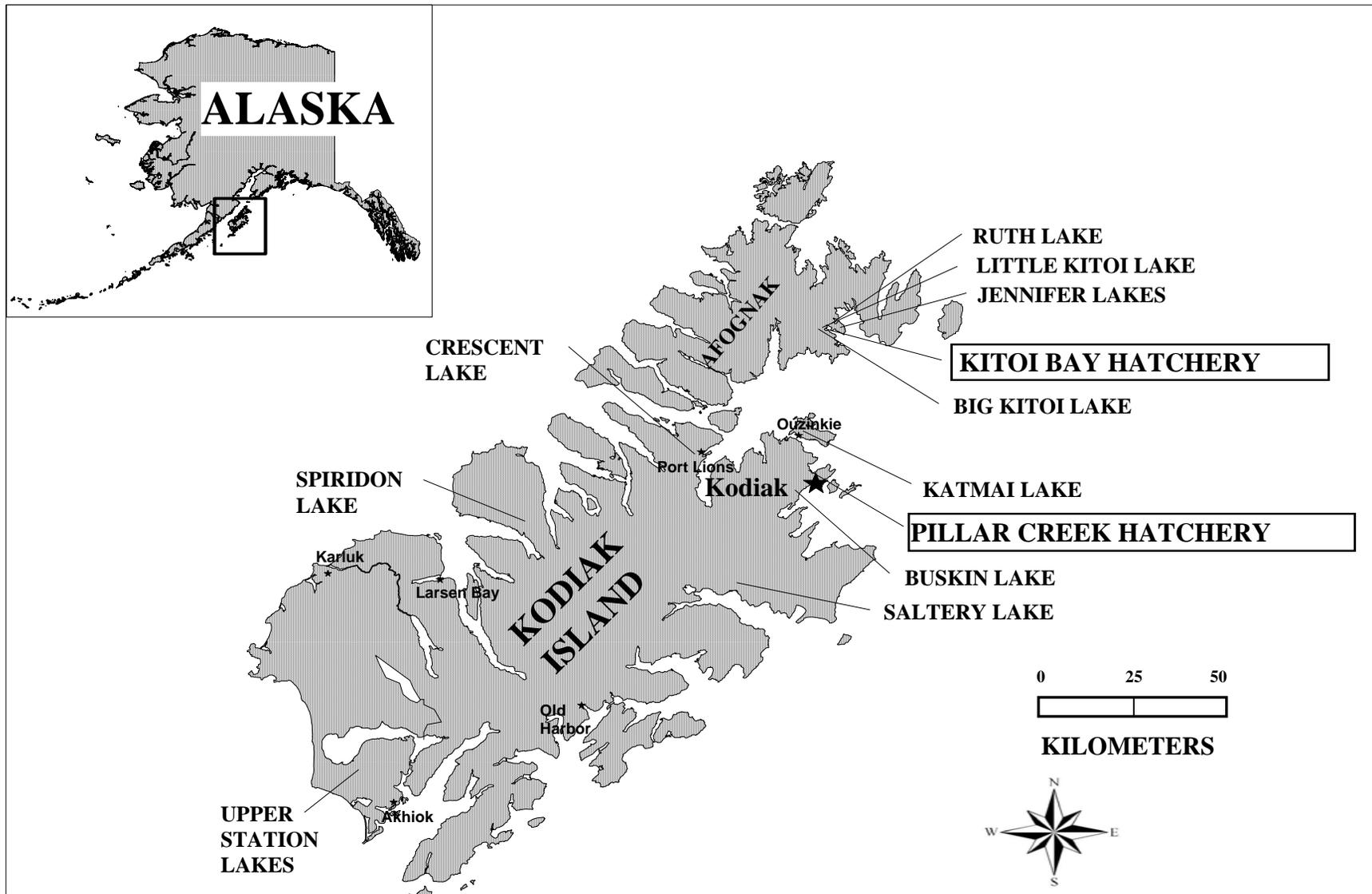


Figure 1.—Locations of salmon stocking and enhancement projects associated with Kitoi Bay Hatchery on Kodiak and Afognak Islands.

