

## 2018 ANNUAL MANAGEMENT PLAN

### ARMIN F. KOERNIG HATCHERY

#### Prince William Sound Aquaculture Corporation

---

This plan remains in effect until superseded by a new annual management plan (AMP) in the following year. Prince William Sound Aquaculture Corporation (PWSAC) will notify the Alaska Department of Fish and Game (ADF&G) private nonprofit (PNP) hatchery program coordinator in a timely manner of any departure from the AMP. That notification will be in the form of a request to amend the AMP. No variation or deviation will be implemented until an AMP amendment has been approved or waived by both the department and PWSAC. This policy applies to all hatchery operations covered under the AMP.

### I. OPERATIONAL PLAN

#### 1.1 Egg-Take Goals by Species

**Pink Salmon:** The pink salmon egg-take goal for 2018 is 190 million eggs. Broodstock requirements are 170,500 females and 170,500 males, assuming:

- (a) Average fecundity of 1,450 eggs/female
- (b) 1/1 female to male ratio
- (c) 15% holding mortality
- (d) 15% green/over-mature spawners

If the required broodstock for pink salmon egg-take goal at AFK is not available for returning fish to the hatchery, PWSAC will consult with ADF&G staff to implement broodstock collection in order to conduct an egg-take at WNH to collect up to 162 million additional green eggs in order to reach the AFK goal. After eyeing at WNH, eggs will be transferred to AFK for rearing and release.

If the required broodstock for pink salmon egg-take goal at Wally Noerenberg Hatchery (WNH) is not available for returning fish to the hatchery, PWSAC will consult with ADF&G staff to implement broodstock collection in order to conduct an egg-take at Armin F. Koernig Hatchery (AFK) to collect up to 148 million additional green eggs in order to reach the WNH goal. After eyeing at AFK, eggs will be transferred to WNH for rearing and release.

#### 1.2 Broodstock

The expected broodstock collection schedule for pink salmon is derived from historical run timing curves for Armin F. Koernig (AFK) Hatchery. The run curve is an aggregate of all even years' (2008–2016) SHA hatchery harvests and Port San Juan Subdistrict commercial fishery catch data from ADF&G's annual management reports and preliminary inseason estimates. The adult return summary includes the projected total return, hatchery escapement schedule, and fish available for common property fishery harvest (Table 3).

To ensure that run timing is proportionally represented in broodstock, a hatchery escapement schedule that includes the broodstock acquisition schedule will be implemented based on run-timing percentages by date in the AMP tables to establish a hatchery escapement goal by week. These goals will be measured according to the total number of fish estimated in the hatchery SHAs.

If inseason catch data indicate the run is earlier or later than the historical run curve would suggest, PWSAC will consult with the department prior to altering the hatchery escapement schedule, accordingly, to match the actual run.

The hatchery escapement exclusion zone (HEEZ), outlined in section 3.4, protect potential broodstock fish staging directly in front of the hatchery from being harvested in the commercial CPF. These fish include those that will eventually become broodstock along with those needed to ensure a high quality, efficient and successful egg collection process.

Any fish collected beyond those utilized as broodstock will be sold for cost recovery to fund PWSAC’s salmon fisheries enhancement program. Historically, PWSAC has carried forward revenues from the hatchery raceway fish sales and full-utilization programs to the following year as a reduction in the cost-recovery revenue goal calculation. This provides benefits to the commercial common property fisheries (CCPF) with an increased PWSAC salmon harvest and potentially an earlier timed CCPF.

Broodstock fish will be collected by volitional entry through the fishway leading to the brood holding pond and raceways located just above the tidal influence at the hatchery.

1.3 Egg-Take Schedule and Data Reporting

Ultimately, the egg-take schedule depends upon broodstock recruitment and the maturation rate of the broodstock in salt and fresh water. The table below summarizes an anticipated egg-take schedule based on the average historical egg-take percent completion (1996–2016). All data associated with egg-take and broodstock collection will be provided to the department by November 1. Data will be provided in electronic format (Excel file) and include all categories presented in the template attached as Table 6. Data to be collected specifically includes the numbers of green and overripe females from the broodstock and associated cost recovery.

**Anticipated Egg-take Schedule**

<b>Percent Complete</b>	<b>Pink Salmon</b>
25%	September 5
50%	September 9
75%	September 12
100%	September 17

A complete listing of all PWSAC hatchery egg-take schedules is shown in Table 4. PWSAC egg-take goals are shown in Table 2.

