2022 ANNUAL MANAGEMENT PLAN
TRAIL LAKES HATCHERY
Cook Inlet Aquaculture Association

1.0 Executive Summary

1.1 Introduction

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. In-season assessments and project alterations by Cook Inlet Aquaculture Association (CIAA) or Alaska Department of Fish and Game (ADF&G) may result in changes to this AMP in order to reach or maintain program objectives. CIAA 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 CIAA. This policy applies to all hatchery operations covered under the AMP.

1.2 New This Year: (production, harvest management, culture techniques, etc.)

1.2.1 Facility Changes

There are no changes to the facility planned for 2022.

1.2.2 Production Changes

- Bear Lake Sockeye Salmon
    - BY2020 resulted in enough broodstock to obtain sufficient eggs for the 2022 smolt program.
- English Bay Lakes Sockeye Salmon (Second Lake)
    - CIAA is not planning to collect eggs from the English Bay Lakes system.

- Hidden Lake Sockeye Salmon*
    - Based on the 4-year floating averages and in order to maintain adult returns at 30,000 and hatchery capacity limitations, the egg-take goal for brood year 2022 (BY22) will be 1,266,000.

    - 2022 Goals*:

BY22 Brood:	1,116 fish total (558 females; 558 male)
BY22 Egg-take Goal:	1,266,000 green eggs
BY22 Stocking Goal:	1,250,000 unfed fry to Hidden Lake

Note* Calculations based off 2012-2017 Operational plan, extended to 2018. To be updated with 2019-2023 five-year operational plan Hidden Lake Sockeye Program, anticipated BOD approval 2022.

    - CIAA estimates 1,045,000 unfed fry will be stocked in 2022.

- Shell Lake Sockeye Salmon
    - CIAA will monitor the sockeye return. If adequate fish are available broodstock and gametes will be collected for rearing to smolt and release back into Shell Lake. CIAA and ADF&G have discussed using hatchery returns as future broodstock. While the genetic policy does not promote the use of hatchery returns as a broodstock source, there is agreement that Shell Lake warrants an exception.

- Lower Cook Inlet Lakes Sockeye Salmon (EBL stock)
    - No production changes.

- Bear Lake Coho Salmon
    - CIAA may keep fry in excess of the 450,000 stocking goal to rear to the smolt stage for release to Bear Creek.

1.2.3 Fish Culture Changes

- Until an alternative site for the LCI sockeye program is located, for the eggs allocated to terminal fisheries (Hazel, Leisure, and Kirschner lakes), the mating cross will be 2 females to 1 male. This will reduce the number of fish required for broodstock and reduced the density in the lensing bag. For the eggs allocated to Tutka smolt production the mating cross will be 1 female:1 male as these fish will be used for future broodstock.

1.2.4 Evaluation Changes

- Hidden Lake Sockeye Salmon
    - Pending discussions with USFWS, CIAA is not planning to perform any straying analysis outside of Hidden Lake. CIAA sampled outside of Hidden Lake and no strays were found. This fulfilled the sampling requirements of the Hidden Lake Operational Plan.
    - Otoliths will be collected in Hidden Lake to assess spawning fidelity.

- Shell Lake Sockeye Salmon
    - CIAA will operate a smolt trap in Shell Creek to estimate the smolt outmigration from Shell Lake in 2022.

- CIAA will conduct aerial surveys of Shell Creek to enumerate the adult salmon return to Shell Lake.

1.2.5 Projected Return and Cost-recovery (CR) Licensing Changes

- Hidden Lake Sockeye Salmon
  - No change.

- Bear Lake, Kamishak, & Tutka Sockeye Salmon
  - To meet the 2022 cost recovery goal, CIAA anticipates a significant cost recovery harvest in Resurrection Bay/Bear Lake, Kamishak, and Tutka.

- Port Graham Bay Sockeye Salmon
  - No sockeye salmon adults are expected to return in 2022.

1.3 Fish Transport Permits (FTPs) or Amendments Needed This Year

- CIAA plans to apply to renew the following FTPS that expire 6/30/2022:
  - 12A-0111(1) which allows of the collection of sockeye broodstock (up to 188 adults) and green sockeye salmon eggs and milt (up to 250,000 eggs) from Shell Lake. This FTP also includes the transport of gametes from Shell Lake to Trail Lakes Hatchery (TLH), rearing at TLH to smolt, and the release of smolts back into Shell Lake.
  - 08A-0112(3) which allows for the collection of 1,122,500 green coho eggs from Bear Lake. The current coho production from Bear Lake includes the release of 450,000 fry to Bear Lake, the release of up to 150,000 smolts to Bear Creek, as well as collection for William Jack Hernandez Hatchery.

New TLH FTPs needed in 2022 are:

- No new FTPs are required.

1.4 Expected Return

The following assumptions are used to estimate the number of eggs to be collected in 2022.

Species	Stock	Stocking Location	Stocking Goal	Eyed-to-Smolt Mortality	Eyed-to Fry Mortality	Green-to-Eyed Mortality	# of Eggs to Collect	Comments
Sockeye Salmon	Hidden Lk	Hidden Lk	1,250,000		5.0%	12.0%	1,266,000	
	Bear Lk	Bear Lk	2,400,000		7.0%	15.0%	3,036,000	
	Bear Lk	Res. Bay	1,536,000	39.0%		15.0%	2,964,000	
	*English Bay (Tutka)	Leisure Lk	2,000,000		15.0%	13.0%	2,705,000	
	*English Bay (Tutka)	Hazel Lk	1,250,000		15.0%	13.0%	1,690,000	
	*English Bay (Tutka)	Kirschner Lk	250,000		15.0%	13.0%	338,000	
	*English Bay (Tutka)	Tutka Lagoon	500,000	40.0%		13.0%	958,000	
	English Bay Lk (Second Lake)	Second Lk	0		20.0%	35.0%	0	Green to eyed includes hatchery broodstock culling (only non-enhanced can be used for backstocking
	Shell Lake	Shell Lake	130,500	40.0%		13.0%	250,000	
Coho Salmon	Bear Lk (Fry)	Bear Lk	450,000		5.0%	5.0%	499,000	Green to eyed includes BKD culls
	Bear Lk (Smolt)	Bear Cr.	50,000	20.0%		5.0%	66,000	Green to eyed includes BKD culls

* English Bay (Tutka) are adult sockeye salmon returns to Tutka Bay Lagoon and not broodstock collected from Second Lake.

The following assumptions, based on past survivals, are used to determine this year's estimated adult sockeye and coho returns expected from sockeye and coho fry and smolt released in previous years.

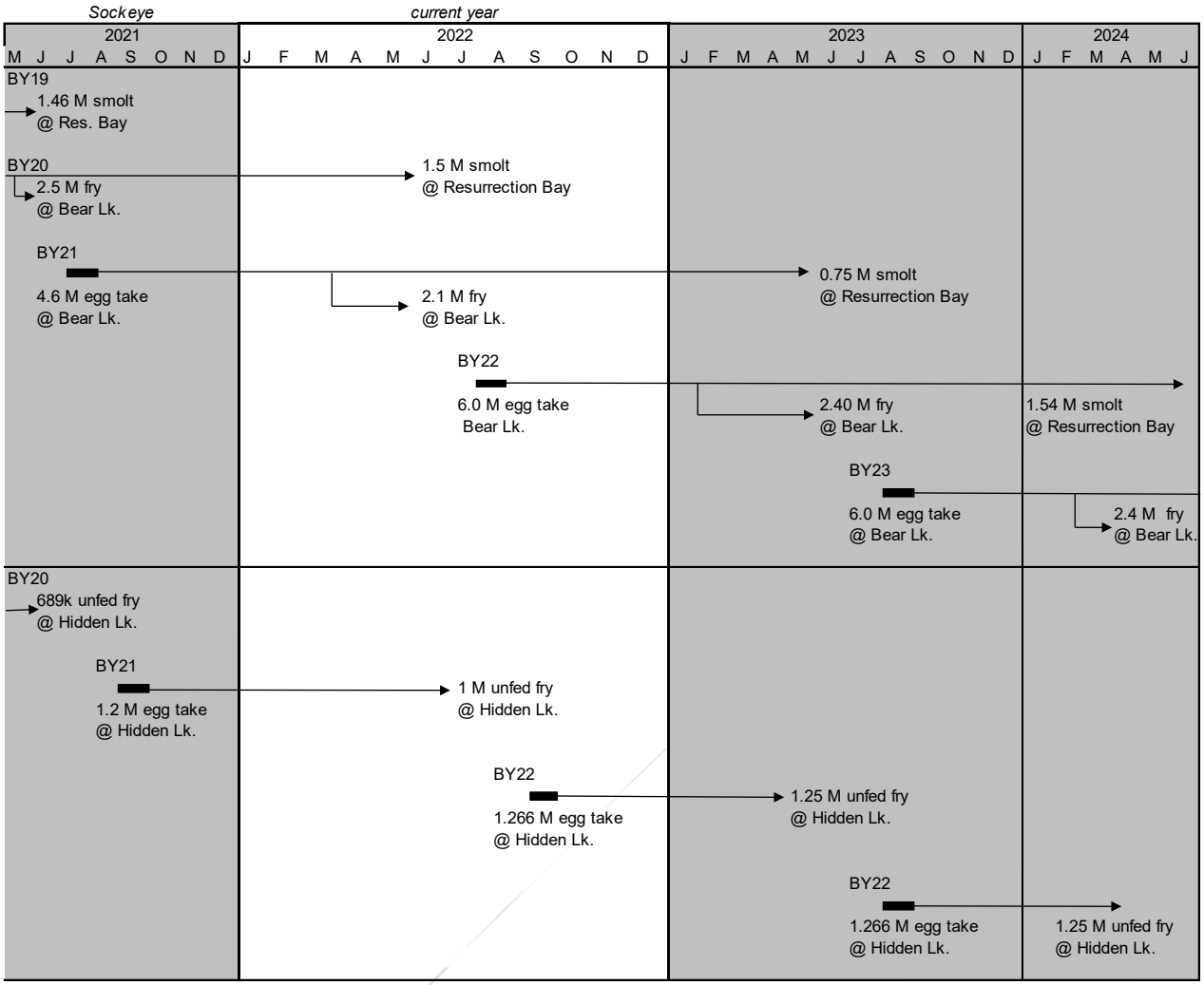
Species	Location	Stock	Fry-to-Smolt Survival	Fry-to-Adult Survival	Smolt-to-Adult Survival
Sockeye	Bear Lake	Bear Lake	22 %		10%
Sockeye	Res. Bay	Bear Lake			4%
Sockeye	Kirschner	English Bay		12%	
Sockeye	Hazel Lake	English Bay		3%	
Sockeye	Leisure Lake	English Bay		3%	
Sockeye	Hidden Lake	Hidden Lake			10%
Sockeye	Shell Lake	Shell Lake			10%
Sockeye	Tutka Bay Lagoon	English Bay			10%
Coho	Bear Lake	Bear Lake		1.5%	
Coho	Bear Creek	Bear Lake			10%

Based on the above assumptions, the table below summarizes the expected adult return for 2022.

