**2018 ANNUAL MANAGEMENT PLAN**
**Port Graham Hatchery**
**Cook Inlet Aquaculture Association**

## 1.0 Executive Summary

### 1.1 Introduction

This plan remains in effect until superseded by next year's annual management plan (AMP). The AMP serves as an instruction manual for hatchery operations and adult return management; it is incumbent upon Alaska Department of Fish and Game (ADF&G) and Cook Inlet Aquaculture Association (CIAA) to share information with each other regularly for successful adherence to this plan. Anticipated departures from the plan should be communicated as soon as possible in the event an amendment is necessary. Unintended and unexpected changes should be disclosed immediately. The ADF&G private nonprofit (PNP) coordinator will advise as to whether an amendment, exception report, or other action is warranted.

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

#### *1.2.1 Facility Changes*

- CIAA will work with the Alaska Department of Environmental Conservation (ADEC) to update the facility's Alaska Pollutant Discharge Elimination System (APDES) permit. No modifications to the facility are anticipated this year.

#### *1.2.2 Production Changes*

- Sufficient adult pink salmon returns are expected at Port Graham Hatchery (PGH) to meet the goal of 84 million green eggs. If hatchery returns are insufficient additional broodstock may be collected from wild returns that are excess to escapement or are purchased from the commercial fishery.

- CIAA will not collect pink salmon eggs from the Bruin Bay stock in 2018.

#### *1.2.3 Fish Culture Changes*

- No changes to fish culture are planned this year.

#### *1.2.4 Projected Return and Cost-recovery Changes*

- At a 3% fry-to-adult survival rate, CIAA is expecting approximately 181,800 adult pink salmon to return to Port Graham Bay. CIAA anticipates a small cost recovery harvest from Port Graham SHA to occur.

**1.3** Fish Transport Permits or Amendments Needed This Year

No new or amended permits required.

