

# 2020 ANNUAL MANAGEMENT PLAN

## Port Armstrong Hatchery

Armstrong-Keta, Inc.

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 Armstrong-Keta, Inc. (AKI) or Alaska Department of Fish and Game (ADF&G) may result in changes to this AMP in order to reach or maintain program objectives. AKI 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 AKI. This policy applies to all hatchery operations covered under the AMP.

### 1.0 Executive Summary

#### 1.1 Introduction

The Port Armstrong Hatchery (PAH) is a PNP facility owned and operated by Armstrong-Keta, Inc. (AKI). The hatchery is located at the outlet of Jetty Lake, in Port Armstrong, near the southeastern tip of Baranof Island along Chatham Strait (Figure 1). Fed by water from two lakes perched 285 feet above the facility, up to 30 cfs of water is seasonally available for hatchery use and hydropower generation. The hatchery facilities include a primary incubation building, a king and coho salmon building, freshwater raceways, and two saltwater net pen complexes.

PAH is currently producing pink, chum, and coho salmon, and is also permitted to rear king salmon. Because of the overlap of its king and chum runs, AKI decided to move its king salmon production from its PAH facility to the Little Port Walter Research Station, where there is extra water and facility space available. AKI has procured a hatchery permit for that production but is waiting on the availability of broodstock to start production there. All fish are released at or near Port Armstrong, except for a small portion of the pink salmon that have been reared and released for two years at Port Herbert SHA. In addition, PAH has a chum salmon release site at Port Lucy that has not been active. Fish from Port Armstrong contribute to common property fisheries in southern Chatham Strait and other areas of Southeast Alaska. PAH is located in a productive traditional troll fishery area, and seine fisheries exist immediately north and east of Port Armstrong. Salmon returning to Port Armstrong not harvested in common property fisheries are used for hatchery cost recovery and broodstock.

AKI believes that nearshore predation on salmon fry is negatively impacting marine survival. Since 2015, AKI has been experimenting with different pink salmon release strategies to boost marine survivals. In 2015, AKI towed a differentially thermal marked cohort of PAH pink salmon

fry up to one mile off shore into Chatham Strait for release to avoid the narrow bottleneck at the entrance of Port Armstrong. In 2017 and 2018 (BY16 and BY17), AKI released a cohort of PAH pink salmon fry offshore of the hatchery in southern Chatham Strait via a fry transport vessel. The two years of adult BY16 and BY17 pink returns from the vessel transport fish show higher marine survivals back to the hatchery than the net pen tow-out or Port Armstrong released groups (see Appendix B). In 2019, fry scheduled for release in southern Chatham via vessel transport were instead towed up to one mile out into Chatham Strait for release due to warm water in May and the schedule of the transport vessel. This year, due to weather and bacterial infections, the pink salmon were not able to be released via vessel, but 20 million chum fry, as well as 610,000 26-gram coho were released in Southern Chatham via vessel transport. Vessel-transported fish are reared in pens at PAH and then ocean water is pumped into the fish holds during transport to ensure the fry have contact with the same water they would have otherwise traveled through during out-migration. It is hoped the vessel-transport method will better ensure departure of the fry from the nearshore area, while still allowing them to home in on the PAH water signature.

1.2 *New this year (production, harvest management, culture techniques, etc.)*

In 2020, PAH intends to take the full chum salmon permitted capacity of 60 million green eggs if the return is strong enough and the weather conditions are favorable enough to get sufficient broodstock up the fish ladder. Because of facility limitations, the 2020 pink salmon egg take goal is 42 million green eggs. AKI is in the process of acquiring new net pens and, as it puts the new facilities into service, expects to take additional pink green eggs up to the 105 million green eggs that the current permit allows. Additionally, in light of the difficulties experienced with the very small 2019 chum eggs from the three-year-old chum broodstock, AKI has changed its policy to avoid placing small chum eggs into its incubators. If a shortfall occurs in the chum salmon egg take, the pink salmon egg take will be increased accordingly to make full use of the hatchery capacity.

1.3 *New permits or permit amendments*

The chum FTP (19J-1012) for vessel transport of its chum production to a point no greater than 7.5 miles south and 5 miles east of PAH towards the mouth of Chatham Strait is new this year. Based on positive results with the marine survivals of its vessel transport pink releases (see Appendix B), PAH applied for and received a similar permit for vessel transport and release of a portion of its coho in 2020 (20J-1020).

1.4 *Expected Returns*

Species, Run	Release Location	Total Return	Common Property Harvest	Return to Hatchery	Broodstock Needed	Available for Cost Recovery
Pink salmon, BY18	Port Armstrong	367,871	161,863	206,008	72,000	134,008
Pink Salmon, BY18	Port Herbert	0	0	0	0	0

Coho salmon, BY17	Port Armstrong	189,315	94,658	94,657	6,000	88,657
King salmon, BY15-16	Port Armstrong	300	100	200	0	200
Chum salmon, BY14 -17	Port Armstrong	557,775	55,778	501,997	60,000	441,997

Additional detail on adult salmon returns from PAH projects can be found in the appendices Table 1.

### 1.5 *Production Summary*

<b>Program Name</b>	<b>Brood Year</b>	<b>Planned Release Date</b>	<b>Number to Release</b>	<b>Life Stage</b>	<b>Type of Mark, Percent or Number Marked</b>
Armstrong pink salmon; Tow out release	2019	May 1, 2020	20.0 million	Fed Fry	100% TM 3H
Armstrong pink salmon; S. Chatham boat release	2019	May 1, 2020	20.0 million	Fed Fry	100% TM 3H3
Armstrong coho salmon	2018	May 15, 2020	3.7 million	Smolt	CWT, 1.64%
Armstrong chum salmon	2019	May 1, 2020	52.0 million	Fed fry	TM 100% 6H

In 2020, the egg-take goal at PAH will be 42 million or more pink salmon eggs, depending on net pen space available; 60 million chum salmon eggs; 5 million coho salmon eggs; and zero king salmon eggs.

### 1.6 *Current Permitting*

The permitted capacity of PAH is 105 million pink salmon eggs, 60 million chum salmon eggs, and 5 million combined king and coho salmon eggs, (with no more than 2 million being king salmon eggs.)

## 2.0 **Late Summer Pink Salmon Production**

### 2.1 *Program details*

Since 1983, PAH has been producing pink salmon. In previous years, PAH strived to annually release 97 million, 0.5 gram to 1.2 gram, otolith-marked pink salmon fry. Due to the increase in chum production, the hatchery has insufficient capacity to continue releasing pink salmon at its full permitted level until it is able to procure additional net pens. PAH's pink egg take goal for 2020 is at least 42 million, unless there is a shortfall in its chum egg take goal, in which case PAH

will increase pink production as space allows. The purpose of the program is to provide pink salmon to common property fisheries in lower Chatham Strait, as well as provide sufficient pink salmon return to the hatchery to meet PAH cost-recovery and broodstock requirements.

Average marine survival of PAH pink salmon has been approximately 2.0%, with a high of 6.9% in return-year 1990 and a low of 0.12% in return-year 2008 (Table 2). In 2015, PAH began investigating the effects of release location on marine survival by towing a cohort of differentially marked pink salmon into Chatham Strait for release. In 2017, PAH began releasing a portion of their pink salmon production at Port Herbert SHA (Figure 2). In 2017, there were four pink salmon release strategies: traditional rearing and release at PAH; traditional rearing at PAH with release in Chatham Strait; remote rearing and release at Port Herbert; and release via vessel transport of fed fry to lower Chatham Strait, approximately 10 miles from PAH towards the mouth of Chatham Strait, presumably in the direction of their normal outmigration. For 2018 releases and subsequent years until additional rearing facilities can be acquired, the hatchery chose not to rear pink fry at the Port Herbert site due to the reduced egg take number, requiring that all the pinks be released from the Port Armstrong Hatchery in order to ensure sufficient broodstock. AKI has a multi-pronged release strategy again in 2020, within Port Armstrong, via net pen tow-outs into Chatham Strait, and via vessel transport to southern Chatham Strait.

Problems with the flows of the PAH siphon pipelines and the associated hydropower production resulted in otolith marks only a portion of its incubating pink salmon eggs in the winter of 2017-2018. AKI has made resolution of this problem its top capital improvement priority. In addition to adopting a more rigorous pigging program for the pipelines, AKI is initiating a project to repair the old and leaky wooden coffer dam at the outlet of Betty Lake, providing an estimated additional reservoir of 42 days of full pipeline operation as well as sufficient power generation to ensure full otolith marking.

ADF&G has estimated that, on average, 44% of the PAH pink salmon return is harvested in the lower Chatham seine fishery (District 109). This is an estimate made years ago by the Sitka and Petersburg ADF&G area management biologists based on review of historical catch records.

## 2.2 Egg Takes

<b>Program Name</b>	<b>Ancestral Stock(s)</b>	<b>Egg-Take Site, Stat Area</b>	<b>Primary or Alternate Source?</b>	<b>Current Year Egg Goal</b>	<b>Permitted Maximum</b>
Armstrong pink salmon	Sashin Creek	Port Armstrong Hatchery 109-10-002	<b>P</b>	42,000,000	105,000,000
<b>Totals</b>				42,000,000	105,000,000

### 2.3 *Broodstock capture method*

Pink salmon returning to the hatchery are an enhanced run. Sex ratios are sampled during the harvest to monitor run timing. Broodstock mature in the inner bay over the course of the run. In early September, when broodstock have sufficiently matured, two fish ladders are opened and adults are recruited into raceways. An electro-anesthesia unit attached to the raceways is used during egg take.

### 2.4 *Spawning*

Approximately 75,000 pink salmon will be required for broodstock. Spawning takes place on a covered deck adjacent to the broodstock raceways. After being stunned with an electro-anesthesia unit, males and females are sorted and their gametes are collected. The eggs are transported by hand cart to the incubation building, where fertilization and rinsing takes place. The fertilized eggs are loaded into R-48 bulk incubators for incubation to the eyed stage.

### 2.5 *Egg-take schedule*

Egg take typically begins around September 10 and lasts for two to three weeks, but may be extended due to run timing and pace of recruitment to the fish ladder. Egg take should approximate the normal run curve since broodstock will be allowed to accumulate at the mouth of the creek proportionally during the course of the run. Depending on the number of ripe females and fecundity, between 5 and 10 million eggs can be taken in a day.