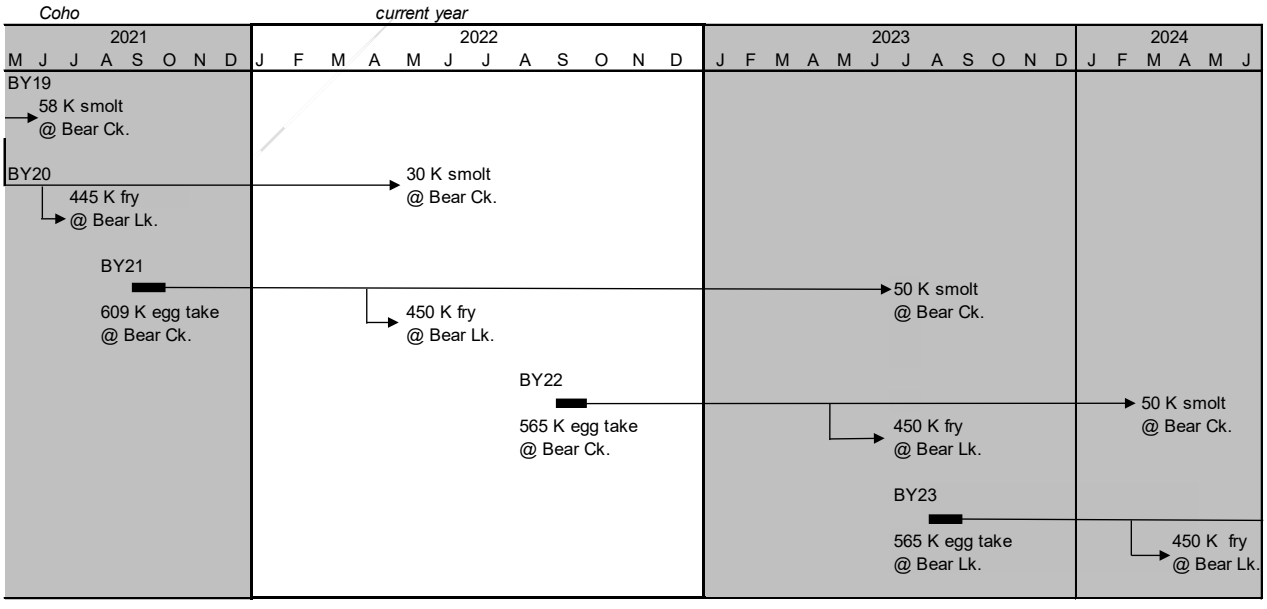
1.5 Production Summary

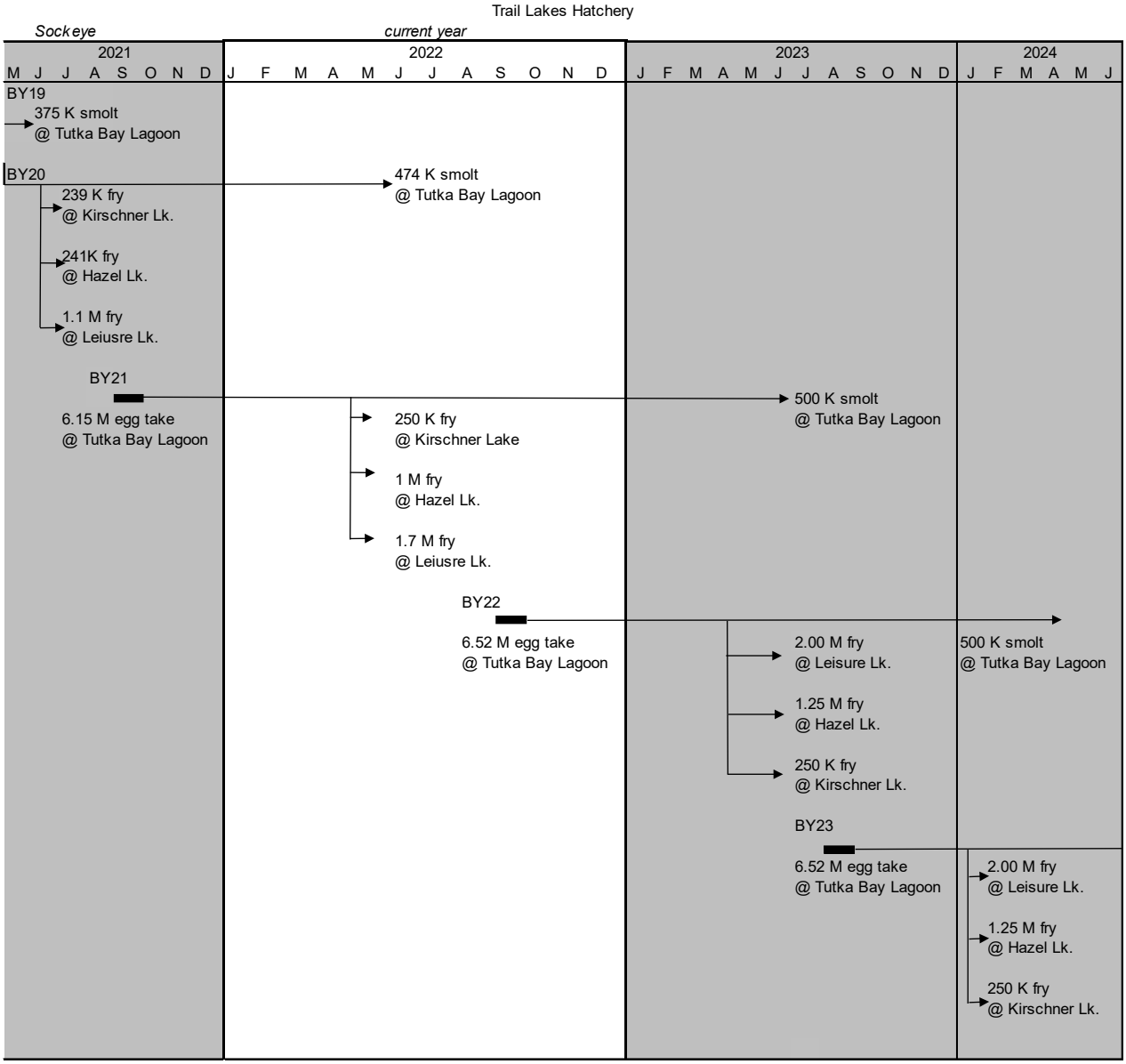
Species	Stock	Return Site	Brood Year	Total Return	Enhanced Return	Natural Return	Cost Recovery	Broodstock/ Escapement	Common Property Harvest
Sockeye	Hidden Lk	Hidden Lk	2017	4,194	2,516	1,678	0	1,678	2,516
			2018	20,458	12,275	8,183	0	8,183	12,275
	Combined Age Classes			**24,652**	**14,791**	**9,861**	**0**	**9,861**	**14,791**
	% of Total				**60%**	**40%**	**0%**	**40%**	**60%**
	English Bay Lk	Leisure Lk/Hazel Lk	2017	33,132	33,132	0	0	0	33,132
			2018	42,804	42,804	0	0	0	42,804
	Combined Age Classes			**75,936**	**75,936**	**0**	**0**	**0**	**75,936**
	% of Total				**100%**	**0%**	**0%**	**0%**	**100%**
	English Bay Lk	Kirschner Lake	2017	11,712	11,712	0	10,541	0	1,171
			2018	18,576	18,576	0	16,718	0	1,858
	Combined Age Classes			**30,288**	**30,288**	**0**	**27,259**	**0**	**3,029**
	% of Total				**100%**	**0%**	**90%**	**0%**	**10%**
	English Bay Lk	Tutka Lagoon	2017	17,080	17,080	0	13,055	2,575	1,451
			2018	21,784	21,784	0	17,288	2,575	1,921
	Combined Age Classes			**38,864**	**38,864**	**0**	**30,343**	**5,150**	**3,371**
	% of Total				**100%**	**0%**	**78%**	**13%**	**9%**
	English Bay Lk	English Bay Lk	NA	0	0	0	0	0	0
			NA	0	0	0	0	0	0
	Combined Age Classes			**0**	**0**	**0**	**0**	**0**	**0**
	% of Total				**NA**	**NA**	**NA**	**NA**	**NA**
	Shell Lake	Shell Lake	NA	0	0	0	0	0	0
			NA	0	0	0	0	0	0
	Combined Age Classes			**0**	**0**	**0**	**0**	**0**	**0**
	% of Total				**NA**	**NA**	**NA**	**NA**	**NA**
	Bear Lk	Bear Lake/Res. Bay	2017 (Fry)	34,850	34,850	0	27,536	4,254	3,060
			2018 (Fry)	20,290	20,290	0	14,433	4,253	1,604
			2017 (Smolt)	22,952	22,952	0	16,829	4,253	1,870
			2018 (Smolt)	0	0	0	0	0	0
	Combined Age Classes			**78,092**	**78,092**	**0**	**58,799**	**12,760**	**6,533**
	% of Total				**100%**	**0%**	**75%**	**16%**	**8%**
Coho Salmon	Bear Lk	Bear Lk	2018 (fry)	6,795	6,795	0	0	420	6,375
			2018 (smolt)	9,689	9,689	0	0	420	9,269
	Combined Age Classes			**16,484**	**16,484**	**0**	**0**	**840**	**15,644**
	% of Total				**100%**	**0%**	**0%**	**5%**	**95%**

Trail Lakes Hatchery



Trail Lakes Hatchery




Trail Lakes Hatchery
Sockeye
current year
2021
2022
2023
2024
M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
BY19
375 K smolt
@ Tutka Bay Lagoon
BY20
474 K smolt
@ Tutka Bay Lagoon
239 K fry
@ Kirschner Lk.
241K fry
@ Hazel Lk.
1.1 M fry
@ Leiusre Lk.
BY21
6.15 M egg take
@ Tutka Bay Lagoon
500 K smolt
@ Tutka Bay Lagoon
250 K fry
@ Kirschner Lake
1 M fry
@ Hazel Lk.
1.7 M fry
@ Leiusre Lk.
BY22
6.52 M egg take
@ Tutka Bay Lagoon
2.00 M fry
@ Leisure Lk.
500 K smolt
@ Tutka Bay Lagoon
1.25 M fry
@ Hazel Lk.
250 K fry
@ Kirschner Lk.
BY23
6.52 M egg take
@ Tutka Bay Lagoon
2.00 M fry
@ Leisure Lk.
1.25 M fry
@ Hazel Lk.
250 K fry
@ Kirschner Lk.

1.6 Permitted Capacity

TLH operates under Private Nonprofit Permit #27 issued in 1988 and has a permitted capacity of 30.0 million sockeye salmon eggs, 6.0 million coho salmon eggs, and 4.0 million king salmon eggs. The FTPs under which CIAA operates TLH programs are as follows:

Sockeye					
FTP #	**Donor Stock/ Ancestral Stock**	**Action**	**Expiration Date**	**Maximum #, Life Stage**	**Transport from, to**
08A-0091	Hidden Lk/ Hidden Lk	Egg take, incubation	6/30/2024	2,200,000 green eggs	Hidden Lk to TLH
08A-0089	Hidden Lk/ Hidden Lk	Transfer, release	6/30/2024	Fry from 2,200,000 eggs	TLH to Hidden Lk
08A-0090	Bear Lk/ Upper Russian + Big R L	Egg take, incubation	12/31/2023	6,000,000 green eggs	Bear Lk to TLH
08A-0069	Bear Lk/ Upper Russian + Big R L	Transfer, release	12/31/2023	2,400,000 fed fry	TLH to Bear Lk
11A-0062	Bear Lk/ Upper Russian + Big R L	Transfer, release	12/31/2023	1,536,000 smolt	TLH to Resurrection Bay
12A-0111	Shell Lk/ Shell Lk	Egg take, transfer, release	6/30/2022	250,000 green eggs	Shell Lk to TLH to Shell Lk
10A-0153	English Bay Lk/ English Bay Lk	Egg take, incubation	12/31/2026	6,720,000 green eggs	English Bay Lk to TLH
10A-0155	TLH/ English Bay Lk	Transfer, release	12/31/2026	200,000 fed fry	TLH to English Bay Lk
18A-0031	Tutka Bay/ English Bay Lk	Egg take, incubation	12/31/2023	6,520,000 green eggs	Tutka Bay to TLH
11A-0051	English Bay Lk / English Bay Lk	Transfer, release	12/31/2025	1,000,000 smolt	TLH to Tutka Bay
11A-0052	English Bay Lk / English Bay Lk	Transfer, release	12/31/2025	1,250,000 fed fry	TLH to Hazel Lk
11A-0053	English Bay Lk / English Bay Lk	Transfer, release	12/31/2025	250,000 fed fry	TLH to Kirschner Lk
11A-0054	English Bay Lk / English Bay Lk	Transfer, release	12/31/2025	2,000,000 fed fry	TLH to Leisure Lk (a.k.a. China Poot Lake)
17A-0007	Port Graham+EBL/ English Bay Lk	Transfer, release	12/31/2026	1,150,000 fed fry	TLH to Port Graham
15A-0069	Tutka Lagoon/ English Bay Lk	Transfer	6/30/2025	6,000 adults	Tutka Bay to Port Graham
11A-0076	Port Graham H/ English Bay L	Egg take, transfer	12/31/2023	6,520,000 green eggs	Port Graham Bay to TLH
11A-0077	Port Graham H/ English Bay L	Transfer	12/31/2023	5,000 adults	Port Graham Bay to TBLH
15A-0077	Kirschner Lk/ English Bay L	Egg take, transfer, release	8/1/2025	2,500 adults	Kirschner Lake to PGH to TLH

Coho					
FTP #	**Donor Stock/ Ancestral Stock**	**Action**	**Expiration Date**	**Maximum #, Life Stage**	**Transport from, to**
08A-0112	Bear Lk/ Bear Lk	Egg take, incubation	6/30/2022	1,122,500 green eggs	Bear Lk to TLH
08A-0113	Bear Lk/ Bear Lk	Transfer, release	12/31/2023	450,000 fed fry	TLH to Bear Lk
08A-0114	Bear Lk/ Bear Lk	Transfer, release	6/30/2026	150,000 smolt	TLH to Bear Cr

1.7 Project Evaluation

- Hidden Lake Sockeye Salmon
  - CIAA will enumerate smolt and adult escapement.
  - CIAA will collect limnology samples.
  - CIAA will collect up to 1,000 samples at the weir for otolith analysis for hatchery/wild stock contribution as well as age composition.
  - CIAA will collect up to 750 otoliths for spawning fidelity study as described in the Special Use Permit.
  - All stocked fish will be thermally otolith-marked.

- Bear Lake Sockeye Salmon
  - CIAA will collect up to 1,000 heads for otolith dissection from the processing plant to analyze the returns contributing to the harvest from the net pen complex versus the lake. Samples will be collected randomly throughout the fishery.
  - CIAA will enumerate smolt and adult escapement.
  - Kidney samples will be taken to collect BKD data.
  - CIAA will collect limnology samples at least 4 times during the open water season.
  - The lake fertilization project at Bear Lake will continue as appropriate based on water chemistry analysis.
  - All fish stocked will be thermally otolith-marked.

- Shell Lake Sockeye Salmon
  - CIAA will enumerate smolt and adult escapement.
  - All fish stocked will be thermally otolith-marked and adipose fin clipped.
  - CIAA will actively harvest northern pike from the lake.
  - CIAA will collect otolith samples from those fish used as broodstock.

- Tutka Bay Sockeye Salmon (EBL)
  - Adult sockeye salmon returns will be estimated through harvest records and fish used for broodstock.
  - CIAA will collect up to 400 otoliths from the cost recovery or common property harvests to determine age characteristics.
  - All fish will be thermally otolith-marked.

- Lower Cook Inlet Lakes
    - Adult fish returns will be estimated through harvest records and ADF&G surveys.
    - Leisure Lake will be fertilized by applying 20:5:0 (Nitrogen:Phosphorus:Potassium) fertilizer between mid-June and mid-August.
    - All fish stocked will be thermally otolith-marked. CIAA anticipates collecting otolith samples from fish caught in the common property and cost recovery fisheries.
    - CIAA will assist ADF&G in the analysis of adult sockeye salmon otoliths collected from Kamishak and Kachemak Bay area fisheries.

- Bear Lake Coho Salmon
    - Those fish used for egg collection will be family tracked for BKD disease screening.
    - CIAA will perform enumeration of smolt and adult escapement.
    - All fish will be thermally otolith-marked.
    - CIAA may collect heads for otolith dissection from the processing plant to analyze the returns contributing to the Seward Chamber of Commerce derby harvest.

2.0 Bear Lake Coho Salmon

2.1 Purpose and History

The coho salmon enhancement project was initiated at Bear Lake near Seward in 1962; CIAA assumed operation of the project in 1989 and expanded it to include stocking of sockeye salmon in 1990.

The primary intent of the enhancement programs at Bear Lake is, through lake fertilization and stocking of both coho and sockeye salmon, to maximize sockeye salmon production without causing a net loss of historical coho salmon smolt production. A secondary intent of the Bear Lake enhancement program is to produce sufficient coho salmon eggs to service other enhancement projects.

Historically, CIAA has provided additional coho salmon smolt for release to Bear Creek (Resurrection Bay), Kachemak Bay at the Nick Dudiak Enhancement Lagoon on the Homer Spit, Seward Lagoon, Alaska Sealife Center, and Seldovia. Currently the coho salmon smolt program has been scaled down to the occasional release at Bear Creek and/or Seward Lagoon if excess fry are available from the fry program or through a contract with the Seward Chamber of Commerce.

2.2 Operational Plan

2.2.1 Egg-take Goal/Brood Sources

Broodstock and eggs are collected from Bear Creek to support CIAA's Bear Lake coho salmon program. CIAA also assists with collection of broodstock and eggs for ADF&G coho salmon projects. The ADF&G coho salmon program is described in the William Jack Hernandez Sport Fish Hatchery AMP.

CIAA's egg-take goal is 565,000 coho salmon green eggs to achieve a 450,000 spring fry stocking goal at Bear Lake in 2023 and a 50,000 smolt stocking goal at Bear Creek in 2024. In addition to CIAA's goal, ADF&G has an egg collection goal of approximately 330,000 eggs.

Broodstock requirements for CIAA's egg target goal are 170 females and 170 males (340 adult coho salmon). In addition to CIAA's requirements, broodstock requirements for ADF&G egg target goal are 100 females and 100 males (200 adult coho salmon) for a combined total broodstock goal of 540 adult coho salmon.

CIAA Broodstock Requirements		
Stock		Bear Lake
Species		Coho
# Green Eggs		565,000
Fecundity		3,500
F:M Ratio		1
Inviable	3%	5%
Excess Males/Roe Recovery	0%	
Mortalities	2%	
# Females		170
# Males		170
Total Broodstock		**340**

ADF&G Broodstock Requirements		
Stock		Bear Lake
Species		Coho
# Green Eggs		330,000
Fecundity		3,500
F:M Ratio		1
Inviable	3%	5%
Excess Males/Roe Recovery	0%	
Mortalities	2%	
# Females		100
# Males		100
Total Broodstock		**200**

2.2.2 Egg Take, Transport of Eggs

Coho salmon broodstock will be collected at the Bear Lake weir and placed into raceways until spawning. Gametes will be collected and eggs will be fertilized on site at 1.5:1 female to male ratio. Gametes will remain separate for BKD family tracking. Eggs will be allowed to water harden for 1 to 2 hours before being transported back to TLH.

2.2.3 Incubation Plans

Eggs will be transferred to the hatchery and placed into vertical Heath stacks until they reach the eyed stage. Any BKD positive eggs will be culled. The healthy eggs will be shocked, picked, and inventoried before being placed into Kitoi boxes for otolith thermal marking.

2.2.4 Rearing and Release Plans

This year's anticipated releases from eggs collected in 2020 and 2021.

