2022 ANNUAL MANAGEMENT PLAN
Tutka Bay Lagoon 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

No major modifications to the facility are anticipated this year.

1.2.2 Production Changes

All pink salmon fry will be reared and released in Tutka Bay Lagoon.

1.2.3 Fish Culture Changes

No major changes anticipated in 2022.

1.2.4 Projected Return and Cost-recovery Changes

- At a 2.8% fry-to-adult survival rate (based on average of past 5 even-year survival to this facility), CIAA is expecting approximately 2,013,401 adult pink salmon to return to Tutka Bay Lagoon Hatchery (TBLH). An estimated 137,143 fish will be required to meet the number of broodstock necessary to meet the egg take goal and 6,500–17,000 for escapement. The remaining fish will be available for common property and cost recovery harvests. Any remaining fish will be harvested by the common property or cost recovery harvesters or removed by the hatchery operator.

1.3 Fish Transport Permits or Amendments Needed This Year

No new permits or amendments needed in 2022.

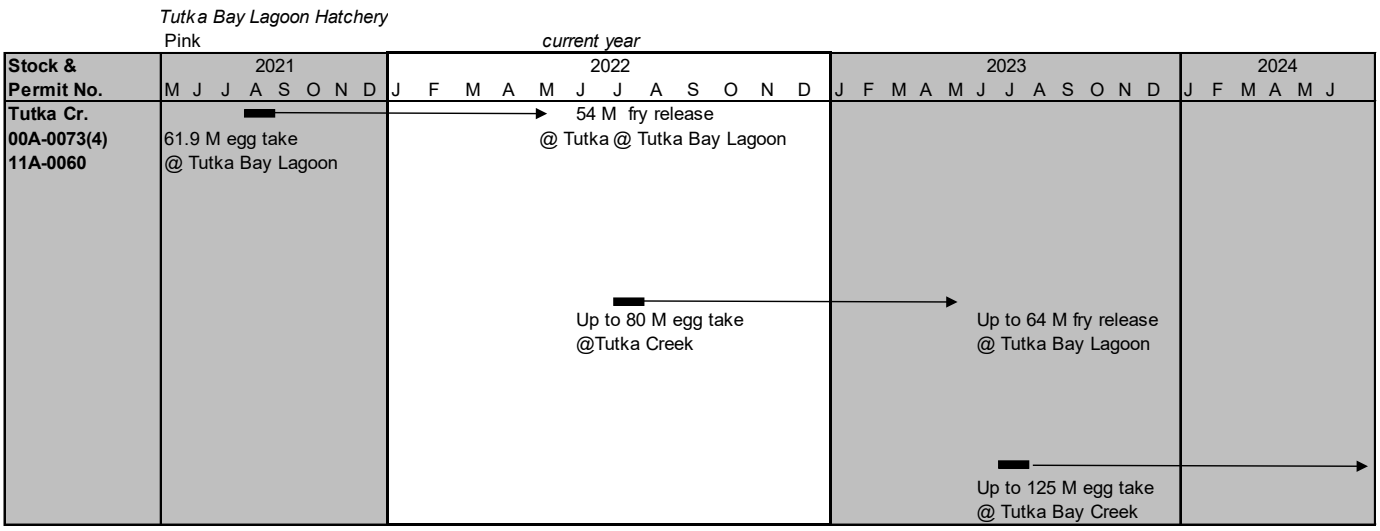
1.4 Expected Return

In order to estimate adult production from TBLH projects, it is assumed that there is 80% green egg-to-fry survival and a 2.8% adult return.

The projected adult production from TBLH enhancement projects this year are:

Species	Stock	Return Site	Brood Year	Total Return	Enhanced Return	Natural Return	Cost Recovery	Broodstock/ Escapement	Common Property Harvest
Pinks	Tutka	Tutka Bay Lagoon	2020	2,013,401	2,013,401	0	1,676,932	150,143	186,326
	Combined Age Classes			**2,013,401**	**2,013,401**	**0**	**1,676,932**	**150,143**	**186,326**
	% of Total				**100%**	**0%**	**83%**	**7%**	**9%**

1.5 Production Summary



1.6 Permitted Capacity

TBLH operates under PNP Hatchery Permit #32 issued in 1994 and has a permitted capacity of 125,000,000 pink salmon green eggs and 660,000 sockeye salmon green eggs.

