

2019

ANNUAL MANAGEMENT PLAN

KITOI BAY HATCHERY

Kodiak Regional Aquaculture Association

This Annual Management Plan (AMP) plan is prepared to fulfill the requirements of 5 AAC 40.840. This plan must organize and guide the hatchery's operations, for each calendar year, regarding production goals, broodstock development, and harvest management of hatchery returns. Egg take through release details are included in planning for succeeding calendar years. Inseason assessments and project alterations by the Kodiak Regional Aquaculture Association (KRAA) or Alaska Department of Fish and Game (ADF&G) may result in changes to this AMP in order to reach or maintain program objectives. KRAA will notify the ADF&G private nonprofit (PNP) hatchery program coordinator in a timely manner of any departure from the AMP. The ADF&G PNP coordinator will advise as to whether an amendment, exception report, or other action is warranted. No variation or deviation will be implemented until an AMP amendment has been approved or waived by both the department and KRAA. This policy applies to all hatchery operations covered under the AMP.

INTRODUCTION

The Kitoi Bay Hatchery (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 (Appendix A1). The hatchery infrastructure was constructed in 1954 by the U. S. Department of the Interior, Fish and Wildlife Service (USFWS), but was destroyed in the 1964 earthquake and rebuilt by the Alaska Department of Fish and Game (ADF&G) in 1965.

Funding for the hatchery was provided exclusively by ADF&G prior to state fiscal year 1987 (FY87) and was provided jointly by ADF&G and Kodiak Regional Aquaculture Association (KRAA) from FY87 to FY91. The hatchery has been fully funded by KRAA since FY92. KBH is owned by the State of Alaska and KRAA operates the facility under an agreement with the State of Alaska. The hatchery is operated in accordance with AS 16.10.400–480, the *KBH Basic Management Plan* (BMP), *KBH Annual Management Plan* (AMP), and private nonprofit (PNP) hatchery permit #29.

The hatchery was initially designed as a sockeye salmon (*Oncorhynchus nerka*) research facility. By 1976, hatchery production priorities switched to pink salmon (*O. gorbuscha*) fisheries enhancement. The present goal of the facility is to provide enhanced common property salmon fishing opportunities for Kodiak Management Area (KMA) fishermen by increasing returns of pink, chum (*O. keta*), coho (*O. kisutch*), and sockeye salmon through broodstock development, egg takes, incubation, hatching, rearing and releasing juvenile salmon, primarily to the Kitoi Bay area. KBH primarily increases salmon harvest of KMA commercial fisheries. Secondary user groups (in terms of the number of salmon harvested) of hatchery production include subsistence and sport fishermen. KBH has the capacity to produce 230 million juveniles of all life stages (fry, fingerling, presmolt, and smolt).

The purpose of this AMP is to describe the proposed stocking, rearing, and egg-take activities to be undertaken by KBH in 2019, anticipated 2019 salmon returns resulting from KBH projects, and management of KBH salmon in Kodiak waters. Appendix A contains maps showing the KMA and

the location of KBH and various projects. Appendix B contains KBH salmon production records. Appendix C shows data and methodology used for return and harvest estimates, and Appendix D cites all relevant KBH fish transport permits (FTP).

1.0 OPERATIONAL PLANS FOR 2019

1.1 Egg-take Limits and Broodstock Sources

PNP salmon hatchery permit number 29, approved permit alterations, and the KBH BMP specify the maximum green egg capacity and broodstock by species. Hatchery release sites are similarly authorized and projects are further delimited by fish transport permits (FTPs).

Species	Permitted Level	Donor Stock	Egg-Take Goal	Release Site
Chum salmon	36,000,000	Big Kitoi Creek	36,000,000	Kitoi Bay
Pink salmon	215,000,000	Big Kitoi Creek	215,000,000	Kitoi Bay
Coho salmon	2,300,000	Big Kitoi Creek	1,800,000	Kitoi Bay
		Big Kitoi Creek	190,000	Crescent Lake
		Big Kitoi Creek	230,000	Jennifer Lake
		Big Kitoi Creek	40,000	Katmai Lake
		Big Kitoi Creek	40,000	Ruth Lake
Sockeye salmon	850,000	Little Kitoi Lake/ Saltery Lake ¹	850,000	Little Kitoi Lake

¹ Saltery Lake is ancestral stock for Little Kitoi Lake sockeye and is permitted as a backup brood source.

1.2 Capture, Egg take, Transport, and Carcass Disposal Plans

1.2.1 Chum Salmon: Big Kitoi Creek

Approximately 40,000 returning adult KBH chum salmon will be needed for broodstock in 2019 to achieve the egg-take goal of 36 million eggs. Adults are collected and contained behind a barrier seine prior to ascending the fish ladder to the broodstock raceways where the eggs are collected. KBH uses the dry spawning method and eggs are water hardened in an iodophor solution for one hour prior to being loaded into incubators. No Big Kitoi Creek (BKC) chum salmon gametes are transferred to any other location. Chum salmon egg collection normally occurs between July 15th and August 1st. Chum salmon carcasses are disposed of in Outer Kitoi Bay.

1.2.2 Pink Salmon: Big Kitoi Creek

Approximately 425,000 returning adult KBH pink salmon will be needed for broodstock in 2019 to achieve the egg-take goal of 215 million eggs. Adults are collected and contained behind a barrier seine prior to ascending the lower section of the fish ladder where the eggs are

collected. KBH uses the dry spawning method before eggs are loaded into incubators. No BKC pink salmon gametes are transferred to any other location. Pink salmon egg collection normally occurs between September 1st and the 21st. Pink salmon carcasses are disposed of in Outer Kitoi Bay.

1.2.3 Coho Salmon: Big Kitoi Creek

Approximately 6,000 returning adult KBH coho salmon will be used for broodstock in 2019 to achieve the egg-take goal of 2.3 million eggs. Coho salmon eggs will be collected in 2019 for future releases into Big Kitoi Bay, Jennifer, Ruth, Crescent, and Katmai lakes. Adults are collected and contained behind a barrier seine prior to ascending the fish ladder to the broodstock raceways where the eggs are collected. KBH uses the dry spawning method and eggs are water hardened in an iodophor solution for one hour prior to being loaded into incubators. No BKC coho salmon gametes will be transferred to any other location. Coho salmon egg collection normally occurs on November 1st. Coho salmon carcasses are disposed of in Outer Kitoi Bay.

1.2.4 Sockeye Salmon: Little Kitoi Lake

Approximately 1,200 adult sockeye salmon returning to Little Kitoi Lake (LKL) will be used for broodstock in 2019 to achieve the egg-take goal of 850,000 eggs. Sockeye salmon adults are collected by seining in LKL during the first week of September. Broodstock are held in 20' x 20' net pens in LKL for about two weeks prior to egg collection. Standard sockeye salmon egg-take procedures will be used during egg take and eggs are water hardened in an iodophor solution for one hour prior to transfer back to KBH for incubation. Sockeye salmon gametes will be transferred from LKL to KBH for incubation, rearing, and release back into LKL, but none will be transferred to any other location. Egg collection normally occurs between September 14th and the 21st. Carcasses from the sockeye salmon egg takes in LKL are disposed of in the lake.