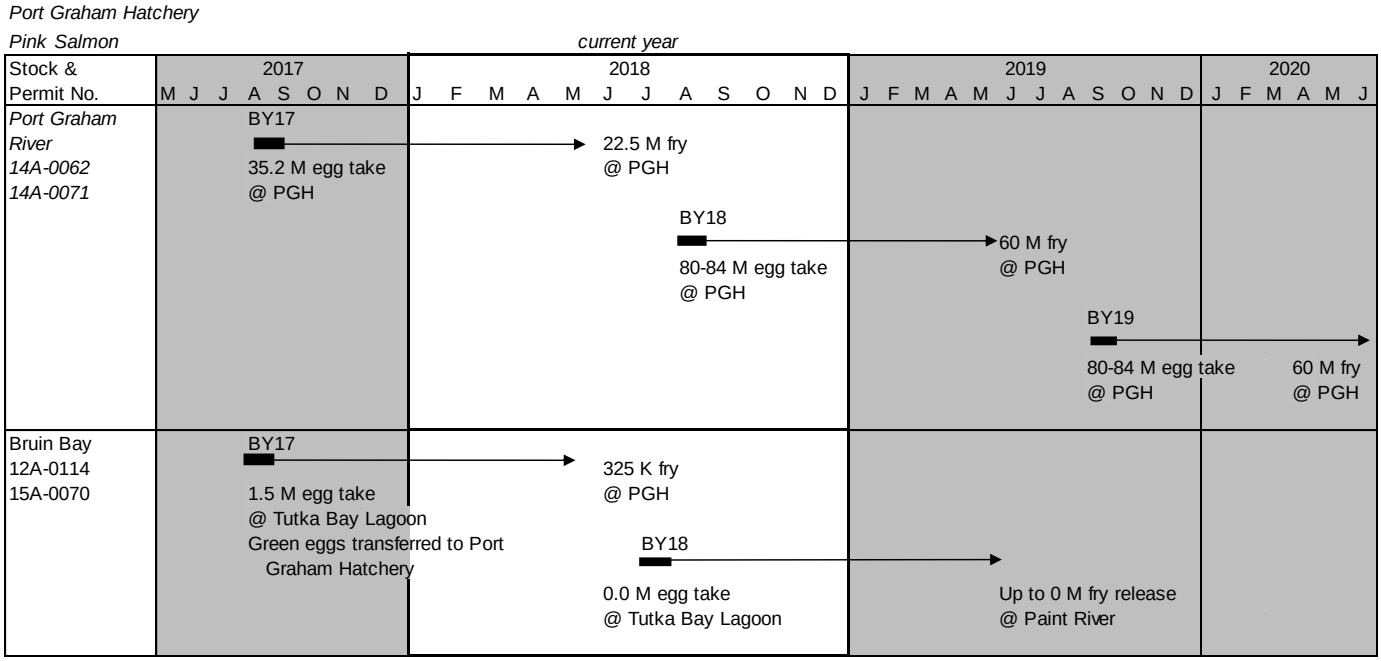
**1.4** Expected Return

To estimate adult pink salmon production from PGH projects, it is assumed there is 80% green egg-to-fry survival and 3% fry-to-adult survival. These values are estimates only and are not based on current observed survival data. These survival rates may be adjusted as hatchery operations continue and data becomes available.

The 2018 projected adult production from PGH pink salmon enhancement project is:

| Species | Stock | Return Site | Brood Year | Total Return | Enhanced Return | Natural Return | Cost Recovery | Broodstock Escapement | Common Property Harvest |
|---|---|---|---|---|---|---|---|---|---|
| Pinks | Port Graham | Port Graham Bay | 2016 | 181,800 | 181,800 | 0 | 61,000 | 108,000 | 12,800 |
| | **Combined Age Classes** | | | **181,800** | **181,800** | **0** | **61,000** | **108,000** | **12,800** |
| | **% of Total** | | | | **100%** | **0%** | **34%** | **59%** | **7%** |

**1.5** Production Summary




**1.6** Permitted Capacity

PGH operates under Private Nonprofit Hatchery Permit #46 issued in 2014 and has a maximum permitted capacity of 125,000,000 green salmon eggs. CIAA recognizes that there is insufficient water available to meet the water demand of the maximum production goal. Until an additional water source has been acquired, start-up capacity will be 84,000,000 green salmon eggs.

**Port Graham Hatchery FTP Schedule**

**Pink Salmon**

| FTP Number | Stock | Action | Expiration Date | Purpose |
|---|---|---|---|---|
| 14A-0062 | Port Graham Bay | Egg take, release | 6/30/2019 | Allows the egg take of up to 84 M green pink salmon eggs, rearing, and release of resultant progeny at Port Graham Hatchery |
| 14A-0071 | Port Graham Bay | Transfer, release | 7/31/2019 | Allows the transfer of gametes (84 million green pink salmon eggs) from Port Graham Bay to Tutka Bay Lagoon Hatchery for incubation, and the subsquent return to PGH as eyed eggs |
| 15A-0070 | Bruin Bay | Egg take, incubation, release | 6/30/2020 | Allows egg take of up to 4 million eggs from Bruin Bay pink salmon adults held in net pens at Tutka Bay Lagoon Hatchery, fertilization and incubation at PGH and stocking of unfed fry into Paint River. |

New Permit in 2018

To Be Renewed in 2018

## **1.7** Project Evaluation

Adult pink salmon are expected to return from pink salmon releases that occurred in 2017 at Port Graham Bay.

Fish tickets submitted to ADFG as well as counts during egg take will be used to enumerate returns to the area.

All fish will be thermally marked.

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

All species of adult salmon migrating into the Paint River system will be monitored with a video weir.