The FTPs under which CIAA operates TBLH programs are:

FTP #	Donor Stock/ Ancestral Stock	Maximum #, Life Stage	Action	Expiration Date	Transport from, to
Pink salmon					
00A-0073	Tutka Cr/ Tutka Cr	125 million green eggs	Egg take, rearing, release	12/31/2026	TBLH to Tutka Bay and Tutka Bay Lagoon
12A-0114	Tutka Bay/ Bruin Bay	4,714 adults	Transfer	6/30/2022	Bruin Bay to TBLH
Sockeye salmon					
11A-0051[a]	Tutka Lagoon/English Bay Lk	1,000,000 smolts	Transfer, rearing, release	12/31/2025	TLH to Tutka Bay

[a]FTP for TLH.

1.7 Project Evaluation

Fish tickets submitted to ADF&G as well as counts during egg take and escapement will be used to enumerate returns to Tutka Bay Lagoon Hatchery.

All fish will be thermally marked.

2.0 Paint River Stocking Program

2.1 Purpose and History

The Paint River system, which enters Akjemguiga Cove in Kamishak Bay over a forty-foot waterfall at tidewater, has never had a self-sustaining run of salmon, but has long been recognized by both ADF&G and CIAA as having significant salmon production potential. A fish ladder was completed in 1991. The next phase of this project is to develop salmon runs to Paint River.

In spring 2011, the fish ladder was opened to allow migration of adult salmon to thesystem and natural colonization of the watershed. The first anadromous fish (coho salmon) were documented in the system in 2014. In 2015, chum salmon were also documented in and above the ladder.

No stocking programs planned for 2022. The fish ladder will be open from early June through September to allow natural colonization of this extensive watershed. A video camera will be installed to document fish passage through the fish ladder.

2.2 Operational Plan

2.2.1 Egg-take Goal/Brood Sources

CIAA will not collect eggs from pink salmon returning to Bruin River in 2022.

2.2.2 Egg Take; Transport of Eggs

CIAA will not collect eggs from pink salmon returning to Bruin River in 2022.

2.2.3 Incubation Plans

CIAA will not collect eggs from pink salmon returning to Bruin River in 2022 and no incubation of Bruin Bay stock will take place at TBLH in 2022. This part of the project occurs under *Port Graham Hatchery's Annual Management Plan*.

2.2.4 Rearing and Release Plans

CIAA will not collect eggs from pink salmon returning to Bruin River in 2022 and no rearing or release of Bruin Bay stock will take place at TBLH in 2022. This part of the project occurs under *Port Graham Hatchery's Annual Management Plan*.

2.3 Donor Stock Management

2.3.1 Management Strategies

CIAA will not collect eggs from pink salmon returning to Bruin River in 2022.

2.3.2 Escapement Requirements

CIAA will not collect eggs from pink salmon returning to Bruin River in 2022.

2.4 Evaluation Plans

CIAA will not collect eggs from pink salmon returning to Bruin River this year.

No TBLH hatchery incubated pink salmon are expected to return this year. Depending on the return and completion of a cabin at Paint River, CIAA may collect otolith samples from this year's pink salmon returns.

A video camera will be installed to document all adult returns through the fish ladder at Paint River.

3.0 Tutka Pink Salmon

3.1 Purpose and History

ADF&G initiated this project in 1975; CIAA assumed operation of the project in 1991.

The purpose of the project is enhancement of the pink salmon return to Tutka Bay Lagoon for the common property fishery and cost-recovery harvest.

In 2004, CIAA suspended the Tutka Bay Lagoon pink salmon project and year-round operations at TBLH. In 2009, after reviewing options for improving hatchery operations, CIAA elected to resume pink salmon production at the facility. In 2011, natural returns to Tutka Creek were sufficient to allow the use of adult fish for broodstock and hatchery operations resumed.

3.2 Operational Plan

3.2.1 Egg-take Goal/Brood Sources

Primarily hatchery-produced pink salmon returning to Tutka Bay Lagoon Hatchery will be used as the brood source. Sufficient adult pink salmon returns are expected in 2022 to meet full permitted production of 125 million green eggs. The actual number ofeggs collected will be dependent on egg size and based on the loading of 239 incubators at up to 80 kg per incubator.