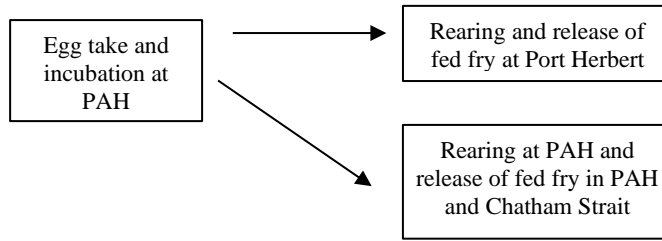
### 2.6 *Carcass disposal*

The majority of carcasses are expected to be sold to processors. Those carcasses not sold are collected daily in a small barge. Carcasses may also be given away and/or sold as bait. All remaining carcasses are driven approximately one mile offshore and discarded in Chatham Strait at a DEC-approved carcass disposal area.

### 2.7 *Planned releases this calendar year of previous brood year's production*

<b>Program Name</b>	<b>Brood Year</b>	<b>Planned Release Date</b>	<b>Number to Release</b>	<b>Life Stage</b>	<b>Type of Mark, Percent or Number Marked</b>
Armstrong pink salmon; Tow out release	2019	May 1, 2020	20.0 million	Fed Fry	100% TM 3H
Armstrong pink salmon; S. Chatham boat release	2019	May 1, 2020	20.0 million	Fed Fry	100% TM 3H3

2.8 *Operational diagram*



2.9 *Fish transport permits*

FTP #	Egg take, transport or release	Transport from → to	Maximal #, Life Stage	Expires
98J-1009	Egg take and release	PAH to PAH	105 million eggs	1/31/2025
15J-1014	Transport and release	PAH to Port Herbert	55 million eggs	12/31/2020
15J-1015	Egg take, transport and release	Sashin Creek to PAH	105 million eggs	12/31/2025
19J-1006	Transport and release	PAH to offshore of PAH <sup>1</sup>	20 million fry	5/31/2021

<sup>1</sup>Release is approximately 10 miles offshore near the mouth of Chatham Strait.

Egg take at Sashin Creek under 15J-1015 cannot commence until the ADF&G Division of Commercial Fisheries area management biologist has authorized it for that year. The escapement target for Sashin Creek is a peak aerial survey count of between 20,000 and 40,000 pink salmon. This includes fish above and below the weir site. The weir may be installed once a 20,000 pink salmon peak aerial survey count has been made. No hatchery broodstock may be collected until an estimated 20,000 fish are above the weir. Once 20,000 fish are estimated above the weir, 20% of the daily return may be collected for hatchery broodstock until an estimated 50,000 fish are above the weir. Once 50,000 fish are estimated above the weir, 50% of the daily return may be collected for hatchery broodstock until an estimated 100,000 fish are above the weir. Once 100,000 fish are estimated above the weir, 80% of the daily return may be collected for hatchery broodstock.

Fish transport Permit 17J-1010 was issued for 2017 and 2018 to experiment with a release strategy, vessel transporting fry out of the near-shore environment at time of release in an attempt to improve marine survival of PAH pink salmon. AKI was issued a new fish transport permit 19J-1006 effective from March 2019 through May 2021 to allow two additional years of this alternative release strategy. Fry will be reared in net pens at PAH per usual practice, but at time of release they will be transferred to a vessel which will transport them for around two hours to a point several miles offshore near the mouth of Chatham Strait.

### **3.0 Fall Coho Salmon**

#### *3.1 Program details*

The purpose of the program is to provide coho salmon to common property fisheries in lower Chatham Strait and outer Baranof Island, as well as provide a sufficient coho salmon return to the hatchery to meet PAH cost recovery and broodstock requirements.

In 1988, PAH began its coho salmon program with broodstock taken from Blanchard Lake in Deep Cove. In 1989 and 1990, broodstock was taken from Sashin Creek stock at the NSRAA Mist Cove site. In 2005, the permitted capacity of PAH coho salmon increased from 2 million to 3 million eggs. In 2007, the permitted capacity increased to a possible 5 million coho salmon eggs, if no king salmon eggs are collected (permitted capacity is 5 million combined king and coho salmon eggs with no more than 2 million being king salmon eggs). Coded wire tag (CWT) recoveries indicate the average contribution rate to the troll fishery averages approximately 50% of the total PAH return. Overall marine survivals for BY88 through BY11 releases average 5.8% (Table 3). The highest marine survival was 23.6% (BY99) and the low was 1.45 % (BY02). PAH strives to annually release at least 4.0 million, 25 to 35-gram coho salmon smolt, maintain a green egg to smolt survival rate over 80%, maintain marine survivals comparable to, or exceeding, those experienced at Hidden Falls and Mist Cove, and maintain a fishery contribution rate of 50% or higher.

Bacterial kidney disease (BKD) is managed by strict family tracking with culling of positive families prior to hatching, isolation between brood years and stocks, and early diagnosis and possible treatment. Fish are also being fed Aqua 100 at fry stage as a BKD preventative.

In 2020, approximately 67,900 BY18 coho salmon smolt were coded wire tagged. These tags are to be recovered by AKI at the rack and by ADF&G during sampling of the commercial and sport fisheries. PAH will continue to CWT coho salmon at ADF&G approved tag rates. A portion of this year's release was vessel-transported into Chatham Strait to increase marine survival and received a unique CWT code.

Starting with BY19, coho salmon will be 100% otolith thermal-marked with a pre-hatch code. We will differentially mark any distinct rearing or release groups with coded-wire tags.

### 3.2 *Egg takes*

<b>Program Name</b>	<b>Ancestral Stock(s)</b>	<b>Egg-Take Site, Stat Area</b>	<b>Primary (P) or (A) Alternate Source?</b>	<b>Current Year Egg Goal</b>	<b>Permitted Maximum</b>
Armstrong coho salmon	Deep Cove/Sashin Creek	Port Armstrong Hatchery 109-10-002	<b>P</b>	5,000,000	5,000,000 <sup>1</sup>
Armstrong coho salmon	Deep Cove/Sashin Creek	Hidden Falls Hatchery	<b>A</b>	None	3,000,000
<b>Species/ Run Totals</b>				5,000,000	5,000,000

<sup>1</sup>Five million combined king and coho salmon eggs, with no more than two million being king salmon eggs.

### 3.3 *Broodstock capture method*

Coho salmon returning to the hatchery are from an enhanced run. In October, two fish ladders are opened and adult coho salmon are recruited into several holding raceways. Males and females are monitored for the next several weeks for ripeness.

### 3.4 *Spawning*

Approximately 6,000 adults are required for broodstock. Spawning takes place on a covered deck adjacent to the broodstock raceways. After being stunned with an electro-anesthesia unit, males and females are sorted and their gametes are collected and transported to the coho and king salmon incubation building. Initial incubation takes place in Heath tray incubators. Iodophor is used to disinfect eggs. Eggs are family-tracked and are culled from parents identified to be BKD-positive.

### 3.5 *Egg-take schedule*

Egg take usually occurs between late October and early November, over a one to two-week period, as females ripen. Eggs will be taken in lots of approximately 500,000, or greater, until the egg-take goal has been reached. In the event that sufficient broodstock is not available at PAH, additional eggs may be taken at HFH.

### 3.6 *Carcass disposal*

Carcasses are sold to processors when possible. Carcasses that are not sold are collected in a small barge and made available to local residents or fishermen for bait. Any remaining carcasses are disposed of in Chatham Strait, approximately one mile offshore.



3.7 *Planned releases this calendar year of previous brood years' production*

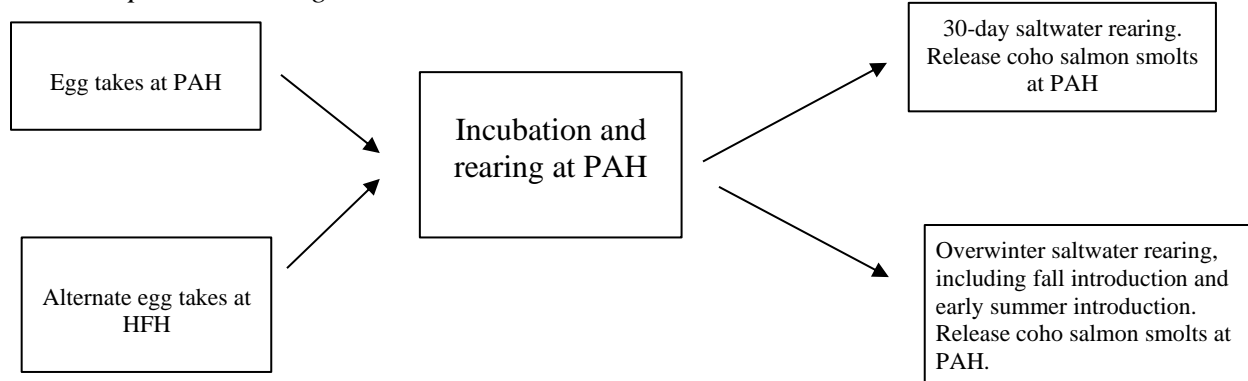
Program Name	Brood Year	Release Date	Number to Release	Life Stage	Type of Mark, Number Marked
Armstrong coho salmon	2018	5/15/20	3.7 million <sup>a</sup>	smolt	CWT: 65,700

<sup>a</sup>A portion (~17%) of this release was vessel-transported into Chatham Strait and received a unique CWT code.

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

Program Name	Brood Year	Number Live	Life Stage	Type of Mark Number Marked	Number to Release, Date
Armstrong coho salmon	2019	3.2 million	fry	65,000 CWT and 100% otolith	3.0 million, May 2021

3.9 *Operational diagram*



3.10 *Fish transport permits*

FTP #	Stock	Egg take, transport, or release	Trans. From → To	Maximal #, Life Stage	Expires
98J-1010	Sashin Creek	Egg take and release	PAH to PAH	5,000,000 eggs <sup>1</sup>	8/31/2025
93J-1036	Sashin Creek	Egg take, transport, and release	HFH to PAH	3,000,000 eggs <sup>1</sup>	8/31/2025
17J-1027	Deep Cove	Egg take and release	PAH to PAH	5,000,000 eggs <sup>1</sup>	8/31/2025

17J-1028	Deep Cove	Egg take, transport, release	HFH to PAH	3,000,000 eggs <sup>1</sup>	8/31/2025
20J-1020	Sashin Creek	Transport, Release	PAH to PAH <sup>2</sup>	2,500,000 juveniles	6/30/2023

<sup>1</sup>Total not to exceed 5 million eggs when combined with king salmon eggs.