## 2.0 Port Graham Pink Salmon

### **2.1** Purpose and History

PGH began production in 1992, primarily focusing on pink salmon production. In 1998, a fire destroyed the original hatchery building, including incubation modules containing pink and sockeye salmon eggs collected the previous year. A separate building that housed the empty coho salmon module was undamaged. This building was converted to pink and sockeye salmon production to allow for incubation of eggs collected during the upcoming summer. In 2006, the loss of a hatchery manager, combined with financial limitations, resulted in pink and sockeye salmon releases ending in 2006 and 2007 respectively. Consequently, in 2007 the Port Graham Hatchery Corporation (PGHC) contracted with CIAA to assist with the collection of 510,000 sockeye salmon eggs from returning English Bay Lakes adult salmon. Eggs were incubated at Trail Lakes Hatchery (TLH) and released as presmolt to English Bay Lakes and as smolt to Port Graham Bay. In 2010, the PGHC approached CIAA to take over the sockeye salmon program and resume operations of PGH for pink salmon production.

CIAA received Hatchery PNP Permit #46 for the operation of Port Graham Hatchery and undertook a major renovation of the facility in 2014. The majority of this renovation is complete and CIAA put the first eggs into the renovated facility in 2015.

### **2.2** Operational Plan

#### *2.2.1 Egg-take Goal/Brood Sources*

Pink salmon returning to the PGH will be used as the brood source. CIAA will begin operations at a production capacity of 84 million green pink salmon eggs. To meet this goal, CIAA will capture approximately 108,000 pink salmon for broodstock. If there are not enough hatchery-produced pink salmon adults returning in 2018 to meet this production target, CIAA will capture broodstock from Port Graham River as per the broodstock development section outlined in the Basic Management Plan and depicted in the table below. To ensure adequate eggs are available for supporting hatchery operations during broodstock development, CIAA may purchase live adult pink salmon returning to Port Graham Bay from the fleet.

Table 1. Port Graham River pink salmon donor broodstock removal based on the current escapement goal.

| Total Number of Port Graham River Pinks Returning: | Escapement allowed into Port Graham River: | Escapement utilized for Hatchery Broodstock: |
|---|---|---|
| Less than 7,700 | 100% | 0 |
| 7,700–33,000 | First 7,700, plus 50% of fish in excess of 7,700, until 20,000 fish total escapement is reached | 50% of fish in excess of 7,700 |
| More than 33,000 | 20,000 | Remainder |

| Fish Required to Meet Egg Take Goal | | |
|---|---|---|
| | | |
| **Stock** | | Port Graham |
| **Species** | | Pink Salmon |
| **# Green Egg Goal** | | 84,000,000 |
| **Fecundity** | | 1,400 |
| **Female to Male Ratio** | | 2:1 |
| | Female | 60,000 |
| | Male | 30,000 |
| | **Total Broodstock** | 90,000 |
| Inviable | 7% | 6,300 |
| Excess Males/Roe Recovery | 10% | 9,000 |
| Mortalities | 3% | 2,700 |
| | | |
| | **Grand Total** | **108,000** |

### *2.2.2 Egg Take, Transport of Eggs*

Brood year 2018 (BY18) pink salmon broodstock will be collected via seine boat and placed into net pens until sexually mature. Gametes will be collected and transferred in iced coolers to PGH via boat. Eggs will be fertilized 2:1 female to male ratio and allowed to water harden in a 100 ppm ovadine solution for 3–5 minutes before being placed into NOPAD incubators. Two-thirds of the 240[1] incubators will be loaded with green eggs at a loading rate of 100 kg per incubator.

[1] *There are 360 incubators available but until an alternate water source is found there is only sufficient water to run 240 incubators.*

### *2.2.3 Incubation Plans*

Once BY18 eggs have reached the eyed stage, they will be shocked, picked and inventoried before being placed back into incubators until emergence. All eggs will be thermally marked. Incubators will be loaded with eyed eggs at a loading rate of 50 kg per incubator.

### *2.2.4 Rearing and Release Plans*

BY17 fry will non-volitionally migrate from the incubators to net pens located in Port Graham Bay for short-term rearing before release.