Fish Required to meet Egg-Take Goal		
Stock		Tutka
Species		Pinks
# Green Egg Goal		80,000,000
Fecundity		1,400
Female to Male Ratio		1:1
	Female	57,143
	Male	57,143
	Total Broodstock	114,286
Inviable	7%	8,000
Excess Males/Roe Recovery	10%	11,429
Mortalities	3%	3,428
	Grand Total	**137,143**

3.2.2 Egg Take; Transport of Eggs

BY22 pink salmon broodstock will be collected from Tutka Creek. A weir will be constructed to restrict access above the pump house to those fish required for escapement (6,500 - 17,000) under approved fish transport and habitat permits. Egg takes will occur at the creek side and eggs will be fertilized immediately at a 1:1 female to male ratio and placed into NOPAD incubators. Two-thirds of the 359 incubators will be loaded with green eggs at a loading rate of up to 80 kg per incubator.

3.2.3 Incubation Plans

Once BY22 eggs have reached the eyed stage, they will be shocked, picked, and inventoried before being placed back into the incubators until emergence. Incubators will be loaded with eyed eggs at a loading rate of up to 40 kg per incubator. The fish will be thermal marked.

3.2.4 Rearing and Release Plans

All pink salmon fry will non-volitionally migrate from the incubators to net pens located in Tutka Bay Lagoon for short-term rearing before release. Loading will be such that the final density at release will be up to 8 kg/m^3.

Table 1. Anticipated releases this calendar year.

Species	Pink		**Stock**	Tutka		
Brood Year	**Life Stage**	**Release Site**	**Released**	**Mark Type**	**Percent marked**	**Hatch code**
2021	Fry	Tutka Lagoon	54,200,000	Otolith	100%	4,3H & 6,3H

3.3 Donor Stock Management

3.3.1 Management Strategies

Cost recovery and common property harvest efforts will be managed to allow sufficient escapement into Tutka Creek for both broodstock harvest as well as natural escapement.

Broodstock will be collected directly from the creek below the weir and egg take will occur at the creek. CIAA will work with department staff to spread broodstock selection throughout the run based on historic run timing.

Any mortality problems associated with collection and holding of adults, and/or transportation of gametes will be immediately reported to the ADF&G Homer office.

3.3.2 Escapement Requirements

A weir will be established on Tutka Creek in early to mid-July just below the pump house. CIAA will work with department staff to manage freshwater spawning escapement in a manner that mimics historic run timing and distribution (both above and below the weir), while targeting a final stream-wide escapement by mid-August within the SEG range of 6,500 - 17,000 fish.

3.4 Evaluation Plans

CIAA and ADF&G personnel will cooperatively monitor the adult pink salmon return to assess abundance.

All BY22 eggs will be thermally marked.

CIAA will collect otoliths from adult pink salmon used as broodstock.

4.0 Harvest Management

4.1 Cost-recovery Plan

Cost recovery for sockeye salmon will be done under the Trail Lakes Hatchery (TLH) program and is detailed in the *Trail Lakes Hatchery 2022 Annual Management Plan*.

CIAA funds the cost of operating TLH, TBLH, PGH, 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 Tutka Bay SHA, as well as other hatchery subdistricts listed in 5 AAC 21.372 *Tutka Bay Lagoon Salmon Hatchery Management Plan* that ensure achievement of broodstock and cost recovery licensing goals for CIAA, as well as to allow for an orderly common property fishery opportunity to harvest fish surplus to hatchery needs. Some reduction in the common property fishery opportunity in hatchery subdistricts may be necessary to ensure broodstock and cost recovery

licensing objectives are met in a timely and orderly fashion. In addition to weekly updates providing current levels of CIAA brood and cost recovery harvests to the Homer ADF&G office, CIAA will submit written hatchery subdistrict management recommendations to the AMB with clear justifications as to how the recommendations support achieving cost recovery and/or broodstock collection goals. Recommendations will be submitted in the form of a brief email and 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 also include the number of fish within Tutka Lagoon outside of holding pens as well as in the creek.