<sup>2</sup>Release up to 5 miles east and 7.5 miles south of PAH.

## 4.0 Spring king salmon

### 4.1 Program details

In 2001, PAH began a king salmon broodstock program utilizing the Unuk River stock king salmon from LPW. The purpose of the program is to provide increased opportunity for common property harvest of king salmon in lower Chatham Strait, as well as provide a sufficient king salmon return to the hatchery to meet PAH cost- recovery and broodstock requirements. In 2005, the first adult king salmon returned to PAH. In 2006, PAH conducted its first king salmon egg take. PAH initiated a zero-check program beginning with BY06. For this program, a portion of the eggs are incubated in warmer water, ponded early, and reared in indoor tanks. A minimum of 30,000 fish from this release group will be given a CWT (per ADF&G guidelines) and transferred to saltwater pens in May for short-term rearing, then released in late May at approximately 14 grams. The purpose of the zero-check program is to increase king salmon production at PAH within the constraints of fresh water and existing raceway capacity while keeping production costs manageable. The remaining king salmon are incubated in colder water and reared in a traditional one-check program. Fry are reared in freshwater raceways and then transferred to a saltwater net pen for overwinter rearing and released the following May. A minimum of 30,000 fish from this release group will be given a CWT (per ADF&G guidelines). The target release size of one-check smolt is 25 to 40 grams. The smolt release is timed to coincide with LPW king salmon releases. PAH strives to annually release 140,000 25 to 40-gram king salmon smolt and 120,000 14 gram zero-check king salmon. PAH strives to maintain a green egg to smolt survival rate above 80%, although in some years extra eggs are culled when survivals exceed anticipated percentages, resulting in reported survivals lower than actual rates. CWT recoveries will be used to evaluate PAH common property contributions and survival rates. ADF&G personnel recover CWTs while sampling the commercial troll and sport fisheries. PAH employees also recover CWTs at the rack during egg take. Additional information on PAH king salmon survival can be found in the appendices (Table 4).

No king salmon eggs have been taken at PAH since 2015, and the last king salmon smolts released were zero-checks released by June 30, 2016. The king salmon program has been suspended. In 2020, PAH will not release any king salmon and will not take any king salmon eggs at PAH.

4.2 *Egg takes*

<b>Program Name</b>	<b>Ancestral Stock(s)</b>	<b>Egg-Take Site, Stat Area</b>	<b>(P) Primary or (A) Alternate Source?</b>	<b>Current Year Egg Goal</b>	<b>Permitted Maximum</b>
Armstrong king salmon	Unuk River	Little Port Walter	A	0	2,000,000
Armstrong king salmon	Unuk River	Port Armstrong Hatchery 109-10-002	P	0	2,000,000
Armstrong king salmon	Unuk River	Deer Mountain Hatchery	A	0	2,000,000
Species/ Run Totals				0	2,000,000

4.3 *Broodstock capture method*

King salmon returning to the hatchery are enhanced fish. Over the course of the run, broodstock enter the inner bay and mature. In mid-July, two fish ladders are opened and adults are recruited into several holding raceways. Males and females are monitored for ripeness. Little Port Walter research facility, located five miles north of PAH, is a backup egg source for Unuk River stock king salmon eggs.

4.4 *Spawning*

Not applicable because no egg takes are planned for 2020.

4.5 *Egg-take schedule*

No egg takes are planned for 2020.

4.6 *Carcass disposal*

Not applicable because no egg takes are planned for 2020.

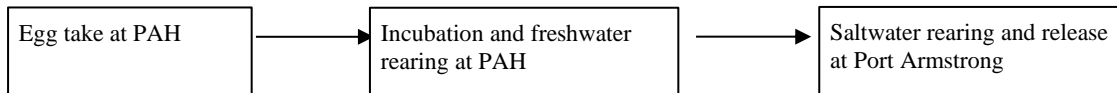
4.7 *Planned releases this calendar year of previous brood years' production.*

No previous brood year fish available for release (see section 4.1)

4.8 *Previous brood years that will remain in culture during the entire calendar year.*

Program Name	Brood Year	Number Live	Life Stage	Type of Mark, # to Mark	Number to Release, Date
Armstrong king salmon	N/A	-	-	-	-

4.9 *Operational diagram*



4.10 *Fish transport permits*

FTP #	Ancestral Stock	Egg take, transport, or release	Trans. From To	Maximal #, Life Stage	Expires
01J-1005	Unuk	Egg take, transport, and release	LPW to PAH	2,000,000 eggs <sup>1</sup>	9/30/25
11J-1004	Unuk	Egg take, transport, and release	PAH to PAH	2,000,000 eggs <sup>1</sup>	12/31/25
12J-1015	Unuk	Egg take, transport, and release	DMH to PAH	2,000,000 eggs <sup>1</sup>	8/14/2022

<sup>1</sup>Total not to exceed 5 million eggs when combined with coho salmon eggs.

**5.0 Summer chum salmon**

5.1 *Program details*

In 2003, PAH began its summer chum salmon program utilizing the enhanced-return chum salmon stock from GCH and HFH. The purpose of the program is to establish a chum salmon return at PAH that will provide opportunities for common property harvest of chum salmon in Lower Chatham Strait, as well as broodstock and cost recovery fish for PAH. Since 2009, a full complement of chum salmon year-classes has returned to PAH. It is anticipated that all future egg-take goals will be achieved from returns to PAH. In 2015, permitted chum salmon production at PAH increased from 30 million to 60 million green eggs, and a permitted remote release site was added at Port Lucy (Figure 3). The production goal is to annually release over 55 million 2.0 gram or larger thermal marked chum salmon fry from both Port Armstrong and from Port Lucy, once the program is at full production. Chum salmon will be released from each location as a single group, near the beginning of May. PAH strives to maintain a green egg to fry survival rate above 90%. AKI strives to thermal mark 100% of the chum salmon incubated at PAH.

## 5.2 *Egg takes*

<b>Program Name</b>	<b>Ancestral Stock(s)</b>	<b>Egg-Take Site, Stat Area</b>	<b>Primary or Alternate Source?</b>	<b>Current Year Egg Goal</b>	<b>Permitted Maximum</b>
Armstrong chum salmon	HFH	PAH, 109-10-002	<b>P</b>	60,000,000	60,000,000
Armstrong chum salmon	HFH		<b>A</b>	30,000,000	30,000,000
Armstrong chum salmon	HFH	HFH	<b>A</b>	30,000,000	30,000,000
<b>Species/ Run Totals</b>				<b>60,000,000</b>	<b>60,000,000</b>

## 5.3 *Broodstock capture method*

Returning chum salmon are from an enhanced run. Sex ratios will be sampled during the harvest to monitor run timing. In late July, when broodstock have sufficiently matured, three fish ladders are opened and adults recruit into raceways. An electro-anesthesia unit, attached to the raceways, is used during egg take.

## 5.4 *Spawning*

Approximately 60,000 chum salmon will be required for broodstock. Additional broodstock may be required if eggs are taken for HFH. Spawning takes place on a covered deck adjacent to the brood raceways. After being stunned with an electro-anesthesia unit, males and females are sorted and their gametes are collected. The eggs are transported by handcart to the incubation building, where fertilization and rinsing takes place. The fertilized eggs are loaded into R48 bulk incubators for incubation to the eyed stage.

## 5.5 *Egg-take schedule*

Egg take generally begins around the end of July, and lasts for one to two weeks; however, it may be extended depending on run timing and pace of recruitment into the fish ladder. Between 3 and 6 million eggs can be taken in a day, depending on the number of ripe females available and their fecundities.

## 5.6 *Carcass disposal*

The majority of carcasses will be sold to processors. Those carcasses not sold are collected daily in a small barge. Carcasses may also be given away and/or sold as bait. All remaining carcasses are driven approximately one mile offshore and discarded in Chatham Strait.

5.7 *Planned releases this calendar year of previous brood years' production*

Program Name	Brood Year	Release Date	Number to Release	Life Stage	Type of Mark, % Marked
Armstrong chum salmon	BY19	5/15/2020	52 million	Fed Fry	TM 100%

5.8 *Operational diagram*

Egg take, incubation, rearing, and release at PAH or release in Chatham Strait

5.9 *Fish transport permits*

FTP #	Egg take, transport, or release	Transport from to	Maximal #, Life Stage	Expires
06J-1011	Egg take and release	PAH to PAH	60,000,000 eggs	12/31/2025
03J-1009	Transport and release	HFH to PAH	30,000,000 eggs	11/01/2022
15J-1016	Transport and release	PAH to Port Lucy	30,000,000 eggs	12/31/2025
19J-1012	Transport and release	PAH to offshore of PAH <sup>1</sup>	20,000,000 fed fry	06/01/2023

<sup>1</sup>Vessel-transport release to be no more than 7.5 miles south and 5 miles east of PAH.

**6.0 HARVEST MANAGEMENT**

**6.1 *Special harvest areas***

Described in **5 AAC 40.081 District 9: Port Armstrong Special Harvest Area.**

The AKI Special Harvest Area (SHA) for king salmon is defined in regulation as the waters of Port Armstrong west of 134°39.47' W. longitude and is open for harvest by the hatchery permit holder beginning April 15. The SHA for chum, pink, and coho salmon includes the waters of Port Armstrong Bay enclosed by a line from Point Eliza at 56°17.73' N. latitude, 134°38.75' W. longitude to a point on the Baranof Island shoreline at 56°17.98' N. latitude, 134°38.35' W. longitude (Figure 1) and is open to harvest to the hatchery permit holder from June 15 through October 31. This area will be closed to common property commercial fishing by regulation from July 31 through September 30, unless opened by emergency order (EO) to harvest salmon surplus to cost recovery and broodstock needs, or for continued trolling by request of PAH.