The table below describes anticipated releases for 2018 from eggs collected in 2017.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Species** | Pink | | | | | | |
| **Stock** | Port Graham | | | | | | |
| **Brood Year** | **Life Stage** | **Release Site** | **Projected Release** | **Year Stocked** | **Migration Year** | **Estimated Adult Return** | **Return Years** |
| 17 | Fry | Port Graham | 22,500,000 | 2018 | 2018 | 675,000 | 2019 |

**2.3** Donor Stock Management

*2.3.1 Management Strategies*

Hatchery returns to PGH are anticipated to be sufficient to meet the target broodstock goal. The management of returns will occur as follows:

(1) CIAA will attempt to capture all necessary broodstock from adult hatchery produced pink salmon returns to the Port Graham SHA. These fish may be caught by purse or beach seines. The SHA shall be opened and closed to commercial fishing by emergency order (EO). Sport fisheries will be managed in accordance with regulations as provide in 5 AAC 47-5 AAC 75. Emergency orders may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals. In case of low wild stock returns for pink and chum salmon to Port Graham River, it may be necessary to limit fishing pressure in the SHA by reducing time or boundaries of the SHA.

(2) In the event that hatchery returns are insufficient to meet target broodstock goals, CIAA may: (a) purchase live broodstock from the common property fishery during scheduled openings and only in waters open for fishing, or (b) collect broodstock from those fish which are excess to escapement as per the guidelines provided in Table 1 (See Section 2.2.1).

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

**2.4** Evaluation Plans

All eggs will be thermally marked. CIAA will collect otoliths from those fish used in the eggtake and may collect otoliths from those fish caught in the common property fishery to determine hatchery contribution.

## 3.0 Paint River Stocking Program

### 3.1 Purpose and History

The Paint River system, which enters Kamishak Bay over a forty-foot waterfall at tidewater, has never had a self-sustaining run of salmon, but has long been recognized by 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 the system 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.

In 2018, CIAA plans to release 325,000 pink salmon fry from Bruin Bay into the Paint River system. Broodstock will not be collected from Bruin Bay in 2018. The fish ladder will be open between June and September to allow for any possible natural colonization of the watershed. A video camera will be installed to document the returns through the fish ladder.

### 3.2 Operational Plan

#### *3.2.1 Egg-take Goal/Brood Sources*

CIAA will not collect eggs from pink salmon returning to Bruin River in 2018.

#### *3.2.2 Egg Take; Transport of Eggs*

CIAA will not collect eggs from pink salmon returning to Bruin River in 2018.

#### *3.2.3 Incubation Plans*

CIAA will not collect eggs from pink salmon returning to Bruin River in 2018.

#### *3.2.4 Rearing and Release Plans*

BY17 pink salmon fry will be removed from incubators and placed directly into a transport container located in a fixed wing aircraft for transport and release into the Paint River system at a site to be determined in consultation with ADF&G.

| **Species** | Pink | | | | | | |
|---|---|---|---|---|---|---|---|
| **Stock** | Bruin Bay | | | | | | |
| **Brood Year** | **Life Stage** | **Release Site** | **Projected Release** | **Year Stocked** | **Migration Year** | **Estimated Adult Return** | **Return Years** |
| 17 | Fry | Paint River | 325,000 | 2018 | 2018 | 9,750 | 2019 |

**3.3** Donor Stock Management

*3.3.1 Management Strategies*

CIAA will not collect eggs from pink salmon returning to Bruin River in 2018.

*3.3.2 Escapement Requirements*

CIAA will not collect eggs from pink salmon returning to Bruin River in 2018.

**3.4** Evaluation Plans

CIAA will not collect eggs from pink salmon returning to Bruin River in 2018.

No hatchery incubated pink salmon are expected to return in 2017. All fry released in 2018 will be thermally marked. Depending on the return and completion of a cabin at Paint River, CIAA may collect otolith samples from pink salmon returning in 2019.

