

2021

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 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 2021, anticipated 2021 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 2021

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 / Ancestral stock | Egg-Take Goal | Release Site |
|----------------|-----------------|---|---------------|-------------------|
| Chum salmon | 36,000,000 | Big Kitoi Creek / Sturgeon River | 36,000,000 | Kitoi Bay |
| Pink salmon | 215,000,000 | Big Kitoi Creek / Kitoi Bay | 215,000,000 | Kitoi Bay |
| Coho salmon | 2,300,000 | Big Kitoi Creek / L Kitoi Lk | 1,800,000 | Kitoi Bay |
| | | Big Kitoi Creek / L Kitoi Lk | 190,000 | Crescent Lake |
| | | Big Kitoi Creek / L Kitoi Lk | 230,000 | Jennifer Lake |
| | | Big Kitoi Creek / L Kitoi Lk | 40,000 | Katmai Lake |
| | | Big Kitoi Creek / L Kitoi Lk | 40,000 | Ruth Lake |
| Sockeye salmon | 850,000 | Little Kitoi Lake / Saltery Lake ¹ | 850,000 | Little Kitoi Lake |
| | 100,000 | Little Kitoi Lake / Saltery Lake ¹ | | Ouzinkie |

¹ Saltery Lake is ancestral stock for Little Kitoi Lake sockeye and is permitted as a backup brood source. Note: Maximum numbers are specific to release site; in combination may not exceed permitted capacity.

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

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 and are documented on the KRAA Salmon Hatchery Carcass Disposal Log.

1.2.2 Pink Salmon: Big Kitoi Creek

Approximately 425,000 returning adult KBH pink salmon will be needed for broodstock 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 may be disposed of in Outer Kitoi Bay and will be documented on the KRAA Salmon Hatchery Carcass Disposal Log, or they may be sold to processors.

1.2.3 Coho Salmon: Big Kitoi Creek

Approximately 6,000 returning adult KBH coho salmon will be used for broodstock in to achieve the egg-take goal of 2.3 million eggs. Coho salmon eggs will be collected 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 BKD 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 and are documented on the KRAA Salmon Hatchery Carcass Disposal Log.

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 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. Brood use for these egg takes is documented annually in the KRAA Salmon Hatchery Carcass Disposal Log.

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 between the second week in January and 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 million brood year 2020 (BY20) chum salmon juveniles are currently incubating at KBH for release in 2021.

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 65% of the number of juveniles, or about 85 million fry. The remaining 35% of pink salmon fry, or about 46 million juveniles, will move non-volitionally through a separate HDPE outmigration line to saltwater net pens. Approximately 131 million BY20 pink salmon juveniles are currently incubating at KBH for release in 2021.

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 280,000 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 2.3 million BY20 coho salmon eggs are currently incubating at KBH for release in 2021 and 2022.

1.3.4 Sockeye Salmon

Sockeye salmon eggs are incubated at KBH in Kitoi box incubators in an isolated room 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 451,000 BY20 sockeye salmon eggs are currently incubating at KBH for release in 2022.

1.4 Rearing and Release Plans, 2021

1.4.1 Chum Salmon

Approximately 31 million BY20 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 6 and June 1 (Appendix B1). Fry will be reared in saltwater net pens for approximately 14 to 18 weeks. Fry will be released in two separate groups; one half of the juveniles (marked 4,4,2H) will be released between May 6 and May 18 and the second group (marked 3n,2H) 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 126 million BY20 pink salmon fry (marked 2,3H) will be reared in net pens and released at 0.8g within the Inner Kitoi Bay Section between May 6 and May 30 (Appendix B2). The fry will be reared in saltwater net pens for approximately 3 to 9 weeks.

1.4.3 Coho Salmon

Approximately 1,300,000 BY19 coho salmon smolt (marked 3,6H) will be reared in net pens and released at 20.0g within the Inner Kitoi Bay Section between June 3 and June 17 (Appendix B3).

Approximately 2.0 million BY20 coho salmon fry will be ponded in June and reared at KBH for release to several different locations. After results of single family tracking are received, all disease positive eggs will be culled. KBH plans are to release 40,000 coho salmon fry (marked 2,2H) into Ruth Lake, 230,000 fry (marked 2,2H) into Upper and Lower Jennifer lakes, 190,000 fry (marked 2,2H) into Crescent Lake around the middle of July 2021, and an additional 40,000 presmolt (marked 2,2H) will be released into Katmai Lake around the beginning of October 2021. Approximately 1.45 million fry will be retained at KBH for rearing and eventual release within the Inner Kitoi Bay Section as 20.0g smolt (marked 2,2H) in June of 2022.