1.3 Incubation Plans

1.3.1 Chum Salmon

Chum salmon eggs are incubated in the main hatchery building in two types of NOPAD incubators supplied with ultraviolet (UV)-treated water. Kitoi NOPADs are loaded at 420,000 green eggs and 235,000 eyed eggs. Regular NOPAD incubators are loaded at 336,000 green eggs and 200,000 eyed eggs. Fry generally emerge from incubators during the last week of February or the first week in March. All chum salmon fry are non-volitionally ponded from these incubators, through a high-density polyethylene (HDPE) line, directly to saltwater net pens. Approximately 31.0 million brood year 2018 (BY18) chum salmon juveniles are currently incubating at KBH for release in 2019.

1.3.2 Pink Salmon

Pink salmon eggs are incubated in the main and expansion hatchery buildings in Kitoi NOPADs, regular NOPADs and Kitoi box incubators. Kitoi NOPADs are loaded at 500,000 green eggs and 350,000 eyed eggs. Regular NOPADs are not loaded with green eggs, but are loaded with 304,000 eyed eggs. Kitoi box incubators are loaded at 825,000 green eggs at egg take and at 430,000 eyed eggs after pick. Fry generally emerge from incubators during the third week in March. All fry in Kitoi Box incubators move volitionally to saltwater net pens through polyvinyl chloride (PVC) piping and are enumerated with electronic fry counters. This represents about 50% of the number of juveniles or about 80 million fry. The remaining 50% of pink salmon fry or about 80 million juveniles will move non-volitionally through a separate HDPE outmigration line to saltwater net pens. Approximately 160 million juveniles are currently incubating at KBH for release in 2019.

1.3.3 Coho Salmon

Coho salmon eggs are currently incubated in Kitoi box and NOPAD incubators located in the Coho Annex. The annex is an isolated incubation room attached to the Main Hatchery Building. Coho salmon NOPAD Incubators are partitioned for single family tracking for BKD and loaded at 60,000 green eggs at egg take. After single family tracking is complete, Kitoi Boxes will be loaded at 325,000 eyed eggs. Fry generally emerge from incubators between the third week in May and the first week in June. All fry move volitionally from incubators, through PVC piping, to a collection trough, where they are enumerated and ponded into raceways. Approximately 1.1 million BY18 coho salmon eggs are currently incubating at KBH for release in 2019 and 2020.

1.3.4 Sockeye Salmon

BY18 Sockeye salmon eggs were transported to KBH at the green egg stage from Saltery Lake. BY19 eggs are anticipated to be transferred to KBH from the Little Kitoi Lake remote egg collection site. BY18 and BY19 eggs are incubated in an isolated room in Kitoi box incubators supplied with UV-treated water. The eggs are disinfected prior to loading into the incubators. Incubators are loaded at approximately 125,000 green eggs each. Fry generally emerge from incubators between the second week of May and the last week in May. Fry emerge volitionally from incubators into start tanks, which are placed adjacent to the incubators and then are transferred to raceways supplied with UV-treated water. Approximately 467,000 BY18 LKL sockeye salmon eggs are currently incubating at KBH for releases in 2019 and 2020.

1.4 Rearing and Release Plans

1.4.1 Chum Salmon

Approximately 31.0 million BY18 chum salmon fry will be reared in net pens and released between 2.0 and 4.0 grams (g) within the Inner Kitoi Bay Section between May 5 and June 1, 2019 (Appendix B1). Fry will be reared in saltwater net pens for approximately 14 to 18 weeks. Fry will be released in two separate groups in 2019; the first half of the juveniles will be released between May 6 and May 15 and the second group will be released two weeks later. The late release group will be split into empty pens that result from the first release.

1.4.2 Pink Salmon

Approximately 160 million BY18 pink salmon fry will be reared in net pens and released at 0.8 g within the Inner Kitoi Bay Section between May 18 and May 30, 2019 (Appendix B2). The fry will be reared in saltwater net pens for approximately 3 to 9 weeks.

1.4.3 Coho Salmon

Approximately 1,245,000 BY17 coho salmon smolt will be reared in net pens and released at 20.0 g within the Inner Kitoi Bay Section between June 3 and June 17, 2019 (Appendix B3).

Approximately 1.6 million BY18 coho salmon fry will be ponded in June of 2019 and reared at KBH for release to several different locations. After results of single family tracking are received, all high level disease positive eggs will be culled. Low level possibility for disease eggs will be segregated and pooled together for remote stocking releases only. All negative disease eggs will be segregated and pooled together to make up the Inner Kitoi Bay release grouping. Normally, KBH releases 30,000 coho salmon fry into Ruth Lake, 200,000 fry into Upper and Lower Jennifer lakes, and 165,000 fry into Crescent Lake around the middle of July and an additional 30,000 presmolt will be released into Katmai Lake around the beginning of October. Approximately 1.1 million fry will be retained at KBH for rearing and eventual release within the Inner Kitoi Bay Section as 20.0 g smolt in June of 2020.

1.4.4 Sockeye Salmon

Approximately 593,000 BY17 (Saltery) sockeye salmon smolt will be reared in net pens in LKL and released at 24.0 g into the Little Kitoi Estuary (LKE) in the first week of June 2019 (Appendix B4). The fish will be transported to LKL in an oxygenated transfer tank and pumped into net pens in the lake for approximately three to five weeks of rearing and imprinting. Smolt will then be siphoned from net pens to the estuary at release, which will occur during the peak outmigration of the resident sockeye salmon smolt, which usually occurs the beginning of June.

Approximately 75,000 BY17 sockeye salmon presmolt will be transferred to Ouzinkie Boat Harbor (OBH) for imprinting and release. The fish will be transported to OBH in an oxygenated transfer tank and pumped into net pens in the harbor for approximately three to four weeks of rearing and imprinting. Release will occur around the first week of June at approximately 24.0 g.

Approximately 465 BY18 sockeye salmon eggs (Saltery) are currently incubating at KBH and will be reared and released into LKL and OBH in 2019 and 2020. No BY18 presmolt (LKL) will be released directly into LKL in 2020.

Approximately 20,000 to 50,000 smolt (OBH) and 430,000 smolt (LKL) will be transferred for short-term net pen rearing and imprinting prior to being released in the spring of 2020.

2.0 WILD DONOR STOCK MANAGEMENT

In 2019 and beyond, there are no plans or expectations to use naturally-spawning salmon stocks as donor stocks for KBH broodstock and egg takes.

Management of KBH salmon stocks is detailed in the *Hatchery Return Management* section below.

2.1 Common Property Fisheries

Not applicable.

2.2 Escapement Requirements

Not Applicable.

2.3 Donor Stock Collection Procedures

Not Applicable.

3.0 HATCHERY RETURN MANAGEMENT

Management of salmon harvested by subsistence and commercial fishermen is conducted by the ADF&G Division of Commercial Fisheries through permitting, preseason development of regulatory management plans and annual harvest strategies, inseason management actions by emergency order (EO) establishing fishing time and area (within guidelines in management plans) based on harvest strategies and inseason salmon escapements and/or other conservation considerations.

Harvest of salmon by sport anglers and personal use fishermen is managed by the ADF&G Division of Sport Fish in accordance with regulations as provided in 5 AAC 47 – 5 AAC 75. Emergency orders may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

KRAA staff work closely with the Kodiak ADF&G commercial and sport fisheries area management biologists (AMBs) to assure that they have information that KRAA can provide to manage the associated fisheries. KRAA is involved in cooperative projects with ADF&G and assists in the management of natural stocks by providing funding and personnel to gather data necessary for sustainable management of Kodiak salmon populations. Further, KRAA staff share openly with ADF&G salmon management staff any inseason observations on salmon runs or fishery issues.