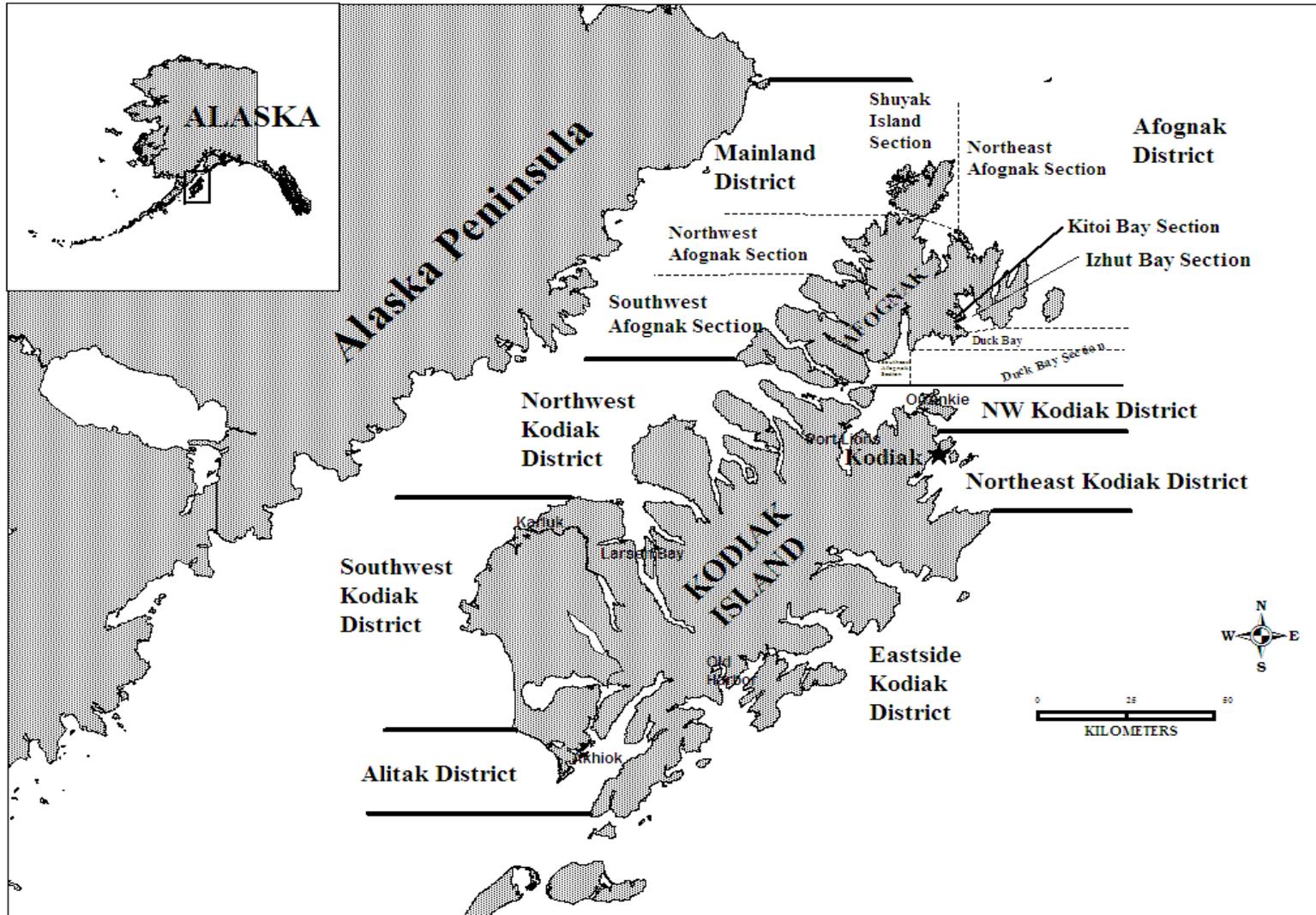


Figure 2.—Map of the Kodiak Management Area depicting commercial fishing districts and selected sections associated with Kitoi Bay Hatchery salmon returns on Afognak Island.

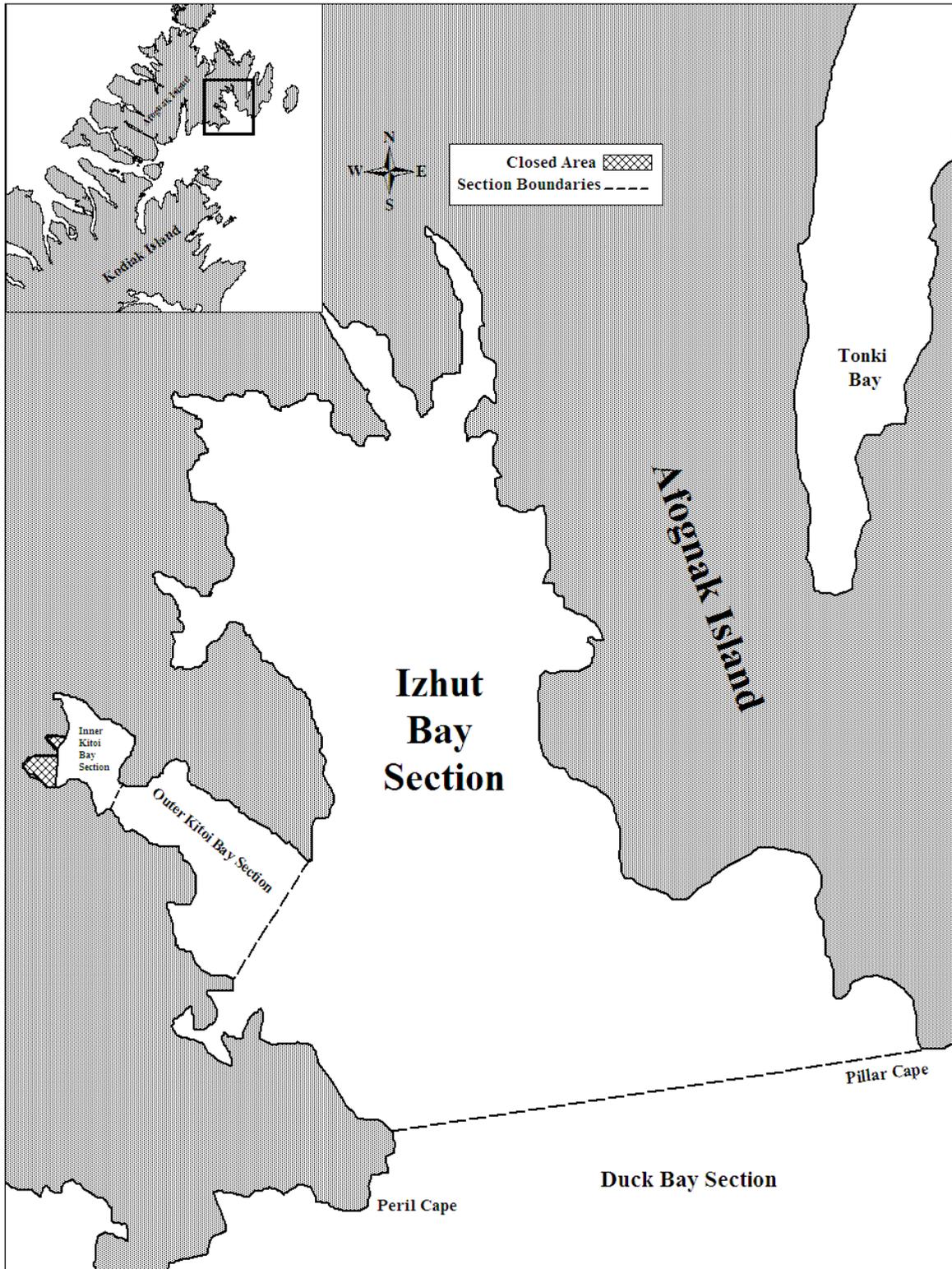


Figure 3.—Map of Izhut (252-30), Duck (252-31), and Inner and Outer Kitoi Bay (252-32) sections.