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

## 4.0 Harvest Management

**4.1** Cost-recovery Plan

CIAA funds the cost of operating TLH, Tutka Bay Lagoon Hatchery (TBLH), PGH and Eklutna Salmon Hatchery (ESH), and associated field projects, by licensing for harvest a portion of the fish returning to the hatchery's release sites. CIAA will begin cost recovery in Resurrection Bay/Bear Lake followed by China Poot/Neptune Bay, Kirschner Lake, Tutka Bay sockeye and pink salmon, and Port Graham Bay.

**4.2** Special Harvest Areas

*4.2.1 Port Graham Special Harvest Area*

4.2.1.1 Area Definition

The Port Graham Special Harvest Area (SHA), as defined in 5AAC 21.377(b), consists of the marine waters of the 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 off shore at 59°20.83′ N. lat., 151°48.53′ W. long. (Figure 1).

4.2.1.2 Fishery Management

ADF&G will be responsible for fishery management as it relates to sustainable escapement goals (SEGs) for Port Graham River pink and chum salmon. This includes common property and hatchery-related fisheries.

A small cost-recovery harvest is anticipated in 2018 under the PGH permit. CIAA anticipates most of the cost recovery harvest will be surplus broodstock.

The SHA shall be opened and closed to commercial fishing by emergency order (EO). Areas within the SHA where hatchery harvest is permitted, as well as the SHA boundaries, may be adjusted by the department as needed based on wild stock escapement and hatchery returns. 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.