KBH is a remote facility located on the east side of Afognak Island (Appendix A1). KBH-released salmon to return to waters adjacent to the hatchery. The Kitoi Bay commercial fishery harvest strategy is described in the *Eastside Afognak Management Plan* (5 AAC 18.365) and is designed to increase fishing opportunities for the commercial salmon fishery in the Duck, Izhut, and the Inner and Outer Kitoi bays sections (Appendix A2), while providing for adequate returns to KBH.

Inseason management of KBH salmon runs is complex, with overlapping run timing between species and multispecies broodstock priorities. The ADF&G Kodiak Salmon AMB will open and close the Duck, Izhut, and Inner and Kitoi bay sections adjacent to KBH as needed to harvest hatchery salmon returns in common property or cost-recovery fisheries. During broodstock collection periods, adjustments to fishing periods in KBH management units will be necessary. Communication between the Kodiak salmon fisheries AMB and the Kitoi Bay hatchery manager is essential to secure broodstock to achieve egg-take goals while maintaining harvests on high quality hatchery returns.

3.1 Hatchery Return Projections

3.1.1 Chum Salmon

The midpoint estimate for adult chum salmon returning to KBH in 2019 is 201,000 (range 140,000 to 261,000), assuming a 0.69% marine survival (Appendix C1) from the 2016 fry release of 29.1 million (75% 0.3).

3.1.2 Pink Salmon

The midpoint estimate for adult pink salmon returning to KBH in 2019 is 7.06 million (range 5.3 million to 8.8 million), assuming a 3.68% marine survival (Appendix C1) from the 2018 fry release of 192 million.

3.1.3 Coho Salmon

The midpoint estimate for adult coho salmon returning to KBH in 2019 from the Kitoi Bay smolt release is 39,000 (range 31,000 to 47,000), assuming a 10.4% marine survival (Appendix C1) from the 2018 smolt release of 373,000.

3.1.4 Sockeye Salmon

The midpoint estimate for adult sockeye salmon returning to LKL in 2019, from KBH releases is 26,000 (range 21,000 to 31,000), based on recent brood year survivals of 2.5% (Appendix C1).

3.2 Returns to Common Property Fisheries

3.2.1 Chum Salmon

Chum salmon are produced for harvest by the common property fishery. The anticipated 2019 KBH chum salmon return is 201,000 fish. About 40,000 adults will be needed for broodstock. Additionally, BKC chum salmon escapement is monitored by KBH staff with an annual escapement objective of 2,000 adults. An estimated 161,000 chum salmon are available for common property harvest.

Chum salmon produced at KBH are taken in the commercial common property fishery in the Duck, Izhut, and Kitoi Bay sections. The chum salmon run begins in early June, peaks in late June to early July, and ends in late July. The initial KBH chum salmon commercial fishery opening is expected to occur on June 9, 2019, but may occur as early as June 1, 2019. Portions of the Inner and Outer Kitoi, and Izhut sections are expected to close for broodstock collection

around June 30, 2019. The Duck Bay Section will open and close depending on the strength of the hatchery chum and sockeye salmon.

3.2.2 Pink Salmon

Pink salmon are produced for the common property fishery, as well as for cost recovery. The anticipated 2019 KBH pink salmon return is 7,062,000 fish. Approximately 425,000 pink salmon adults will be needed for broodstock. The 2019 cost recovery harvest goal determined by the KRAA board of directors is 4.5 million lbs. Based on average odd year cost recovery weights an additional 1.3 million adults are required for cost recovery. Broodstock collection will be prioritized above cost recovery. Additionally, BKC pink salmon escapement is monitored by KBH staff, with an annual escapement objective of 15,000 adults.

Pink salmon produced at KBH are harvested in the commercial fishery in the Duck, Izhut, and Kitoi Bay sections. The Kitoi Bay pink salmon return begins in mid-July, peaks in early to mid-August, and ends in late August to early September. The initial fishery opening for pink salmon will be July 6, 2019 and is designed to assess run strength and timing and to harvest excess males, which arrive during the early portion of the run. Traditionally, portions of the Inner and Outer Kitoi, Izhut, and Duck Bay sections could close to commercial common property fishing for cost-recovery operations around August 1.

The number of pink salmon available for the common property fishery will depend on a combination of marine survival, average adult fish weigh, and KRAA's cost recovery harvest needs. In additional, once cost recovery operations are complete, portions of the Duck, Izhut, and Kitoi Bay sections could close for pink salmon broodstock collection.

3.2.3 Coho Salmon

The anticipated 2019 KBH coho salmon return is 39,000 fish. About 6,000 adult coho salmon are required for broodstock. Approximately 33,000 coho salmon are available for common property harvest.

Coho salmon produced at KBH are harvested in the commercial common property fishery in the Duck, Izhut, and Kitoi Bay sections. The coho salmon run is expected to start in early August, peak in late August, and continue through early September. KBH coho salmon will be harvested incidental to the pink salmon fishery in the Duck, Izhut, and Kitoi Bay sections as well as in directed coho salmon fisheries in late August and early September. After August 24, fishing time in some of these sections will depend on the abundance of local and hatchery coho salmon. Coho salmon returning to Jennifer and Ruth lakes will also be harvested during these commercial fisheries.

3.2.4 Sockeye Salmon

The anticipated 2019 KBH sockeye salmon return is 26,000 fish. About 1,200 adult sockeye salmon are required for broodstock. Sockeye salmon broodstock is collected in LKL following an average escapement of 7,000 into the system. When maturing adults aggregate in the lake, they are captured by beach seine and sorted by sex into floating net pens, where they are held until ready for egg collection. Approximately 19,000 sockeye salmon are available for common property harvest.

Sockeye salmon produced at LKL are harvested in the commercial common property fishery in the Duck, Izhut, and Kitoi Bay sections. However, a portion of the LKL sockeye run is also harvested incidentally in the cost recovery program. The sockeye salmon run should begin in late June and continue through late August with the peak occurring during the last two weeks of July.

4.0 EVALUATION/SPECIAL STUDIES

4.1 Marking and Tagging Programs

4.1.1 Chum salmon

All BY18 chum salmon were marked using differential water sources from Big Kitoi Lake (deep and shallow) and the marking program will continue for all BY19. Two different marks were given to BY18: 3,3,3H for the regular release and 3,2,4H for the late release group that will be released approximately two weeks after the initial release.

4.1.2 Pink Salmon

There is no marking requirement for pink salmon releases from KBH. An experimental 7H saltwater mark was applied to approximately 19% (31.0 million) of the BY18 pink salmon. This mark will be used to see the mark effectiveness and multiple life stage survival rates of saltwater marking through adulthood.

4.1.3 Coho Salmon

There is no marking requirement for coho salmon releases from KBH. However, a 3.4H dry mark will be applied to the outstocking portion of the BY18 coho salmon eggs.

4.1.4 Sockeye Salmon

BY18 Sockeye salmon eggs were otolith marked using the dry mark process. The BY18 mark applied was 6,3H. KBH intends to continue otolith marking sockeye salmon eggs for all future production.

4.2 Evaluation

4.2.1 Chum Salmon

Chum salmon scales and otoliths are collected in the common property fishery and from broodstock returning to hatchery raceways during egg take to determine the age composition of the returning adults. The data is used for determining survivals and forecasting.