#### 1.4 Egg Transport and Broodstock Carcass Disposal Plans

Approximately 22 million green chum salmon eggs will be collected at WNH and will be transported to AFK when they reach the eyed stage of development. These approximately 20 million eyed chum salmon eggs will be incubated, reared and released at AFK.

If the required broodstock for pink salmon egg-take goal at Wally Noerenberg Hatchery (WNH) is not available for returning fish to the hatchery, PWSAC will conduct an egg-take at Armin F. Koernig Hatchery (AFK) to collect up to 148 million additional green eggs in order to reach the WNH goal. After eyeing at AFK, eggs will be transferred to WNH for rearing and release.

If the required broodstock for pink salmon egg-take goal at AFK is not available for returning fish to the hatchery, PWSAC will conduct an egg-take at WNH to collect up to 162 million additional green eggs in order to reach the AFK goal. After eyeing at WNH, eggs will be transferred to AFK for rearing and release.

PWSAC may sell broodstock carcasses if a market is available. If carcasses are not sold, eggs that are not used for fertilization may be harvested in accord with 5 AAC 93.350(d)(1). The carcass of a salmon from which milt or eggs are extracted for lawful use as broodstock may be disposed of in accordance with Alaska Department of Environmental Conservation requirements. Broodstock carcass disposals and the number of carcasses disposed of from fish used for roe sales will be logged on the carcass disposal form.

#### 1.5 Incubation Plans

**Hatchery Production Summary**

<b>Species</b>	<b>Green Eggs</b>	<b>Eyed Eggs</b>	<b>Fry Released</b>
Pink Salmon	190,000,000	179,600,000	171,600,000
Pink Salmon	*148,000,000	139,900,000	**
Chum Salmon	0	*** 20,000,000	19,100,000

\* Up to 148 million pink salmon green eggs will be collected at AFK and transferred to WNH at the eyed-egg developmental stage.

\*\* Fry release provided in WNH AMP

\*\*\* Approximately 20 million chum salmon eggs will be transferred from WNH at the eyed-egg developmental stage.

The above table was generated with the following assumptions:

- 1) 94.5% and 91.5% survival from green to eyed for pink and chum salmon respectively; and
- 2) 96.0% survival from eyed stage to emergent; and
- 3) 99.5% survival from emergence to release.

All eggs will be incubated at AFK. 100% of the pink and chum salmon eggs incubated at AFK during the fall incubation period will be thermally otolith-marked at the eyed stage. See section 4.1 for more details.

### 1.6 Rearing and Release Plans

**Pink Salmon:** Pink salmon fry will emerge nonvolitionally from incubators and pass via separate flume into saltwater rearing pens. The saltwater net pen rearing complex consists of 12, 15.2m x 15.2m x 4.6m rearing pens. Maximum loading densities will be 11 kg/m<sup>3</sup>.

Approximately 171.6 million pink salmon will be released at AFK. Based on the predicted outmigration curve and zooplankton bloom timing, all pink salmon fry will be reared for an average of 30 days and released in two groups into the zooplankton bloom.

**Chum Salmon:** Chum salmon fry will emerge nonvolitionally from incubators and pass via separate flume into saltwater rearing pens. The saltwater net pen rearing complex consists of 12, 12.2m x 12.2m x 3.0m rearing pens. Maximum loading densities will be 11 kg/m<sup>3</sup>.

Approximately 19.1 million chum salmon will be released at AFK. Based on the predicted outmigration curve and zooplankton bloom timing, all chum salmon fry will be reared for an average of 12 weeks in saltwater net pens and released together in one group at a target size of 1.8 grams. PWSAC estimated salmon releases are shown in Table 5.

### 1.7 Fry Transport Methods

No AFK pink salmon fry will be transported off-station for release.

### 1.8 Permitted Capacity

AFK Hatchery was issued PNP Hatchery Permit #2 in 1975. It is permitted to incubate 190 million pink salmon eggs and 34 million chum salmon eggs. All permitted releases are from the AFK Hatchery facility.

#### **Fish Transport Permit Summary**

<b>FTP Number</b>	<b>Expiration Date</b>	<b>Purpose</b>
<b>PINK SALMON</b>		
96A-0041	6/30/2021	Allows egg take, incubation, and resultant release of 190 million pink salmon eggs at AFK (of ancestral stocks Larsen, Ewan, and Galena creeks).
16A-0058	4/30/2026	Allows for backup egg take of 162 million pink salmon green eggs at WNH, transport to AFK for incubation and release.
16A-0059	4/30/2026	(WNH FTP) Allows for backup egg take of 148 million pink salmon green eggs at AFK, transport to WNH for incubation and release.