### *4.2.2 Paint River Special Harvest Area*

#### 4.2.2.1 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).

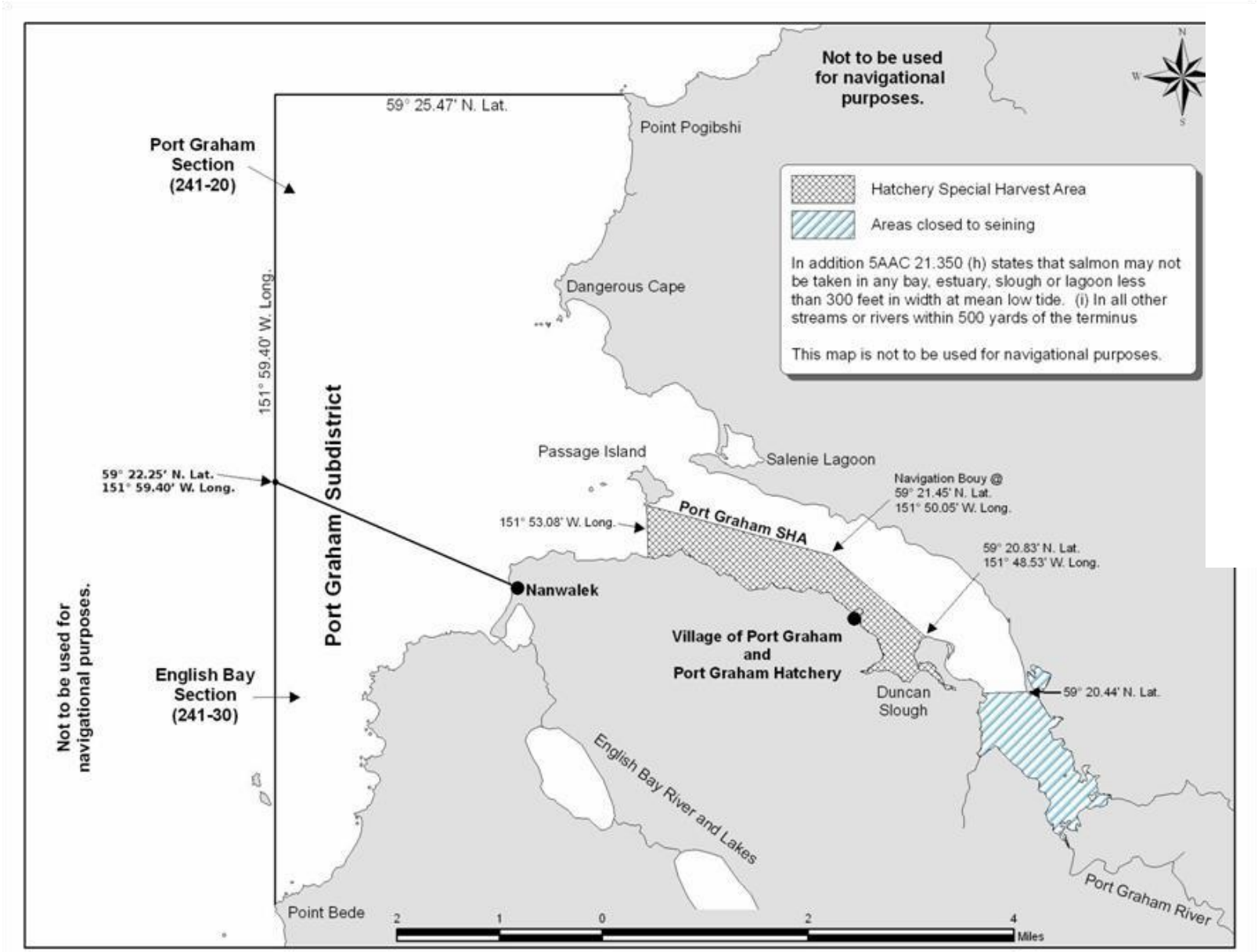
#### 4.2.2.2 Fishery Management

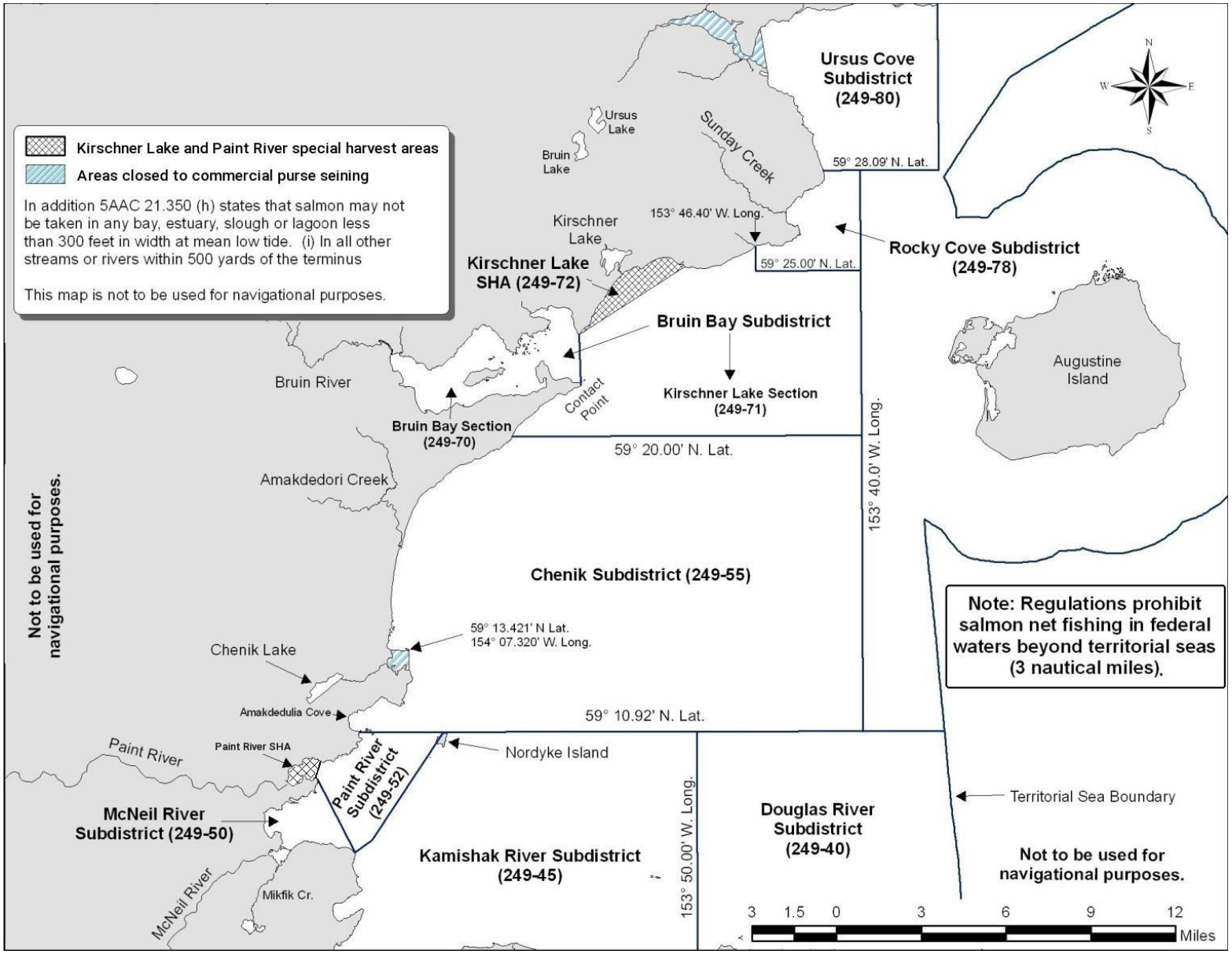
No adult hatchery pink salmon are expected back to Paint River in 2018 as no fish were released in 2017. ADF&G will be responsible for fishery management for Paint River and the common property fishery.