Chum salmon returns will be evaluated for the success of the two different rearing strategies by collecting otoliths and evaluating differential thermal marks. Otoliths will be collected during scale collections in the common property fishery, from broodstock, and from Kodiak processors.

4.2.2 Pink Salmon

Adult pink salmon are sampled throughout cost-recovery operations to gather information on average weight, sex ratio, average quality, and species composition of fish sold. Otolith samples will be collected during cost recovery harvest and from broodstock during egg-take operations. Otoliths will be analyzed to determine the efficacy of KRAA's experimental saltwater marking program. Approximately 10% of the BY17 pink salmon released in 2018 were marked with a 3,2H.

4.2.3 Coho Salmon

Coho smolt are evaluated for osmoregulation capability each spring prior to the transfer of the entire juvenile population to salt water. Sequential test groups of 100 smolt are held in saltwater test pens for up to one week starting around the middle of April. Once 100% survival is observed, transfer of the remaining smolt to saltwater net pens is initiated.

4.2.4 Sockeye Salmon

Sockeye salmon scales are collected in the Kitoi Bay sport fishery and from sockeye returning to hatchery raceways during chum egg take to determine the age composition of the returning adults. In 2019, scales will also be collected from sockeye salmon adults entering Little Kitoi Lake. The data is used for determining survivals and forecasting.

Emigrating sockeye salmon smolt are enumerated from Little Kitoi Lake. The data is used to aid in forecasting. In 2019, age, weight and length data will be collected from the emigrating smolt. Data will be used to reconstruct brood tables and to provide condition factor for fish rearing in the lake.

5.0 Approval

Recommendation for Approval: Kitoi Hatchery Annual Management Plan, 2019

Tina Fairbanks: Executive Director, KRAA 7/2/2019

Tyler Polum: Area Management Biologist, Division of Sport Fish 5/20/2019

James Jackson: Area Management Biologist, Division of Commercial Fisheries 7/2/2019

Tom Vania: Regional Supervisor, Division of Sport Fish 5/23/2019

Nicholas Sagalkin: Regional Supervisor, Division of Commercial Fisheries 7/2/2019

Kevin Schaberg: Regional Research Biologist, Division of Commercial Fisheries 5/22/2019

Lorraine Vercessi: PNP Hatchery Program Coordinator, Div. of Commercial Fisheries 6/22/2019

Approval:

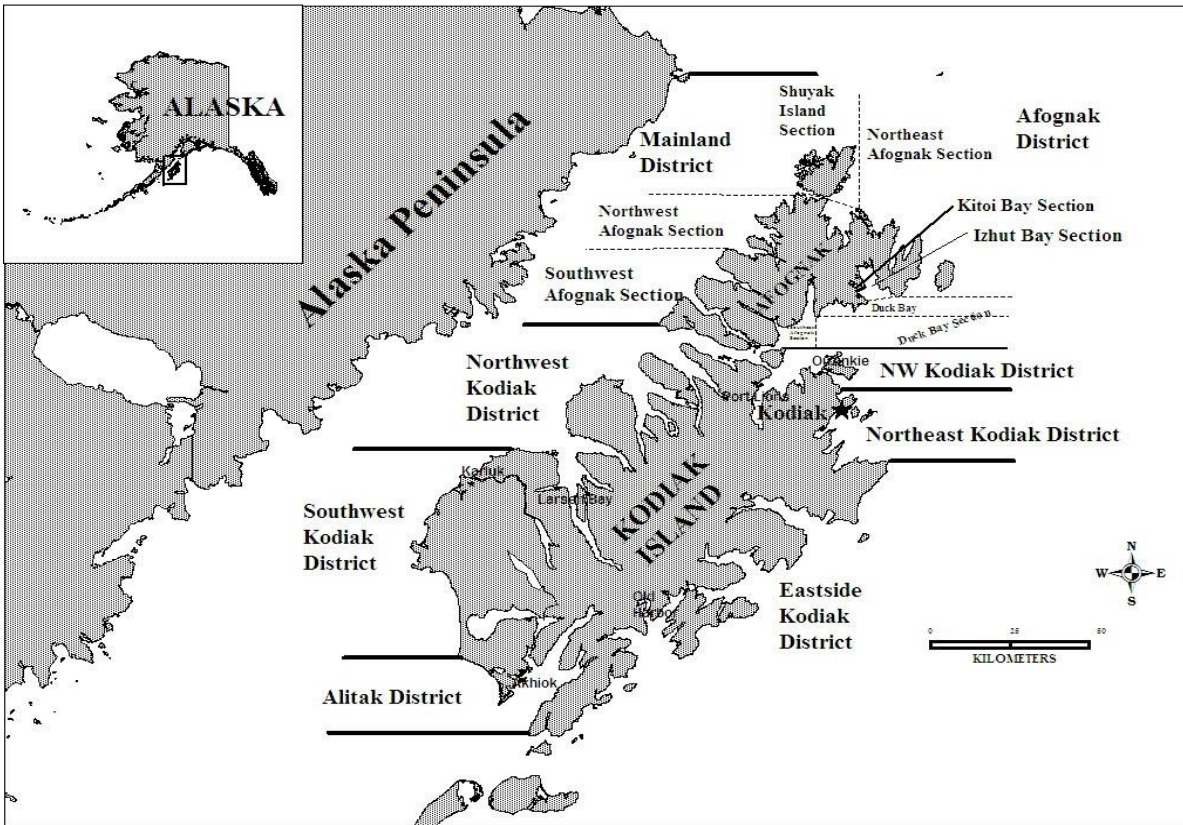
The 2019 Kitoi Bay Hatchery Management Plan is hereby approved:

Tom Taube: Deputy Director, Division of Sport Fish 7/5/2019

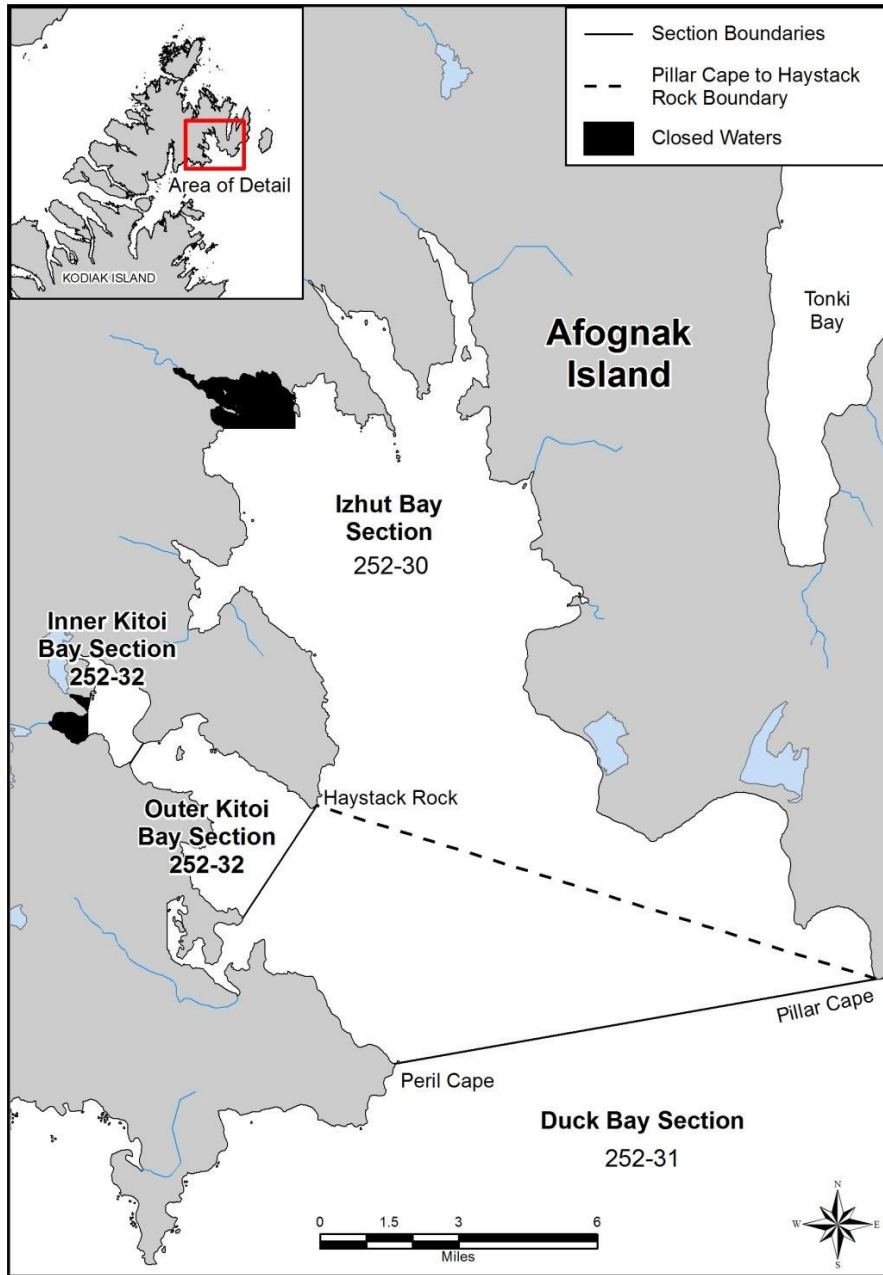
Peter Bangs: Assistant Director, Division of Commercial Fisheries 7/3/2019

APPENDIX A. MAPS

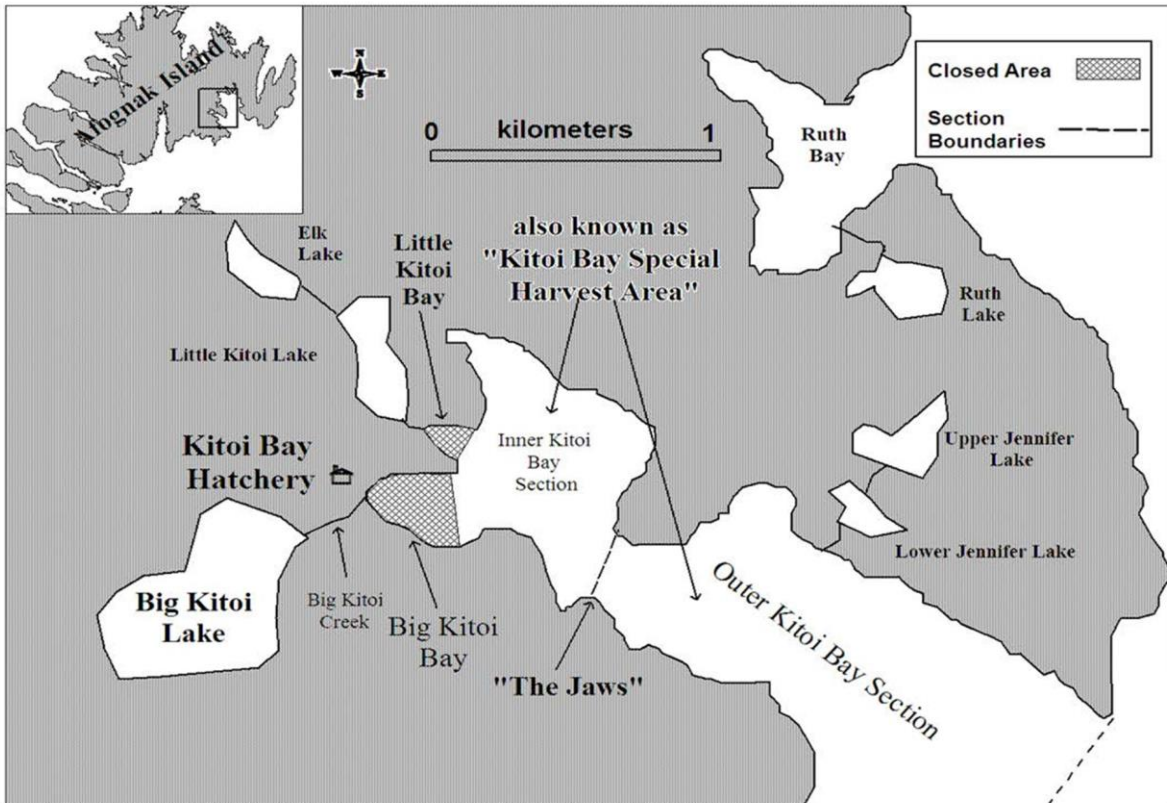
Appendix A1.—Map of the Kodiak Management Area.



Appendix A2.—Map of Izhut (252-30), Duck (252-31), and Inner and Outer Kitoi Bay Sections (252-32).



Appendix A3.—Map of the Kitoi Bay Special Harvest Area (Inner and Outer Kitoi Bay Sections).



APPENDIX B. HISTORIC PRODUCTION TABLES

Appendix B1.–Kitoi Bay Hatchery chum salmon release and return history, 1982–2018.

BY	Releases			Returns				
	Year	Number	Avg Wt (g)	0.2	0.3	0.4	Total ^b	Survival
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	-					
1986	1987	693,166	2.00	1,335	16,450	8,456	26,279	3.79
1987	1988	4,737,587	2.10	8,807	61,466	7,760	78,083	1.65
1988	1989	3,289,878	1.85	995	10,925	4,414	16,334	0.50
1989	1990	1,502,501	2.44	343	5,613	5,313	11,340	0.75
1990	1991	0						
1991	1992	22,214,472	1.80	43,866	260,658	18,093	322,637	1.45
1992	1993	10,101,986	2.02	2,633	27,835	6,960	37,439	0.37
1993	1994	6,507,497	1.52	464	21,170	5,892	27,526	0.42
1994	1995	9,738,472	1.51	6	20,847	269	21,122	0.22
1995	1996	20,139,843	1.27	29,211	153,042	17,147	200,345	0.99
1996	1997	23,500,000	1.50	20,411	322,369	144,630	487,423	2.07
1997	1998	12,310,015	1.50	3,429	99,433	10,487	113,349	0.92
1998	1999	6,859,982	1.02	0	14,266	458	14,724	0.21
1999	2000	22,334,640	1.70	119,494	480,137	40,672	640,303	2.87
2000	2001	20,032,140	1.73	26,311	231,777	12,451	271,424	1.35
2001	2002	19,593,070	1.55	6,129	80,032	24,518	110,679	0.56
2002	2003	18,721,700	1.66	32,479	131,324	2,883	166,683	0.89
2003	2004	21,778,050	2.01	55,727	251,318	34,846	341,891	1.57
2004	2005	21,578,500	2.02	3,192	83,519	16,301	103,012	0.48
2005	2006	17,567,016	2.39	10,670	99,026	15,209	124,905	0.71
2006	2007	21,648,839	1.72	37,909	155,766	5,193	199,822	0.92
2007	2008	21,690,168	1.94	64,567	310,948	101,240	477,341	2.20
2008	2009	22,173,160	1.96	4,391	144,619	36,894	185,904	0.84
2009	2010	20,765,381	2.02	5,654	88,160	18,079	112,018	0.54
2010	2011	19,412,409	1.98	5,945	68,566	9,154	83,665	0.43
2011	2012	22,244,780	1.75	10,618	111,340	34,060	156,018	0.70
2012	2013	16,722,259	1.59	6,095	82,180	12,998	101,276	0.60
2013	2014	21,908,923	2.26	5,704	146,458	36,941	189,103	1.80
2014	2015	29,767,082	2.88	61,638	142,713			
2015	2016	29,122,550	3.08	28,187				
2016	2017	14,192,919	2.22					
2017	2018	22,935,542	2.03					