4.2 Special Harvest Areas

4.2.1 Tutka Bay Special Harvest Area

4.2.1.1 Area Definition

The Tutka Bay SHA is defined in 5 AAC 21.372 *Tutka Bay Lagoon 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 (Figure 1).

4.2.1.2 Fishery Management

The common property fishery will be managed to achieve the established pink salmon sustainable escapement goal (SEG) for Tutka Creek. In addition, an appropriate number of pink salmon will be allowed to escape the common property fishery to meet broodstock and cost recovery licensing needs. Pink salmon returning to Tutka Bay Lagoon are expected to be intermingled with English Bay Lakes sockeye salmon stock that will be harvested for cost recovery licensing and/or broodstock. To avoid capturing the pink salmon multiple times during collection efforts for sockeye salmon, CIAA will place captured pink salmon in net pens. Once the sockeye salmon broodstock capture is complete, the pink salmon being held in net pens will be released, or sold for cost recovery. These numbers will be reported to ADF&G Homer office via fish tickets if sold for cost recovery.

CIAA's first priority is to ensure sufficient escapement to Tutka Creek followed by meeting the broodstock goal. If CIAA's cost recovery licensing goal has been met at other SHAs, the fish that are surplus to escapement and broodstock licensing requirements will be harvested in the common property fishery. Any unharvested fish at the end of the season will be harvested and sold by CIAA as part of clean-up operations. CIAA will also sell broodstock carcasses.

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 (5 AAC 21.372).

4.2.2 Port Graham Special Harvest Area

4.2.2.1 Area Definition

As described in 5AAC 21.377 *Port Graham Salmon Hatchery Management Plan*, the PGH SHA consists of the marine waters of Port Graham Subdistrict east of 151° 53.08′ W. long., 59° 22.00’ N. lat. to a point off shore at 59° 21.45′ N. lat., 151° 50.05′ W. long., to a point on shore at 59° 20.83′ N. lat., 151° 48.53′ W. long. (Figure 2).

4.2.2.2 Fishery Management

Management of pink salmon returning to the Port Graham SHA is described Under the Port Graham Hatchery AMP.

4.2.3 Paint River Special Harvest Area

4.2.3.1 Area Definition

The Paint River SHA is defined in 5AAC 21.372 *Tutka Bay Lagoon Salmon Hatchery Management Plan* as the marine waters of Akjemguiga Cove west of a line from 59° 09.50′ N. lat., 154° 12.83′ W. long. to 59° 10′ N. lat., 154° 12.5′ W. long., including the lagoon at Paint River mouth and intertidal fish ladder (Figure 3).

4.2.3.2 Fishery Management

No adult Port Graham Hatchery pink salmon are expected to return to Paint River in 2022. ADF&G will be responsible for fishery management as it relates to the SEG for Paint River and the common property fishery.

The SHA shall be opened and closed to commercial fishing by EO. 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 (5 AAC 21.372).

4.2.4 Halibut Cove Special Harvest Area

4.2.4.1 Area Definition

The Halibut Cove SHA is defined in 5AAC 21.372 *Tutka Bay Lagoon Salmon Hatchery Management Plan* as the marine waters of the Halibut Cove Subdistrict east of 151° 11.9′ W. long., including all marine waters of Halibut

Cove Lagoon (Figure 4).

4.2.4.2 Fishery Management

No CIAA hatchery-produced fish are expected to return to Halibut Cove SHA in 2022.

5.0 Approval

Recommendation for Approval: Tutka Bay Lagoon 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, Div. of Comm. Fisheries 6/3/2022