1.4.4 Sockeye Salmon

There will be no BY19 sockeye salmon reared or released in 2021.

Approximately 451,000 BY20 sockeye salmon eggs (LKL) are currently incubating at KBH and will be released into Little Kitoi Estuary (LKE) and Ouzinkie Boat Harbor (OBH) in 2022. Approximately 400,000 to 450,000 smolt (LKL) and 0 to 40,000 smolt (OBH) will be transferred for short-term net pen rearing and imprinting prior to being released in the spring of 2022.

2.0 WILD DONOR STOCK MANAGEMENT

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) and KBH-released salmon 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 2021 is 128,000 (range 90,000 to 167,000), assuming a 0.55% marine survival (Appendix C1) from the 2018 fry release of 22.9 million. (74% 0.3)

3.1.2 Pink Salmon

The midpoint estimate for adult pink salmon returning to KBH in 2021 is 11.3 million (range 8.4 million to 14.1 million), assuming a 6.4% marine survival (Appendix C1) from the 2020 fry release of 175.4 million.

3.1.3 Coho Salmon

The midpoint estimate for adult coho salmon returning to KBH in 2021 is 124,000 (range 99,000 to 148,000), assuming a 11.5% marine survival (Appendix C1) from the 2020 smolt release of 1.07 million.

3.1.4 Sockeye Salmon

The midpoint estimate for adult sockeye salmon returning to LKL in 2021 is 15,000 (range 12,000 to 18,000), based off of poor recent brood year survivals of around 2.5% to 3% (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 2021 KBH chum salmon run is 128,000 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 86,000 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, 2021, but may occur as early as June 1, 2021. Portions of the Inner and Outer Kitoi, Izhut, and Duck Bay sections are expected to close for broodstock collection around June 30, 2021.

3.2.2 Pink Salmon

Pink salmon are produced for the common property fishery, as well as for cost recovery. The anticipated 2021 KBH pink salmon return is 11,300,000 fish. Approximately 425,000 pink salmon adults will be needed for broodstock. The 2021 cost recovery harvest goal determined by the KRAA board of directors is 7.0 million lbs. 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, 2021 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 weight, and KRAA's cost recovery harvest needs. In addition, 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 2021 KBH coho salmon return is 124,000 fish. About 6,000 adult coho salmon are required for broodstock. Approximately 118,000 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 2021 KBH sockeye salmon return is 15,000 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 8,000 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 chum salmon juveniles will be thermal marked using differential water sources from Big Kitoi Lake (deep and shallow). Two different marks were given: 4,4,2H for the regular release group, and 3n,2H for the late release group which will be released approximately two weeks after the regular release group.

4.1.2 Pink Salmon

There is no marking requirement for pink salmon releases from KBH. However, a 2,3H saltwater mark will be applied to all pink salmon.

4.1.3 Coho Salmon

There is no marking requirement for coho salmon releases from KBH. However, a 2,2H dry mark will be applied to all coho salmon eggs.

4.1.4 Sockeye Salmon

All sockeye salmon eggs will be dry marked. Approximately 40,000 eggs will receive a 5,4,2H dry mark and the remaining eggs will receive a 5,4H dry mark.

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 saltwater marking program. All of the BY19 pink salmon released in 2020 were marked with a 7H.

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. Additionally, otoliths may be collected from broodstock during egg take to evaluate the dry marking program.

4.2.4 Sockeye Salmon

Sockeye salmon scales are collected in the Kitoi Bay sport fishery and from sockeye salmon returning to hatchery raceways during chum salmon egg take to determine the age composition of the returning adults. In 2021, scales may 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 2021, 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, 2021

Tina Fairbanks: Executive Director, KRAA 5/4/2021

Tyler Polum: Area Management Biologist, Division of Sport Fish 4/23/2021

James Jackson: Area Management Biologist, Division of Commercial Fisheries 5/4/2021

Tom Vania: Regional Supervisor, Division of Sport Fish 5/4/2021

Nicholas Sagalkin: Regional Supervisor, Division of Commercial Fisheries 5/4/2021

Kevin Schaberg: Regional Research Biologist, Division of Commercial Fisheries 5/4/2021

Lorraine Vercessi: PNP Hatchery Program Coordinator, Division of Commercial Fisheries 5/4/2021

Approval:

The 2020 Kitoi Bay Hatchery Management Plan is hereby approved:

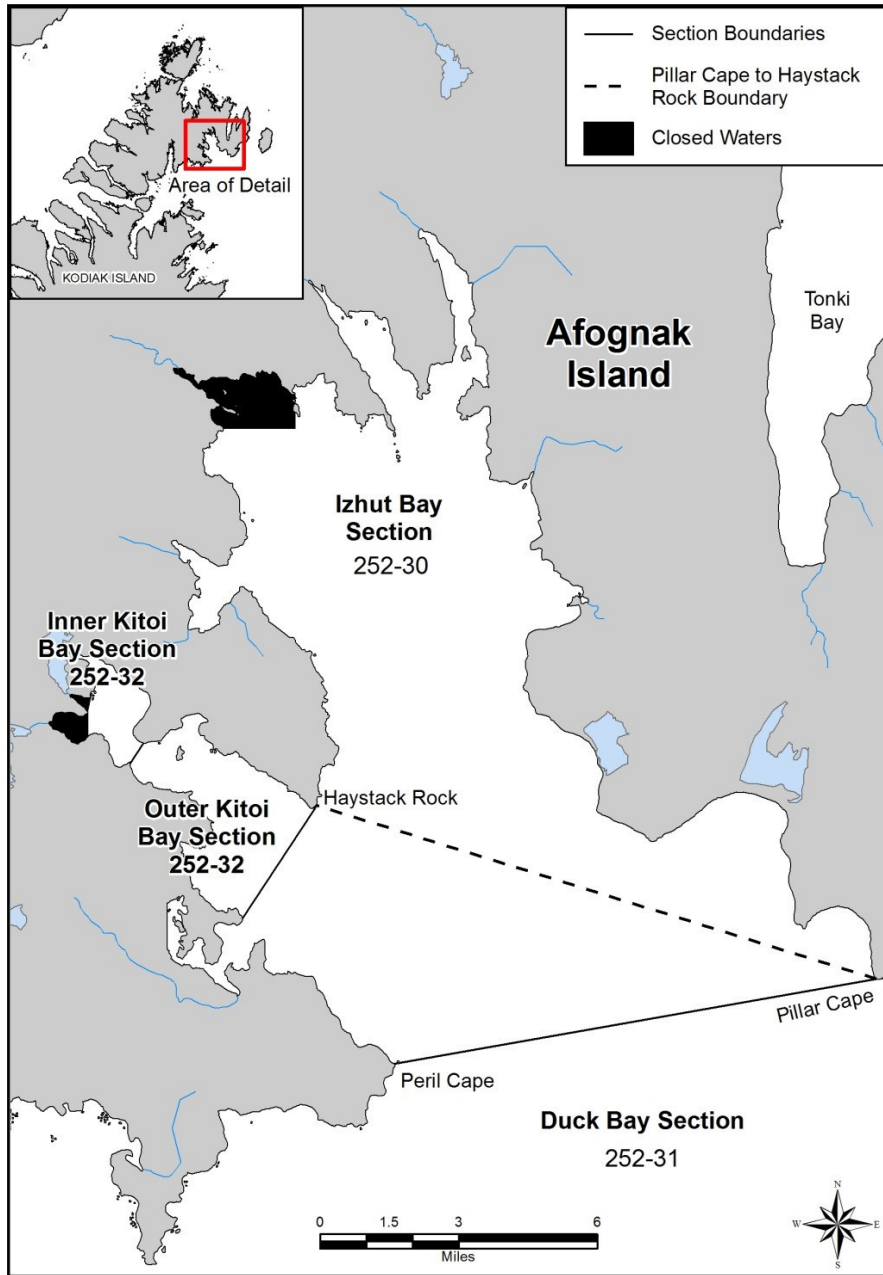
Tom Taube: Deputy Director, Division of Sport Fish 5/18/2021