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.

**5.0 Figures**

**5.1 – Port Graham Bay SHA**






## 6.0 Attachments

## 6.1 Port Graham 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 |
| 2014 | 3,195,649 | 2,205,000 | 69.00% | 18,525 | 0.84% | 0.58% | Eggs were incubated at TBLH due to renovation schedule. Fry were shipped unfed to PGH for short-term rearing in net pens before release |
| 2015 | 2,248,000 | 1,310,800 | 58.31% | 78,516 | 5.99% | 3.49% | Broodstock survival was a challenge due to atypical environmental conditions |
| 2016 | 9,076,400 | 6,060,000 | 66.77% | TBD | TBD | TBD | Large size of pink salmon >4.5 lb but low returns |
| 2017 | 35,213,400 | 24,592,800 | 69.84% | TBD | TBD | TBD | |
| Total | 49,733,449 | 34,168,600 | 68.70% | 97,041 | NA | NA | |

## 6.2 CIAA Enhancement Project Summary – 2018

| | | | Fry (F), Presmolt or Fall Fry (P) and Smolt (S) Projected Releases - 2018 | | | |
|---|---|---|---|---|---|---|
| HATCHERY | PROJECT (release site) | [BROODSTOCK] | COHO | SOCKEYE | PINK | Project Status |
| TRAIL LAKES HATCHERY | Tutka Bay Lagoon | [English Bay] | | 575,000 (S) | | 356,000 in 2017 |
| | Resurrection Bay | [Bear Lake] | | 1,450,000 (S) | | 1,816,000 in 2017 |
| | Port Graham Hatchery | [English Bay Lakes] | | 0 (S) | | 86,000 in 2017 |
| | Shell Lake | [Shell Lake] | | 55,000 (S) | | 0 in 2017 |
| | Bear Creek | [Bear Lake] | 97,500 (S) | | | 54,000 in 2017 |
| | Smolt Totals | | 97,500 | 2,080,000 | 0 | 2,312,000 in 2017 |
| | English Bay Lakes | [English Bay Lakes] | | 0 (P) | | 0 in 2017 |
| | Presmolt Totals | | 0 | 0 | 0 | 0 in 2017 |
| | Bear Lake | [Bear Lake] | | 2,400,000 (F) | | 2,468,000 in 2017 |
| | Leisure Lake | [English Bay Lakes] | | 1,900,000 (F) | | 1,387,000 in 2017 |
| | Hazel Lake | [English Bay Lakes] | | 1,250,000 (F) | | 834,000 in 2017 |
| | Kirschner Lake | [English Bay Lakes] | | 250,000 (F) | | 260,000 in 2017 |
| | Hidden Lake | [Hidden Lake] | | 1,062,500 (F) | | 0 in 2017 |
| | Bear Lake | [Bear Lake] | 425,000 (F) | | | 125,000 in 2017 |
| | Fry Totals | | 425,000 | 6,862,500 | 0 | 5,074,000 in 2017 |
| | HATCHERY TOTALS | | 522,500 | 8,942,500 | 0 | 7,386,000 in 2017 |