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

The 2022 Tutka Bay Lagoon 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

6.0 Attachments

6.1 Tutka Bay Lagoon Hatchery Production

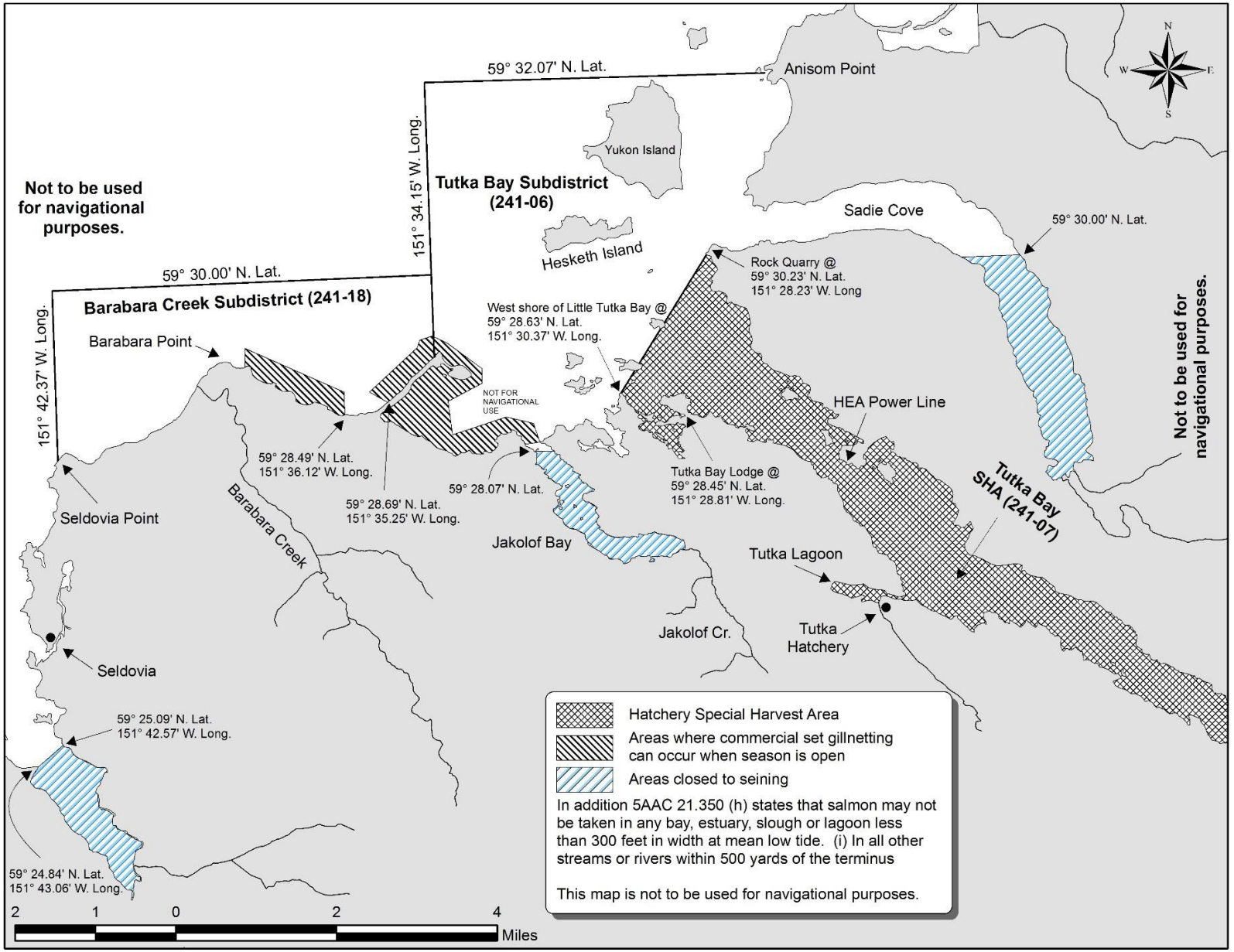
Pink Salmon							
Brood Year	Green Eggs	Fry Released	Egg to Fry Survival	Adult Return	Fry to Adult Survival	Egg to Adult Survival	Comments
1975	3,000,000	250,000	8.33%	undetermined			
1976	10,400,000	4,229,100	40.66%	151,968	3.59%	1.46%	Net pen accident resulted in the loss of more than 2.9 million fry.
1977	7,400,000	4,866,800	65.77%	368,887	7.58%	4.98%	
1978	13,033,200	9,427,586	72.34%	329,896	3.50%	2.53%	
1979	10,100,000	6,268,900	62.07%	1,016,345	16.21%	10.06%	
1980	15,800,000	9,848,200	62.33%	229,374	2.33%	1.45%	
1981	19,900,000	15,258,100	76.67%	666,517	4.37%	3.35%	
1982	18,996,533	14,733,208	77.56%	285,526	1.94%	1.50%	501,956 fry stocked remotely. Makes egg-to-fry survival 80.20% - No data on adult returns.
1983	26,775,619	19,618,325	73.27%	528,372	2.69%	1.97%	
1984	29,537,000	23,537,000	79.69%	441,323	1.88%	1.49%	
1985	32,274,000	25,091,200	77.74%	108,577	0.43%	0.34%	
1986	31,492,000	23,535,000	74.73%	919,629	3.91%	2.92%	559,000 fry stocked remotely. Makes egg-to-fry survival 76.51% - No data on adult returns.
1987	19,491,401	15,026,369	77.09%	954,047	6.35%	4.89%	562,991 fry stocked remotely. Makes egg-to-fry survival 79.98% - No data on adult returns.
1988	46,046,220	36,300,115	78.83%	257,101	0.71%	0.56%	657,075 fry stocked remotely. Makes egg-to-fry survival 80.26% - No data on adult returns.
1989	38,983,286	29,739,716	76.29%	326,915	1.10%	0.84%	614,946 fry stocked remotely. Makes egg-to-fry survival 77.87% - No data on adult returns.
1990	50,000,000	29,696,174	59.39%	469,290	1.58%	0.94%	303,000 fry stocked remotely. Makes egg-to-fry survival 60.00% - No data on adult returns.