Sport fishing will be open in the SHA. Sport fisheries will be managed by regional sport fishing regulations in effect for the Port Armstrong SHA. If necessary to protect broodstock, sport fishing may be closed by EO. If the number of king salmon returning to the SHA is expected to exceed broodstock needs, the sport fish bag and possession limit may be increased.

**Port Herbert Special Harvest Area–Terminal Harvest Area.**

The SHA for Port Herbert is designated as waters within Port Herbert west of 134°39.70'W longitude. Prior to August 15, Port Herbert will be closed west of 134°44.30'W longitude. Prior to September 1, waters off Nakvassin Creek will be closed inside a line from 56°26.51' N. latitude, 134°44.85' W. longitude to 56°26.33' N. latitude, 134°44.64' W. longitude to 56°26.53' N. latitude, 134°44.55' W. longitude (Figure 2). A hatchery permit holder harvesting salmon within the SHA is exempt from the provisions of 5 AAC 33.310. Fishing periods for the hatchery permit holder will be opened and closed by emergency order by gear type. Notwithstanding 5 AAC 33.330, legal gear type for the hatchery permit holder in the SHA is purse seine, beach seine, gillnet, troll gear, and dip net. Additionally, AKI may be required to remove unharvested pink salmon remaining in the terminal harvest area should a significant number remain after common property fisheries have ceased.

**Port Lucy Special Harvest Area–Terminal Harvest Area.**

The SHA for Port Lucy is designated as all waters of Port Lucy west of 134°40.0'W longitude (Figure 3). A hatchery permit holder harvesting salmon within the SHA is exempt from the provisions of 5 AAC 33.310. Fishing periods for the hatchery permit holder will be opened and closed by emergency order by gear type. Notwithstanding 5 AAC 33.330, legal gear type for the hatchery permit holder in the SHA is purse seine, beach seine, gillnet, troll gear, and dip net. AKI will be required to remove unharvested hatchery-produced chum salmon remaining in the terminal harvest area should a significant number remain after common property fisheries have ceased.

6.2 *Projected return this year*

Species, run	Program Name	Projected Common Property Harvest	Other <sup>1</sup>	Total Projected Return, Current Year
Pink salmon BY 18	Port Armstrong	158,185	209,686	367,871
Pink salmon BY 18	Port Herbert	0	0	0
Coho salmon BY 17	Port Armstrong	100,156	100,156	200,312
Chum salmon BY 15-17	Port Armstrong	55,778	501,998	557,775

Species, run	Program Name	Projected Common Property Harvest	Other <sup>1</sup>	Total Projected Return, Current Year
King salmon BY 14-16	Port Armstrong	300	300	600

<sup>1</sup>Other includes broodstock, cost recovery, escapement, etc.

### 6.3 *Common property fisheries management:*

Commercial fisheries

#### King Salmon

In 2020, PAH is expecting about 300 adult king salmon to return. PAH king salmon will be caught in the traditional summer troll season in the outer coastal waters and lower Chatham Strait. An estimated 20% to 40% of these fish will be harvested in common property fisheries.

#### Chum Salmon

In 2020, PAH is expecting approximately 502,000 adult chum salmon to return at 1.5% ocean survival. The ancestral stock is HFH chum salmon, which return in July. If PAH chum salmon return through lower Chatham Strait, very few will be harvested in traditional purse seine fisheries, because lower Chatham Strait purse seine fisheries do not occur until August. Conversely, if PAH chum salmon enter inside waters through Cross Sound, harvest would be expected in traditional seine fisheries in northern Chatham Strait and the Hidden Falls THA. Traditional troll fisheries allow good access to PAH chum salmon. All chum salmon returning to the SHA in excess of broodstock requirements will be harvested for cost recovery by PAH. Common property openings targeting PAH chum salmon are not anticipated in the SHA; however, the outer bay portion of the SHA may be kept open for troll access when the inner bay is closed. Though unlikely, common property openings may be necessary to harvest surplus fish in the SHA if cost-recovery harvesting is overwhelmed. PAH will maintain close contact with the Sitka Area ADF&G management staff throughout the return so the department can respond to unharvested surplus fish in a timely manner, should the need arise. PAH may request the outer bay be closed if broodstock collection or cost recovery falls below projection.

#### Pink Salmon

In 2020, AKI is predicting a return to Port Armstrong of approximately 210,000 adult pink salmon at 1.0% ocean survival. All pink salmon returning to the SHA in excess of broodstock requirements will be harvested by PAH for cost recovery. No common property openings targeting PAH pink salmon are anticipated in the SHA. Though unlikely, common property openings may be necessary to harvest surplus fish in the SHA if cost-recovery harvesting is overwhelmed. No pinks are



expected to return to the Port Herbert rearing and release site this year. PAH will maintain close contact with the Sitka Area ADF&G management staff throughout the return so the department can respond to unharvested surplus in a timely manner, should the need arise.

Wild stock run timing in the most southerly portions of sections 9-A and 9-B overlaps with the run timing of returning PAH pink salmon; therefore, a significant interception of pink salmon returning to PAH would be expected in these fisheries during mid to late August. Opportunities for traditional purse seine fisheries in the southern portions of sections 9-A and 9-B will be determined in season based on observations and abundance. In Section 9-A, traditional purse seine fisheries occur north of Armstrong Point. In recent years, few if any common property openings for seining have occurred south of Red Bluff Bay.

Coho Salmon

In 2020, PAH is expecting a return of about 100,000 adult coho salmon at 5% ocean survival. PAH coho salmon are mostly harvested in the traditional summer troll season in the outer coastal waters and in lower Chatham Strait. It is estimated that 50% of PAH coho salmon will be harvested in the common property fisheries. All coho salmon returning to the SHA in excess of broodstock requirements will be harvested for cost recovery by PAH.

Sport fisheries

Relatively small numbers of PAH salmon are caught in sport fisheries in Chatham Strait. Some targeted fishing may occur near Port Armstrong hatchery for coho salmon. Sport fisheries will be managed as described in regional codified regulations for the waters of Southeast Alaska. There are no special regulations for Port Armstrong. The department may use EO authority to address additional issues as they arise in season.

**6.4 Cost recovery harvest management:**

Species	CR goal
King salmon	All king salmon in terminal area.
Chum salmon	All chum salmon in terminal area.
Pink salmon	All pink salmon in terminal areas.
Coho salmon	All coho salmon in terminal area.

Pink salmon run timing is monitored via daily sex ratio sampling during the harvest activities. Initially, the early portion of the pink salmon return is managed to provide the highest quality flesh condition, as the preponderance of these fish are excess males. As the run progresses and more females begin to account for a larger share of the return, management emphasis may turn to harvesting strategies aimed at maximum roe value, with flesh quality being secondary. As a

general practice, PAH and its contracted processor's harvester will strive to keep the outer portion of the SHA fully harvested each day in order to minimize any potential straying. PAH anticipates 130,000 pink salmon to be available for cost recovery, not counting fish that are lost to sea lion predation. Sufficient processing and tendering capabilities will be contracted to handle daily harvest amounts of nearly 800,000 lbs. if necessary.

With the decline in king salmon returns anticipated since the cessation of king salmon egg takes at PAH, the staff no longer intends to use a gillnetter during May and June for cost recovery of returning king salmon. In past years, the gillnetter has used a driftnet of 6" or greater mesh size in the inner bay and attempt to harvest kings as quickly as possible as they return in order to maximize quality and take advantage of the higher early-season prices.

In 2020, PAH anticipates a return of 422,000 chum salmon to be available for cost recovery in the SHA, again, not counting sea lion predation. Chum salmon should make a significant contribution to PAH's cost-recovery harvest. The chum salmon run generally ends before the end of July, one to two weeks before the pink salmon harvest begins. PAH plans to contract a seiner to fish at least twice a week, to keep the SHA fully harvested.

Based on historical catch data, PAH anticipates that approximately 50% of returning coho salmon will be captured in the traditional summer troll fishery in the outer coastal waters of Baranof Island and lower Chatham Strait. Adult coho salmon not caught in common property fisheries typically begin arriving in the SHA in late August. The coho salmon return usually overlaps with the end of the pink salmon return. If requested by the processor, efforts may be made to harvest coho salmon and pink salmon separately. Coho salmon often completely segregate themselves from pink salmon within the inner bay. Definitive coho salmon harvest strategies may vary with changing conditions and different fish behavior.

## 7.0 APPROVAL

### **Recommendation for Approval: Port Armstrong Hatchery Annual Management Plan, 2020**

Bart Watson, Armstrong Keta, Inc. 8/5/2020

Troy Tydingco, Area Management Biologist, Division of Sport Fish 7/28/2020

Aaron Dupuis, Area Management Biologist, Division of Commercial Fisheries 7/28/2020

Judy Lum, Regional Supervisor, Division of Sport Fish 7/28/2020

Lowell Fair, Regional Supervisor, Division of Commercial Fisheries 7/28/2020

Lorraine Vercessi, PNP Hatchery Program Coordinator, Div. of Commercial Fisheries 7/28/2020

#### **Approval:**

**The 2020 Port Armstrong Hatchery Annual Management Plan is hereby approved:**

Tom Taube, Deputy Director, Division of Sport Fish 8/5/2020

Peter Bangs, Assistant Director, Division of Commercial Fisheries 8/5/2020

## *APPENDICES*

Maps:

**Figure 1.** Location of Port Armstrong (SHA) in Southeast Alaska.

Historic production tables:

**Table 1.** Projected returns for the 2020 season.

**Table 2.** Pink salmon egg take, release, and survival data for Port Armstrong Hatchery.

**Table 3.** Coho salmon egg take, release, and survival data for Port Armstrong Hatchery.

**Table 4.** King salmon egg take, release, and survival data for Port Armstrong Hatchery.

**Table 5.** Chum salmon egg take, release, and survival data for Port Armstrong Hatchery.

**Table 6.** Production summary.

Appendix B. Evaluation of vessel-transport releases of pink salmon from otolith data.