Stock	Bear Lake					
Species	Coho					
Brood Year	**Life Stage**	**Release Site**	**Release Goal**	**Mark Type**	**Percent marked**	**Hatch code**
20	Smolt	Bear Cr	25,000	Otolith	100%	2,6H
21	Fry	Bear Lake	450,000	Otolith	100%	5,3H

Previous brood years that will remain in culture during the entire calendar year:

Program Name	**Brood Year**	**Number Live (Mar, 22)**	**Release goal**	**Release Date**
Bear Lake Coho Salmon	2021	57,000	50,000	Spring 2023

2.3 Donor Stock Management

2.3.1 Management Strategies

In 2013, the Alaska Board of Fish established 5 AAC 21.373 Trail Lakes Salmon Hatchery Management Plan. This plan sets in regulation the Bear Lake Special Harvest Area. In addition, 5 AAC 21.376 Resurrection Bay Salmon Management Plan also provides guidance to ADF&G with regards to fisheries management in the Resurrection Bay North Subdistrict.

2.3.2 Escapement Requirements

All returning Bear Lake coho salmon in excess of the minimum inriver return may be used for broodstock. There are no management strategies created in this plan specifically designed to utilize surplus hatchery-produced fish returning to Bear Lake for cost-recovery harvest.

The minimum inriver return for Bear Lake is:

Goal	**Escapement**
Minimum inriver return	300

2.4 Evaluation Plans

CIAA will operate a smolt trap in Bear Creek to enumerate and describe the smolt outmigration from Bear Lake. A weir in Bear Creek will be used to enumerate and describe adult escapement to Bear Lake.

Limnological samples from Bear Lake will be collected and analyzed.

The lake fertilization project at Bear Lake will continue as appropriate based on water chemistry analysis.

CIAA will perform family tracking and sample all females used for gamete collection for BKD analysis.

All fish will be thermally otolith-marked.

3.0 Resurrection Bay and Bear Lake Sockeye Salmon

3.1 Purpose and History

The purpose of the sockeye salmon project was to create and maintain a commercial sockeye salmon fishery without decreasing coho salmon production from Bear Lake or conflicting with the Resurrection Bay recreational fishery. In 1993, CIAA added a sockeye smolt program for the purpose of providing sockeye salmon returns for corporate cost-recovery licensing.

3.2 Operational Plan

3.2.1 Egg-take Goal/Brood sources

Broodstock and eggs for the Resurrection Bay and Bear Lake stocking projects are collected from escapement at Bear Lake.

For 2022, CIAA's egg target goal is 6.0 million green sockeye salmon eggs in order to achieve a stocking goal of 2.4 million spring fry to Bear Lake in 2023 and 1.54 million smolt to Resurrection Bay in 2024. A total of 4,460 adult sockeye salmon are required to meet this target (2,230 females; 2,230 males). To assure that there are 4,460 brood fish available, CIAA must pass an additional 8,300 fish. Therefore, 12,760 fish (6,380 females; 6,380 males) will be passed into the lake from the weir.

CIAA Broodstock Requirements		
Stock		Bear Lake
Species		Sockeye
# Green Eggs		6,000,000
Fecundity		3,100
F:M Ratio		1:1
Inviable	10%	15%
Excess Males/Roe Recovery	0%	
Mortalities	5%	
# Females		2,230
# Males		2,230
Total Broodstock		**4,460**

3.2.2 Egg Take, Transport of Eggs

Broodstock will be captured between a temporary double picket weir and at the lake shore with a beach seine when necessary. Captured broodstock will be placed into holding pens when ripe. Carcasses (both males and female) will be discarded back into

Bear Lake's nutrient enrichment zone. Gametes will remain separate in iced coolers until delivery to TLH.

3.2.3 Incubation Plans

Eggs will be fertilized at a 1:1 female to male ratio and allowed to sit in an ovadine solution for 1–2 hours for water hardening before being placed into incubators. Eggs will be shocked, picked, and inventoried. Live eyed eggs will be placed back into the modified Kitoi boxes for otolith thermal marking and will remain there until emergence.

3.2.4 Rearing and Release Plans

The table below describes the anticipated releases in 2022 from eggs collected in 2020 and 2021.

Stock	Bear Lake					
Species	Sockeye					
Brood Year	**Life Stage**	**Release Site**	**Release Goal**	**Mark Type**	**Percent marked**	**Hatch code**
20	Smolt	Res. Bay	1,500,000	Otolith	100%	1,3H
21	Fry	Bear Lake	2,100,000	Otolith	100%	4,2H

Previous brood years that will remain in culture during the entire calendar year:

Program Name	**Brood Year**	**Number Live (Mar,22)**	**Release goal**	**Release Date**
Resurrection Bay Sockeye Salmon	2021	1,040,676	750,000	Spring 2023

3.3 Donor Stock Management

3.3.1 Management Strategies

Bear Lake sockeye salmon traditionally return from late May to early July with most escapement occurring mid-June. Sockeye salmon returns to Bear Lake are harvested primarily in the Resurrection Bay commercial purse seine and hatchery cost-recovery licensed fisheries and secondarily in the Resurrection Bay recreational fishery. Specific management actions are guided by language in 5AAC 21.376 Resurrection Bay Salmon Management Plan.

3.3.2 Escapement Requirements

Management of sockeye salmon passage by sex to Bear Lake is noted in the table below.

Goal	Escapement		
	Female	**Male**	**Total**
SEG			700- 8,300
Broodstock	2,230	2,230	4,460
Additional weir passage to achieve brood goal	4,150	4,150	8,300
Total weir passage to achieve brood goal	**6,380**	**6,380**	**12,760**

Sockeye salmon will be passed into the lake throughout the course of the run using historic run timing as provided by ADF&G.

If the escapement goal is not achieved and harvest restrictions have not been placed on common property and cost-recovery fisheries, and CIAA can project the egg-take goal will not be achieved, CIAA will request ADF&G allow CIAA to collect eggs from an alternative broodstock source.

3.4 Evaluation Plans

CIAA will operate a smolt trap in Bear Creek to enumerate and describe smolt outmigration from Bear Lake. A weir in Bear Creek will be used to enumerate and describe adult escapement to the creek and lake.

Limnological samples from Bear Lake will be collected and analyzed.

The lake fertilization at Bear Lake will continue as appropriate based on water chemistry analysis.

CIAA will collect otoliths from sockeye salmon captured in the cost recovery licensing/common property fisheries to determine the contribution from the net pen and the lake stocking program.

All fish will be thermally otolith-marked.

4.0 English Bay Lakes Sockeye Salmon (Second Lake)

4.1 Purpose and History

To transition from the Hidden Lake stock to the English Bay Lakes (EBL) stock for the Lower Cook Inlet (LCI) sockeye program, broodstock were collected from Second Lake in the EBL system for developing the broodstock program at Tutka Bay Lagoon (smolt), as well as the spring fry stocking at Hazel, Leisure and Kirschner lakes and the back-stocking of fall fry to Second Lake (2010-2014). In 2015, sufficient broodstock (English Bay Lakes stock) were returning to Tutka Bay Lagoon to support the LCI sockeye programs such that additional broodstock from Second Lake were no longer required. Broodstock collected from Second Lake beginning in 2015 would only provide stocking opportunities for the back-stocking of fall fry into Second Lake.

4.1.2 English Bay Stocking Program

The purpose of the EBL system sockeye salmon enhancement project is to provide adult sockeye salmon to the LCI commercial fishery, for hatchery cost-recovery harvest licensing and for personal use and subsistence harvests by the communities of Nanwalek and Port Graham. Fish are also available to the recreational fishery.

The EBL sockeye salmon enhancement project has been operating for over 20 years and has been modified several times. This project consists of an egg take from the EBL system, the incubation and rearing of the resultant fry and their release back to the EBL system and Port Graham Bay. CIAA began assisting with the project in 2004, when eggs from the EBL system were transferred to the TLH for incubation and rearing. In 2010, CIAA submitted a permit alteration request (PAR) which was subsequently approved, allowing CIAA to continue to provide assistance to the Port Graham Hatchery Corporation (PGHC) by being responsible for the collection of sockeye salmon eggs from the EBL system and/or sockeye salmon returns to the PGH facility, incubating the eggs, rearing the resulting fry at TLH, and releasing fall fry to the EBL system and/or smolt to Port Graham Bay.

4.2 Operational Plan

4.2.1 Egg-take Goal/Brood Sources

CIAA is not planning to collect eggs from the English Bay Lakes system in 2022.

4.2.2 Egg Take, Transport of Eggs

CIAA is not planning to collect eggs from the English Bay Lakes system in 2022.

4.2.3 Incubation Plans

CIAA is not planning to collect eggs from the English Bay Lakes system in 2022.

4.2.4 Rearing and Release Plans

CIAA is not planning to collect eggs from the English Bay Lakes system in 2022.

4.3 Donor Stock Management

4.3.1 Management Strategies

Sockeye salmon returns to the EBL system are harvested primarily in the Port Graham Subdistrict subsistence and commercial set gillnet fisheries. EBL system sockeye salmon traditionally return from early June to mid-July, with 50% of the escapement occurring typically by June 29, and 90% by July 15.

Sockeye salmon escapements to the EBL system over the past decade have annually achieved or slightly exceeded the current established SEG. Specific management actions are governed by regulations established by the BOF. The subsistence salmon fishing season in the Port Graham Subdistrict will open on April 1 and close on September 30. Weekly fishing periods are from 10:00 PM Thursday until 10:00 AM on Wednesday.

Recognizing the greater harvesting potential of commercially-operated set gillnets, the department has closed waters of Port Graham Subdistrict to commercial harvest as a precautionary measure until a commercially harvestable surplus of sockeye salmon can be assured by comparing actual escapement counts to anticipated counts through the English Bay River weir.

No enhanced returns are expected in 2022.

Sport fisheries will be managed 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.

4.3.2 Escapement Requirements

The sockeye salmon escapement goal for EBL is:

Goal	Minimum Requirements	Maximum Requirements
SEG	6,000	13,500
Hatchery Broodstock	0	0
Total Escapement	6,000	13,500

Management for the maximum inriver return provides for adequate natural lake spawning and ensures sufficient hatchery broodstock is available at the EBL system.

CIAA has no plans to collect sockeye salmon broodstock from English Bay Lakes (Second Lake) in 2022.

4.4 Evaluation Plans

No adult sockeye salmon returns and smolt out migrations will be enumerated in the English Bay River system in 2022 by CIAA staff. Staff from Nanwalek may enumerate returns under a Fish Resource Permit. CIAA may provide technical assistance if requested. The commercial sockeye salmon harvest as reported on fish tickets will be used to estimate the magnitude of the adult return.

CIAA has no plans to collect returning adult salmon for otolith analysis but may assist Nanwalek staff with sample collection and analysis if requested.

CIAA has no plans to collect limnology samples during the open water season from Second and Third lakes but may assist Nanwalek staff with sample collection and analysis if requested.

5.0 Hidden Lake Sockeye Salmon

5.1 Purpose and History

ADF&G initiated this project in 1976; CIAA assumed operation of the project after 1991.

Hidden Lake has the potential for increased sockeye salmon production because the natural spawning area is limited and/or egg to fry survival is poor. The purpose of this project is to enhance the Hidden Lake sockeye salmon return for the common property fishery.

The goal of the project is a 4-year floating average adult sockeye salmon escapement of 30,000 fish. The average adult escapement from 2016 through 2019 was 26,899.

5.2 Operational Plan

Note* Calculations based off 2012-2017 Operational plan, extended to 2018. To be updated with 2019-2023 five-year operational plan Hidden Lake Sockeye Program, anticipated BOD approval 2022.

5.2.1 Egg-take Goal/Brood Sources

Broodstock and eggs are collected at Hidden Lake under terms of a Kenai National Wildlife Refuge (KNWR) Special Use Permit issued to ADF&G.

The egg-take goal for fry released to Hidden Lake represents the number of eggs required to produce an estimated adult return of 30,000 fish based on 4-year floating average survival rates as indicated in the table below.

Broodstock Requirements	
Stock	Hidden Lake
Species	Sockeye
Natural Smolt Production (4 yr avg)	97,700
Egg:Fry Survival (4 yr avg)	90.4%
Fry: Smolt Survival (4 yr avg)	15.5%
Smolt: Adult Survival (4 yr avg)	11.0%
Common Property Harvest (4 yr avg)	56.8%
Natural Adult Return to Inlet	10,750
Natural Adult Escapement	4,640
Total Escapement (Natural + Enhanced)	30,000
Enhanced Adult Escapement	25,360
Total Enhanced Eggtake Required	**3,808,700**

Only 1,266,000 green sockeye eggs will be collected. A total of 1,120 broodstock will be required.

CIAA Broodstock Requirements		
Stock		Hidden Lake
Species		Sockeye
# Green Eggs		1,266,000
Fecundity		2,500
F:M Ratio		1
Inviable	8%	10%
Excess Males/Roe Recovery	0%	
Mortalities	2%	
# Females		560
# Males		560
Total Broodstock		**1,120**

5.2.2 Egg Take, Transport of Eggs

Broodstock will be captured by beach seine. Captured broodstock will be placed into holding pens when ripe. Gametes will remain separate and in iced coolers until delivery to TLH via truck. All female broodstock will be visually checked for clinical signs of BKD (swollen kidneys, granulomas). Gametes from any female that shows visual signs of BKD will be discarded.

5.2.3 Incubation Plans

Eggs will be fertilized 1:1 female to male ratio and allowed to sit in an ovadine solution for 1–2 hours for water hardening, before being placed into Kitoi boxes. Once the eggs have reached the eyed stage, the eggs will be removed and will be shocked, picked, and inventoried. Live eyed-eggs will be placed back into the Kitoi boxes for thermal marking and will remain there until emergence.

5.2.4 Rearing and Release Plans

The table below describes the anticipated releases in 2022 from eggs collected in 2021.

Species	Sockeye					
Stock	Hidden Lake					
Brood Year	**Life Stage**	**Release Site**	**Release Goal**	**Mark Type**	**Percent marked**	**Hatch code**
21	Fry	Hidden Lake	1,045,000	Otolith	100%	3,2,1H

5.3 Donor Stock Management

5.3.1 Management Strategies

Broodstock and eggs for the Hidden Lake fry release project are collected at Hidden Lake. Sockeye salmon returns to Hidden Lake (Kenai River) contribute to mixed species/mixed stock set and drift gillnet commercial, subsistence, and personal use fisheries in the Central District and recreational fisheries in the Kenai River system.

Specific management actions are governed by regulations established by the BOF. No specific management strategies are applied to ensure sufficient hatchery broodstock at Hidden Lake and no management strategies are currently specifically designed to harvest surplus hatchery-produced fish returning to Hidden Lake. Fish sacrificed for otolith processing will be sold or donated to charity.

5.3.2 Escapement Requirements

The sockeye salmon return per USFWS Special Use Permit to Hidden Lake is:

Goal	**Escapement**
Minimum inriver return	8,000
Desired inriver return	30,000

The broodstock removal schedule for Hidden Lake is:

Escapement	**Adults Available for Broodstock**
≤ 1,600	0
≥ 1,600	80% of those exceeding 1,600

Under terms of a KNWR Special Use Permit issued to ADF&G, broodstock for stocking programs outside of Hidden Lake will not be collected from Hidden Lake. If the Hidden Lake sockeye salmon desired inriver return is achieved, adequate fish will be available for broodstock needs.

5.4 Evaluation Plans

All fry released to Hidden Lake will be thermally otolith marked.

CIAA will operate a smolt trap in Hidden Creek to enumerate and describe the smolt outmigration from Hidden Lake. A weir in Hidden Creek will be used to enumerate and describe adult escapement to the creek.

CIAA will collect otolith samples from Hidden Lake during spawning to assess spawning fidelity. The details of the sampling program are described in the Special Use Permit.

Limnological samples from Hidden Lake will be collected and analyzed during the open-water season.

6.0 Packers Lake Sockeye Salmon

6.1 Purpose and History

ADF&G initiated this project in 1973; CIAA assumed operation of the project in 1980 and expanded it to include nutrient enrichment in 1983 and stocking in 1988. The Packers Lake fry release and nutrient enrichment portions of the project were suspended in April 1998.