^aBig Kitoi Creek broodstock. Juveniles (fry life stage) were released into Big Kitoi Bay net pens for rearing then released into Big Kitoi Bay.

^bTotal reflects returns of all age classes (0.5 age class not shown).

Appendix B2.–Kitoi Bay Hatchery pink salmon release and return history, 1973–2018.

Brood Year	Releases ^a			Returns		
	Year	Number	Average Weight (g)	Year	Total ^b	Survival (%)
1972	1973	493,130	-			
1973	1974	447,642	-			
1974	1975	1,226,314	-	1976	12,500	1.02
1975	1976	2,486,410	-			
1976	1977	4,722,152	0.50			
1977	1978	17,255,424	0.44			
1978	1979	17,319,537	-	1980	359,205	2.07
1979	1980	22,458,947	0.63	1981	797,436	3.55
1980	1981	26,351,664	0.93	1982	322,300	1.22
1981	1982	47,828,701	-	1983	279,000	0.58
1982	1983	72,054,096	0.79	1984	487,000	0.68
1983	1984	87,065,569	0.58	1985	3,638,000	4.18
1984	1985	75,109,442	0.29	1986	510,500	0.68
1985	1986	97,773,052	0.78	1987	1,215,000	1.24
1986*	1987	90,017,823	0.27	1988	746,047	0.83
1987	1988	94,172,516	0.73	1989	7,622,000	8.09
1988	1989	80,502,220	0.62	1990	730,133	0.90
1989	1990	84,907,550	0.61	1991	1,622,000	1.91
1990	1991	121,543,338	0.60	1992	1,093,000	0.90
1991	1992	147,145,130	0.79	1993	12,395,000	8.42
1992	1993	169,552,112	0.51	1994	2,051,000	1.20
1993	1994	152,167,939	0.45	1995	4,768,000	3.13
1994	1995	134,104,406	0.53	1996	1,267,000	0.95
1995	1996	144,045,245	0.48	1997	1,468,000	1.02
1996	1997	102,583,724	0.50	1998	6,725,000	6.56
1997	1998	128,101,460	0.50	1999	4,537,000	3.54
1998	1999	127,685,500	0.54	2000	3,963,000	3.10
1999	2000	137,702,154	0.61	2001	13,604,000	9.89
2000	2001	134,823,670	0.72	2002	7,073,000	5.25
2001	2002	152,990,900	0.56	2003	5,896,000	3.85
2002	2003	144,823,895	0.86	2004	4,330,000	2.99
2003	2004	154,073,358	0.76	2005	14,014,000	9.10
2004	2005	136,287,250	0.62	2006	4,491,000	3.30
2005	2006	115,661,940	0.83	2007	8,223,000	7.11
2006	2007	140,898,860	0.60	2008	2,483,000	1.76
2007	2008	144,920,820	0.64	2009	9,967,000	6.40
2008	2009	153,705,600	0.67	2010	3,567,000	2.32
2009	2010	144,431,650	0.70	2011	2,527,000	1.75
2010	2011	146,461,254	0.85	2012	3,227,000	2.20

Appendix B2.–Continued

Brood Year	Pink Salmon Releases ^a			Pink Salmon Returns		
	Year	Number	Average Weight (g)	Year	Total ^b	Survival (%)
2011	2012	156,644,477	0.62	2013	12,396,000	7.91
2012	2013	107,009,684	0.65	2014	6,215,000	5.81
2013	2014	191,501,986	0.80	2015	5,596,000	2.92
2014	2015	177,203,968	0.96	2016	1,522,000	0.86
2015	2016	138,103,485	0.99	2017	2,588,000	1.87
2016	2017	66,578,989	1.01	2018	3,517,000	5.30
2017	2018	191,952,116	1.10			

^aBig Kitoi Creek broodstock. Juveniles (fry life stage) were released into Big Kitoi Bay net pens for rearing then released into Big Kitoi Bay.

^bReturn estimates rounded to nearest 1,000.

*1986 FRED Report. This number doesn't include the 138,500 reported as "Afoznak fish passes".

Appendix B3.–Kitoi Bay Hatchery coho salmon release history by location (active projects), 1986–2018.

Coho Salmon Releases					
Brood Year	Release Year	Number	Average Weight (g)	Life Stage	Location
1986 ^a	1987	9,600	5.00	Presmolt	Big Kitoi Creek
1987	1988	241,373	1.13	Fingerling	Crescent Lake
1988	1989	202,955	0.82	Fingerling	Crescent Lake
1988	1990	137,493	23.30	Smolt	Big Kitoi Bay
1990	1991	191,416	1.10	Fingerling	Crescent Lake
1990	1992	60,755	32.00	Smolt	Big Kitoi Bay
1991	1992	69,100	7.04	Presmolt	Crescent Lake
1991	1992	162,387	4.50	Fingerling	Jennifer Lake
1991	1993	613,681	18.90	Smolt	Big Kitoi Bay
1992	1993	68,420	14.60	Presmolt	Crescent Lake
1992	1993	135,486	1.94	Fingerling	Jennifer Lake
1992	1993	5,163	14.60	Presmolt	Big Kitoi Creek
1992	1994	97,973	28.40	Smolt	Big Kitoi Bay
1993	1994	163,680	0.98	Fingerling	Crescent Lake
1993 ^b	1995	258,926	25.90	Smolt	Big Kitoi Bay
1994	1995	167,778	1.16	Fingerling	Crescent Lake
1994	1995	165,000	1.46	Fingerling	Jennifer Lake
1994	1995	59,500	1.74	Fingerling	Ruth Lake
1994	1996	894,486	23.54	Smolt	Big Kitoi Bay
1995	1996	163,200	0.40	Fry	Crescent Lake
1995	1997	819,046	19.57	Smolt	Big Kitoi Bay
1996	1997	165,000	0.35	Fry	Crescent Lake
1996	1997	163,000	0.35	Fry	Jennifer Lake
1996	1997	35,000	0.35	Fry	Ruth Lake
1996	1998	769,000	23.90	Smolt	Big Kitoi Bay
1997	1998	163,000	0.60	Fry	Crescent Lake
1997	1998	165,000	0.50	Fry	Jennifer Lake
1997	1998	35,000	0.50	Fry	Ruth Lake
1997	1999	1,098,338	19.30	Smolt	Big Kitoi Bay
1998	1999	165,000	0.57	Fry	Crescent Lake
1998	1999	136,000	0.55	Fry	Jennifer Lake
1998	1999	35,000	0.57	Fry	Ruth Lake
1998	2000	871,448	16.92	Smolt	Big Kitoi Bay
1999	2000	165,837	0.42	Fry	Crescent Lake
1999	2000	155,688	0.44	Fry	Jennifer Lake
1999	2000	30,695	0.72	Fry	Ruth Lake
1999	2001	936,913	20.76	Smolt	Big Kitoi Bay

-Continued-

Appendix B3.—Continued.