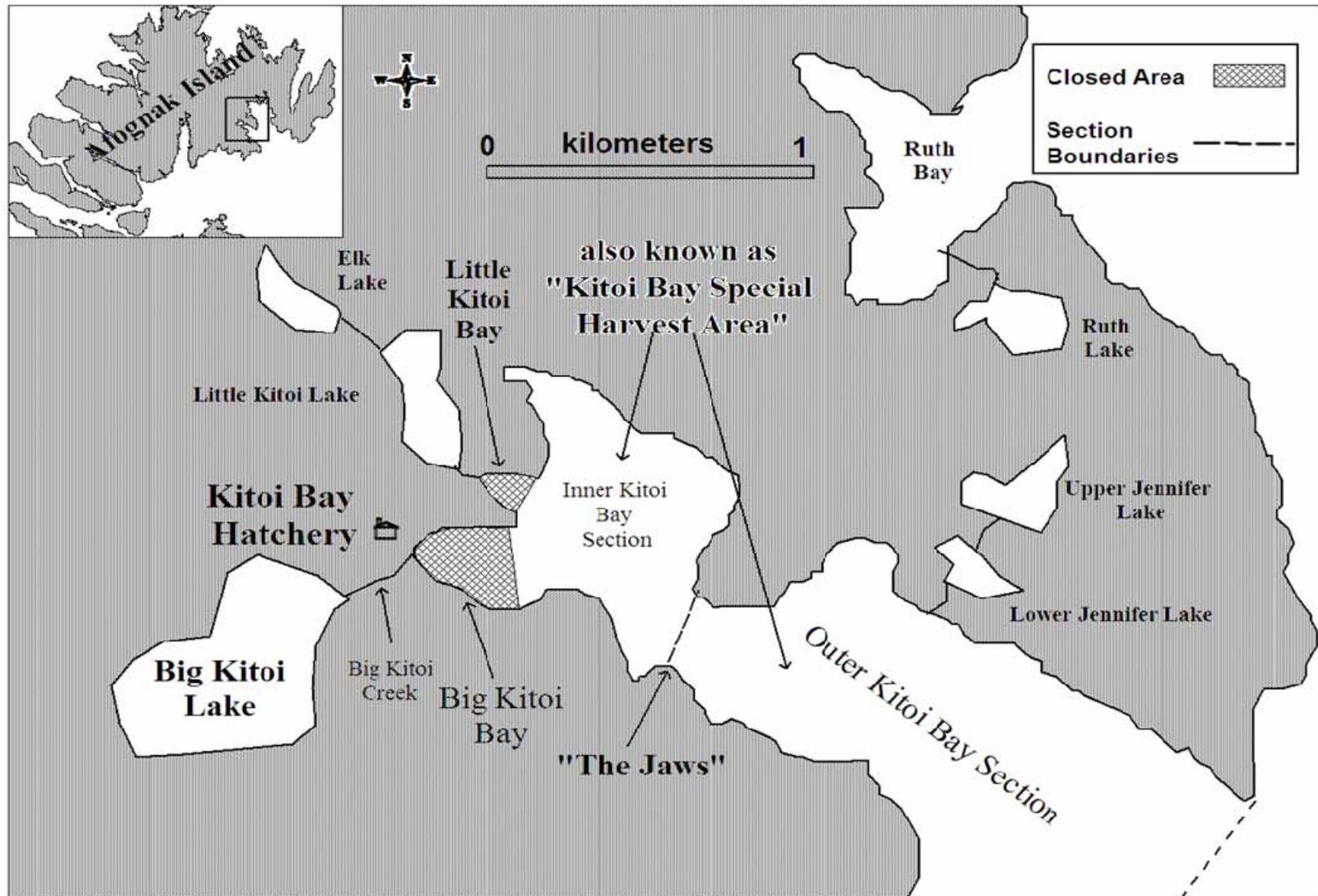


Figure 4.—Map of Inner and Outer Kitoi Bay sections (252-32).