| | | | Fry (F), Presmolt or Fall Fry(P) and Smolt (S) Projected Releases - 2018 | | | |
|---|---|---|---|---|---|---|
| HATCHERY | PROJECT (release site) | [BROODSTOCK] | COHO | SOCKEYE | PINK | Project Status |
| TUTKA BAY LAGOON HATCHERY | Tutka Bay/Lagoon | [Tutka Creek/Lagoon] | | | 55,000,000 (F) | 54,245,000 in 2017 |
| | Paint River | [Bruin Bay] | | | 0 (F) | 0 in 2017 |
| | HATCHERY TOTALS | | 0 | 0 | 55,000,000 | 54,245,000 in 2017 |

| | | | Fry (F), Presmolt or Fall Fry(P) and Smolt (S) Projected Releases - 2018 | | | |
|---|---|---|---|---|---|---|
| HATCHERY | PROJECT (release site) | [BROODSTOCK] | COHO | SOCKEYE | PINK | Project Status |
| PORT GRAHAM HATCHERY | Port Graham Bay | [Port Graham Bay] | | | 22,500,000 (F) | 6,060,000 in 2017 |
| | Paint River | [Bruin Bay] | | | 325,000 (F) | 0 in 2017 |
| | HATCHERY TOTALS | | 0 | 0 | 22,825,000 | 6,060,000 in 2017 |

| | | | | | |
|---|---|---|---|---|---|
| CIAA | CORPORATE TOTALS | 522,500 | 8,942,500 | 77,825,000 | 67,691,000 in 2017 |

## 7.0 Approval

**Recommendation for Approval: Port Graham Hatchery Annual Management Plan, 2018:**

Approved 05/21/2018 by email

Gary Fandrei, Executive Director, Cook Inlet Aquaculture Association

Approved 05/18/2018 by email

Matt Miller, Fish and Game Coordinator, Division of Sport Fish

Approved 05/18/2018 by email

Glenn Hollowell, Area Management Biologist, Division of Commercial Fisheries

Approved 05/21/2018 by email

Tom Vania, Regional Supervisor, Division of Sport Fish

Approved 05/21/2018 by email

Bert Lewis, Regional Supervisor, Division of Commercial Fisheries

Approved 05/24/2018 by email

Ethan Ford, Regional Resource Development Biologist, Division of Commercial Fisheries

**The 2018 Port Graham Hatchery Annual Management Plan is hereby recommended for approval by the Cook Inlet Regional Planning Team (RPT):**

Approved 05/24/2018 by email

Ethan Ford, Cook Inlet RPT Chair

Approved 05/25/2018 by email

Lorraine Vercessi, PNP Hatchery Program Coordinator, Division of Commercial Fisheries

**The 2018 Port Graham Hatchery Management Plan is hereby approved:**

Approved 05/30/2018 by email

Tom Taube, Deputy Director, SF

Approved 05/30/2018 by email

Peter Bangs, Assistant Director, CF