6.2 Operational Plan

6.2.1 Egg-take Goal/Brood Sources

No activities planned.

6.2.2 Egg Take; Transport of Eggs

No activities planned.

6.2.3 Incubation Plans

No activities planned.

6.2.4 Rearing and Release Plans

No releases planned.

6.3 Donor Stock Management

6.3.1 Management Strategies

Not applicable.

6.3.2 Escapement Requirements

Not applicable.

6.4 Evaluation Plans

CIAA will maintain a flow control structure at the lake's outlet to assist the migration of adult sockeye salmon into the lake.

7.0 Tustumena Lake Sockeye Salmon

7.1 Purpose and History

ADF&G initiated this project in 1974. CIAA assumed operation of various parts of the project from 1993 through 1998 when CIAA became responsible for operation of the entire project. In December 2003, the Ninth Circuit Court ruled the Tustumena Lake enhancement project was not permissible under the terms of the 1962 Wilderness Act and ordered the project be terminated. No brood or egg collections have occurred since 2004.

7.2 Operational Plan

7.2.1 Egg-take Goal/Brood Sources

No longer permitted.

7.2.2 Egg Take; Transport of Eggs

No longer permitted.

7.2.3 Incubation Plans

No longer permitted.

7.2.4 Rearing and Release Plans

No longer permitted.

7.3 Donor Stock Management

7.3.1 Management Strategies

Not applicable.

7.3.2 Escapement Requirements

Not applicable.

7.4 Evaluation Plans

Not applicable.

8.0 Tutka Bay Sockeye Salmon (Hidden Lake)

No Hidden Lake stock returns are expected. This program was replaced with the Tutka Bay Sockeye Salmon (English Bay Lake) which is now called the Lower Cook Inlet Lakes Sockeye Salmon (English Bay Lakes) project.

9.0 Lower Cook Inlet Sockeye Salmon (English Bay Lakes stock)

9.1 Purpose and History

In December 2003, the Tustumena Lake sockeye salmon enhancement project was terminated and the egg source for the LCI lakes sockeye salmon enhancement project was eliminated. Eggs were collected from Hidden Lake as an interim measure in order to continue the LCI lakes enhancement project. To develop a future brood source, a remote smolt release project was initiated at Tutka Bay Lagoon in 2005.

Although sockeye salmon returns to Tutka Bay Lagoon achieved numerical expectations, Hidden Lake stock was not a good choice for release to Tutka Bay Lagoon for broodstock or licensed cost-recovery harvest purposes. While the fish cultured well in the hatchery and returns slightly exceeded projections, they have not served well as a broodstock because the spawning time of Hidden Lake stock returning to Tutka Bay Lagoon was delayed by two to four weeks, the fish have been smaller than expected, and the value of the cost-recovery harvests have not met expectations.

For this reason, CIAA collected EBL stock to develop a return of this stock at Tutka Bay Lagoon to supply the broodstock necessary to maintain the Hazel/Leisure/Kirschner lakes stocking program and licensed cost-recovery/common property harvests at Tutka Bay.

Adult sockeye salmon returns of the English Bay Lake stock to Tutka Bay Lagoon are expected to provide sufficient broodstock to meet the egg target goals (6,520,000 green eggs) for the stocking programs at Tutka Bay Lagoon, and the Lower Cook Inlet lakes (Kirschner, Hazel, Leisure).

Adult sockeye will be captured from Tutka Bay Lagoon and placed in lensing bags for ripening. Staff from TBLH will perform the egg takes and ship the gametes via aircraft to Trail Lakes Hatchery for fertilization, incubation, and rearing.

9.2 Operational Plan

9.2.1 Egg-take Goal/Brood Sources

Adult sockeye salmon returns of the EBL stock to Tutka Bay Lagoon are expected to provide sufficient broodstock to meet the egg target goals for the stocking programs at Tutka Bay Lagoon/Port Graham, and the Lower Cook Inlet lakes (Kirschner, Hazel, Leisure) (6,520,000 green eggs).

A total of 5,150 adult sockeye salmon are required to meet the egg-take goal of 6,520,000 (3260 female; 1,890 male).

CIAA Broodstock Requirements		
Stock		English Bay (Tutka)
Species		Sockeye (Smolt)
# Green Eggs		1,020,000
Fecundity		2,400
F:M Ratio		1
Inviable	8%	20%
Excess Males/Roe Recovery	2%	
Mortalities	10%	
# Females		510
# Males		510
Total Broodstock		**1,020**

CIAA Broodstock Requirements		
Stock		English Bay (Tutka)
Species		Sockeye (Fry)
# Green Eggs		5,500,000
Fecundity		2,400
F:M Ratio		2
Inviable	8%	20%
Excess Males/Roe Recovery	2%	
Mortalities	10%	
# Females		2,750
# Males		1,380
Total Broodstock		**4,130**

9.2.2 Egg Take, Transport of Eggs

Adult sockeye salmon will be captured from Tutka Bay Lagoon and placed into a freshwater lensing bag. Hatchery staff will perform the egg takes and ship the gametes in iced coolers via aircraft to Trail Lakes Hatchery for fertilization, incubation, and rearing.

9.2.3 Incubation Plans

For eggs allocated to smolt production at Tutka Bay Lagoon, eggs will be fertilized at a 1:1 female to male ratio. For eggs allocated to fry production at Hazel, Leisure and Kirschner lakes, eggs will be fertilized at a 2:1 female to male ratio. Newly fertilized eggs will be placed into ovadine solution (100 ppm) and allowed to water harden for 1–2 hours, before being placed into Kitoi boxes. Once the eggs have reached the eyed stage, they will be shocked, picked, and inventoried. All eggs will be thermally otolith marked.

9.2.4 Rearing and Release Plans

The table below describes the anticipated releases for 2022 from eggs collected in 2020 and 2021.

Species	Sockeye					
Stock	English Bay					
Brood Year	**Life Stage**	**Release Site**	**Release Goal**	**Mark Type**	**Percent marked**	**Hatch code**
21	Fry	Hazel Lake	1,000,000	Otolith	100%	5,2,3H
21	Fry	Leisure Lake	1,700,000	Otolith	100%	5,4H
21	Fry	Kirschner Lake	250,000	Otolith	100%	4,2,2H
20	Smolt	Tutka Lagoon	380,000	Otolith	100%	4,2H

Previous brood years that will remain in culture during the entire calendar year:

Program Name	Brood Year	Number Live (Mar, 22)	Number to release	Release Date
Lower Cook Inlet Sockeye (Tutka Smolts)	2021	985,417	500,000	Spring 2023

9.3 Donor Stock Management

9.3.1 Management Strategies

The Division of Commercial Fisheries Area Management Biologist (AMB), in consultation with the hatchery operator, will employ management strategies within waters of the Tutka Bay SHA and other hatchery Subdistricts listed in 5 AAC 21.373 Trail Lakes Hatchery Salmon Management Plan to ensure achievement of broodstock goals for TLH, as well as allow for an orderly common property opportunity to harvest fish surplus to hatchery requirements.

Sport fisheries will be managed in accordance with regulations as provided in 5 AAC 47–5 AAC 75. EOs may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

9.3.2 Escapement Requirements

Not required.

9.4 Evaluation Plans

CIAA and ADF&G will determine total return to Tutka Bay through broodstock enumeration and commercial/cost recovery harvests as supplied by fish tickets.

All fish will be thermally otolith-marked.

Efforts to increase essential plant nutrients in Leisure Lake will continue in 2022. The fertilization program at Leisure Lake will continue as appropriate based on water chemistry analysis.

CIAA may collect otolith samples from fish caught in the common property and cost recovery fisheries.

10.0 Shell Lake Sockeye Salmon

10.1 Purpose and History

From 2006 through 2011, CIAA monitored sockeye salmon returns to Shell Lake. Similarly, CIAA monitored sockeye salmon smolt migration from Shell Lake starting in 2007. Over this time period, the number of fish returning and migrating from the lake has decreased substantially, with only 17 sockeye salmon smolt being recorded in 2011. In 2007, CIAA conducted sampling to determine the average fecundity and reproductive potential of the sockeye salmon returning to Shell Lake. Based on this information, the highest egg-to-smolt survival was in BY07 when 0.09% of the potential eggs migrated out as smolt (2009/2010).

While the actual reasons for the decline in both adult return and smolt migration numbers are still being investigated, it is apparent that if something is not done immediately to conserve the sockeye salmon, there is a risk of multiple year class failures at Shell Lake, which could lead to extirpation of sockeye salmon from that system. For that reason, CIAA undertook a rehabilitation project in 2012, which aggressively removed northern pike and collected gametes from returning adult sockeye in order to conserve the genetic lineage. Additionally, disease screening revealed the presence of two microsporidian parasites which may be negatively impacting the sockeye salmon population at Shell Lake. In 2014, 80,000 sockeye salmon smolt were released into Shell Lake as part of the rehabilitation effort. In 2018 46,000 smolt were stocked into Shell lake, 32,606 sockeye salmon smolt were enumerated passing through the smolt trap in 2018.

CIAA will continue the smolt migration counts in 2022, as well as enumerate the returning sockeye salmon. CIAA will also continue to harvest northern pike from the system. If smolt counts are low (less than 6,000 fish), and adult returns are adequate (few adult fish are estimated to be returning), CIAA will capture spawning adults from Shell Lake and collect up to 250,000 green sockeye salmon eggs. Approximately 762 returning adults are expected from stocking in 2018. CIAA has consulted with ADF&G on the use of hatchery-produced returns as broodstock. Generally, for stock rehabilitation projects, no more than one generation of separation from the donor stock to stocking of the progeny will be allowed. ADF&G has agreed this location has exceptional circumstances with little to no natural returns.

10.2 Operational Plan

10.2.1 Egg-take Goal/Brood Sources

Up to 250,000 green sockeye salmon eggs will be collected at Shell Lake. Up to 180 broodstock will be required (90 female; 90 male).

CIAA Broodstock Requirements		
Stock		Shell Lake
Species		Sockeye
# Green Eggs		250,000
Fecundity		2,920
F:M Ratio		1
Inviable	8%	10%
Excess Males/Roe Recovery	0%	
Mortalities	2%	
# Females		90
# Males		90
Total Broodstock		**180**

10.2.2 Egg Take; Transport of Eggs

Broodstock will be collected using a beach seine and placed into holding pens when ripe. Gametes will be collected and shipped individually in iced coolers via fixed wing aircraft to TLH. The total number of broodstock that can be used is limited by the FTP and the actual number will be based on adult returns to the lake and discussion with ADF&G for an escapement goal.

10.2.3 Incubation Plans

Eggs will be fertilized at a 1:1 female to male ratio. Newly fertilized eggs will be placed into ovadine solution (100 ppm) and allowed to water harden for 1–2 hours before being placed into heath stacks. Once eggs have reached the eyed stage they will be shocked, picked, inventoried, and placed into Kitoi boxes until emergence. All eggs will be thermally otolith marked and later adipose fin clipped.

10.2.4 Rearing and Release Plans

The table below describes the anticipated releases for 2022 from eggs collected in 2020. No eggs were collected in 2021.

Species	Sockeye					
Stock	Shell Lake					
Brood Year	**Life Stage**	**Release Site**	**Release Goal**	**Mark Type**	**Percent marked**	**Hatch code**
20	Smolt	Shell Lake	0	NA	NA	NA

10.3 Donor Stock Management

10.3.1 Management Strategies

The number of returning adult salmon to Shell Lake will be estimated using aerial counts.

10.3.2 Escapement Requirements

The total number of broodstock that can be used is limited by the FTP and actual number will be based on adult returns to the lake and discussion with ADF&G for an escapement goal.

10.4 Evaluation Plans

CIAA will perform smolt counts on migrating salmon via fyke net.

CIAA will actively remove northern pike from Shell Lake using hook and line and gillnetting between mid-May and mid-September.

Hatchery smolt released into Shell Lake will be adipose fin clipped to help identify hatchery origin adults upon return.

CIAA will collect otoliths from adult salmon used as broodstock.

All fish will be thermally otolith-marked.

11.0 Harvest Management

11.1 Cost-recovery Harvest Plan

CIAA funds the cost of operating TLH, TBLH, PGH, and Eklutna Salmon Hatchery (ESH) and associated field projects by licensing for harvest a portion of the fish returning to the hatcheries' release sites. CIAA will begin cost recovery in Resurrection Bay/Bear Lake followed by Kirschner Lake sockeye, then Tutka Bay Lagoon sockeye and pink salmon, and Port Graham Bay pink salmon until the cost recovery goal is met. The table below describes anticipated returns and revenue to the special harvest areas (SHAs) in which cost recovery licensing is possible in 2022.

CIAA 2022 Cost Recovery Target	
SHA/AREA	**Financial Target**
Bear Lake/Resurrection Bay Sockeye	$1,005,207.79
Kirschner Lake Sockeye	$239,090.44
Tutka Bay (sockeye and pink)	$2,488,723.36
Port Graham Pink	$865,934.43

The Division of Commercial Fisheries Area Management Biologist (AMB), in consultation with the hatchery operator, will employ management strategies within waters of the TLH SHAs as well as other hatchery subdistricts listed in 5AAC 21.373 *Trail Lakes Hatchery Salmon Hatchery Management Plan* that ensure achievement of corporate escapement broodstock requirements for TLH, as well as to allow for an orderly common property fishery opportunity to harvest fish surplus to hatchery requirements. In addition to weekly updates that provide current levels of brood and cost recovery harvests to the Homer ADF&G office, CIAA will submit written hatchery sub-district management recommendations to the AMB with clear justifications as to how the recommendations support achieving cost recovery and/or broodstock collection goals. Each recommendation, in the form of a brief email, will include but not be limited to current cost recovery and brood harvest data, SHA estimates of fish in the water, as well as actual and anticipated run entry, and actual and anticipated cost recovery and brood harvest progress. SHA estimates may include the number of fish estimated in Bear Creek, as well as number of fish within Tutka Lagoon outside of holding pens and in the creek.

11.2 Special Harvest Areas

11.2.1 Kirschner Lake SHA

11.2.1.1 Area Definition

The Kirschner Lake SHA (Figure 1) is defined in 5AAC 21.373 Trail Lakes Salmon Hatchery Management Plan as the marine waters of the Bruin Bay Subdistrict in the Kamishak Bay District northwest of a line connecting 59° 25.17′ N. lat., 153° 50.50′ W. long. and 59° 23.17′ N. lat., 153° 56.90′ W. long.

11.2.1.2 Fishery Management

The Division of Commercial Fisheries AMB, in consultation with the hatchery operator, shall manage the Kirschner Lake Section of the Bruin Bay Subdistrict including the SHA to achieve corporate escapement goals in a timely and orderly manner.

Sport fisheries will be managed 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.

11.2.2 China Poot and Hazel Lake SHA

11.2.2.1 Area Definition

The China Poot and Hazel Lake SHA (Figure 2) is defined in 5AAC 21.373 Trail Lakes Salmon Hatchery Management Plan as the marine waters of the China Poot Bay Subdistrict in the Southern District inshore of, and enclosed by, a line connecting 59° 34.66′ N. lat., 151° 19.27′ W. long., then to 59° 35.08′ N. lat., 151° 19.77′ W. long., then to 59° 33.09′ N. lat., 151° 25.22′ W. long., and then to 59° 32.84′ N. lat., 151° 24.90′ W. long.

11.2.2.2 Fishery Management

The Division of Commercial Fisheries AMB, in consultation with the hatchery operator, shall manage the China Poot Bay Subdistrict in the Southern District including the SHAs to achieve corporate escapement goals in a timely and orderly manner.