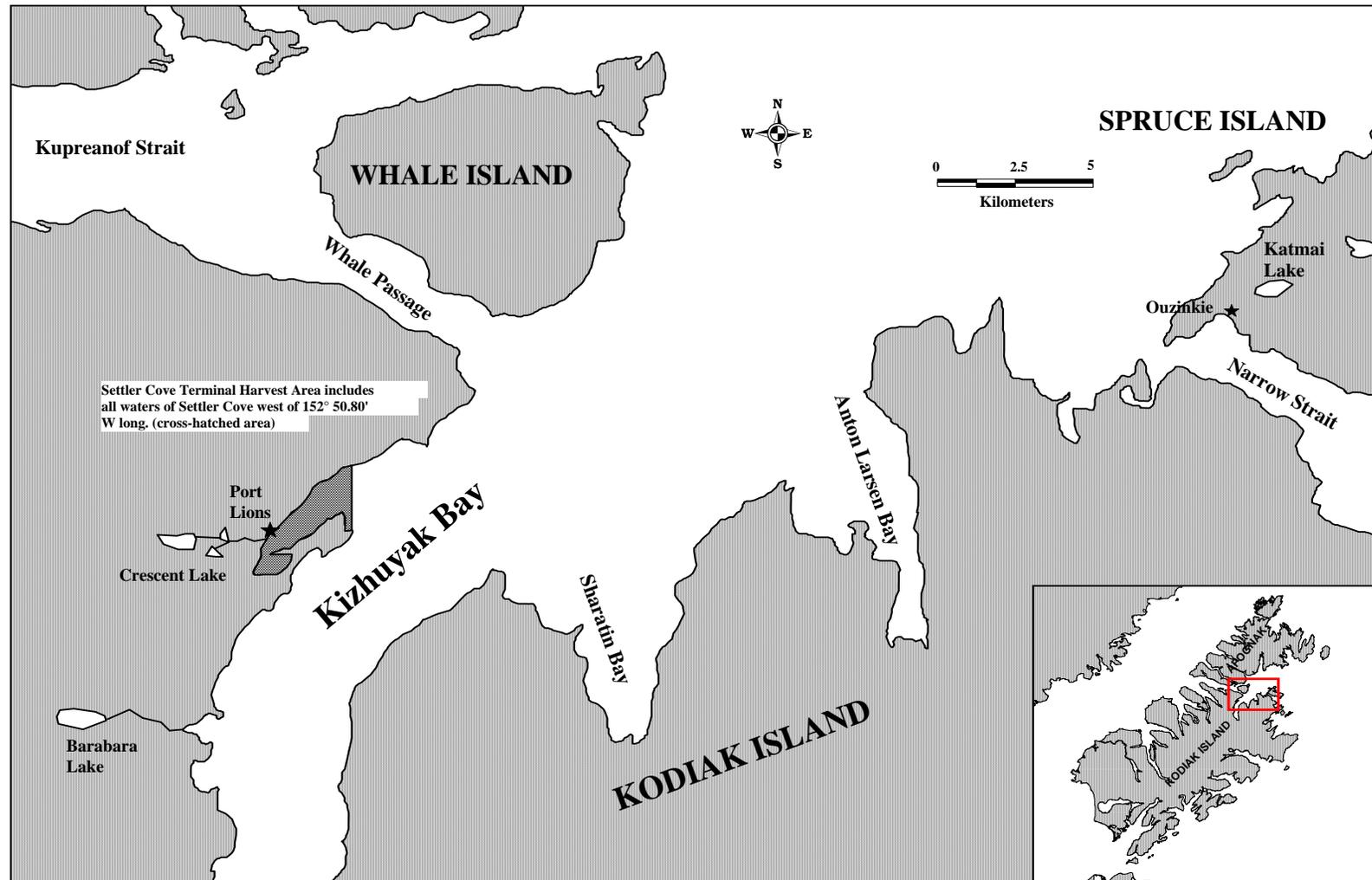


Figure 5.—A map of the Settler Cove (Crescent Lake) special harvest area boundaries in Kizhuyak Bay and the coho salmon stocking project at Katmai Lake (upper right corner of the map) on Spruce Island.