1991	39,500,000	32,079,000	81.21%	772,886	2.41%	1.96%	302,000 fry stocked remotely. Makes egg-to-fry survival 81.98% - No data on adult returns.
1992	60,000,000	48,700,000	81.17%	1,735,647	3.56%	2.89%	
1993	77,000,000	61,100,000	79.35%	2,610,615	4.27%	3.39%	
1994	89,200,000	63,000,000	70.63%	568,578	0.90%	0.64%	
1995	125,600,000	105,000,000	83.60%	2,770,686	2.64%	2.21%	
1996	116,000,000	89,000,000	76.72%	1,470,354	1.65%	1.27%	
1997	117,400,000	90,000,000	76.66%	1,262,772	1.40%	1.08%	
1998	129,000,000	60,132,000	46.61%	1,253,303	2.08%	0.97%	
1999	114,091,000	65,120,000	57.08%	715,722	1.10%	0.63%	
2000	122,314,000	99,336,000	81.21%	906,745	0.91%	0.74%	
2001	134,384,000	99,370,000	73.94%	860,005	0.87%	0.64%	
2002	124,848,000	67,967,000	54.44%	1,196,195	1.76%	0.96%	
2003	73,196,000	47,964,000	65.53%	1,771,685	3.69%	2.42%	
2011	10,308,000	8,100,399	78.58%	215,840	2.66%	2.09%	
2011	4,300,000	3,146,000	73.16%	19,415	0.62%	0.45%	Windy Bay stock
2012	5,330,700	4,300,000	80.66%	56,552	1.32%	1.06%	
2012	16,439,000	14,250,000	86.68%	1,700	0.01%	0.01%	Port Graham Stock
2013	80,000,000	51,100,000	63.88%	2,472,394	4.84%	3.09%	
2013	373,000	188,000	50.40%	0	0.00%	0.00%	Port Graham stock. 95% of broodstock lost before spawning.
2014	13,495,000	11,249,250	83.36%	261,126	2.32%	1.93%	Large size pink (4.5 lb)
2014	1,367,000	1,025,000	74.98%	na	na	na	Bruin Bay stock for Paint River. Video weir was not working during the return of pink salmon to the ladder.
2015	29,126,000	11,433,500	39.26%	523,293	4.58%	1.80%	Issues with broodstock survival in the lagoon and high fungus
2016	66,003,000	54,245,400	82.19%	1,364,900	2.52%	2.07%	
2017	118,095,000	50,040,000	42.37%	243,115	0.49%	0.21%	Issues with high fall sediment loads in water supply
2018	114,383,665	85,580,538	74.82%	932,868	1.09%	0.82%	
2019	39,187,425	27,684,949	70.65%	466,633	1.69%	1.19%	
2020	91,573,034	71,907,183	78.52%				
2021	61,987,400						
Total	2,347,730,483	1,590,444,012		31,506,796			
Avg.			69.08%		2.69%	1.85%	