Sport fisheries will be managed in accordance with regulations as provided in 5 AAC 47 – 5 AAC 75. EOs may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

11.2.3 Tutka Bay SHA

11.2.3.1 Area Definition

The Tutka Bay SHA (Figure 3) is defined in 5AAC 21.373 Trail Lakes Salmon Hatchery Management Plan as the marine waters of Tutka Bay Subdistrict in the Southern District southeast and shoreward of a line from 59° 30.23′ N. lat., 151° 28.23′ W. long. to 59° 28.63′ N. lat., 151° 30.37′ W. long., including Tutka Bay Lagoon.

11.2.3.2 Fishery Management

The Division of Commercial Fisheries AMB, in consultation with the hatchery operator, shall manage the Tutka Bay Subdistrict in the Southern District including the SHAs to achieve corporate escapement goals in a timely and orderly manner.

Common property and hatchery fisheries will be managed by ADF&G to achieve the established pink salmon SEG for Tutka Creek, as well as the established CIAA sockeye and pink salmon revenue and broodstock escapement goals. Sockeye salmon returns to Tutka Bay

Lagoon will be intermingled with pink salmon returns that will be captured for cost-recovery harvest licensing and/or broodstock. To avoid capturing the pink salmon multiple times during collection efforts for sockeye salmon, CIAA will place any caught adult pink salmon in the net pens. Management of these caught adult pink salmon is described in the Tutka Bay Lagoon Hatchery 2022 Annual Management Plan. Once in the net pens, the fish will be sorted by sex and enumerated. These numbers will be reported to ADF&G.

Per 5 AAC 21.373 Trail Lakes Hatchery Salmon Hatchery Management Plan, the Tutka Bay SHA opens on June 1 to cost recovery harvest. Portions of the SHA may open to commercial common property harvest by EO. The established commercial set gillnet fishery within the Tutka Subdistrict will not be restricted by this management plan in order to achieve hatchery objectives.

Sport fisheries will be managed in accordance with regulations as provided in 5 AAC 47–5 AAC 75. EOs may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

11.2.4 Bear Lake SHA

11.2.4.1 Area Definition

The Bear Lake SHA (Figure 4) is defined in 5AAC 21.373 Trail Lakes Salmon Hatchery Management Plan as the marine waters of Resurrection Bay in the Eastern District north of the latitude of Caines Head at approximately 59° 58.93' N. lat., and the fresh waters of Bear Creek, Salmon Creek, and Resurrection River downstream from, and including, the Bear Creek weir, excluding the freshwaters downstream from the Seward Highway and downstream from Nash Road to the ADF&G fresh/salt water boundary markers. Cost-recovery licensing harvest will occur both in saltwater by contracted purse seine vessels and at the Bear Creek weir.

11.2.4.2 Fishery Management

CIAA is anticipating achieving the $1,005,208 corporate cost recovery licensing goal generated from the sockeye returns to Resurrection Bay and Bear Lake. A commercial common property fishery should occur targeting hatchery produced sockeye salmon in the Bear Lake SHA in 2022 at the conclusion of CIAA cost recovery operations in that area.

Per 5 AAC 21.373 Trail Lakes Hatchery Salmon Hatchery Management Plan, The Bear Lake SHA opens on May 15 to cost recovery harvest. Portions of the SHA may open to commercial common property harvest by EO. Cost recovery management objectives will also include adherence to relevant portions of 5AAC 21.376 Resurrection Bay Salmon Management Plan concerning non-interference in the recreational fishery.

Sport fisheries will be managed in accordance with regulations as provided in 5 AAC 47–5 AAC 75. EOs may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

The hatchery cost-recovery licensing, commercial salmon seine, and sport fisheries targeting sockeye salmon may be restricted or closed completely if inseason information suggests that an escapement near the upper end of the desired inriver return range may not be achieved.

11.2.5 English Bay Lakes SHA

11.2.5.1 Area Definition

The English Bay SHA (Figure 5) is defined in the TLH BMP. It consists of those waters of the English Bay River between 59° 20.53′ N. lat. and 59° 20.88′ N. lat., excluding the English Bay River Lagoon. The English Bay SHA is unique in that there is no segregation of wild and enhanced stocks in this defined area.

11.2.5.2 Fishery Management

CIAA does not intend to conduct cost recovery activities at the English Bay SHA in 2022.

Intermediate escapement goals for English Bay River sockeye salmon, based on average daily weir counts, 1997–2006.

Date	Cumulative % of Return	Cumulative Desired Escapement by Date
11-Jun	9%	1,155
16-Jun	21%	2,865
21-Jun	31%	4,355
25-Jun	42%	5,979
27-Jun	50%	7,249
30-Jun	61%	8,786
3-Jul	71%	10,119
7-Jul	81%	11,605
12-Jul	91%	13,827
16-Jul	95%	13,574
30-Jul	100%	15,387

ADF&G may announce that commercial harvest of sockeye salmon will be postponed until escapement as measured at the English Bay weir warrants a fishery.

Determination of run strength in the 2022 EBL system sockeye salmon return will be a critical factor in management decisions.

Sport fisheries will be managed in accordance with regulations as provided in 5 AAC 47–5 AAC 75. EOs may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

11.2.6 Port Graham SHA

11.2.6.1 Area Management

The Port Graham SHA (Figure 6) is defined in 5AAC 21.377 Port Graham Salmon Hatchery Management Plan as the marine waters of Port Graham Subdistrict in the Southern District south of a line from the southern tip of Passage Island at 151° 53.08' W. long., 59° 22.00’ N. lat., to a point offshore at 59° 21.45’ N. lat., 151° 50.05' W. long., to a point onshore at 59° 20.83' N. lat., 151° 48.53' W. long.

11.2.6.2 Fishery Management

No sockeye adults are anticipated to return in 2022.

ADF&G will be responsible for fishery management as it relates to the SEGs for chum and pink salmon in the Port Graham River common property and hatchery fisheries. The SHA will be opened or closed for the commercial common property fishery by EO.

Sport fisheries will be managed in accordance with regulations as provided in 5 AAC 47–5 AAC 75. EOs may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

12.0 Approval

Recommendation for Approval: Trail Lakes Hatchery Annual Management Plan, 2022:

Dean Day, Executive Director, Cook Inlet Aquaculture Association 6/1/2022

Matt Miller, Fish and Game Coordinator, Division of Sport Fish 6/7/2022

Glenn Hollowell, Area Management Biologist, Division of Commercial Fisheries 6/3/2022

Tom Vania, Regional Supervisor, Division of Sport Fish 6/7/2022

Bert Lewis, Regional Supervisor, Division of Commercial Fisheries 6/3/2022

Ethan Ford, Regional Resource Development Biologist, Division of Comm. Fisheries 6/3/2022

Lorraine Vercessi, PNP Hatchery Program Coordinator, Division of Comm. Fisheries 6/15/2022

The 2022 Trail Lakes Hatchery Management Plan is hereby approved:

Tom Taube, Deputy Director, Division of Sport Fish 6/21/2022

Peter Bangs, Assistant Director, Division of Commercial Fisheries 6/22/2022

13.0 Attachments

13.1 Production history.

Coho Salmon

Brood Year	Egg Take Number	Brood Stock	Number Released	Life Stage	Release Year	Release Site	Notes
2021	609,926	Bear Lk.	-	Fry	2022	Bear Lk	
			-	Smolt	2023	Bear Ck.	
2020	568,414	Bear Lk.	445,081	Fry	2021	Bear Lk	
			-	Smolt	2022	Bear Ck.	
2019	604,869	Bear Lk.	400,809	Fry	2020	Bear Lk	
			58,202	Smolt	2021	Bear Ck.	
2018	640,243	Bear Lk.	453,000	Fry	2019	Bear Lk	
			96,890	Smolt	2020	Bear Ck.	
2017	587,900	Bear Lk.	438,000	Fry	2018	Bear Lk	additional green eggs collected for ADFG
			61,800	Smolt	2019	Bear Ck.	
2016	288,700	Bear Lk.	125,000	Fry	2017	Bear Lake	Adult return low. CIAA collect all eggs available for CIAA & ADFG Stocking
			28,000	Smolt	2018	Seward Lagoon	
2015	575,000	Bear Lk.	446,600	Fry	2016	Bear Lk	An additional 351,952 green eggs collected for ADFG; 10,458 culled for BKD
			54,000	Smolt	2017	Bear Ck.	
2014	581,000	Bear Lk.	448,000	Fry	2015	Bear Lk	An additional 343,605 green eggs collected for ADFG
			100,000	Smolt	2016	Bear Ck.	
2013	635,000	Bear Lk.	468,000	Fry	2014	Bear Lk	An additional 444,576 green eggs collected for ADFG
			98,000	Smolt	2015	Bear Ck.	
2012	630,927	Bear Lk.	405,000	Fry	2013	BearLk	An additional 129,914 green eggs collected for ADFG
			55,000	Smolt	2014	Bear Ck.	
2011	577,695	Bear Lk.	222,000	Fry	2012	Bear Lk	Alarm failure in brood raceway/Water flow issues in incubator. Additional 280,676 eggs for ADFG
2010	547,000	Bear Lk.	437,000	Fry	2011	Bear Lk	An additional 488,100 green eggs collected for Ft. Richardson
			93,000	Smolt	2012	Bear Ck.	
2009	545,000	Bear Lk.	435,000	Fry	2010	Bear Lk.	An additional 406,500 green eggs collected for Ft. Richardson
2008	574,000	Bear Lk.	270,000	Fry	2009	Bear Lk.	An additional 492,000 green eggs collected for Ft. Richardson
2007	724,000	Bear Lk.	360,000	Fry	2008	Bear Lk.	An additional 336,000 green eggs collected for Ft. Richardson
			68,000	Smolt	2009	Bear Ck.	
			111,000	Smolt	2009	Homer Spit	
2006	1,084,000	Bear Lk.	521,000	Fry	2007	Bear Lk.	An additional 343,000 green eggs collected for Ft. Richardson
			142,000	Smolt	2008	Bear Ck.	
			95,000	Smolt	2008	Homer Spit	
			88,000	Smolt	2008	Seldovia	
2005	1,415,000	Bear Lk.	447,000	Fry	2006	Bear Lk.	An additional 321,000 green eggs collected for Ft. Richardson
			237,000	Smolt	2007	Bear Ck.	
			101,000	Smolt	2007	Homer Spit	
			97,000	Smolt	2007	Seldovia	
2004	1,673,000	Bear Lk.	405,000	Fry	2005	Bear Lk.	An additional 348,000 green eggs collected for Ft. Richardson
			115,000	Smolt	2006	Bear Ck.	
			324,000	Smolt	2006	Homer Spit	Temporary rearing at ESH - TLH water shortage - Treated for BKD
			114,000	Smolt	2006	Seldovia	
			146,000	Smolt	2006	Lowell Falls	Temporary rearing at ESH - TLH water shortage - Treated for BKD
2003	1,193,000	Bear Lk.	406,000	Fry	2004	Bear Lk.	An additional 831,000 green eggs collected for Ft. Richardson
			488,000	Smolt	2005	Bear Ck.	Temporary rearing at ESH - TLH water shortage
			95,000	Smolt	2005	Homer Spit	
2002	1,238,000	Bear Lk.	405,000	Fry	2003	Bear Lk.	An additional 367,000 green eggs collected for Ft. Richardson
			285,000	Smolt	2004	Bear Ck.	
			192,000	Smolt	2004	Res. Bay	
			113,000	Smolt	2004	Homer Spit	
2001	1,052,000	Bear Lk.	405,000	Fry	2002	Bear Lk.	An additional 368,300 green eggs collected for Ft. Richardson
			253,000	Smolt	2003	Bear Ck.	
			153,000	Smolt	2003	Homer Spit	
2000	972,000	Bear Lk.	311,000	Fry	2001	Bear Lk.	An additional 695,000 green eggs collected for Ft Richardson
			124,000	Smolt	2002	Bear Lk.	
1999	867,000	Bear Lk.	316,000	Fry	2000	Bear Lk.	An additional 919,000 green eggs collected for Ft. Richardson
			121,000	Smolt	2001	Bear Ck.	
1998	805,000	Bear Lk.	306,000	Fry	1999	Bear Lk.	An additional 575,000 green eggs collected for Elmendorf
			102,000	Smolt	2000	Bear Ck.	
1997	687,000	Bear Lk.	409,000	Fry	1998	Bear Lk.	An additional 584,000 green eggs collected for Elmendorf
			51,000	Smolt	1999	Bear Ck.	
1996	968,000	Bear Lk.	449,000	Fry	1997	Bear Lk.	An additional 540,000 green eggs collected for Elmendorf
			177,000	Smolt	1998	Bear Ck.	
1995	868,000	Bear Lk.	350,000	Fry	1996	Bear Lk.	An additional 1,000,000 green eggs collected for Elmendorf
			153,000	Smolt	1997	Bear Ck.	
1994	847,000	Bear Lk.	330,000	Fry	1995	Bear Lk.	An additional 796,000 green eggs collected for Elmendorf
			75,000	Smolt	1996	Bear Ck.	
1993	736,000	Bear Lk.	335,000	Fry	1994	Bear Lk.	An additional 667,000 green eggs collected for Elmendorf
			7,000	Smolt	1995	Bear Ck.	
1992	803,000	Bear Lk.	621,000	Fry	1993	Bear Lk. & Bear Ck.	An additional 794,000 green eggs collected for Elmendorf
1991	696,000	Bear Lk.	204,000	Fry	1992	Bear Ck.	An additional 807,000 green eggs collected for Elmendorf
1990	798,000	Bear Lk.	390,000	Fry	1991	Bear Lk.	
			52,000	Smolt	1992	Bear Ck.	
1989	932,000	Bear Lk.	333,000	Fry	1990	Bear Lk.	192,000 fry transferred to Elmendorf
	26,323,674		17,020,382				