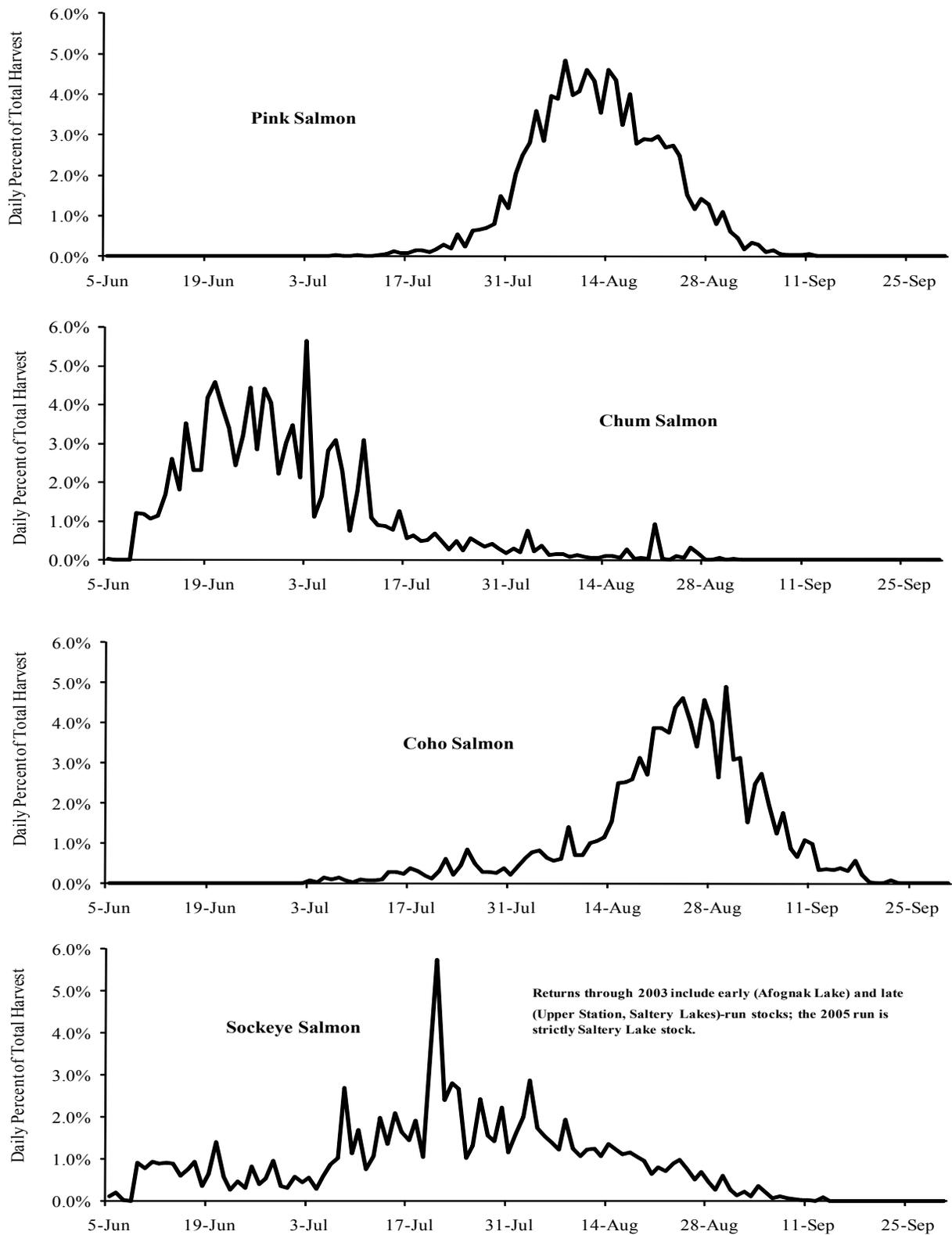


Figure 6.—A historical perspective on the daily harvest of pink, chum, coho, and sockeye salmon in the Kitoi Bay area (combined harvests in the Izhut, Duck, and Kitoi Bay sections).

APPENDIX A: SALMON RELEASE HISTORY

Appendix A1.–Kitoi Bay Hatchery pink salmon releases, 1973–2009.

Brood Year	Pink Salmon Releases ^a		
	Year	Number	Average Weight (g)
1972	1973	493,130	ND
1973	1974	447,642	ND
1974	1975	1,226,314	ND
1975	1976	2,486,410	ND
1976	1977	4,722,152	0.50
1977	1978	17,255,424	0.44
1978	1979	17,319,537	ND
1979	1980	22,458,947	0.63
1980	1981	26,351,664	0.93
1981	1982	47,828,701	ND
1982	1983	72,054,096	0.79
1983	1984	87,065,569	0.58
1984	1985	75,109,442	0.29
1985	1986	97,773,052	0.78
1986	1987	90,017,823	0.27
1987	1988	94,172,516	0.73
1988	1989	80,502,220	0.62
1989	1990	84,907,550	0.61
1990	1991	124,148,019	0.60
1991	1992	147,145,130	0.79
1992	1993	169,552,112	0.51
1993	1994	163,192,575	0.45
1994	1995	134,104,406	0.53
1995	1996	144,045,245	0.48
1996	1997	102,583,724	0.50
1997	1998	128,101,460	0.50
1998	1999	127,685,500	0.54
1999	2000	137,702,154	0.61
2000	2001	134,823,670	0.72
2001	2002	152,990,900	0.56
2002	2003	144,823,895	0.86
2003	2004	154,073,358	0.76
2004	2005	136,287,250	0.62
2005	2006	115,661,940	0.83
2006	2007	140,898,860	0.60
2007	2008	144,920,820	0.64
2008	2009	153,705,600	0.67

Note: ND = No data

^a Juveniles are short term reared in net pens and eventually released into Big Kitoi Bay.

Appendix A2.–Kitoi Bay Hatchery chum salmon releases, 1982–2009.

Brood Year	Chum Salmon Releases ^a		
	Year	Number	Average Weight (g)
1981	1982	36,846	0.56
1982	1983	105,058	1.05
1983	1984	630,422	1.16
1984	1985	784,078	0.67
1985	1986	414,233	ND
1986	1987	693,166	2.00
1987	1988	4,737,587	2.10
1988	1989	3,289,878	1.85
1989	1990	1,502,501	2.44
1990	1991	0	ND
1991	1992	22,214,472	1.80
1992	1993	10,101,986	2.02
1993	1994	6,507,497	1.52
1994	1995	9,738,472	1.51
1995	1996	20,139,843	1.27
1996	1997	23,500,000	1.50
1997	1998	12,310,015	1.50
1998	1999	6,859,982	1.02
1999	2000	22,334,640	1.70
2000	2001	20,032,140	1.73
2001	2002	19,593,070	1.55
2002	2003	18,721,700	1.66
2003	2004	21,778,050	2.01
2004	2005	21,578,500	2.02
2005	2006	17,567,016	2.39
2006	2007	21,648,839	1.72
2007	2008	21,690,168	1.94
2008	2009	22,173,160	1.96

Note: ND = No data

^a Juveniles are short term reared in net pens and eventually released into Big Kitoi Bay.

Appendix A3.–Kitoi Bay Hatchery coho salmon releases by location, 1983–2009.