CIAA Enhancement Project Summary – 2022

Tutka Bay Lagoon Hatchery BY2021 Production Data as of 3/16/22

BY	Species	Stock	Green	Eyed	Hatched	Fry/Smolt	Release Site *	Target Release #	Current or Release Size (g)	Released or Transferred	
21	Pink	Tutka	61,987,400	59,506,127	58,911,066	-	Tutka	54,200,000	-	-	-

Figure 1.–Tutka Bay



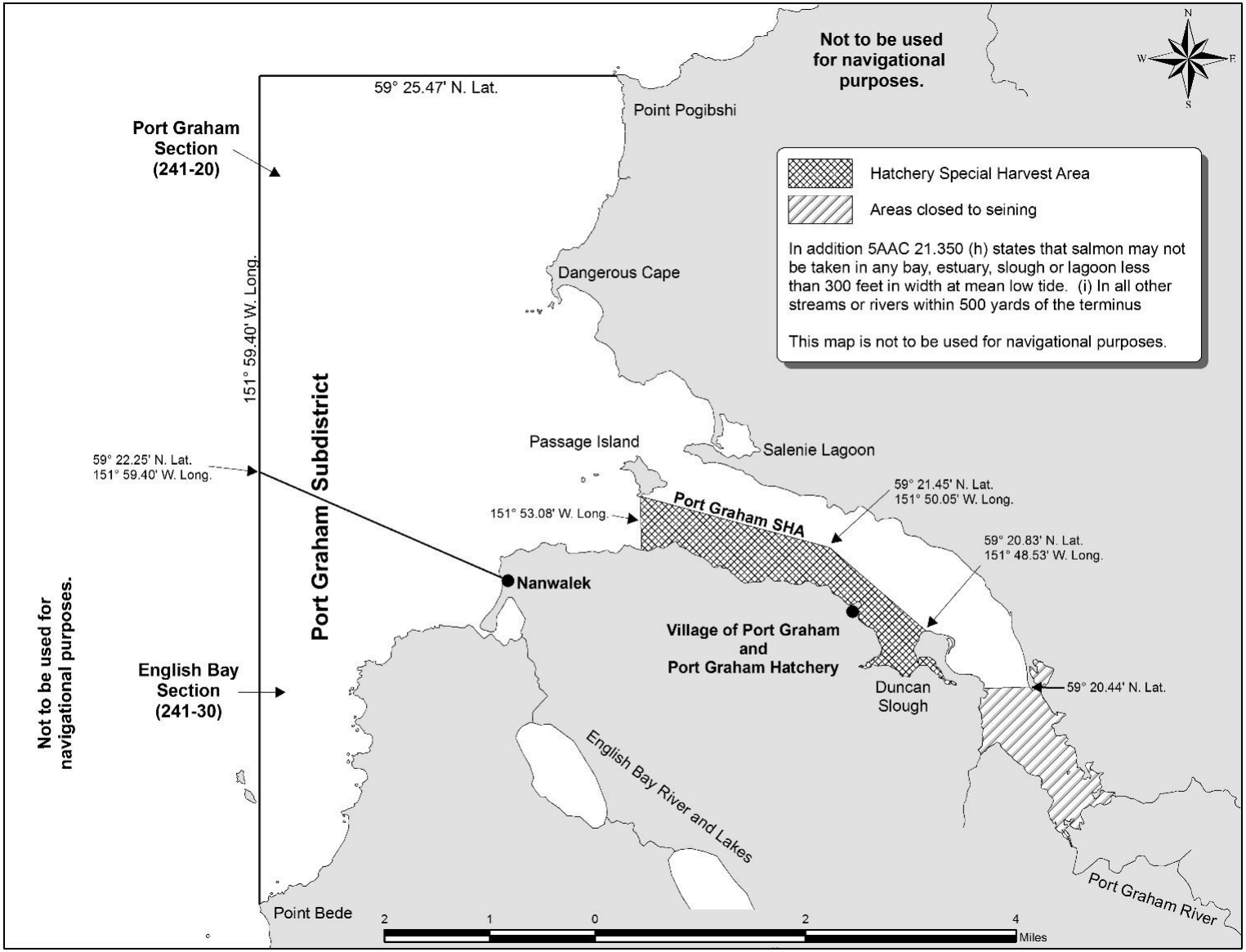


Figure 2.–Port Graham Bay.