# Port Armstrong SHA

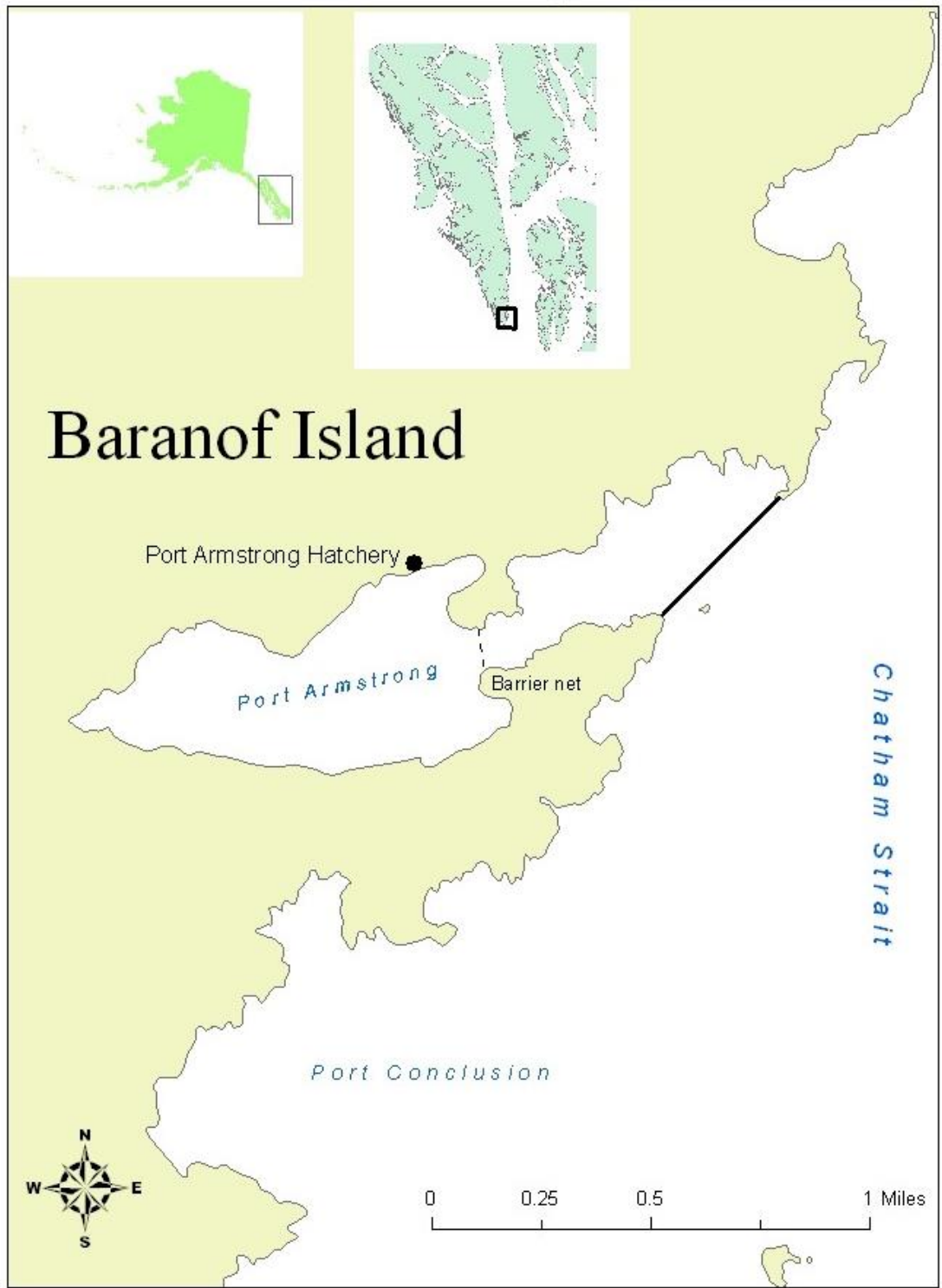


Figure 1.—Location of Port Armstrong SHA in Southeast Alaska

Table 1. AKI projected returns for the 2020 season.							
Species	Brood	Fry/Smolt	Est. Marine	Estd.	Estd. CP	Estd. Brood	Estd. Cost
	Year	Released	Survival %	Return	Harvest	Stock	Recovery
<b>Pink</b>	2018	36,787,073	1.5%	551,806	253,831	187,500	110,475
	Age 2				46%		
<b>Coho</b>	2017	3,732,258	7%	261,258	130,629	6,000	124,629
	Age 3				50%		
<b>Chum</b>	2015-17		1.3%	422,000	42,200	60,000	319,800
	Age 3-5				10%		
<b>Chinook</b>	2013-2015	-	0.35%	497	149	-	348
	Age 5-7				30%		

Table 2.—Pink salmon: egg take, release, and survival data for Port Armstrong Hatchery, 1983-2020.											
Brood Year	Origin	Eggs Taken	Fry Released	% Fry Survival	Size Gram	Release Dates	Adult	%	Total	%	Return Year
							Return To Hatchery	Return To Hatchery	Adult Return	Marine Survival	
1983	Sashin Creek	2,900,000									
1983	Lovers Cove	6,100,000	7,400,000	82.20%	0.23	3/5-4/12/84	74,000	1.00%	148,000	2.00%	1985
1984	Sashin Creek	2,800,000									
1984	Lovers Cove	8,400,000	7,500,000	67.00%	0.3	1985/4/29-5/23	30,098	0.40%	60,196	0.80%	1986
1985	Port Armstrong	13,630,000	9,676,000	71.00%	0.4	1986/5/1-7	275,976	2.85%	289,775	2.99%	1987
1986	Port Armstrong	14,520,000	12,350,000	85.10%	0.39	1987/4/15-25	24,061	0.19%	28,256	0.23%	1988
1987	Port Armstrong	20,940,000	19,370,000	92.50%	0.32	1988/4/18-24	75,066	0.39%	125,115	0.65%	1989
1988	Port Armstrong	17,150,000	16,040,000	93.50%	0.36	1989/4/24-29	903,378	5.63%	1,113,413	6.94%	1990
1989	Port Armstrong	24,000,000	22,420,000	93.40%	0.38	1990/4/28-5/1	1,097,622	4.90%	1,393,752	6.22%	1991
1990	Port Armstrong	53,710,000	50,116,000	93.30%	0.34	1991/5/5-15	2,041,595	4.07%	2,722,127	5.43%	1992
1991	Port Armstrong	41,849,000	39,616,000	94.70%	0.45	1992/5/2-6	358,967	0.91%	478,623	1.21%	1993
1992	Port Armstrong	58,108,000	51,189,000	88.10%	0.31	1993/4/27-5/5	1,260,758	2.46%	1,760,758	3.44%	1994
1993	Port Armstrong	58,668,000	43,000,000	73.30%	0.3	1994/4/26-5/4	843,954	1.96%	1,343,954	3.13%	1995
1994	Port Armstrong	59,416,000	53,839,000	90.60%	0.31	1995/4/24-5/3	1,266,381	2.35%	2,110,635	3.92%	1996
1995	Port Armstrong	81,360,000	72,480,000	91.00%	0.31	1996/4/27-5/7	1,246,342	1.72%	1,821,342	2.51%	1997
1996	Port Armstrong	91,286,000	81,012,000	88.70%	0.32	1997/4/25 - 5/10	1,426,978	1.76%	2,212,708	2.73%	1998
1997	Port Armstrong	80,071,739	75,776,850	94.60%	0.7	1998/3/31-4/27	3,522,588	4.65%	4,327,788	5.71%	1999
1998	Port Armstrong	86,619,007	73,269,304	84.60%	0.45	1999/4/26 - 6/7	204,618	0.28%	304,618	0.42%	2000
1999	Port Armstrong	89,082,366	85,638,750	96.10%	0.63	2000/4/24 - 5/8	1,362,561	1.59%	2,452,610	2.90%	2001
2000	Port Armstrong	52,992,615	52,343,525	96.00%	0.94	2001/4/20-6/4	1,104,959	2.10%	1,988,926	3.80%	2002
2001	Port Armstrong	78,906,537	72,663,780	92.10%	0.67	2002/5/1-6/12	598,569	0.82%	1,077,424	1.48%	2003
2002	Port Armstrong	90,366,055	83,470,980	92.40%	0.78	2003/4/24-5-29	1,184,027	1.42%	1,691,465	2.03%	2004
2003	Port Armstrong	89,675,516	83,835,050	93.50%	0.76	2004/4/21 - 6/2	1,015,299	1.21%	1,786,926	2.13%	2005
2004	Port Armstrong	88,040,126	80,110,972	91.00%	0.78	2005/4/28 - 5/31	356,371	0.44%	636,377	0.79%	2006
2005	Port Armstrong	87,610,268	78,172,288	89.20%	1.12	2006/5/27 - 6/1	672,207	0.86%	1,209,973	1.55%	2007
2006	Port Armstrong	85,617,687	78,211,021	91.30%	0.6	2007/6/2 - 6/7	52,113	0.07%	93,803	0.12%	2008
2007	Port Armstrong	64,478,274	61,734,194	95.70%	0.75	2008/5/20 - 5/28	793,488	1.29%	1,428,278	2.31%	2009
2008	Port Armstrong	23,204,712	21,438,507	92.40%	0.64	5/6/09	759,488	3.54%	1,240,699	5.79%	2010
2009	Port Armstrong	59,858,384	53,677,075	89.20%	0.49	4/29/10	658,638	1.23%	1,176,351	2.19%	2011
2010	Port Armstrong	85,090,195	75,506,078	88.70%	0.48	2011/5/3-5/7	163,538	0.2%	292,032	0.4%	2012
2011	Port Armstrong	85,870,462	82,734,292	96.30%	0.52	2012/5/1-2	1,086,035	1.3%	2,204,708	2.7%	2013
2012	Port Armstrong	53,598,205	52,120,334	97.20%	0.65	2013/ 4/25 - 5/4	310,959	0.6%	403,843	0.8%	2014
2013	Port Armstrong	87,840,626	79,659,097	90.70%	0.46	2014/4/18-5/7	451,741	0.5%	721,612	0.8%	2015
2014	Port Armstrong	93,185,785	87,664,878	94.10%	.5-.97	2015/4/20 - 5/6	151,347	0.2%	280,272	0.3%	2016
2015	Port Armstrong	103,883,660	97,116,922	93.50%	.61-.99	2016/ 4/13-4/19	758,455	0.8%	1,404,546	1.4%	2017
2016	Port Armstrong	55,134,038	52,820,574	95.80%	.52-.9	4/28/19-5/14	194,535	0.4%	360,250	0.7%	2018
2017	Port Armstrong	82,198,745	77,904,453	94.78%	.42-.48	2018/4/30-5/8	212,640	0.3%	303,771	0.4%	2019
2018	Port Armstrong	40,206,672	36,787,073	91.49%	.77-.86	5/5/19					2020
2019	Port Armstrong	41,737,626	38,930,384	93.27%	1.0-1.23	4/26, 4/28, 5/12					2021
2020	Port Armstrong										2022