Brood Year	Brood Stock	Coho Salmon Releases				
		Year	Number	Average Weight (g)	Life Stage	Location
1986	Little Kitoi Lake	1987	9,600	5.00	Presmolt	Big Kitoi Creek
1988	Little Kitoi Lake	1990	137,493	23.30	Smolt	Big Kitoi Bay
1990	Little Kitoi Lake	1992	60,755	32.00	Smolt	Big Kitoi Bay
1991	Little Kitoi Lake	1993	613,681	18.90	Smolt	Big Kitoi Bay
1992	Little Kitoi Lake	1993	5,163	14.60	Presmolt	Big Kitoi Creek
1992	Little Kitoi Lake	1994	97,973	28.40	Smolt	Big Kitoi Bay
1993	Big Kitoi Creek	1995	258,926	25.90	Smolt	Big Kitoi Bay
1994	Big Kitoi Creek	1996	894,486	23.54	Smolt	Big Kitoi Bay
1995	Big Kitoi Creek	1997	819,046	19.57	Smolt	Big Kitoi Bay
1996	Big Kitoi Creek	1998	769,000	23.90	Smolt	Big Kitoi Bay
1997	Big Kitoi Creek	1999	1,098,338	19.30	Smolt	Big Kitoi Bay
1998	Big Kitoi Creek	2000	871,448	16.92	Smolt	Big Kitoi Bay
1999	Big Kitoi Creek	2001	936,913	20.76	Smolt	Big Kitoi Bay
2000	Big Kitoi Creek	2002	1,041,342	16.90	Smolt	Big Kitoi Bay
2001	Big Kitoi Creek	2003	1,064,864	16.75	Smolt	Big Kitoi Bay
2002	Big Kitoi Creek	2004	969,483	20.08	Smolt	Big Kitoi Bay
2003	Big Kitoi Creek	2005	1,009,200	18.54	Smolt	Big Kitoi Bay
2004	Big Kitoi Creek	2006	976,059	17.06	Smolt	Big Kitoi Bay
2005	Big Kitoi Creek	2007	1,046,365	17.03	Smolt	Big Kitoi Bay
2006	Big Kitoi Creek	2008	991,498	16.31	Smolt	Big Kitoi Bay
2007	Big Kitoi Creek	2009	1,027,684	18.44	Smolt	Big Kitoi Bay
1987	Little Kitoi Lake	1988	241,373	1.13	Fingerling	Crescent Lake
1988	Little Kitoi Lake	1989	202,955	0.82	Fingerling	Crescent Lake
1990	Little Kitoi Lake	1991	191,416	1.10	Fingerling	Crescent Lake
1991	Little Kitoi Lake	1992	69,100	7.04	Presmolt	Crescent Lake
1992	Little Kitoi Lake	1993	68,420	14.60	Presmolt	Crescent Lake
1993	Big Kitoi Creek	1994	163,680	0.98	Fingerling	Crescent Lake
1994	Big Kitoi Creek	1995	167,778	1.16	Fingerling	Crescent Lake
1995	Big Kitoi Creek	1996	163,200	0.40	Fry	Crescent Lake
1996	Big Kitoi Creek	1997	165,000	0.35	Fry	Crescent Lake
1997	Big Kitoi Creek	1998	163,000	0.60	Fry	Crescent Lake
1998	Big Kitoi Creek	1999	165,000	0.57	Fry	Crescent Lake
1999	Big Kitoi Creek	2000	165,837	0.42	Fry	Crescent Lake
2000	Big Kitoi Creek	2001	165,000	0.90	Fry	Crescent Lake
2001	Big Kitoi Creek	2002	164,487	0.65	Fry	Crescent Lake
2002	Big Kitoi Creek	2003	164,395	0.63	Fry	Crescent Lake
2003	Big Kitoi Creek	2004	165,000	0.76	Fry	Crescent Lake
2004	Big Kitoi Creek	2005	140,000	0.75	Fry	Crescent Lake
2005	Big Kitoi Creek	2006	121,410	0.84	Fry	Crescent Lake
2006	Big Kitoi Creek	2007	143,008	1.07	Fry	Crescent Lake
2007	Big Kitoi Creek	2008	165,479	0.71	Fry	Crescent Lake
2008	Big Kitoi Creek	2009	153,545	0.72	Fry	Crescent Lake

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Appendix A3.–Page 2 of 2.

Coho Salmon Releases						
Brood Year	Brood Stock	Year	Number	Average Weight (g)	Life Stage	Location
1991	Little Kitoi Lake	1992	162,387	4.50	Fingerling	Jennifer Lakes
1992	Little Kitoi Lake	1993	135,486	1.94	Fingerling	Jennifer Lakes
1994	Big Kitoi Creek	1995	165,000	1.46	Fingerling	Jennifer Lakes
1996	Big Kitoi Creek	1997	163,000	0.35	Fry	Jennifer Lakes
1997	Big Kitoi Creek	1998	165,000	0.50	Fry	Jennifer Lakes
1998	Big Kitoi Creek	1999	136,000	0.55	Fry	Jennifer Lakes
1999	Big Kitoi Creek	2000	155,688	0.44	Fry	Jennifer Lakes
2000	Big Kitoi Creek	2001	120,000	0.86	Fry	Jennifer Lakes
2001	Big Kitoi Creek	2002	201,320	0.57	Fry	Jennifer Lakes
2002	Big Kitoi Creek	2003	197,590	0.57	Fry	Jennifer Lakes
2003	Big Kitoi Creek	2004	200,000	0.76	Fry	Jennifer Lakes
2004	Big Kitoi Creek	2005	110,000	0.97	Fry	Jennifer Lakes
2005	Big Kitoi Creek	2006	199,943	0.78	Fry	Jennifer Lakes
2006	Big Kitoi Creek	2007	209,577	1.23	Fry	Jennifer Lakes
2007	Big Kitoi Creek	2008	200,655	0.87	Fry	Jennifer Lakes
2008	Big Kitoi Creek	2009	180,480	0.88	Fry	Jennifer Lakes
1986	Little Kitoi Lake	1987	22,349	0.50	Fingerling	Katmai Creek
1987	Little Kitoi Lake	1988	20,000	0.70	Fingerling	Katmai Creek
1991	Little Kitoi Lake	1992	14,973	8.00	Presmolt	Katmai Lake
1992	Little Kitoi Lake	1993	15,052	14.60	Presmolt	Katmai Lake
1993	Big Kitoi Creek	1994	13,178	23.28	Presmolt	Katmai Lake
1994	Big Kitoi Creek	1995	16,489	5.87	Presmolt	Katmai Lake
1995	Big Kitoi Creek	1996	15,246	5.04	Presmolt	Katmai Lake
1996	Big Kitoi Creek	1997	15,735	7.33	Presmolt	Katmai Lake
1998	Big Kitoi Creek	1999	15,000	8.23	Presmolt	Katmai Lake
1999	Big Kitoi Creek	2000	15,000	7.40	Presmolt	Katmai Lake
2000	Big Kitoi Creek	2001	15,000	8.37	Presmolt	Katmai Lake
2001	Big Kitoi Creek	2002	15,000	6.23	Presmolt	Katmai Lake
2002	Big Kitoi Creek	2003	15,000	7.38	Presmolt	Katmai Lake
2003	Big Kitoi Creek	2004	15,000	7.02	Presmolt	Katmai Lake
2004	Big Kitoi Creek	2005	15,000	6.71	Presmolt	Katmai Lake
2005	Big Kitoi Creek	2006	15,000	6.48	Presmolt	Katmai Lake
2006	Big Kitoi Creek	2007	13,593	7.71	Presmolt	Katmai Lake
2007	Big Kitoi Creek	2008	27,265	7.78	Presmolt	Katmai Lake
2008	Big Kitoi Creek	2009	13,254	7.04	Presmolt	Katmai Lake
1994	Big Kitoi Creek	1995	59,500	1.74	Fingerling	Ruth Lake
1996	Big Kitoi Creek	1997	35,000	0.35	Fry	Ruth Lake
1997	Big Kitoi Creek	1998	35,000	0.50	Fry	Ruth Lake
1998	Big Kitoi Creek	1999	35,000	0.57	Fry	Ruth Lake
1999	Big Kitoi Creek	2000	30,695	0.72	Fry	Ruth Lake
2001	Big Kitoi Creek	2002	30,000	0.69	Fry	Ruth Lake
2002	Big Kitoi Creek	2003	30,000	0.63	Fry	Ruth Lake
2003	Big Kitoi Creek	2004	30,000	0.76	Fry	Ruth Lake
2004	Big Kitoi Creek	2005	30,000	0.97	Fry	Ruth Lake
2005	Big Kitoi Creek	2006	30,886	0.78	Fry	Ruth Lake
2006	Big Kitoi Creek	2007	30,000	1.23	Fry	Ruth Lake
2007	Big Kitoi Creek	2008	30,000	0.87	Fry	Ruth Lake
2008	Big Kitoi Creek	2009	30,295	0.88	Fry	Ruth Lake