Coho Salmon Releases					
Brood Year	Release Year	Number	Average Weight (g)	Life Stage	Location
2000	2001	165,000	0.90	Fry	Crescent Lake
2000	2001	120,000	0.86	Fry	Jennifer Lake
2000	2002	1,041,342	16.90	Smolt	Big Kitoi Bay
2001	2002	164,487	0.65	Fry	Crescent Lake
2001	2002	201,320	0.57	Fry	Jennifer Lake
2001	2002	30,000	0.69	Fry	Ruth Lake
2001	2003	1,064,864	16.75	Smolt	Big Kitoi Bay
2002	2003	164,395	0.63	Fry	Crescent Lake
2002	2003	197,590	0.57	Fry	Jennifer Lake
2002	2003	30,000	0.63	Fry	Ruth Lake
2002	2004	969,483	20.08	Smolt	Big Kitoi Bay
2003	2004	165,000	0.76	Fry	Crescent Lake
2003	2004	200,000	0.76	Fry	Jennifer Lake
2003	2004	30,000	0.76	Fry	Ruth Lake
2003	2005	1,009,200	18.54	Smolt	Big Kitoi Bay
2004	2005	140,000	0.75	Fry	Crescent Lake
2004	2005	110,000	0.97	Fry	Jennifer Lake
2004	2005	30,000	0.97	Fry	Ruth Lake
2004	2006	976,059	17.06	Smolt	Big Kitoi Bay
2005	2006	121,410	0.84	Fry	Crescent Lake
2005	2006	199,943	0.78	Fry	Jennifer Lake
2005	2006	30,886	0.78	Fry	Ruth Lake
2005	2007	1,046,365	17.03	Smolt	Big Kitoi Bay
2006	2007	143,008	1.07	Fry	Crescent Lake
2006	2007	209,577	1.23	Fry	Jennifer Lake
2006	2007	30,000	1.23	Fry	Ruth Lake
2006	2008	991,498	16.31	Smolt	Big Kitoi Bay
2007	2008	165,479	0.71	Fry	Crescent Lake
2007	2008	200,655	0.87	Fry	Jennifer Lake
2007	2008	30,000	0.87	Fry	Ruth Lake
2007	2009	1,027,684	18.44	Smolt	Big Kitoi Bay
2008	2009	153,545	0.72	Fry	Crescent Lake
2008	2009	180,480	0.88	Fry	Jennifer Lake
2008	2009	30,295	0.88	Fry	Ruth Lake
2008	2010	1,048,670	19.68	Smolt	Big Kitoi Bay
2009	2011	1,045,331	17.30	Smolt	Big Kitoi Bay

-Continued-

Appendix B3.—Continued.

Coho Salmon Releases					
Brood Year	Release Year	Number	Average Weight (g)	Life Stage	Location
2009	2010	166,656	0.50		Crescent Lake
2009	2010	201,533	0.61	Fry	Jennifer
2009	2010	30,179	0.61	Fry	Ruth Lake
2009	2011	1,045,331	17.30	Smolt	Big Kitoi Bay
2010	2011	0	0.00		Crescent Lake
2010	2011	0	0.00		Jennifer Lake
2010	2011	0	0.00		Ruth Lake
2010	2012	81,649	19.17	Smolt	Big Kitoi Bay
2011	2012	165,000	0.63	Fry	Crescent Lake
2011	2012	200,000	0.78	Fry	Jennifer Lake
2011	2012	32,709	0.92	Fry	Ruth Lake
2011	2013	1,036,682	19.37	Smolt	Big Kitoi Bay
2012	2013	165,000	0.59	Fry	Crescent Lake
2012	2013	200,000	2.80	Fingerling	Jennifer Lake
2012	2013	30,000	0.63	Fingerling	Ruth Lake
2012	2014	1,047,756	18.00	Smolt	Big Kitoi Bay
2013	2014	20,000	2.67	Fingerling	Crescent Lake
2013	2014	14,000	7.83	Presmolt	Katmai Lake
2013	2015	838,580	16.34	Smolt	Big Kitoi Bay
2014	2015	12,000	5.87	Presmolt	Crescent Lake
2014	2015	12,000	5.87	Presmolt	Katmai Lake
2014	2016	1,210,099	21.56	Smolt	Big Kitoi Bay
2015	2016	12,000	5.61	Presmolt	Crescent Lake
2015	2016	12,000	5.61	Presmolt	Katmai Lake
2015	2017	1,026,348	19.41	Smolt	Big Kitoi Bay
2016	2017	19,612	3.11	Presmolt	Crescent Lake
2016	2018	373,133	21.1	Smolt	Big Kitoi Bay
2017	2018	165,000	1.5	Fingerling	Crescent Lake
2017	2018	30,000	1.5	Fingerling	Ruth Lake
2017	2018	170,000	1.5	Fingerling	Jennifer Lake
2017	2018	30,980	6.0	Presmolt	Katmai Lake

^aBroodstock from Little Kitoi Lake, 1986-1993.

^bBroodstock from Big Kitoi Creek returns (Little Kitoi Lake ancestral stock), 1993 to present.

Appendix B4.—Kitoi Bay Hatchery sockeye salmon release history, 1988–2018.

Brood Year	Broodstock	Sockeye Salmon Releases				
		Release 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 Lake
1989	Upper Station	1990	241,000	0.50	Fingerling	Little Kitoi Lake
1989	Upper Station	1990	337,932	0.18	Fry	Little Kitoi Lake
1989	Upper Station	1990	854,610	3.23	Zero Check Smolt	Little Kitoi Bay
					Zero Check	
1989	Upper Station	1990	458,118	0.48	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
1992	Upper Station	1993	180,000	0.50	Fingerling	Jennifer Lakes
1992	Upper Station	1994	326,500	15.00	Smolt	Little Kitoi Bay
1993	Upper Station	1994	1,672,710	1.11	Zero Check Smolt	Little Kitoi Bay
1993	Little Kitoi Lake	1994	10,108	4.60	Presmolt	Little Kitoi Lake
1993	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
1994	Little Kitoi Lake	1995	84,861	4.98	Presmolt	Little Kitoi Lake
1994	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
1995	Upper Station	1997	587,435	12.10	Smolt	Little Kitoi Bay
1996	Little Kitoi Lake	1997	77,039	3.31	Presmolt	Little Kitoi Lake
1996	Little Kitoi Lake	1998	99,085	11.70	Presmolt	Little Kitoi Lake
1996	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
1998	Saltery Lake	1999	74,463	14.63	Presmolt	Little Kitoi Lake
1998	Saltery 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	2004	193,646	25.68	Smolt	Little Kitoi Lake ^b
2003	Saltery Lake	2004	20,664	9.40	Presmolt	Little Kitoi Lake
2003	Saltery Lake	2005	279,962	24.15	Smolt	Little Kitoi Lake ^b
2004	Saltery Lake	2005	20,000	7.89	Presmolt	Little Kitoi Lake
2004	Saltery Lake	2006	379,687	22.82	Smolt	Little Kitoi Lake ^b
2005	Saltery Lake	2006	206,884	6.14	Presmolt	Little Kitoi Lake
2005	Saltery Lake	2007	402,911	19.56	Smolt	Little Kitoi Lake ^b