Peter Bangs: Deputy Director, Division of Commercial Fisheries 5/19/2021

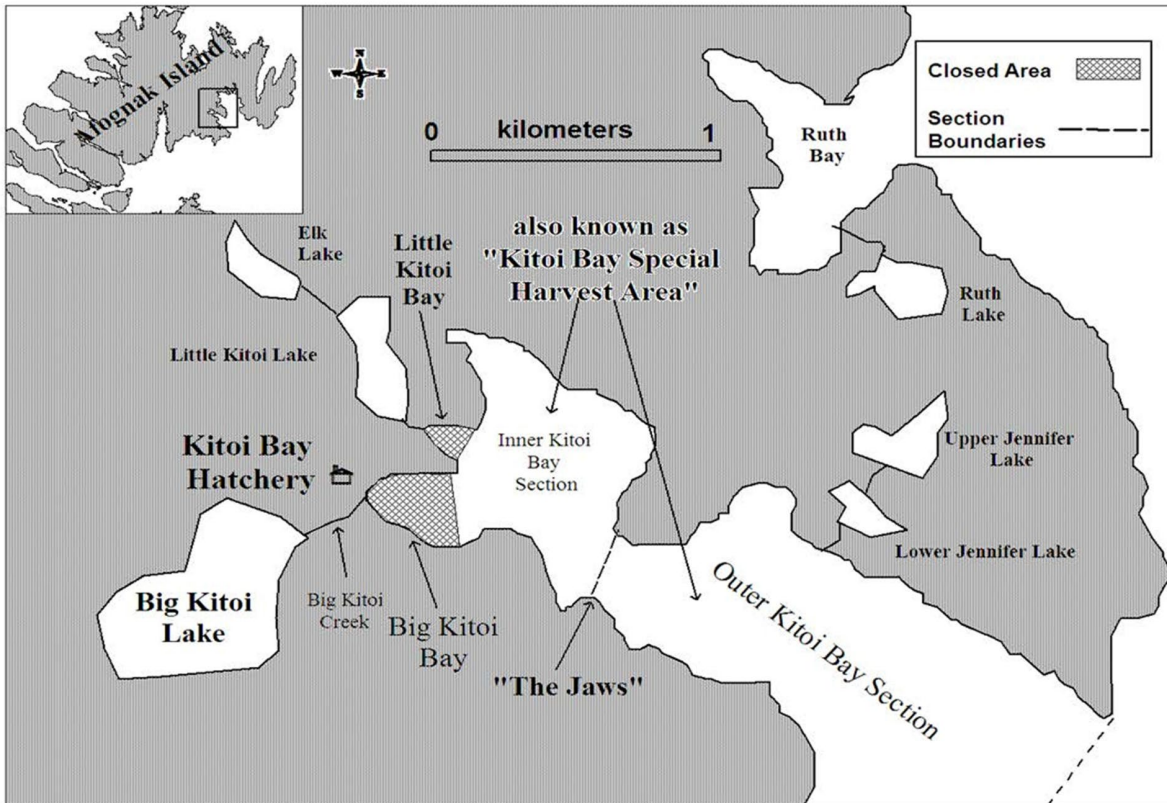
This page intentionally left blank

APPENDIX A. MAPS

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, 1982–2020.

| BY | Releases | | | Returns | | | | Survival |
|------|----------|------------|------------|---------|---------|---------|--------------------|----------|
| | Year | Number | Avg Wt (g) | 0.2 | 0.3 | 0.4 | Total ^b | |
| 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 | 1,276 | 205,627 | 0.70 |
| 2015 | 2016 | 29,122,550 | 3.08 | 28,187 | 54,703 | 34,314 | 117,204 | 0.04 |
| 2016 | 2017 | 14,192,919 | 2.22 | 16,859 | 55,070 | | | |
| 2017 | 2018 | 22,935,542 | 2.03 | 2,860 | | | | |
| 2018 | 2019 | 29,800,000 | 2.85 | | | | | |
| 2019 | 2020 | 18,173,783 | | | | | | |

^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, 1973–2020.

| 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 | 2019 | 5,577,000 | 2.91 |
| 2018 | 2019 | 146,729,124 | 1.12 | 2020 | 4,966,668 | 2.83 |
| 2019 | 2020 | 175,359,011 | 0.91 | | | |

^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 "Afognak fish passes".

Appendix B3.–Kitoi Bay Hatchery coho salmon release history by location (active projects), 1986–2020.

| 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 |
| 2017 | 2019 | 1,242,070 | 20.4 | Smolt | Big Kitoi Bay |
| 2018 | 2019 | 188,200 | 1.5 | Fingerling | Crescent Lake |
| 2018 | 2019 | 221,100 | 1.55 | Fingerling | Jennifer Lake |
| 2018 | 2019 | 30,000 | 1.8 | Fingerling | Ruth Lake |
| 2018 | 2019 | 35,500 | 5.50 | Presmolt | Katmai Lake |
| 2018 | 2020 | 1,071,447 | 20.46 | Smolt | Big Kitoi Bay |