Appendix A4.–Kitoi Bay Hatchery coho salmon releases by location (non-active), 1983–1995.

Brood		Coho Salmon Releases				
Year	Brood Stock	Year	Number	Average Weight (g)	Life Stage	Location
1982	Buskin	1983	77,348	0.9	Fingerling	Buskin Lake
1983	Buskin	1984	43,288	0.6	Fingerling	Buskin Lake
1984	Buskin	1985	45,645	1.9	Fingerling	Buskin Lake
1985	Buskin	1986	50,024	0.8	Fingerling	Buskin Lake
1994	Big Kitoi Creek	1995	59,030	2.5	Fingerling	Elk Lake
1994	Big Kitoi Creek	1995	28,350	2.4	Fingerling	Finger Lake
1987	Little Kitoi Lake	1988	137,585	1.1	Fingerling	Hidden Lake
1988	Little Kitoi Lake	1989	239,817	0.9	Fingerling	Hidden Lake
1990	Little Kitoi Lake	1991	250,889	1.3	Fingerling	Hidden Lake
1983	Little Kitoi Lake	1984	131,825	1.0	Fingerling	Kodiak Road System
1984	Little Kitoi Lake	1985	109,568	0.9	Fingerling	Kodiak Road System
1984	Little Kitoi Lake	1985	12,731	2.6	Fingerling	Kodiak Road System
1985	Little Kitoi Lake	1986	141,750	1.1	Fingerling	Kodiak Road System
1986	Little Kitoi Lake	1987	103,824	1.0	Fingerling	Kodiak Road System
1987	Little Kitoi Lake	1988	84,600	1.2	Fingerling	Kodiak Road System
1988	Little Kitoi Lake	1989	87,585	0.8	Fingerling	Kodiak Road System
1989	Little Kitoi Lake	1990	36,040	1.8	Fingerling	Kodiak Road System
1990	Little Kitoi Lake	1991	83,530	1.2	Fingerling	Kodiak Road System
1991	Little Kitoi Lake	1992	51,500	1.6	Fingerling	Kodiak Road System
1991	Little Kitoi Lake	1992	15,200	8.0	Presmolt	Kodiak Road System
1992	Little Kitoi Lake	1993	64,000	1.8	Fingerling	Kodiak Road System
1983	Little Kitoi Lake	1984	127,700	1.0	Fingerling	Little Kitoi Lake
1984	Little Kitoi Lake	1985	33,472	1.5	Fingerling	Little Kitoi Lake
1985	Little Kitoi Lake	1986	53,360	6.1	Presmolt	Little Kitoi Lake
1986	Little Kitoi Lake	1987	171,103	1.8	Fingerling	Little Kitoi Lake
1987	Little Kitoi Lake	1988	43,807	1.5	Fingerling	Little Kitoi Lake
1991	Little Kitoi Lake	1992	70,605	1.4	Fingerling	Little Kitoi Lake
1992	Little Kitoi Lake	1993	139,147	1.3	Fingerling	Little Kitoi Lake
1983	Little Kitoi Lake	1984	5,000	2.5	Fingerling	Shemya

Appendix A5.–Kitoi Bay Hatchery sockeye salmon releases by location, 1989–2009.