Table 3.–Coho salmon: egg take, release and survival data for Port Armstrong Hatchery, 1988–2011.										
Brood Year	Origin	Eggs	Smolt	Smolt	Size	Release	Return	Marine	Adult	Return
		Taken	Released	Survival	Gram	Dates	Age	Survival	Return	Year
1988	Blanchard Lake (Deep Cove)	140,000	121,730	86.95%	24.3	5/16/90	2	2.0%	2,442	1990
							3	22.3%	27,090	1991
1989	Deer Lake (Sashin)	280,000	206,724	73.83%	19.6	5/25-26/1991	2	0.2%	488	1991
							3	19.4%	40,140	1992
1990	Deer Lake (Sashin)	230,180	164,766	71.58%	18.5	5/17-18/1992	2	0.1%	100	1992
							3	7.0%	11,493	1993
1991	Deer Lake (Deep Cove) - Abnormally low fry survival due to pipeline failure.	613,504	81,673	13.31%	17.2	5/23/93	2	0.0%	-	1993
							3	4.7%	3,805	1994
1992	Deer Lake (Sashin)	893,000	828,199	92.74%	18.4	5/20-30/1994	2	0.0%	312	1994
							3	10.4%	86,244	1995
1993	PAH Hidden Falls	663,000 217,000	457,281 184,525	68.97% 85.03%	17.6 15.5	5/28-29/1995 5/28/95	2	0.0%	15	1995
							3	5.1%	32,443	1996
							4	0.0%	97	1997
1994	PAH Hidden Falls	1,098,000 703,333	751,566 633,203	68.45% 90.03%	20.8 18.7	6/2/96 5/31/96	2	0.0%	-	1996
							3	5.5%	76,488	1997
1995	PAH	1,830,000	952,000	52.02%	19.7	5/19-6/6/1997	2	0.2%	1,500	1997
							3	3.6%	33,801	1998
1996	PAH	1,853,000	123,850	35.11%	21.4	5/23/98	2	0.0%	-	1998
							3	16.4%	20,244	1999
1997	PAH	748,779	625,363	83.52%	22.6	5/19-26/1999	2	0.0%	-	1999
							3	3.1%	19,589	2000
1998	PAH	1,585,368	1,358,299	85.68%	22.9	5/15-28/2000	2	1.8%	25,000	2000
							3	15.0%	203,619	2001
1999	Hidden Falls	1,400,000	975,549	83.83%	24.2	5/22-23/2001	2	0.4%	3,690	2001
							3	23.2%	226,409	2002
2000	Hidden Falls	1,775,298	1,468,761	82.70%	21.5	5/24-31/2002	2	0.1%	700	2002
							3	4.5%	66,355	2003
2001	PAH	1,861,605	1,331,351	71.52%	22.2	5/30/03	2	0.0%	-	2003
							3	2.6%	34,724	2004
2002	PAH Hidden Falls	1,576,659 325,171	1,340,985	70.51%	27.3	6/3-4/2004	2	0.0%	-	2004
							3	1.5%	19,444	2005
2003	PAH	2,338,298	1,581,050	67.62%	26.7	6/9/05	2	0.0%	-	2005
							3	2.3%	36,238	2006
2004	PAH Hidden Falls	1,287,880 1,746,625	2,616,063	86.21%	19.3	6/8/06	2	0.1%	1,666	2006
							3	5.6%	145,393	2007
2005	PAH	2,933,857	2,156,500	73.50%	20.7	6/15/07	2	0.0%	751	2007
							3	2.7%	59,038	2008
2006	PAH	3,296,075	2,509,128	76.12%	18.9	6/5/08	2	0.1%	2,572	2008
							3	4.5%	113,254	2009
2007	PAH	3,702,400	3,148,462	85.04%	15	5/28/09	2	0.0%	217	2009
							3	3.9%	123,552	2010
2008	PAH	4,287,737	3,223,867	75.19%	16.5	5/8&27/2010	2	0.0%	1,031	2010
							3	4.6%	148,756	2011
2009	PAH	3,494,400	2,274,860	65.10%	19.5	5/15-27/2011	2	0.0%	695	2011
							3	2.6%	58,332	2,012
2010	PAH	2,421,000	2,380,474	85.28%	19.6	5/18-28/2012	2	0.0%	477	2012
							3	5.7%	135,869	2013
2011	PAH	2,499,209	2,243,392	89.76%	23.6	5/19-27/2013	2	0.0%	788	2013
							3	9.7%	250,555	2014



Table 3 (continued) .-Coho salmon: egg take, release and survival data for Port Armstrong Hatchery, 2012–2018.										
Brood Year	Origin	Eggs	Smolt	Smolt	Size	Release	Return	Marine	Adult	Return
		Taken	Released	Survival	Gram	Dates	Age	Survival	Return	Year
2012	PAH	3,010,994	2,466,514	81.90%	24.4	2014	2	0.2%	3,701	2014
							3	9.1%	223,802	2015
2013	PAH	2,358,046	1,944,904	82.50%	24.5	2015	2	1.1%	20,740	2015
							3	5.3%	103,141	2016
2014	PAH	2,911,992	2,192,592	75.30%	29-36	2016	2	1.0%	22,236	2016
							3	6.6%	191,736	2017
2015	PAH	2,886,214	2,061,012	71%	25-52	2017	2	0.6%	17,522	2017
							3	2.0%	56,880	2018
2016	PAH	5,023,610	4,006,231	80%	20-30	2018	2	0.0%	0	2018
							3	4.5%	179,165	2019
2017	PAH	6,097,997	3,881,172	64%		2019	2			2019
							3			2020
2018	PAH	4,828,800	3,664,783	76%	23-28	2020	2			2020
							3			2021
2019	PAH	4,838,400		0%		2021	2			2019
							3			2020
2020	PAH					2022	2			2020
							3			2021

Table 4a.–King salmon: egg take, release, and survival data for Port Armstrong Hatchery, 1985–2000.

Brood Year	Origin	Eggs Taken	Fry Released	% Fry Survival	Size Gram	Release Dates	Age at Return	% Marine Survival	Adult Return	Return Year
1985	Sashin (Unuk)	n/a	69,949	n/a	24.13	6/3/87	2(minijack)	0.21%	150	1987
							3(jack)	0.42%	295	1988
							4	0.50%	351	1989
							5	1.50%	1,051	1990
							6	1.28%	896	1991
BY85 TOTAL								3.92%	2,743	
1986	Sashin (Unuk)	80,000	75,602	94.50%	6.21	7/2/87	n/a	0.00%	-	
BY86 TOTAL								0.00%	-	
1987	Sashin (Unuk)	130,000	89,942	69.20%	35.04	5/18/89	2(minijack)	2.97%	2,667	1989
							3(jack)	0.29%	264	1990
							4	0.20%	180	1991
							5	0.68%	615	1992
							6	1.33%	1,192	1993
BY87 TOTAL								5.47%	4,918	
1988	Sashin (Unuk)	166,000	144,323	86.90%	38.72	5/16/90	2(minijack)	0.24%	340	1990
							3(jack)	0.08%	121	1991
							4	0.06%	88	1992
							5	0.40%	584	1993
							6	0.19%	275	1994
BY88 TOTAL								0.98%	1,408	
1989	Sashin (Unuk)	154,588	62,176	40.20%	40.25	5/26/91	2(minijack)	0.19%	120	1991
						5/27/91	3(jack)	0.16%	100	1992
							4	0.27%	170	1993
							5	0.29%	181	1994
							6	0.08%	48	1995
BY89 TOTAL								1.00%	619	
1990	Sashin (Unuk), PAH	160,316	88,964	55.50%	25.6	5/26/92	2(minijack)	0.00%	-	1992
	Snettisham Smolt	n/a	306,701	n/a	10.5	6/11/92	3(jack)	0.10%	413	1993
			395,665				4	0.19%	734	1994
							5	0.08%	315	1995
							6	0.10%	398	1996
BY90 TOTAL								0.47%	1,860	
1991	Sashin (Unuk), PAH	32,000	-	0.00%	-	1/1/94	2(minijack)	0.00%	-	1993
	Snettisham Smolt		1,275,041	n/a	8.87	6/9/93	3(jack)	0.00%	-	1994
							4	0.05%	594	1995
							5	0.00%	-	1996
							6	0.00%	-	1997
BY 91 PAH smolt lost due to pipeline failure.								0.05%	594	
1992-2000 No Eggs Taken										

Table 4b.–King salmon: egg take, release, and survival data for Port Armstrong Hatchery, 2001–2006.