Sockeye Salmon

Brood Year	Egg Take Number	Brood Stock	Number Released	Life Stage	Release Year	Release Site	Notes
2021	4,694,585	Bear Lk.	-	Fry	2022	Bear Lk.	High water temps during eggtake reduced female brood
			-	Smolt	2023	Resurrection Bay	survival
2020	6,000,672	Bear Lk.	2,543,927	Fry	2021	Bear Lk.	
			-	Smolt	2022	Resurrection Bay	
2019	5,176,809	Bear Lk.	2,446,353	Fry	2020	Bear Lk.	
			1,466,109	Smolt	2021	Resurrection Bay	
2018	2,770,000	Bear Lk.	2,427,000	Fry	2019	Bear Lk.	
			NA	Smolt	2020	Resurrection Bay	BY18 returns did not produce enough eggs for smolt program.
2017	5,122,000	Bear Lk.	2,555,000	Fry	2018	Bear Lk.	
			1,510,000	Smolt	2019	Resurrection Bay	
2016	5,007,000	Bear Lk.	2,468,000	Fry	2017	Bear Lk.	
			1,488,000	Smolt	2018	Resurrection Bay	
2015	5,148,400	Bear Lk.	2,374,000	Fry	2016	Bear Lk.	
			1,816,000	Smolt	2017	Resurrection Bay	
			356,000	Smolt	2016	Bear Ck.	Released early due to water shortage at hatchery
2014	5,292,600	Bear Lk.	2,415,000	Fry	2015	Bear Lk.	IHN detected-180,000 destroyed
			1,680,200	Smolt	2016	Resurrection Bay	
2013	5,325,000	Bear Lk.	2,405,000	Fry	2014	Bear Lk.	
			1,758,000	Smolt	2015	Resurrection Bay	
2012	6,041,114	Bear Lk.	2,548,000	Fry	2013	Bear Lk.	IHNV detected - 575,000 destroyed
			1,742,000	Smolt	2014	Resurrection Bay	
2011	5,984,132	Bear Lk.	2,490,000	Fry	2012	Bear Lk.	IHNV - 300,000 fry destroyed
			2,090,000	Smolt	2013	Resurrection Bay	
2010	5,400,000	Bear Lk.	2,488,000	Fry	2011	Bear Lk.	
			1,305,000	Smolt	2012	Resurrection Bay	
2009	5,009,000	Bear Lk.	2,200,000	Fry	2010	Bear Lk.	IHNV detected - 1,975,000 fry destroyed
2008	6,033,000	Bear Lk.	2,543,000	Fry	2009	Bear Lk.	
			1,650,000	Smolt	2010	Resurrection Bay	
2007	6,090,000	Bear Lk.	2,400,000	Fry	2008	Bear Lk.	
			1,675,000	Smolt	2009	Resurrection Bay	
2006	6,087,000	Bear Lk.	2,437,000	Fry	2007	Bear Lk.	
			1,600,000	Smolt	2008	Resurrection Bay	Temporary rearing at ESH - TLH water shortage
2005	4,002,000	Bear Lk.	2,414,000	Fry	2006	Bear Lk.	
			619,000	Smolt	2007	Bear Lk.	Temporary rearing at ESH - TLH water shortage
2004	5,661,000	Bear Lk.	2,416,000	Fry	2005	Bear Lk.	
			604,000	Fall Fry	2005	Bear Lk.	
			979,000	Smolt	2006	Bear Lk.	Temporary rearing at ESH - TLH water shortage
2003	5,000,000	Bear Lk.	2,409,000	Fry	2004	Bear Lk.	
			603,000	Fall Fry	2004	Bear Lk.	
			402,000	Smolt	2005	Bear Lk.	Temporary rearing at ESH - TLH water shortage
2002	6,004,000	Bear Lk.	1,467,000	Fry	2003	Bear Lk.	IHNV detected - 3,000,000 fry destroyed
2001	6,017,000	Bear Lk.	2,408,000	Fry	2002	Bear Lk.	
			802,000	Fall Fry	2002	Bear Lk.	
			334,000	Smolt	2003	Bear Lk.	
2000	5,093,000	Bear Lk.	145,000	Fry	2001	Bear Lk.	IHNV detected - 3,505,000 fry destroyed
1999	2,436,000	Bear Lk.	1,796,000	Fry	2000	Bear Lk.	
1998	2,645,000	Bear Lk.	1,380,000	Fry	1999	Bear Lk.	Fry lost to clogged incubator screens and fungi infections
1997	502,000	Bear Lk.	265,000	Fry	1998	Bear Lk.	
1996	1,481,000	Bear Lk.	788,000	Fry	1997	Bear Lk.	
1995	2,040,000	Bear Lk.	781,000	Fry	1996	Bear Lk.	
1994	534,000	Bear Lk.	330,000	Fry	1995	Bear Lk.	
1993	270,000	Bear Lk.	170,000	Fry	1994	Bear Lk.	
1992	45,000	Bear Lk.	44,000	Fry	1993	Bear Lk.	
1992	3,428,000	S. Fork Big R.	1,766,000	Fry	1993	Bear Lk.	IHNV detected - 538,000 presmolt destroyed
1991	2,535,000	S. Fork Big R.	878,000	Fry	1992	Bear Lk.	
			565,000	Smolt	1992	Bear Lk.	
1991	1,442,000	U. Russian Lk.	917,000	Fry	1992	Bear Lk.	
1990	128,000	S. Fork Big R.	75,000	Smolt	1991	Bear Lk.	
1990	2,602,000	U. Russian Lk.	1,530,000	Fry	1991	Bear Lk.	
1989	3,119,000	S. Fork Big R.	2,191,000	Fry	1990	Bear Lk.	
			191,000	Fry	1990	S. Fork Big R.	
			159,000	Smolt	1990	Bear Lk.	
1989	57,000	U. Russian Lk.	20,000	Fry	1990	Bear Lk.	
2014	1,093,000	English Bay Lakes	200,200	Rry	2015	English Bay Lakes	26,905 culled as Hidden Lake crosses.
			531,600	Smolt	2016	Tutka Bay Lagoon	
2013	2,120,000	English Bay Lakes	209,000	Fall Fry	2014	English Bay Lakes	
			523,500	Smolt	2015	Tutka Bay Lagoon	
			217,000	Fry	2014	Kirschner Lk.	
			725,000	Fry	2014	Hazel Lk.	
2012	432,000	English Bay Lakes	211,000	Fall Fry	2013	English Bay Lakes	
2011	2,504,876	English Bay Lakes	1,240,000	Fry	2012	Hazel Lk.	
			213,000	Fall Fry	2012	English Bay Lakes	
			511,000	Smolt	2013	Tutka Bay Lagoon	
			102,000	Smolt	2013	Port Graham Bay	
2010	1,113,000	English Bay Lakes	160,000	Fry	2011	Kirschner Lk.	
			203,300	Fall Fry	2011	English Bay Lakes	
			371,300	Smolt	2012	Tutka Bay Lagoon	
2009	307,000	English Bay Lakes	202,000	Fall Fry	2010	English Bay Lakes	
			58,200	Smolt	2011	Tutka Bay Lagoon	
2007	510,000	English Bay Lakes	246,000	Fall Fry	2008	English Bay Lakes	
			112,000	Smolt	2009	Port Graham Bay	
2004	1,562,000	English Bay Lakes	203,000	Fall Fry	2005	English Bay Lakes	575,000 fry lost during raceway overflow event
			499,000	Smolt	2006	Port Graham Bay	

Sockeye Salmon con'd

Brood Year	Egg Take Number	Brood Stock	Number Released	Life Stage	Release Year	Release Site	Notes
2021	1,263,305	Hidden Lk.	-	Fry	2022	Hidden Lk.	
2020	871,317	Hidden Lk.	689,000	Fry	2021	Hidden Lk.	Low escapement numbers.
2019	1,260,921	Hidden Lk.	1,020,382	Fry	2020	Hidden Lk.	
2018	1,258,000	Hidden Lk.	1,094,000	Fry	2019	Hidden Lk.	
2017	1,258,230	Hidden Lk.	1,271,000	Fry	2018	Hidden Lk.	
2016	0	Hidden Lk.	0	Fry	2017	Hidden Lk.	Due to low escapement, eggs were not collected
2015	1,445,600	Hidden Lk.	1,231,000	Fry	2016	Hidden Lk.	
2014	1,647,600	Hidden Lk.	1,497,000	Fry	2015	Hidden Lk.	
2013	1,765,000	Hidden Lk.	1,540,000	Fry	2014	Hidden Lk.	
2012	964,148	Hidden Lk.	860,000	Fry	2013	Hidden Lk.	
2011	1,119,538	Hidden Lk.	948,000	Fry	2012	Hidden Lk.	
2010	1,241,000	Hidden Lk.	1,044,000	Fry	2011	Hidden Lk.	
2009	5,140,000	Hidden Lk.	880,000	Fry	2010	Hidden Lk.	
			255,000	Fry	2010	Kirschner Lk.	
			1,933,000	Fry	2010	Leisure Lk.	
			1,218,000	Fry	2010	Hazel Lk.	
2008	4,004,000	Hidden Lk.	911,000	Fry	2009	Hidden Lk.	
			1,225,000	Fry	2009	Leisure Lk.	
			1,186,000	Fry	2009	Hazel Lk.	
			278,000	Smolt	2010	Tutka Bay Lagoon	
2007	5,686,000	Hidden Lk.	917,000	Fry	2008	Hidden Lk.	
			300,000	Fry	2008	Kirschner Lk.	
			2,053,000	Fry	2008	Leisure Lk.	
			1,161,000	Fry	2008	Hazel Lk.	
			301,000	Smolt	2009	Tutka Bay Lagoon	
2006	5,640,000	Hidden Lk.	658,000	Fry	2007	Hidden Lk.	
			254,000	Fry	2007	Kirschner Lk.	
			2,315,000	Fry	2007	Leisure Lk.	
			1,411,000	Fry	2007	Hazel Lk.	
			480,000	Smolt	2008	Tutka Bay Lagoon	
2005	2,027,000	Hidden Lk.	582,000	Fry	2006	Hidden Lk.	
			680,000	Fry	2006	Leisure Lk.	
			144,000	Smolt	2007	Tutka Bay Lagoon	
2004	5,445,000	Hidden Lk.	573,000	Fry	2005	Hidden Lk.	
			316,000	Fry	2005	Kirschner Lk.	
			2,252,000	Fry	2005	Leisure Lk.	
			1,558,000	Fry	2005	Hazel Lk.	
			260,000	Smolt	2006	Tutka Bay Lagoon	
2003	893,000	Hidden Lk.	646,000	Fry	2004	Hidden Lk.	
			96,000	Smolt	2005	Tutka Bay Lagoon	
2002	1,118,000	Hidden Lk.	629,000	Fry	2003	Hidden Lk.	Surplus fish - 293,000 fry destroyed
2001	1,332,000	Hidden Lk.	980,000	Fry	2002	Hidden Lk.	Surplus fish - 190,000 fry destroyed
2000	1,486,000	Hidden Lk.	906,000	Fry	2001	Hidden Lk.	
1999	2,253,000	Hidden Lk.	1,242,000	Fry	2000	Hidden Lk.	
1998	2,299,000	Hidden Lk.	1,507,000	Fry	1999	Hidden Lk.	Egg lost to incubator air entrapment
1997	2,166,000	Hidden Lk.	1,035,000	Fry	1998	Hidden Lk.	
1996	2,048,000	Hidden Lk.	1,051,000	Fry	1997	Hidden Lk.	
1995	1,893,000	Hidden Lk.	1,600,000	Fry	1996	Hidden Lk.	
1994	2,156,000	Hidden Lk.	1,700,000	Fry	1995	Hidden Lk.	
1993	2,200,000	Hidden Lk.	1,800,000	Fry	1994	Hidden Lk.	
1992	2,293,000	Hidden Lk.	1,901,000	Fry	1993	Hidden Lk.	
1991	2,652,000	Hidden Lk.	1,716,000	Fry	1992	Hidden Lk.	
1990	2,189,000	Hidden Lk.	1,600,000	Fry	1991	Hidden Lk.	
1989	2,220,000	Hidden Lk.	1,748,000	Fry	1990	Hidden Lk.	
2021	6,153,309	Tutka Bay Lagoon (EBL)	-	Fry	2022	Hazel Lk.	
			-	Fry	2022	Kirschner Lk.	
			-	Fry	2022	Leisure Lk.	
			-	Smolt	2023	Tutka Bay Lagoon	
2020	2,666,434	Tutka Bay Lagoon (EBL)	240,960	Fry	2021	Hazel Lk.	
			239,742	Fry	2021	Kirschner Lk.	
			1,070,851	Fry	2021	Leisure Lk.	
			-	Smolt	2022	Tutka Bay Lagoon	
2019	1,793,342	Tutka Bay Lagoon (EBL)	266,448	Fry	2020	Hazel Lk.	
			271,858	Fry	2020	Kirschner Lk.	
			274,443	Fry	2020	Leisure Lk.	
			375,626	Smolt	2021	Tutka Bay Lagoon	
2018	3,913,000	Tutka Bay Lagoon (EBL)	1,293,000	Fry	2019	Hazel Lk.	
			258,000	Fry	2019	Kirschner Lk.	
			1,085,000	Fry	2019	Leisure Lk.	
			363,072	Smolt	2020	Tutka Bay Lagoon	
2017	5,555,000	Tutka Bay Lagoon (EBL)	813,000	Fry	2018	Hazel Lk.	
			244,000	Fry	2018	Kirschner Lk.	
			1,948,000	Fry	2018	Leisure Lk.	
			427,000	Smolt	2019	Tutka Bay Lagoon	
2016	4,273,500	Tutka Bay Lagoon (EBL)	834,000	Fry	2017	Hazel Lk.	
			260,000	Fry	2017	Kirschner Lk.	
			1,387,000	Fry	2017	Leisure Lk.	
			518,000	Smolt	2018	Tutka Bay Lagoon	
2015	1,141,683	Tutka Bay Lagoon (EBL)	185,000	Fry	2016	Kirschner	
			356,000	Smolt	2017	Tutka Bay Lagoon	
			86,000	Smolt	2017	Port Graham	
2014	3,067,700	Tutka Bay Lagoon (EBL)	237,000	Fry	2015	Kirschner Lk	618,020 culled for IHN
			621,000	Fry	2015	Hazel Lk	
			1,051,000	Fry	2015	Leisure Lk.	
2013	2,664,000	Tutka Bay Lagoon (EBL)	725,000	Fry	2014	Hazel Lk	
			1,353,000	Fry	2014	Leisure Lk.	
2012	4,326,340	Tutka Bay Lagoon (HL)	1,450,000	Fry	2013	Hazel Lk	IHNV detected - 274,000 eggs destroyed
			1,800,000	Fry	2013	Leisure Lk.	
2011	3,012,637	Tutka Bay Lagoon (HL)	2,074,000	Fry	2012	Leisure Lk.	
2010	3,347,000	Tutka Bay Lagoon	1,244,000	Fry	2011	Hazel Lk.	
			1,415,000	Fry	2011	Leisure Lk.	
2009	140,000	Tutka Bay Lagoon	26,600	Smolt	2011	Tutka Bay Lagoon	Saltwater ripening Test
2008	103,000	Tutka Bay Lagoon					Saltwater ripening Test - All resulting fry destroyed
2017	28,700	Shell Lake	15,230	Smolt	2019	Shell Lake	
2016	87,600	Shelll Lake	46,000	Smolt	2018	Shell Lake	
2012	91,300	Shelll Lake	80,000	Smolt	2014	Shell Lake	