---

**CHUM SALMON**

16A-0056	4/30/2026	(WNH FTP) Allows egg take of up to 165 million chum salmon green eggs at WNH
15A-0051	6/30/2025	Allows for transport, incubation, rearing of 34 million chum salmon green eggs from WNH to AFK for release in Sawmill Bay.

**II. DONOR STOCK MANAGEMENT - N/A****III. HATCHERY RETURN MANAGEMENT**

PWSAC operates five facilities: AFK, Cannery Creek Hatchery (CCH), Gulkana Hatchery (GH), Main Bay Hatchery (MBH), and WNH. The corporation generates revenues for annual operations from a 2% salmon enhancement tax and from the sale of hatchery-produced salmon returning to the facilities.

In 1997, the PWSAC Board of Directors (BOD) elected to have corporate cost recovery based upon revenue goals specific to the seine and gillnet salmon fisheries, rather than a goal of harvesting a fixed percentage of the returning adults. This results in each gear group paying for enhanced production from which they benefit. PWSAC calculates these revenue goals by allocating production costs between the seine-caught and gillnet-caught salmon fisheries.

On March 2, 2018, the PWSAC BOD approved the annual corporate budget for Fiscal Year 2019 detailing potential sources of revenue and expenditures. The pink and WNH chum salmon cost-recovery revenue goals are \$6,304,696 and \$3,547,905, respectively. Additional revenue may be generated through PWSAC's raceway fish sales during its egg-take full utilization program.

PWSAC uses preseason assumptions for the number of returning fish, price per pound, and average adult weight to calculate the total projected value of the returning hatchery-produced salmon. Based on these assumptions, PWSAC estimates that approximately 31% of the total value of the run will be required to meet the revenue goal in the Fiscal Year 2019 financial plan.

**Pink Salmon Returns:** AFK, CCH, and WNH pink salmon runs will be managed collectively through openings and closures of nearby subdistricts and/or hatchery management areas. Managing the enhanced pink salmon runs in aggregate may result in site-specific common property fishery (CPF) contribution rates being above or below the approximate target of an 80% CPF pink salmon harvest.

**WNH Chum and MBH Sockeye Salmon Runs:** WNH chum salmon and MBH sockeye salmon runs will be managed collectively through openings and closures of nearby hatchery subdistricts. The collective management will be managed initially for the WNH chum salmon revenue goal. If inseason, PWSAC, in consultation with the department, determines that the WNH chum salmon corporate escapement may not be met, cost-recovery harvest at MBH may be conducted to achieve the balance of the revenue goal. Managing the runs in aggregate may result in site-specific CPF contribution rates being above or below the approximate targets of 79% and 99% for WNH chum and MBH sockeye salmon harvest, respectively.

The AFK Hatchery and Port Chalmers remote release chum salmon runs are expected to have a 100% CPF harvest.

Reductions of CPF opportunity in hatchery subdistricts may be necessary to ensure corporate escapement objectives are met. PWSAC will work closely with local ADF&G management biologists to achieve the seine and gillnet fisheries revenue goal as rapidly as possible to allow for an orderly and consistent CPF.

### 3.1 Hatchery Fish Migration Routes and Timing

AFK pink salmon donor stocks were selected for adults who mature in the time period August 15 to September 15. Timing in the CPF for such fish is expected to be from approximately July 20 to August 25, with a peak occurring mid-August. The probable approach routes of AFK Hatchery fish are shown in Figure 1.

Despite the large area encompassing the Southwestern District, most purse seining is concentrated in the straits and passes that make up the primary migration corridors. Several key areas have been identified where catches with high concentrations of AFK Hatchery-produced pink salmon occur. Primary interception points of AFK Hatchery fish are: to the south - Point Elrington, Fox Farm, and Squirrel Bay areas; and to the east and north - Latouche Passage, Shelter Bay, Point Helen, and Snug Harbor areas. Port San Juan Subdistrict (Evans Point south to Crab Bay) is also an important interception area. Undoubtedly, some AFK Hatchery fish are caught at the other four heavily fished areas: Point Countess, Chenega Point, east Chenega Shore, and east Latouche Shore fisheries. Additionally, CPF harvest of AFK Hatchery fish can be expected in the southern part of the Montague District, the Eshamy gillnet district, and as far north as Esther Island in the Coghill District.