Brood Year	Origin	Eggs Taken	Fry Released	% Fry Survival	Size Gram	Release Dates	Age at Return	% Marine Survival	Adult Return	Return Year					
2001	Sashin (Unuk)	181,228	106,756	58.90%	31.68	5/20/03	2 (minijack)	0.00%	-	2003					
	Little Port Walter						3 (jack)	1.12%	1,200	2004					
							4 yr old	1.55%	1,656	2005					
							5 yr old	1.54%	1,644	2006					
							6 yr old	0.26%	277	2007					
							BY01 TOTAL	4.47%	4,777						
2002	Sashin (Unuk)	172,915	96,285	55.70%	44.81	5/8/04	2 (minijack)	0.09%	83	2004					
	Little Port Walter						3 (jack)	0.01%	8	2005					
							4 yr old	0.05%	45	2006					
							5 yr old	0.90%	862	2007					
							6 yr old	0.06%	60	2008					
							BY02 TOTAL	1.10%	1,058						
2003	Sashin (Unuk)	240,465	83,479	34.70%	52.83	5/21/05	2 (minijack)	0.00%	-	2005					
	Little Port Walter						3 (jack)	0.07%	57	2006					
							4 yr old	0.31%	262	2007					
							5 yr old	0.35%	291	2008					
							6 yr old	0.20%	169	2009					
							BY03 TOTAL	0.93%	779						
2004	Sashin (Unuk)	907,633	273,788	30.20%	42	5/5/06	2 (minijack)	0.01%	18	2006					
	Little Port Walter						3 (jack)	0.01%	20	2007					
							4 yr old	0.03%	75	2008					
							5 yr old	0.12%	337	2009					
							6 yr old	0.01%	34	2010					
							BY04 TOTAL	0.18%	484						
2005	Sashin (Unuk)	215,440	148,631	69.00%	44.2	5/7/07	2 (minijack)	0.07%	111	2007					
	Little Port Walter						3 (jack)	0.41%	608	2008					
							4 yr old	0.79%	1,180	2009					
							5 yr old	1.43%	2,125	2010					
							6 yr old	0.00%	-	2011					
							BY05 TOTAL	2.71%	4,024						
2006	Sashin (Unuk)	1,352,379	938,557	69.40%	4.3	6/25/07	0 ocean (mini)	0.00%	-	2007					
	PAH - 0 check						663,306			1 ocean (jack)	0.00%	-	2008		
										2 ocean zero	0.00%	-	2009		
										3 ocean zero	0.00%	-	2010		
										4 ocean zero	0.00%	-	2011		
										0 check total	0.00%	-			
							PAH - 1 check	275,251		28.97	5/5/08	2 (minijack)	0.19%	523	2008
												3 (jack)	0.22%	597	2009
												4 yr old	0.74%	2,046	2010
												5 yr old	1.16%	3,192	2011
												6 yr old	0.08%	213	2012
												1 check total	2.39%	6,571	
						BY06 TOTAL	0.70%	6,571							

Table 4c.—King salmon: egg take, release, and survival data for Port Armstrong Hatchery, 2007–2010.											
Brood Year	Origin	Eggs Taken	Fry Released	% Fry Survival	Size Gram	Release Dates	Age at Return	% Marine Survival	Adult Return	Return Year	
2007	Sashin (Unuk)	844,492	606,070	71.80%							
	PAH -0 check				7.03	6/9/08	0 ocean (mini)	0.00%	-	2008	
							1 ocean (jack)	0.00%	-	2009	
							2 ocean zero	0.00%	-	2010	
							3 ocean zero	0.03%	132	2011	
							4 ocean zero	0.01%	70	2012	
								0 check total	0.04%	202	
	PAH -1 check			123,017		30.7	5/2/09	2 (minijack)	0.17%	208	2009
								3 (jack)	0.31%	384	2010
								4 yr old	0.42%	520	2011
								5 yr old	0.33%	407	2012
								6 yr old	0.02%	30	2013
								BY07 TOTAL	0.29%	1,751	
	2008	Sashin (Unuk)	973,421	555,988	57.10%						
PAH -0 check					8.35	6/3/09	0 ocean (mini)	0.00%	-	2009	
							1 ocean (jack)	0.00%	16	2010	
							2 ocean zero	0.00%	20	2011	
							3 ocean zero	0.07%	286	2012	
							4 ocean zero	0.02%	95	2013	
								0 check total	0.10%	417	
PAH -1 check				126,376		50.2	5/8/10	2 (minijack)	0.49%	620	2010
								3 (jack)	0.07%	92	2011
								4 yr old	0.47%	594	2012
								5 yr old	0.39%	494	2013
								6 yr old	0.04%	52	2014
								BY08 TOTAL	0.41%	2,269	
2009		Sashin (Unuk)	734,201	279,702	38.10%						
	PAH - 0 check				13.1	5/17/10	0 ocean (mini)	0.00%	-	2010	
							1 ocean (jack)	0.02%	31	2011	
							2 ocean zero	0.23%	344	2012	
							3 ocean zero	0.67%	997	2013	
							4 ocean zero	0.12%	182	2014	
								0 check total	1.04%	1,554	
	PAH - 1 check			129,980		44	5/15/11	2 (minijack)	0.08%	102	2011
								3 (jack)	0.07%	88	2012
								4 yr old	0.20%	262	2013
								5 yr old	0.36%	462	2014
								6 yr old	0.00%	6	2015
								BY09 TOTAL	0.71%	1,824	
	2010	Sashin (Unuk)	833,753	273,553	32.80%						
PAH - 0 check					16.05	5/15/11	0 ocean (mini)	0.03%	34	2011	
							1 ocean (jack)	0.01%	10	2012	
							2 ocean zero	0.08%	94	2013	
							3 ocean zero	0.12%	140	2014	
							4 ocean zero	0.03%	35	2015	
								0 check total	0.26%	313	
PAH - 1 check				153,095		53	5/18/12	2 (minijack)	0.11%	172	2012
								3 (jack)	0.08%	123	2013
								4 yr old	0.25%	384	2014
								5 yr old	0.32%	488	2015
								6 yr old	0.00%		2016
								BY10 TOTAL	0.16%	433	

Table 4d.–King salmon: egg take, release, and survival data for Port Armstrong Hatchery, 2011-2016.

Brood		Eggs	Fry	% Fry	Size	Release	Age at	% Marine	Adult	Return
Year	Origin	Taken	Released	Survival	Gram	Dates	Return	Survival	Return	Year
2011	Sashin (Unuk)	737,644	314,938	42.70%						
	PAH -0 check		96,224		19.6	5/12/12	0 ocean (mini)	0.00%	-	2012
							1 ocean (jack)	0.00%	-	2013
							2 ocean zero	0.00%	6	2014
							3 ocean zero	0.03%	32	2015
							4 ocean zero	0.00%	3	2016
							0 check total	0.04%	41	
	PAH -1 check		218,748		43.24	5/18/13	2 (minijack)	0.57%	870	2013
							3 (jack)	0.00%	128	2014
							4 yr old	0.00%	1,116	2015
							5 yr old	0.00%	45	2016
							6 yr old	0.00%	-	2017
							1 check total	0.97%	2,159	
							BY11 TOTAL	0.68%	2,200	
2012	Sashin (Unuk)									
	PAH -0 check	384,073	238,629	62.10%	13.55	5/14/13	0 ocean (mini)	0.00%	-	2013
							1 ocean (jack)	0.10%	230	2014
							2 ocean zero	0.19%	445	2015
							3 ocean zero	0.00%	-	2016
							4 ocean zero	0.01%	30	2017
							BY12 total	0.30%	706	
2013	Sashin (Unuk)									
	PAH - 0 check	327,100	161,355	49.33%	14.7	2014	0 ocean (mini)	0.00%	-	2014
							1 ocean (jack)	0.05%	76	2015
							2 ocean zero	0.00%	-	2016
							3 ocean zero	0.27%	437	2017
							4 ocean zero	0.02%	33	2018
							BY13 total	0.34%	545	
2014	Sashin (Unuk)									
	PAH - 0 check	293,450	196,994	67.13%	17.5	5/8/15	0 ocean (mini)	0.00%	-	2015
	(100,170 of these smolts were released at LPW)					thru	1 ocean (jack)	0.00%	-	2016
						7/28/15	2 ocean zero	0.09%	181	2017
							3 ocean zero	0.24%	473	2018
							4 ocean zero	0.00%	-	2019
							BY14 total	0.33%	654	
2015	Sashin (Unuk)									
	PAH - 0 check	406,030	231,839	57.10%	18	6/30/16	0 ocean (mini)	0.00%	114	2016
							1 ocean (jack)	0.05%	105	2017
							2 ocean zero	0.08%	196	2018
							3 ocean zero	0.00%	-	2019
							4 ocean zero	0.00%	-	2020
							BY15 total	0.13%	416	

Table 5a.—Chum salmon: egg take, release, and survival data for Port Armstrong Hatchery, 1984–2002.

Brood Year	Origin	Eggs	Fry	% Fry	Size	Release	Return	% Marine	Adult	Return
		Taken	Released	Survival	Gram	Dates	Age	Survival	Return	Year
1984	Security Bay	1,236,400	702,540	56.8%	0.8	6/18/85	3	0.00%	-	1987
	Camden	703,000	223,000	31.7%	1	6/6/85	4	0.01%	90	1988
		1,939,400	925,540	47.7%			5	0.00%	2	1989
BY84 TOTAL								0.01%	92	
1985	Security Bay	2,702,250	1,626,400	60.2%	0.84	5/19/86	3	0.00%	27	1988
						6/9/86	4	0.00%	46	1989
							5	0.00%	-	1990
BY85 TOTAL								0.00%	73	
1986	Security Bay	2,171,103	1,982,450	91.3%	1.05	6/1/87	3	0.01%	128	1989
							4	0.02%	363	1990
							5	0.00%	-	1991
BY86 TOTAL								0.03%	491	
1987	Security Bay	1,506,500	1,287,060	85.4%	0.9	4/24/88	3	0.07%	839	1990
							4	0.03%	396	1991
							5	0.00%	-	1992
BY87 TOTAL								0.10%	1,235	
1988	Port Armstrong	46,571	42,500	91.3%	0.67	4/24/89	3	2.17%	923	1991
						4/30/89	4	0.30%	126	1992
							5	0.00%	-	1993
BY88 TOTAL								2.47%	1,049	
1989	Port Armstrong	157,303	141,921	90.2%	0.56	5/1/90	3	0.28%	400	1992
							4	0.00%	-	1993
							5	0.00%	-	1994
BY89 TOTAL								0.28%	400	
1990	Port Armstrong	855,167	794,673	92.9%	0.51	5/5/91	3	0.00%	-	1993
						5/15/91	4	0.00%	-	1994
							5	0.00%	-	1995
BY90 TOTAL								0.00%	-	
1991	Port Armstrong	444,453	423,000	95.2%	0.52	5/4/92	3	0.00%	-	1994
							4	0.00%	-	1995
							5	0.00%	-	1996
BY91 TOTAL								0.00%	-	
No eggs were taken from 1992-2002										

Table 5b.—Chum salmon: egg take, release, and survival data for Port Armstrong Hatchery, 2003–2010.