Sockeye Salmon con'd

Brood Year	Egg Take Number	Brood Stock	Number Released	Life Stage	Release Year	Release Site	Notes
2007	4,931,000	Big Lk.	3,610,000	Fry	2008	Big Lk.	
2006	6,483,000	Big Lk.	3,812,000	Fry	2007	Big Lk.	
			703,000	Fall Fry	2007	Big Lk.	
2005	2,185,000	Big Lk.	444,000	Fry	2006	Big Lk.	
			426,000	Fall Fry	2006	Big Lk.	
			316,000	Smolt	2007	Big Lk.	Temporary rearing at ESH - TLH water shortage
2004	2,590,000	Big Lk.	1,742,000	Fry	2005	Big Lk.	
2003	7,001,000	Big Lk.	5,004,000	Fry	2004	Big Lk.	
2002	6,342,000	Big Lk.	3,589,000	Fry	2003	Big Lk.	
2001	6,286,000	Big Lk.	4,316,000	Fry	2002	Big Lk.	
2000	3,638,000	Big Lk.	0	Fry	2001	Big Lk.	IHNV detected - 2,600,000 fry destroyed
1999	1,490,000	Big Lk.	846,000	Fry	2000	Big Lk.	
1998	5,132,000	Big Lk.	197,000	Fry	1999	Big Lk.	Fry lost to clogged incubator screens and IHNV detected
1995	1,994,000	Chelatna Lk.	1,042,000	Fry	1996	Chelatna Lk.	
1994	2,341,000	Chelatna Lk.	1,806,000	Fry	1995	Chelatna Lk.	
1993	2,480,000	Chelatna Lk.	1,330,000	Fry	1994	Chelatna Lk.	
1992	2,540,000	Chelatna Lk.	1,003,000	Fry	1993	Chelatna Lk.	IHNV detected - 948,000 fry destroyed
1991	2,084,000	Chelatna Lk.	1,138,000	Fry	1992	Chelatna Lk.	
1990	1,559,000	Chelatna Lk.	635,000	Fry	1991	Chelatna Lk.	
1989	1,008,000	Chelatna Lk.	503,000	Fry	1990	Chelatna Lk.	
1997	2,008,000	Packers Lk.	0			Grouse Lk.	IHNV detected - 800,000 presmolt destroyed
1996	2,188,000	Packers Lk.	500,000	Eggs	1996	Tutka Hatchery	
1996			247,000	Fry	1997	Packers Lk.	
1996			381,000	Fall Fry	1997	Packers Lk.	
1996			609,000	Smolt	1998	Grouse Lk.	
1995	2,958,000	Packers Lk.	246,000	Fry	1996	Packers Lk.	
1995			442,000	Fall Fry	1996	Packers Lk.	
1995			1,170,000	Smolt	1997	Grouse Lk.	
1994	3,581,000	Packers Lk.	511,000	Fry	1995	Packers Lk.	
1994			1,041,000	Fall Fry	1995	Packers Lk.	IHNV detected - 1,000,000 presmolt destroyed
1993	3,950,000	Packers Lk.	2,779,000	Fry	1994	Packers Lk.	
1993			710,000	Smolt	1995	Grouse Lk.	
1992	4,206,000	Packers Lk.	3,266,000	Fry	1993	Packers Lk.	
			570,000	Smolt	1994	Grouse Lk.	
1991	4,125,000	Packers Lk.	3,172,000	Fry	1992	Packers Lk.	
1990	4,053,000	Packers Lk.	2,505,000	Fry	1991	Packers Lk.	
2003	10,936,000	Tustumena Lk.	6,006,000	Fry	2004	Tustumena Lk.	
			251,000	Fry	2004	Kirschner Lk.	
			2,002,000	Fry	2004	Leisure Lk.	
			351,000	Fry	2004	Hazel Lk.	
2002	11,721,000	Tustumena Lk.	6,024,000	Fry	2003	Tustumena Lk.	
			298,000	Fry	2003	Kirschner Lk.	
			2,240,000	Fry	2003	Leisure Lk.	
			1,547,000	Fry	2003	Hazel Lk.	
2001	12,037,000	Tustumena Lk.	6,065,000	Fry	2002	Tustumena Lk.	Surplus fish - 212,000 fry destroyed
			302,000	Fry	2002	Kirschner Lk.	
			2,246,000	Fry	2002	Leisure Lk.	
			1,280,000	Fry	2002	Hazel Lk.	
			508,000	Fall Fry	2002	U. Paint Lk.	
2000	11,810,000	Tustumena Lk.	89,000	Fry	2001	Leisure Lk.	IHNV detected - 8,066,000 fry destroyed
1999	14,984,000	Tustumena Lk.	5,432,000	Fry	2000	Tustumena Lk.	
			249,000	Fry	2000	Kirschner Lk.	
			1,708,000	Fry	2000	Leisure Lk.	
			1,248,000	Fry	2000	Hazel Lk.	
1998	13,382,000	Tustumena Lk.	5,948,000	Fry	1999	Tustumena Lk.	Fry lost to clogged incubator screens, pin heading and improper raceway stocking densities
			173,000	Fry	1999	Kirschner Lk.	
			265,000	Fry	1999	Leisure Lk.	
			453,000	Fry	1999	Hazel Lk.	
1997	6,849,000	Tustumena Lk.	4,558,000	Fry	1998	Tustumena Lk.	
1996	8,560,000	Tustumena Lk.	6,013,000	Fry	1997	Tustumena Lk.	
			679,000	Smolt	1998	Grouse Lk.	
			507,000	Smolt	1998	Bear Ck.	
1995	1,286,000	Tustumena Lk.	796,000	Smolt	1997	Grouse Lk.	
1994	1,432,000	Tustumena Lk.				Grouse Lk. & Coal Ck.	IHNV detected - All fish destroyed
1993	350,000	Tustumena Lk.	151,000	Smolt	1995	Coal Ck.	
			83,000	Smolt	1995	Grouse Lk.	
1991		Tustumena Lk.				Coal Ck.	300,000 fry transfer. IHNV detected - 285,000 presmolt destroyed
1990		Tustumena Lk.	66,000	Smolt	1992	Coal Ck.	100,000 fry transfer.
	443,963,392		281,664,901				

13.2 CIAA Fisheries Enhancement Project Summary – 2022

Trail Lakes Hatchery BY2020 and BY2021 Production Data

BY	Species	Stock	Green	Eyed	Hatched/Ponded	Fry/Smolt	Release Site *	Target Size (gm)	Target Release #	Current or Release Size (g)	Released or Transferred	
20	Sockeye	Bear Lake	6,000,672	3,151,993	3,088,953	Stocked	Bear Lake (F)	0.5	2,400,000	0.68	2,543,927	5/31-6/2/21
				1,816,417	1,780,089	1,598,900	Resurrection Bay (S)	7.5-15	1,500,000	4.65	-	-
20	Sockeye	Hidden Lake	871,317	703,244	689,179	Stocked	Hidden Lake (F)	unfed	1,250,000	0.09	689,000	5/11-5/12//21
20	Sockeye	Tutka	2,666,434	1,132,715	1,098,734	*Stocked*	Leisure Lake (F)	0.25	2,000,000	0.25	1,070,851	6/10-6/14/21
				251,546	244,000	*Stocked*	Hazel Lake (F)	0.25	1,250,000	0.24	240,960	6/11/2021
				250,333	242,823	*Stocked*	Kirschner Lake (F)	0.25	250,000	0.24	239,742	6/14/2021
				498,427	483,474	475,014	Tutka (S)	7.5-15	500,000	4.8	-	-
20	Sockeye	Shell Lake	-	-	-	-	Shell Lake (S)	-	130,500	-	-	-
20	Coho	Bear Lake	568,414	493,847	483970	Stocked	Bear Lake (F)	1.0	450,000	1.22	445,081	6/7/2021
				33,000	32,340	31,462	Bear Creek (S)	12-18	25,000	10.4	-	-
21	Sockeye	Bear Lake	4,694,585	2,466,200	2,191,955	-	Bear Lake (F)	0.5	2,400,000	-	-	-
				1,167,585	1,040,676	-	Resurrection Bay (S)	7.5-15	826,136	-	-	-
21	Sockeye	Hidden lake	1,263,305	1,061,915	1,045,367	-	Hidden Lake (F)	unfed	1,250,000	-	-	-
21	Sockeye	Tutka	6,153,309	1,828,667	1,773,807	-	Leisure Lake (F)	0.25	2,000,000	-	-	-
				1,137,657	-	-	Hazel Lake (F)	0.25	1,250,000	-	-	-
				324,601	314,863	-	Kirschner Lake (F)	0.25	250,000	-	-	-
				1,015,894	985,417	-	Tutka (S)	7.5-15	500,000	-	-	-
21	Sockeye	Shell Lake	0	N/A	N/A	N/A	Shell Lake (S)	-	0	-	-	-
21	Coho	Bear Lake	609,926	474,804	465,308	-	Bear Lake (F)	1.0	450,000	-	-	-
				58,419	57,251	-	Bear Creek (S)	12-18	50,000	-	-	-
		Total	**22,827,962**	**17,867,264**	**16,018,206**	**2,105,376**			**1,905,000**	**BY20 Smolt Release Goal**	**0**	**BY20 Current Smolt Release Number**
									7,845,000	**BY21 Release Goal**	**0**	**BY21 Current Release Number**

13.3 Bear Lake Coho Salmon Fisheries Enhancement Project

Summary Statistics Bear Lake Smolt Production 1962 - 1971 Prior to Coho & Sockeye Enhancement	
Mean	19,330
Standard Error	5,933
Median	14,095
Range	59,070
Minimum	1,873
Maximum	60,943
Sum	193,302
Count	10
Confidence Level (95.0%)	13,421

Summary Statistics Bear Lake Smolt Production 1989 - 2017 With Sockeye Enhancement	
Mean	78,290
Standard Error	5,399
Median	81,900
Range	133,600
Minimum	21,300
Maximum	154,900
Sum	2,270,403
Count	29
Confidence Level(95.0%)	11,058

Summary Statistics Bear Lake Smolt Production 1973 - 1988 Prior to Sockeye Enhancement	
Mean	93,791
Standard Error	5,997
Median	93,069
Range	79,840
Minimum	63,775
Maximum	143,615
Sum	1,500,649
Count	16
Confidence Level (95.0%)	12,783

Summary Statistics Total Smolt Production 1990 - 2017 With Sockeye Enhancement	
Mean	179,637
Standard Error	21,757
Median	164,965
Range	517,500
Minimum	36,200
Maximum	553,700
Sum	5,029,833
Count	28
Confidence Level(95.0%)	44,642