### 3.2 Special Harvest Area

The SHA is used by the hatchery operator to harvest hatchery fish for cost recovery. The terminal harvest area (THA), or outer Sawmill Bay, is normally closed to commercial and subsistence fishing and provides a buffer between the hatchery SHA and open waters of the Southwestern District. In the event of a commercial opening of the SHA and the THA in Sawmill Bay, a 500-yard closure may be in effect in front of O'Brien Creek and Anderson Creek. All latitude and longitude coordinates are based on the North American Datum of 1983.

Harvest of salmon by sport anglers and personal use fishermen in the SHA is managed by the ADF&G Division of Sport Fish in accordance with regulations as provided in 5 AAC 47 – 5 AAC 75. Emergency orders may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

The SHA consists of the waters of Sawmill Bay west of 148°01.95'W long.

The THA consists of the waters of Sawmill Bay north and west of a line from 60°03.66'N lat, 147°59.11'W long to 60°02.77'N lat, 148°01.00'W long to 60°02.76'N lat, 148°01.66'W long, excluding the SHA.

### 3.3 Hatchery Returns to the Special Harvest Area

**Pink Salmon:** The anticipated 2018 adult return of pink salmon to AFK Hatchery is 5,300,000, assuming a 3.85% marine survival using brood year (BY) 2006–14 even-year average, from the BY16 fry release of 137.5 million (Table 1). Assuming a hatchery broodstock goal of approximately 341,000 fish and approximately 697,000 pink salmon sold for cost recovery, the total hatchery harvest will be 22% of the run.

**Pink Salmon Projected Return Summary**

<b>Total Return</b>	<b>Broodstock</b>	<b>Cost Recovery</b>	<b>Hatchery Harvest</b>	<b>CPF Harvest</b>
5,300,000	341,000	697,000	1,038,000	4,262,000
<b>% of Total</b>	<b>7%</b>	<b>13%</b>	<b>20%</b>	<b>80%</b>

**Chum Salmon:** The anticipated 2018 adult run of chum salmon to AFK Hatchery is 450,000, assuming a 1.51% marine survival. All fish will be harvested by the CPF.

**Chum Salmon Projected Run Summary**

<b>Total Run</b>	<b>Broodstock</b>	<b>Cost Recovery</b>	<b>Hatchery Harvest</b>	<b>CPF Harvest</b>
450,000	-0-	-0-	-0-	450,000
<b>% of Total</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>100%</b>

**Chum Salmon Projected Run, Age Composition Summary**

<b>BY</b>	<b>Fry Released</b>	<b>Anticipated Marine Survival</b>	<b>Anticipated Total BY Return</b>	<b>Return Age</b>	<b>2017 Projected Run</b>	<b>% of Total</b>
2012	32,300,000	0.47 %	152,986	Age-6	8,000	1.8%
2013	31,600,000	1.93 %	610,400	Age-5	228,000	51.1%
2014	27,900,000	1.32 %	367,510	Age-4	201,000	45.1%
2015	23,200,000	1.32 %	305,599	Age-3	9,000	2.0%
				<b>Total</b>	<b>450,000</b>	<b>100%</b>

Historical average return age composition: 5% age-6, 37% age-5, 55% age-4, and 3% age-3.

3.4 Separation of Hatchery Escapement

The hatchery escapement goal of 1,038,000 pink salmon is the midpoint of the special harvest area (SHA) escapement goal range 896,000–1,221,000 to provide for the broodstock and cost-recovery requirements based on these variables; sex ratio of fish available for broodstock, fecundity, holding mortality percentage, immature and over-mature spawner percentage, average fish size, and price per pound.

In 2008, PWSAC designated an outer hatchery escapement exclusion zone (HEEZ) within the SHA as an alternative to using a barrier net (Figure 2). The outer HEEZ consists of the waters of the SHA west and south of a line from 60°03.398'N lat, 148°03.326'W long to 60°03.017'N lat, 148°02.547'W long. The inner HEEZ consists of the waters of the SHA west and south of a line from 60°03.253'N lat, 148°03.576'W long to 60°02.889'N lat, 148°03.644'W long.