Brood Year	Brood Stock	Sockeye Salmon Releases				
		Year	Number	Average Weight (g)	Life Stage	Location
1988	Upper Station	1989	143,725	2.48	Zero Check Smolt	Little Kitoi Bay
1989	Upper Station	1990	249,346	0.20	Fry	Spiridon
		1990	241,000	0.50	Fingerling	Little Kitoi Lake
		1990	337,932	0.18	Fry	Little Kitoi Lake
		1990	854,610	3.23	Zero Check Smolt	Little Kitoi Bay
		1990	458,118	0.48	Zero Check Fingerling	Little Kitoi Bay
1990	Upper Station	1991	1,250,000	2.50	Zero Check Smolt	Little Kitoi Bay
1991	Upper Station	1992	1,463,000	1.60	Zero Check Smolt	Little Kitoi Bay
1992	Upper Station	1993	52,418	3.13	Presmolt	Little Kitoi Lake
		1993	180,000	0.50	Fingerling	Jennifer Lakes
		1994	326,500	15.00	Smolt	Little Kitoi Bay
1993	Upper Station	1994	1,672,710	1.11	Zero Check Smolt	Little Kitoi Bay
	Little Kitoi Lake	1994	10,108	4.60	Presmolt	Little Kitoi Lake
		1995	916,677	10.08	Smolt	Little Kitoi Bay
1994	Upper Station	1995	266,952	1.83	Zero Check Smolt	Little Kitoi Lake
	Little Kitoi Lake	1995	84,861	4.98	Presmolt	Little Kitoi Lake
		1996	573,242	12.70	Smolt	Little Kitoi Bay
1995	Little Kitoi Lake	1996	155,687	3.16	Presmolt	Little Kitoi Lake
	Upper Station	1997	587,435	12.10	Smolt	Little Kitoi Bay
1996	Little Kitoi Lake	1997	77,039	3.31	Presmolt	Little Kitoi Lake
	Little Kitoi Lake	1998	99,085	11.70	Presmolt	Little Kitoi Lake
	Little Kitoi Lake	1998	397,000	15.10	Smolt	Little Kitoi Bay
1997	Saltery Lake	1999	106,658	17.70	Smolt	Little Kitoi Lake
1998	Saltery Lake	1999	98,737	7.00	Fingerling	Little Kitoi Lake
		1999	74,463	14.63	Presmolt	Little Kitoi Lake
		1999	23,756	14.35	Presmolt	Little Kitoi Bay ^a
1999	Saltery Lake	2000	154,039	11.31	Presmolt	Little Kitoi Lake
2000	Saltery Lake	2001	282,089	9.53	Presmolt	Little Kitoi Lake
2001	Saltery Lake	2002	212,418	6.55	Presmolt	Little Kitoi Lake
2002	Saltery Lake	2003	102,822	8.75	Presmolt	Little Kitoi Lake
2002	Saltery Lake	2003	193,646	25.68	Presmolt	Little Kitoi Lake ^b
2003	Saltery Lake	2004	20,664	9.40	Presmolt	Little Kitoi Lake
2003	Saltery Lake	2005	279,962	24.15	Presmolt	Little Kitoi Lake ^b
2004	Saltery Lake	2005	20,000	7.89	Presmolt	Little Kitoi Lake
2004	Saltery Lake	2006	379,687	22.82	Presmolt	Little Kitoi Lake ^b
2005	Saltery Lake	2006	206,884	6.14	Presmolt	Little Kitoi Lake
2005	Saltery Lake	2007	402,911	19.56	Presmolt	Little Kitoi Lake ^b
2006	Saltery Lake	2007	133,533	7.65	Presmolt	Little Kitoi Lake
2006	Saltery Lake	2008	414,376	19.91	Presmolt	Little Kitoi Lake ^b
2007	Saltery Lake	2008	116,459	8.04	Presmolt	Little Kitoi Lake
2007	Saltery Lake	2009	417,803	20.01	Presmolt	Little Kitoi Lake ^b
2008	Saltery Lake	2009	100,446	8.04	Presmolt	Little Kitoi Lake

^a This release resulted from a dissolved oxygen crash in the transfer tank.

^b LKL net pen releases.

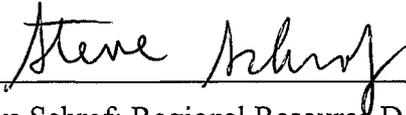
SIGN-OFF sheet for the 2010 Kitoi Bay Hatchery Annual Management Plan



Andrew Aro: Kitoi Bay Hatchery Manager, KRAA

6-25-10

Date



Steve Schrof: Regional Resource Development Biologist, CFD

6/8/2010

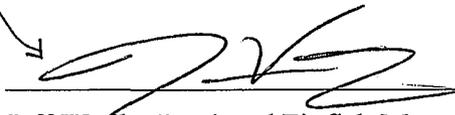
Date



James Jackson: Kodiak Area Management Biologist, CFD

6/9/10

Date



Jeff Wadle: Regional Finfish Management Supervisor, CFD

6/8/10

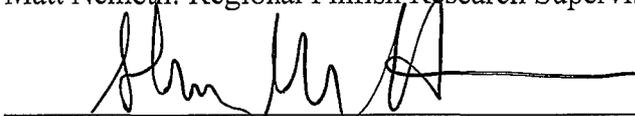
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Matt Nemeth: Regional Finfish Research Supervisor, CFD

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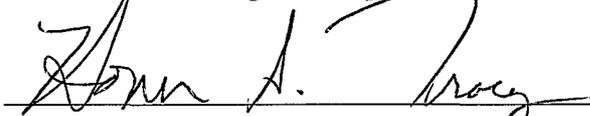
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Steve Honnold: Regional Supervisor, CFD

6-8-10

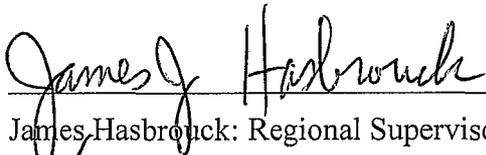
Date



Donn Tracy: Area Management Biologist, SFD

6-8-10

Date



James Hasbrouck: Regional Supervisor, SFD

6/29/2010

Date



Kevin Brennan: Executive Director, KRAA

6-10-10

Date

The 2010 Annual Management Plan for Kitoi Bay Hatchery is hereby approved:



David Bedford: Deputy Commissioner, ADF&G, Juneau

7/27/2010

Date