13.4 Figures

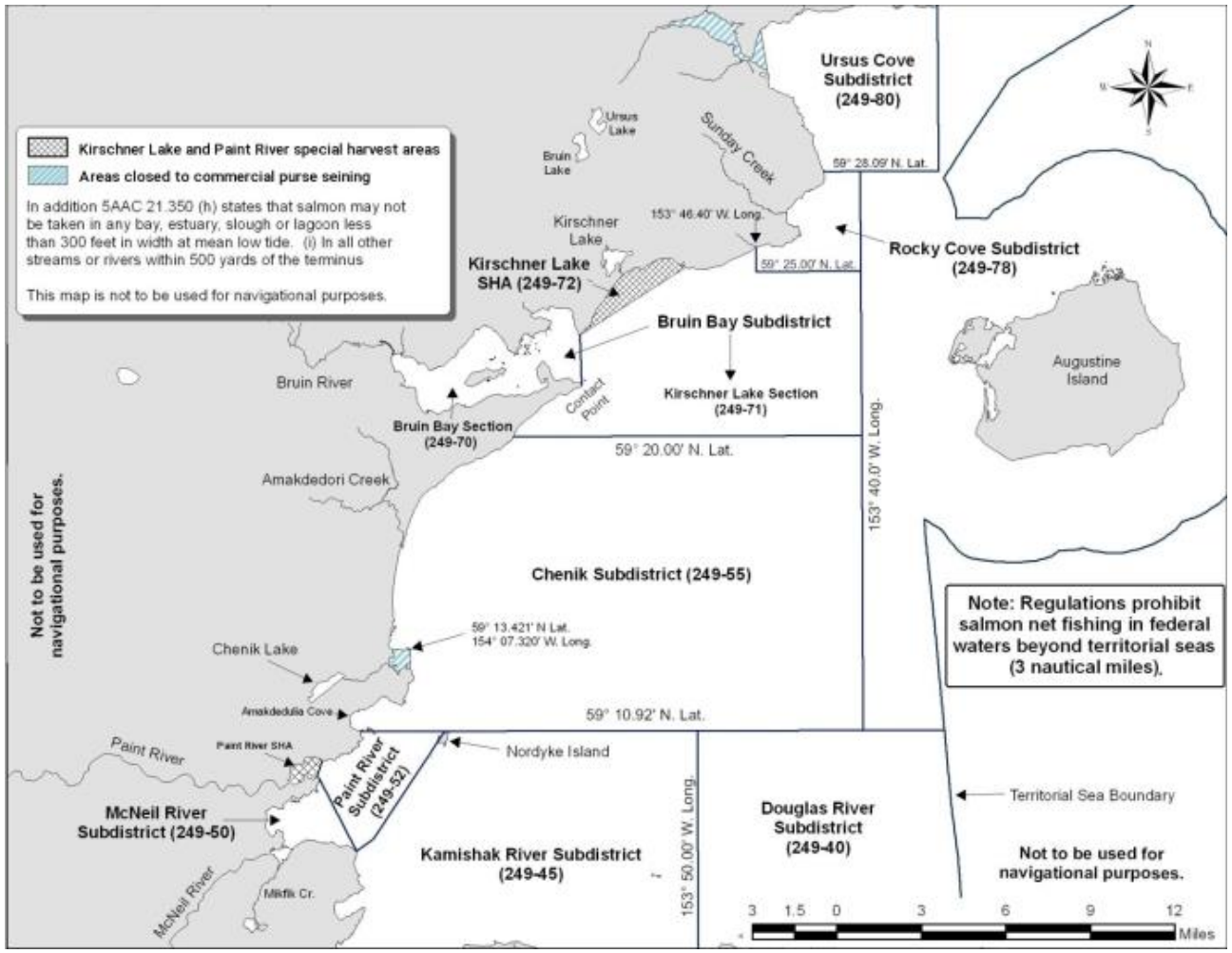


Figure 1.–Kirschner Lake Special Harvest Area

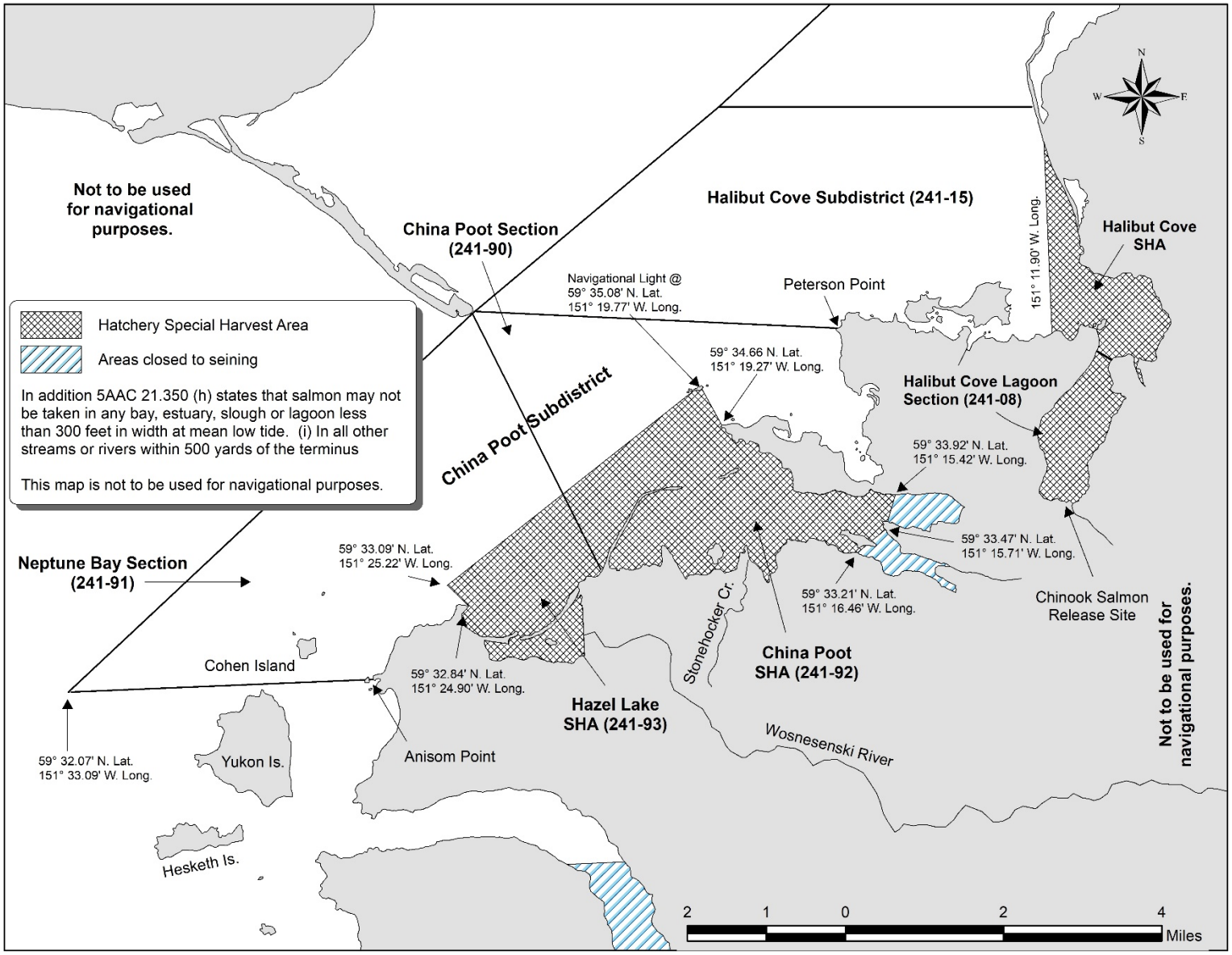


Figure 2.–China Poot/Hazel Lake Special Harvest Area

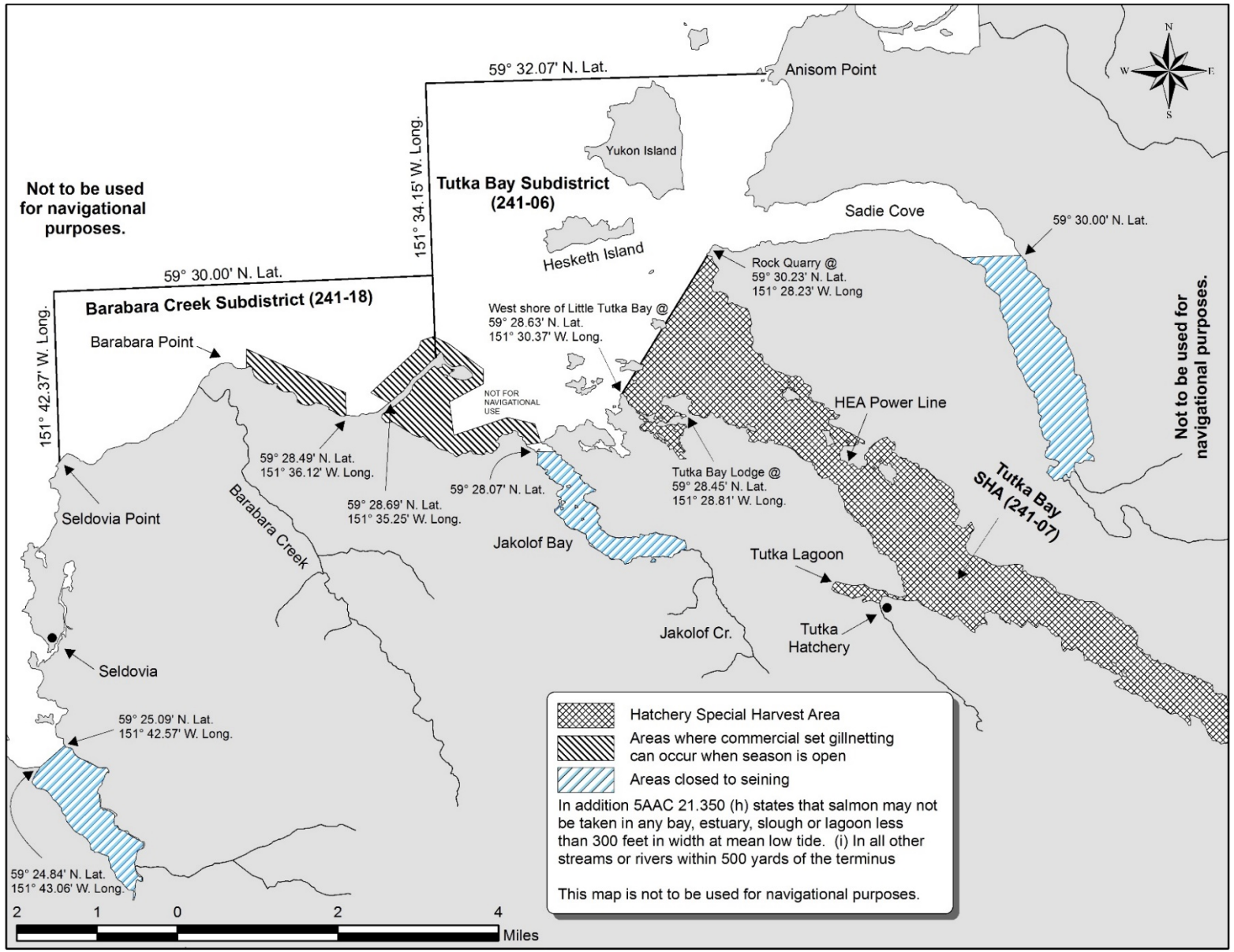


Figure 3.–Tutka Bay Special Harvest Area

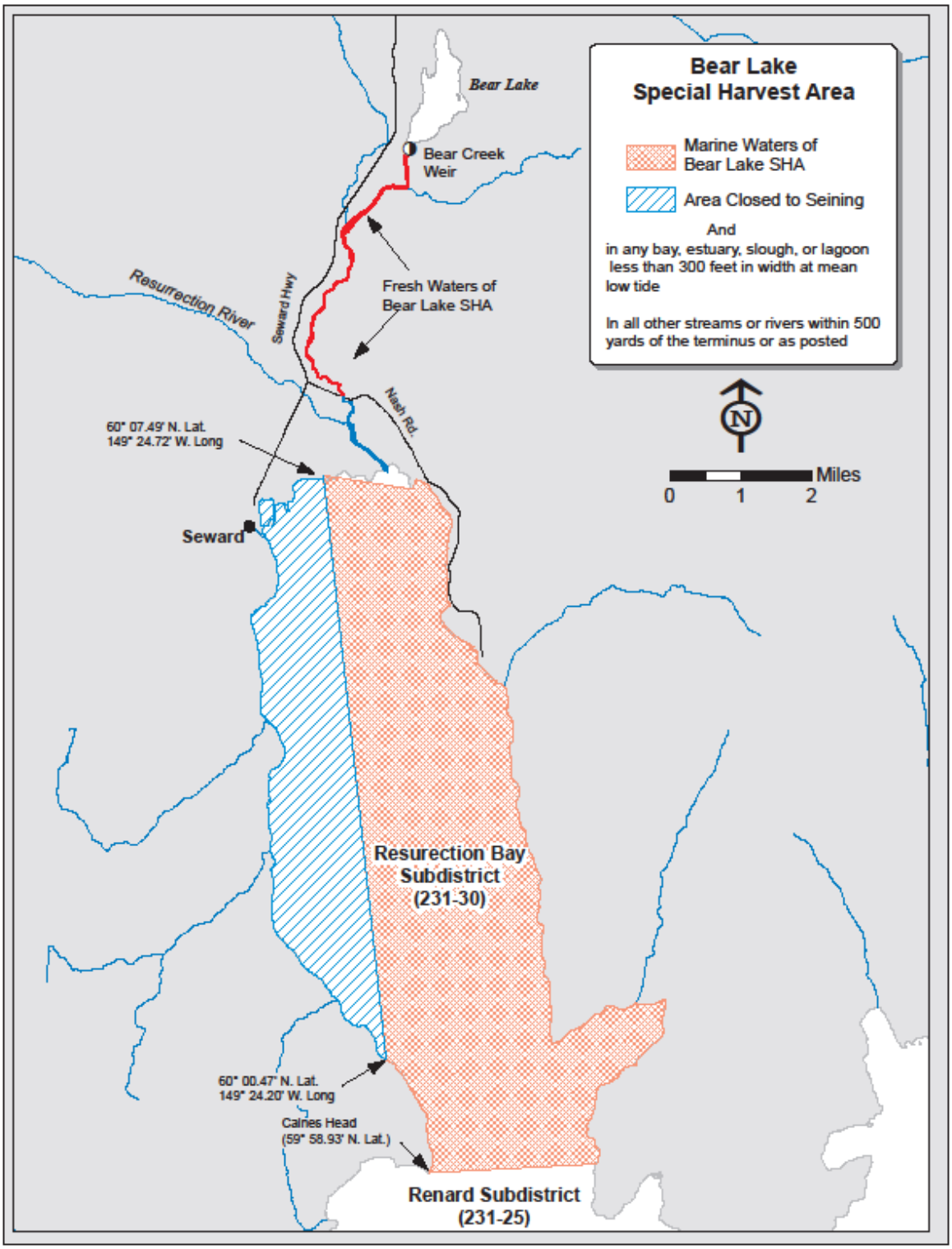


Figure 4.–Bear Lake Special Harvest Area

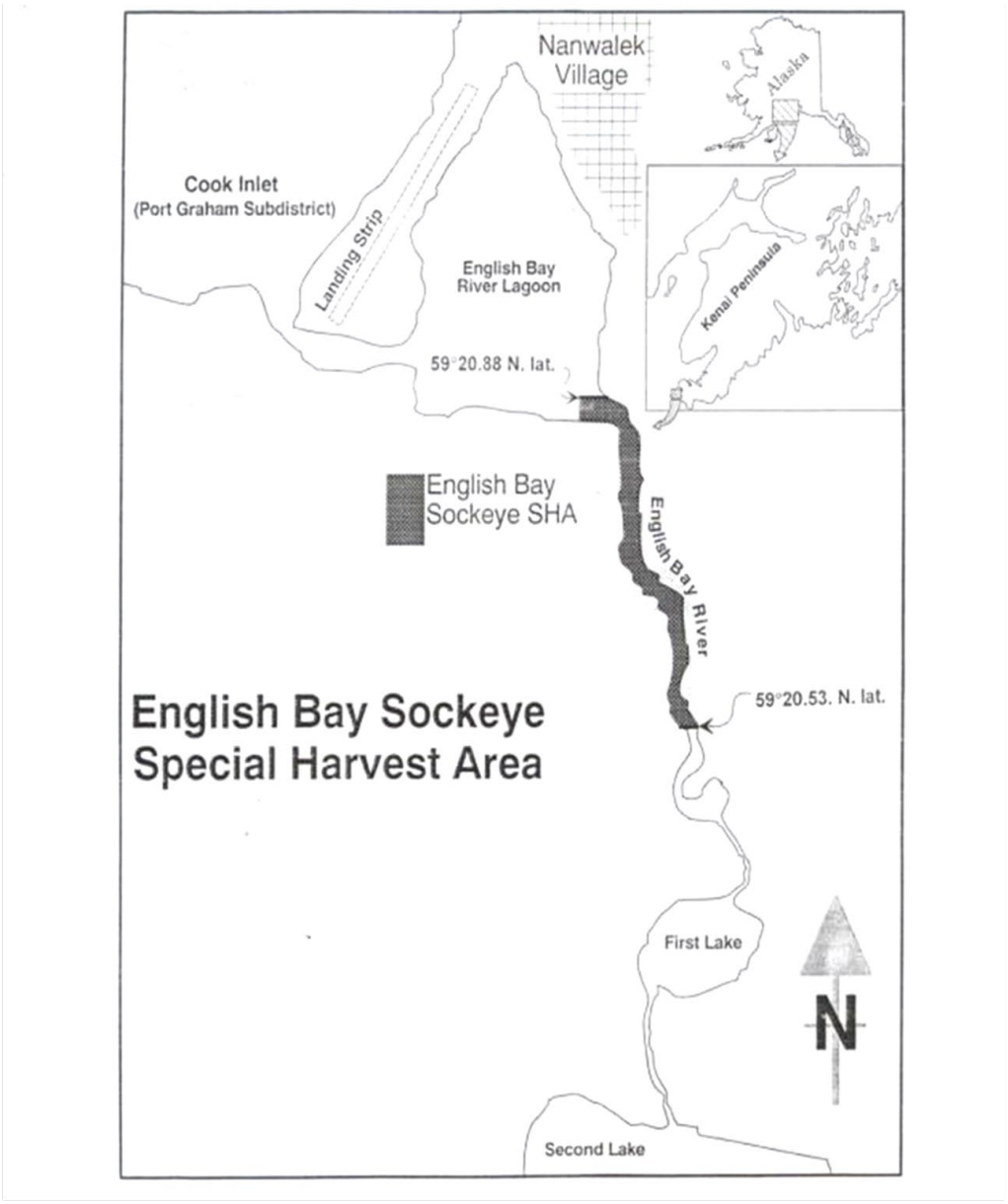


Figure 5.–English Bay Sockeye Salmon Special Harvest Area

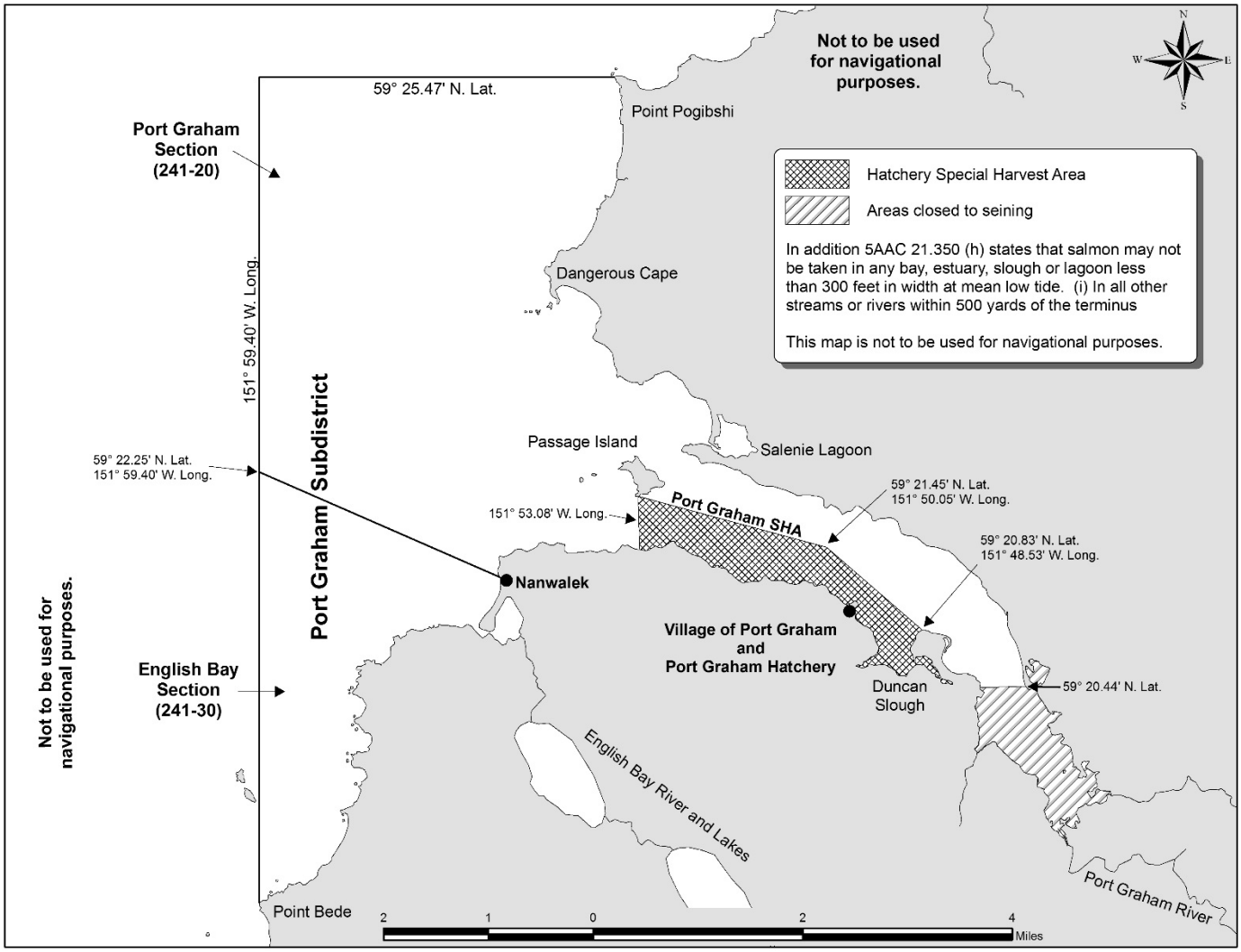


Figure 6. Port Graham Hatchery Special Harvest Area