### 3.5 Special Management Strategies

**Pink Salmon:** Because there is no way of isolating hatchery fish from wild stocks in the general waters of the Southwestern, Montague, and adjacent districts, these districts can only be opened and closed as the wild stock run strength will allow. When the hatchery run can withstand a higher exploitation rate than the returning wild stocks, hatchery fish that are not intercepted in the mixed-stock areas of the general districts continue into Port San Juan Subdistrict and waters of Sawmill Bay. Port San Juan Subdistrict was established to harvest the highest concentration of surplus hatchery fish in a mixed-stock fishery when wild stock interception must be minimized.

The principal tool available to manage the hatchery's return is emergency order manipulations of fishing time in the five designated approach zones to the hatchery: the Point Elrington Subdistrict, the Port San Juan Subdistrict, the THA in outer Sawmill Bay, the SHA in inner Sawmill Bay, and the AFK HEEZ (figures 2–3). The approaches to AFK Hatchery will be conservatively managed to provide for PWSAC's escapement needs. Test fishing and CPF openings in the general waters of the Southwestern District will occur, as necessary, to assess the timing and magnitude of the late pink salmon return. When necessary to protect wild stocks and/or to decrease interception of hatchery fish to ensure corporate escapement objectives are met, a closure of the two subdistricts during the regular season may be used. Fishing time will be extended in the Port San Juan Subdistrict when there is surplus hatchery production and wild stocks do not need protection to meet minimum escapement requirements. When it is apparent that a large hatchery surplus exists, every effort will be made to extend fishing time in waters of the Port San Juan Subdistrict in such a manner as to prevent a large buildup of fish from occurring and to allow for timely harvest of the best possible quality fish while protecting wild stock escapements.

Performance of the hatchery return is evaluated by comparison of daily harvest rates to a predicted run-entry table (Table 3). In addition, sex ratios in the hatchery harvest predict the midpoint of the return. PWSAC will provide these two types of data from the cost-recovery harvest to ADF&G management staff on a daily basis during the season so the area management biologist can make estimates of the number of salmon left in the run. Once egg-take operations commence at the hatchery, progress towards the hatchery's final goal could determine future SHA openings dependent upon SHA fish abundance estimates. PWSAC will provide daily estimates of fish abundance inside the barrier net (if applicable), within the HEEZ, and in the SHA outside of the HEEZ, along with egg-take progress updates to ADF&G management staff.

If corporate escapement problems occur at the hatchery, or western PWS wild stocks are not meeting escapement goals, subdistrict closures may be made based upon the magnitude of the shortfall and the stage of the run. Protection would be provided by commercial and subsistence closure of the Port San Juan and Point Elrington subdistricts. These areas will be reopened as hatchery returns recover and wild stock escapements allow.

The effective management of mixed-stock fisheries is difficult. It is the intent of ADF&G to provide for stated PWSAC corporate escapement goals by species. Achieving the target revenue goal will depend on the timing and magnitude of the PWSAC pink salmon return, average fish size, and price per pound PWSAC receives. It will also depend upon precise inseason assessment of both wild and hatchery run strengths. Depending upon the precision of inseason run assessment, actual percentages of PWSAC total returns by species that provide corporate escapement may fall above or below the stated goals. If precise and timely stock identification data are available, ADF&G will use them to manage the fisheries inseason for an allocation of PWSAC-produced pink, chum, and sockeye salmon between the CPF and PWSAC. Pink, sockeye, and chum salmon will be managed for PWSAC corporate escapement by stock.

PWSAC will submit written management recommendations to the department with clear justifications as to how the recommendations support achieving cost-recovery and/or broodstock collection goals. Each recommendation, in the form of a brief email, will include, but not be limited to, current cost-recovery harvest data, HEEZ and outer SHA estimates, actual and anticipated run entry, and actual and anticipated cost-recovery progress. Each recommendation will also include a summary of actual and anticipated hatchery escapement and broodstock collection progress as it relates to the weekly goals established in this AMP. For this reporting, hatchery escapement will be defined as fish in the HEEZ and outer SHA; fish in the raceways or brood holding ponds will be defined as broodstock.

To ensure accurate and clear reporting, the AMP Adult Return Summary table for each hatchery and species will be submitted to the department, in association with written management recommendations.

It will be the responsibility of PWSAC staff, with written consent of the PWSAC Executive Committee, to advise ADF&G of any desired inseason adjustments to preseason corporate escapement goals and/or significant changes to the preseason management strategy. Recognizing the imprecision of preseason forecasts and inseason assessment of wild stock and hatchery contribution estimates, ADF&G will assess PWSAC's requested changes based upon the best available information. If, based on the assessment of ADF&G, the total hatchery return will be less than or greater than the original PWSAC forecasted return, then ADF&G will adjust openings, as necessary, to best provide for wild stock escapement, corporate escapement, and CPF harvests. Total hatchery and wild stock returns will be estimated after a thorough postseason analysis of all available data. Postseason estimates may not coincide with ADF&G's or PWSAC's inseason estimates.