-continued-

Appendix B4.–Continued

Brood Year	Broodstock	Release Year	Number	Average Weight (g)	Life Stage	Location
2006	Saltery Lake	2007	133,533	7.65	Presmolt	Little Kitoi Lake
2006	Saltery Lake	2008	414,376	19.91	Smolt	Little Kitoi Lake ^b
2007	Saltery Lake	2009	417,803	20.01	Smolt	Little Kitoi Lake ^b
2008	Saltery Lake	2009	100,446	8.04	Presmolt	Little Kitoi Lake
2008	Saltery Lake	2010	393,006	20.99	Smolt	Little Kitoi Lake ^b
2009	Saltery Lake	2010	132,786	7.58	Presmolt	Little Kitoi Lake
2009	Saltery Lake	2011	414,333	22.30	Smolt	Little Kitoi Lake ^b
2010	Saltery Lake	2011	113,313	7.80	Presmolt	Little Kitoi Lake
2010	Saltery Lake	2012	413,015	24.40	Smolt	Little Kitoi Lake ^b
2011	Saltery Lake	2012	142,717	6.4	Presmolt	Little Kitoi Lake
2011	Saltery Lake	2013	412,472	21.57	Smolt	Little Kitoi Lake ^b
2012	Little Kitoi	2013	21,661	4.14	Presmolt	Little Kitoi Lake
2012	Little Kitoi	2014	654,583	18.96	Smolt	Little Kitoi Lake ^b
2013	Little Kitoi	2014	56,029	7.04	Presmolt	Little Kitoi Lake
2013	Little Kitoi	2015	652,460	24.01	Smolt	Little Kitoi Lake ^b
2014	Little Kitoi	2015	69,293	8.49	Presmolt	Little Kitoi Lake
2014	Little Kitoi	2016	577,086	21.92	Smolt	Little Kitoi Lake ^b
2014	Little Kitoi	2016	79,565	23.83	Smolt	Ouzinkie Harbor
2015	Little Kitoi	2016	106,273	8.23	Presmolt	Little Kitoi Lake
2015	Little Kitoi	2017	585,810	21.01	Smolt	Little Kitoi Lake ^b
2015	Little Kitoi	2017	49,388	21.60	Smolt	Ouzinkie Harbor
2016	Saltery Lake	2018	399,668	21.0	Smolt	Little Kitoi Lake ^b
2016	Saltery Lake	2018	55,326	23.1	Smolt	Ouzinkie Harbor

^aThis release resulted from a dissolved oxygen crash in the transfer tanks.

^bLittle Kitoi Lake net pen releases.

This page intentionally left blank

APPENDIX C. ASSUMPTIONS FOR RETURN ESTIMATES

Appendix C1. – Salmon survival and age assumptions used to estimate 2019 returns for Kitoi Bay Hatchery.

Species	Stocking		Size (g)	Survival	Age-at-return Proportions (%) ^a										
	Year	Life Stage ^a			Stocking-to-adult return	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	0.5
Pink	even	F	1.01	5.28%	100										
	odd	F	0.8	3.68%											
Chum	all	F	3.08	1.67%		11.59		75.70			12.63			0.08	
Coho	all	FG	0.7	2.0%			100								
Coho	all	S	20.0	10.4%			100								
Sockeye*	all	FPS	8.0	7.5%			1.00		69.70		26.00	1.50		1.80	
Sockeye	all	SPS	22.0	2.5%			1.00		71.20		27.80				

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

Pink marine survival for odd and even years above are a four year average specific to the four-year cyclical return percentage used for specific years.

Chum marine survival is an average based on adult scale date and historic return age structure (BY95, BY99, BY03, BY11, BY14)

Coho fingerling and fall presmolt survival rates are estimates

Coho smolt marine survival is based a twelve year average (2007-2018)

Sockeye fall presmolt survival is based on estimated number of migrants from LKL following release and scale analysis on returning adults

Sockeye smolt survival is based on scale analysis on returning adults

*resultant smolt from presmolt release are combined with sockeye smolt releases to calculate return estimate

Appendix C2. – Forecasted runs, broodstock requirements, minimum escapements, cost recovery needs, and potential harvest of salmon returning to systems in 2019 as a result of prior Kitoi Bay Hatchery releases.

Return Location	Species	Forecasted Return			Broodstock Required	Minimum Escapement ^a	Cost Recovery ^b	Potential Harvest ^c
		Point	Low	High				
Kitoi Bay Hatchery (Big Kitoi Creek)	Pink	7,062,000	5,296,000	8,827,000	425,000	15,000	1,300,000	5,322,000
	Chum	201,000	141,000	261,000	40,000	2,000	0	159,000
	Coho	39,000	31,000	47,000	6,000	0	0	33,000
Little Kitoi Lake	Sockeye	26,000	21,000	31,000	0	7,000	0	19,000
Ouzinkie Harbor	Sockeye	7,100	5,300	8,800	0	0	0	8,100
Crescent Lake	Coho	400	300	470	0	0	0	400
Katmai Lake	Coho	1,200	900	1,500	0	0	0	1,200

^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 entry into the creek to spawn to continue the run in the event of the loss of the hatchery rearing fish.

^b Cost recovery based on goal of 4.5 million lbs.

^c Projected harvest is the return point estimate minus broodstock, escapement, and cost recovery needs.

This page intentionally left blank

APPENDIX D. FISH TRANSPORT PERMITS

Appendix D1.–Kitoi Bay Hatchery current fish transport permits (FTPs).

FTP#	Species	Ancestral Stock	Description*	Expiration Date
06A-0072	Chum	Sturgeon River	36M egg take at KBH, release Big Kitoi Bay	8/31/2021
06A-0073	Pink	Big Kitoi Creek	215M egg take at KBH, release Big Kitoi Bay	8/31/2021
18A-0022	Coho	Little Kitoi Lake	2.3M egg take at KBH (Big Kitoi Cr), release Big Kitoi Bay	12/31/2022
18A-0023	Coho	Little Kitoi Lake	40k transfer and release Katmai Lake	12/31/2022
18A-0024	Coho	Little Kitoi Lake	190k transfer and release Crescent Lake	12/31/2022
18A-0025	Coho	Little Kitoi Lake	40k transfer and release Ruth Lake	12/31/2022
18A-0026	Coho	Little Kitoi Lake	230k transfer and release Jennifer Lake	12/31/2022
15A-0089	Coho	Little Kitoi Lake	500k juveniles from KBH to LKL for temporary net pen rearing, back to KBH for release	12/31/2019
18A-0021	Sockeye	Saltery Lake	850k egg take at Little Kitoi Lake, incubate at KBH, release Little Kitoi Lake	12/31/2022
15A-0074	Sockeye	Saltery Lake	850k egg take at KBH, incubate KBH, release Little Kitoi Lake	12/31/2019
16A-0038	Sockeye	Saltery Lake	100k smolt transfer from KBH, rear and release Ouzinkie Harbor	12/31/2020
17A-0045	Sockeye	Saltery Lake	850k egg take at Saltery Lake, incubate KBH, release Little Kitoi Lake	12/31/2021

*M denotes million, k denotes thousand