Brood Year	Origin	Eggs Taken	Fry Released	% Fry Survival	Size Gram	Release Dates	Return Age	% Marine Survival	Adult Return	Return Year
2003	Hidden Falls	10,000,826	9,306,909	93.1%	1.62	5/30/04	3	0.06%	7,561	2006
	Gunnuk Creek	5,535,655	4,098,640	74.0%	1.99	4/21/04	4	0.28%	37,471	2007
	TOTAL	15,536,481	13,405,549	86.3%	1.73		5	0.05%	7,098	2008
							6	0.01%	1,254	2009
BY03 TOTAL								0.40%	53,384	
2004	Hidden Falls	12,914,888	574,958	4.5%	2.19	5/31/05	3	0.05%	287	2007
							4	0.14%	799	2008
							5	1.09%	6,266	2009
							6	0.00%	-	2010
BY04 TOTAL								1.28%	7,352	
2005	Hidden Falls	2,716,112	2,110,821	77.7%	2.93	6/1/06	3	0.27%	10,294	2008
	Gunnuk Creek	1,911,488	1,770,390	92.6%	3.86	5/15/06	4	2.91%	112,780	2009
	TOTAL	4,627,600	3,881,211	83.9%	3.35		5	0.21%	8,205	2010
							6	0.02%	719	2011
BY05 TOTAL								3.41%	131,998	
2006	Hidden Falls	13,300,064	11,875,417	89.3%	1.59	6/2/07	3	0.03%	5,012	2009
	Port Armstrong	5,049,447	4,654,882	92.2%	1.77	6/7/07	4	0.18%	31,905	2010
	Gunnuk Creek	940,933	917,949	97.6%	3.27	5/24/07	5	0.57%	100,239	2011
	TOTAL	19,290,444	17,448,248	90.5%			6	0.01%	2,414	2012
BY06 TOTAL								0.79%	139,570	
2007	Port Armstrong	15,348,631	13,786,610	89.8%	2.14	5/28/08	3	0.24%	33,501	2010
							4	1.20%	166,072	2011
							5	0.27%	37,767	2012
							6	0.00%	587	2013
BY07 TOTAL								1.71%	237,927	
2008	Port Armstrong	13,104,587	12,417,244	94.8%	1.2	5/7/09	3	0.06%	6,904	2011
							4	1.01%	125,202	2012
							5	0.31%	38,174	2013
							6	0.00%	363	2014
BY08 TOTAL								1.38%	170,643	
2009	Port Armstrong	30,019,963	27,296,476	90.9%	1.21	4/27/10	3	0.03%	7,071	2012
							4	0.47%	128,029	2013
							5	0.14%	38,070	2014
							6	0.00%	762	2015
BY09 TOTAL								0.64%	173,932	
2010	Port Armstrong	30,479,861	28,444,881	93.3%	1.34	5/7/11	3	0.01%	3,524	2013
							4	0.08%	23,930	2014
							5	0.08%	23,627	2015
							6	0.00%	410	2016
BY10 TOTAL								0.18%	51,491	

Table 5c.—Chum salmon: egg take, release, and survival data for Port Armstrong Hatchery, 2011–2019.										
Brood Year	Origin	Eggs Taken	Fry Released	% Fry Survival	Size Gram	Release Dates	Return Age	% Marine Survival	Adult Return	Return Year
2011	Port Armstrong	30,139,827	26,459,338	87.8%	1.91	5/1/12	3	0.04%	10,152	2014
							4	0.19%	49,541	2015
							5	0.05%	12,560	2016
							6	0.01%	3,321	2017
							BY11 TOTAL		0.29%	75,574
2012	Port Armstrong	29,620,820	25,695,046	86.7%	1.78	4/25/13	3	0.01%	2,286	2015
							4	0.12%	31,037	2016
							5	0.40%	101,782	2017
							6	0.01%	1,442	2018
							BY12 TOTAL		0.53%	136,548
2013	Port Armstrong	30,174,044	25,028,988	82.9%	2.42	4/30/14	3	0.01%	2,926	2016
							4	1.00%	251,520	2017
							5	0.18%	44,192	2018
							6	0.00%	526	2019
							BY13 TOTAL		1.20%	299,163
2014	Port Armstrong	24,773,774	22,817,058	92.1%	3.04	4/11/15	3	0.10%	23,710	2017
							4	0.48%	109,205	2018
							5	0.10%	22,400	2019
							6	0.00%		2020
							BY14 TOTAL		0.68%	155,315
2015	Port Armstrong	40,601,877	34,944,513	86.1%	2.66	3/23/16	3	0.03%	10,294	2018
							4	0.44%	153,500	2019
							5	0.00%		2020
							6	0.00%		2021
							BY15 TOTAL		0.47%	163,794
2016	Port Armstrong	28,179,519	24,802,314	88.0%	2.01	5/5/17	3	0.04%	10,800	2019
							4	0.00%		2020
							5	0.00%		2021
							6	0.00%		2022
							BY16 TOTAL		0.04%	10,800
2017	Port Armstrong	40,153,986	34,876,032	86.9%	1.34	5/4/18	3	0.00%		2020
							4	0.00%		2021
							5	0.00%		2022
							6	0.00%		2023
							BY17 TOTAL		0.00%	-
2018	Port Armstrong	57,029,720	37,185,005	65.2%	1.99-2.76	2019	3	0.00%		2021
							4	0.00%		2022
							5	0.00%		2023
							6	0.00%		2024
							BY18 TOTAL		0.00%	-
2019	Port Armstrong	57,293,201	52,000,000	90.8%	1.71-2.74	2019	3	0.00%		2021
							4	0.00%		2022
							5	0.00%		2023
							6	0.00%		2024
							BY18 TOTAL		0.00%	-



Production Summary																									
Port Armstrong Hatchery																									
Table 6– Production Summary		Current Year																							
Species & Run		2018						2019						2020											
		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
king salmon	BY18	E																							
(Unuk River stock)		-																							
chum salmon	BY18	E			TM					R	BY19	E			TM					R					
		57M			54M					37M		57M			54M					52M					
		PAH								PAH		PAH			PAH					PAH					
pink salmon	BY18	E			TM					R	BY19	E	TM					R							
		40M			39M					37M		42M	41M					39M							
		PAH								PAH		PAH								PAH					
coho salmon	BY17				T					R															
(Deep Cove/Sashin Stock)					65T					3.7M															
					BY18	E															T	R			
					5M															65T	3.7				
					PAH																PAH				
																			BY19	E					
																			4.8M						
																			PAH						
Codes:		Egg take:	E	Tagging:	T	Release:	R	Thermal Marking:	TM																

Appendix B. Evaluation of vessel-transport release of pink salmon from otolith data

Otolith sampling of the 2018 PAH cost-recovery fishery indicated that vessel-transport of pink salmon was successful in increasing survival from release. The percent of fish recovered in the cost-recovery fishery that were vessel-transported for release was greater than in the releases. The percent of PAH-area vessel transport releases recovered in the cost recovery fishery was 23%, which is greater than the percent of vessel transported releases of the releases in the PAH-area, which was 19.5%. Releases are in Table B1 and recoveries are in Table B2.

Table B1. Pink salmon released in 2017 from the three PAH-area release strategies.

	Port Armstrong, inside release	Chatham, vessel transport release	Chatham, net pen tow release	Total
Thermal mark hatch code	3H4	3H5	3H	
# of fry released at PAH	8,323,003	8,345,116	26,056,773	42,724,892
% of fry released at PAH	19.5%	<b>19.5%</b>	61.0%	100%

*Note:* Pink salmon were also released at Pt. Herbert in 2017 with a different thermal mark that are not shown here.

*Note:* Release numbers by mark type are publicly available from the online ADF&G Hatchery Release Report:

<https://mtalab.adfg.alaska.gov/CWT/Reports/hatcheryrelease.aspx>

Table B2. Otolith thermal-marked pink salmon recoveries from the PAH cost-recovery fishery in 2018, by release strategy, and showing total and percent of PAH-released fish.

Stat. week	Sub-district	Not marked	Release strategy					Total otoliths
			Pt. Herbert	Pt. Herbert	PAH, inside	PAH, Chatham vessel- transport	PAH, Chatham, net pen tow	
34	109-11/62	13	6	9	6	16	46	96
37	109-11	6	2	2	18	25	58	111
38	109-11	6	6	17	13	13	40	95
Total PAH-released fish			N/A	N/A	37	54	144	
% of PAH-released fish					16%	<b>23%</b>	61%	100%

*Note:* Otolith mark recovery results are from the online ADF&G Mark Summary Report:

<https://mtalab.adfg.alaska.gov/OTO/reports/MarkSummary.aspx>

Again in 2019, otolith sampling PAH cost-recovery fishery indicated that vessel-transport of pink salmon is successful in increasing returns of pink salmon. The percent of fish recovered that were vessel-transported for release was greater in the returns than in the releases. The percent of PAH-area vessel transport releases recovered in the cost recovery fishery was 55%, which is greater than the percent of vessel transported releases of the releases in the PAH-area, which was 18%. Releases are in Table B3 and recoveries are in Table B4.

Table B3. Pink salmon released in 2018 (BY 2017) from the four PAH-area release strategies.

	Tow-out medium fry	Tow-out small fry	Tow-out large fry	Chatham Vessel- transport	Total
Thermal mark hatch code	3H6	3H4	3H7	3H3	
Number of fry released	11,945,822	11,808,145	30,084,822	12,003,506	65,842,295
% fry released	18.1%	17.9%	45.7%	<b>18.2%</b>	100%

*Note:* Pink salmon were also released at Pt. Herbert in 2018 with a different thermal mark that are not shown here.

*Note:* Release numbers by mark type are from the online ADF&G Hatchery Release Report:

<https://mtalab.adfg.alaska.gov/CWT/Reports/hatcheryrelease.aspx>

Table B4. Otolith thermal-marked pink salmon recovered in PAH cost-recovery fishery in 2019, by release strategy, and showing total and percent of PAH-released fish.

Stat Week	Stat Area	Not Marked	Pt. Herbert	Release strategy				Total otoliths
				PAH, Tow-out small fry	PAH, Tow-out medium fry	PAH, Tow-out large fry	PAH, Chatham vessel- transport	
37	109-11	0	52	5	5	8	16	86
38	109-11	3	26	5	2	3	18	57
Total PAH-released fish			N/A	10	7	11	34	
% of PAH-released fish in return				19.2%	13.5%	21.2%	<b>65.4%</b>	100%

*Note:* Otolith mark recovery results are from the online ADF&G Mark Summary Report:

<https://mtalab.adfg.alaska.gov/OTO/reports/MarkSummary.aspx>