-Continued-

Appendix B3 - Continued

| Brood Year | Coho Salmon Releases | | | | |
|------------|----------------------|---------|--------------------|------------|---------------|
| | Release Year | Number | Average Weight (g) | Life Stage | Location |
| 2019 | 2020 | 190,086 | 0.94 | Fry | Crescent Lake |
| 2019 | 2020 | 230,170 | 0.94 | Fry | Jennifer Lake |
| 2019 | 2020 | 40,074 | 0.94 | Fry | Ruth Lake |
| 2019 | 2020 | 34,947 | 5.31 | Fingerling | 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, 1988–2020.

| 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 |
| 2017 | Saltery Lake | 2019 | 592,757 | 20.69 | Smolt | Little Kitoi Lake |
| 2017 | Saltery Lake | 2019 | 74,872 | 28.97 | Smolt | Ouzinkie Harbor |
| 2018 | Saltery Lake | 2020 | 400,337 | 23.10 | Smolt | Little Kitoi Lake |
| 2018 | Saltery Lake | 2020 | 49,550 | 21.70 | Smolt | Ouzinkie Harbor |

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

^bLittle Kitoi Lake net pen releases.

APPENDIX C. ASSUMPTIONS FOR RETURN ESTIMATES

Appendix C1. – Salmon survival and age assumptions used to estimate 2021 returns for Kitoi Bay Hatchery.

| Species | Stocking | | Survival | Age-at-return Proportions (%) ^a | | | | | | | | | | | | |
|----------|----------|-------------------------|----------|--|--------------------------|-------|-----|-------|-----|------|-----|-------|------|-----|-----|------|
| | Year | Life Stage ^a | | 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 | 0.80 | 3.84% | | | | | | | | | | | | |
| | odd | F | 0.91 | 6.44% | 100 | | | | | | | | | | | |
| Chum | all | F | 2.01 | 0.69% | | 12.89 | | 74.01 | | | | 13.03 | | | | 0.08 |
| Coho | all | FG | 0.90 | 2.0% | | | | 100 | | | | | | | | |
| Coho | all | S | 20.5 | 11.5% | | | | 100 | | | | | | | | |
| Sockeye* | all | FPS | 6.25 | 2.5% | | | | 2.7 | | 66.2 | | | 25.3 | 3.1 | | 2.7 |
| Sockeye | all | SPS | 23.1 | 2.5% | | | | 2.7 | | 66.2 | | | 25.3 | 3.1 | | 2.7 |

^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 data and historic return age structure (BY97, BY01, BY05, BY09, BY13), with an estimated 20% downward adjustment to account for poor chum runs across the state in recent years.

Coho fingerling and fall presmolt survival rates are estimates

Coho smolt marine survival is based on a combination of a ten year average (2011-2020) and a seven year parent class average.

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 and adjusted for poor brood year survivals of approximately 2.5% in recent years.

*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 2021 as a result of prior Kitoi Bay Hatchery releases.

| Return Location | Species | Point | Low | High | Required | Escapement ^a | Recovery ^b | Harvest ^c |
|---|---------|------------|-----------|------------|----------|-------------------------|-----------------------|----------------------|
| Kitoi Bay Hatchery (Big Kitoi Creek) | Pink | 11,301,000 | 8,476,000 | 14,127,000 | 425,000 | 15,000 | 2,089,000 | 8,772,000 |
| | Chum | 128,000 | 89,7000 | 166,600 | 40,000 | 2,000 | 0 | 86,000 |
| | Coho | 123,600 | 98,900 | 148,300 | 1,000 | 0 | 0 | 122,600 |
| Little Kitoi Lake | Sockeye | 14,700 | 11,700 | 17,600 | 0 | 7,000 | 0 | 7,700 |
| Ouzinkie Harbor | Sockeye | 2,000 | 1,600 | 2,400 | 0 | 0 | 0 | 2,000 |
| Crescent Lake | Coho | 3,700 | 2,800 | 4,700 | 0 | 0 | 0 | 3,700 |
| Katmai Lake | Coho | 700 | 560 | 830 | 0 | 0 | 0 | 700 |

^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 7.0 million lbs.

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

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 Kitoi Bay | 8/31/2021 |
| 06A-0073 | Pink | Big Kitoi Creek | 215M egg take at KBH, release Kitoi Bay | 8/31/2021 |
| 18A-0022 | coho | Little Kitoi Lake | 2.3M egg take at KBH (Big Kitoi Cr), release 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 | 12/31/2024 |
| 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 | 12/31/2024 |
| 16A-0038 | Sockeye | Saltery Lake | 100k smolt transfer from KBH, rear and release Ouzinkie Harbor | 12/31/2025 |
| 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