Figure 3.–Paint River SHA

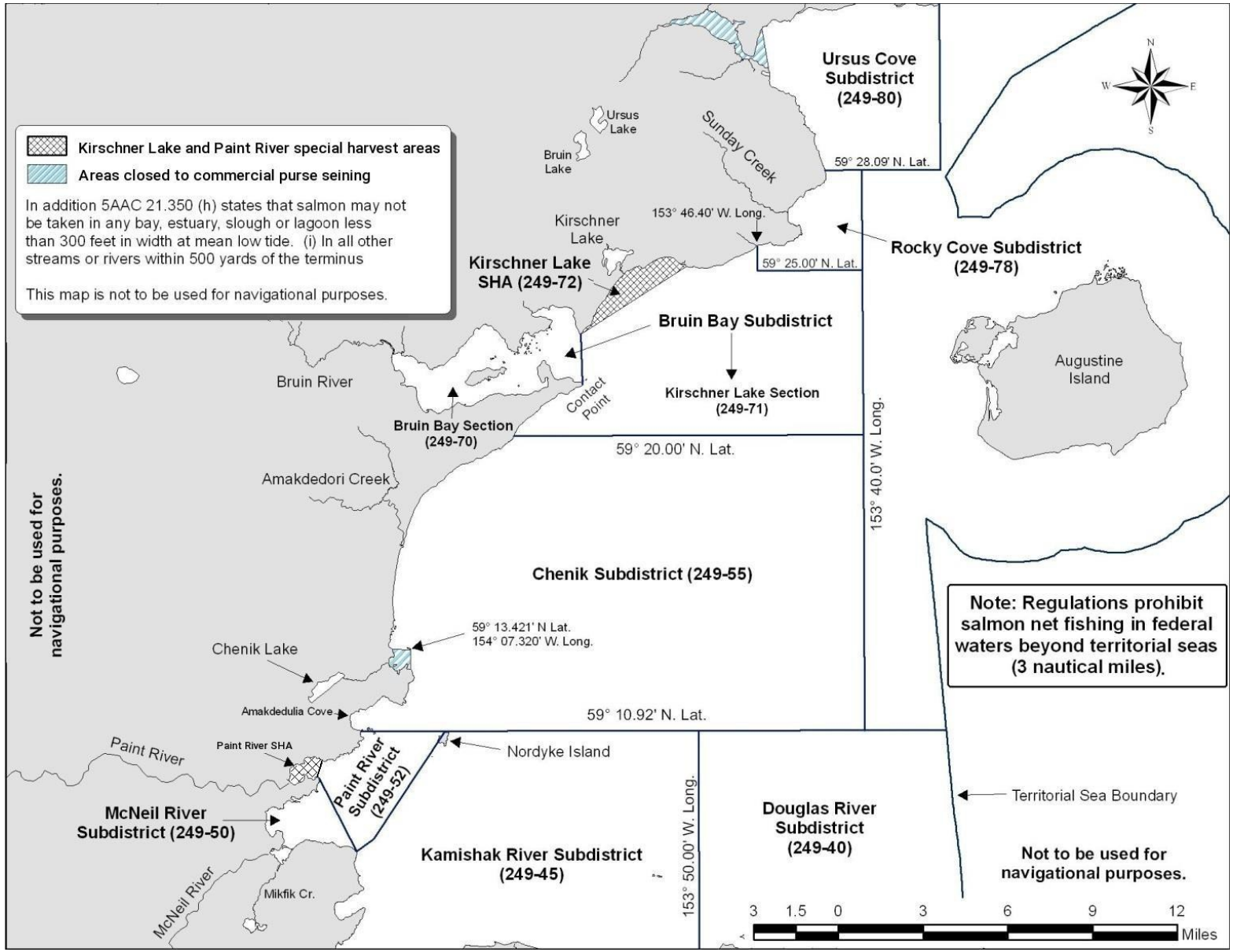


Figure 4.–Halibut Cove