### 3.6 Sport Fish Harvest

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. No target sport fishery has developed to date nor is anticipated at AFK Hatchery.

### 3.7 Subsistence Harvest

The AFK Hatchery facility is within the Prince William Sound Southwestern District subsistence

area. Alaska residents may harvest fish for subsistence use as described in 5 AAC 01.600–01.648.

### 3.8 Avoidance of Nontarget Species

Numerical abundance of species other than pink and chum salmon at AFK Hatchery is insignificant and no particular problems have developed in the history of the facility.

## **IV. EVALUATION STUDIES**

### 4.1 Otolith Marking

During the fall incubation period (October–December 2018), 100% of the pink and chum salmon production will be marked at the eyed-egg stage. The table below summarizes the 2018 thermal otolith mark assignments by the ADF&G Mark, Tag, and Age Lab (MTAL). Voucher samples are collected and submitted along with data as per the ADF&G MTAL sampling protocol.

<b>Species</b>	<b>Number of Eyed Eggs</b>	<b>Thermal Otolith Mark</b>	<b>Intended Release Location</b>
Pink Salmon	179,600,000	4H/*4H3	AFK, Sawmill Bay
Chum Salmon	20,000,000	1,2,3H	AFK, Sawmill Bay

\* It is still being determined whether to utilize an accessory mark on the pinks.

### 4.2 Otolith Recovery in Returning Adults and Data Reporting

Recovery of otoliths from returning adult pink and chum salmon will occur this year. Recovery efforts will be directed at the CPF and cost recovery, and will be performed by field personnel at processing locations.

Otolith mark data will be used by ADF&G and PWSAC to measure fishery contribution and marine survival of salmon. ADF&G will provide PWSAC preliminary otolith mark-recovery data from fishery samples by December 1 each year, and any additional otolith data from straying studies and other projects by April 1 each year. Similarly, PWSAC will provide ADF&G independently-collected otolith mark-recovery data by April 1 each year. These data are to be the individual specimen otolith mark results.

## V. ATTACHMENTS

FIGURE 1. AFK Adult Pink Salmon Probable Migration Route

FIGURE 2. AFK Hatchery Fishery Management Areas

FIGURE 3. AFK Hatchery Escapement Exclusion Zone

TABLE 1. 2018 PWSAC Hatchery Return Forecast Summary

TABLE 2. 2018 PWSAC Planned Egg Takes

TABLE 3. 2018 AFK Adult Return Summary

TABLE 4. 2018 PWSAC Hatchery Egg Take Schedules

TABLE 5. 2018 PWSAC Estimated Salmon Releases



## VI. APPROVAL

### **Recommendation for Approval: Armin F. Koernig Hatchery Annual Management Plan, 2018**

Approved via email on 4/24/2018

---

Casey Campbell, PWSAC, General Manager

Approved via email on 4/30/2018

---

Jay Baumer, Area Management Biologist, Division of Sport Fish

Approved via email on 5/1/2018

---

Charlie Russell, Area Management Biologist, Division of Commercial Fisheries

Approved via email on 5/1/2018

---

Tom Vania, Regional Supervisor, Division of Sport Fish

Approved via email on 5/1/2018

---

Bert Lewis, Regional Supervisor, Division of Commercial Fisheries

Approved via email on 5/1/2018

---

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

The 2018 Armin F. Koernig Hatchery Annual Management Plan is hereby recommended for approval by the Prince William Sound Regional Planning Team (RPT):

Approved via email on 5/10/2018

---

Thomas Sheridan, Prince William Sound RPT Chair

Approved via email on 5/10/2018

---

Lorraine Vercessi, PNP Hatchery Program Coordinator, Div. of Commercial Fisheries

**The 2018 Armin F. Koernig Hatchery Annual Management Plan is hereby approved:**

Approved via email on 5/17/2018

---

Tom Taube, Deputy Director, Division of Sport Fish

Approved via email on 5/16/2018

---

Peter Bangs, Assistant Director, Division of Commercial Fisheries

Figure 1.  
 Probable migratory patterns  
 of San Juan Pink salmon run.  
 Circled, cross-hatched zones  
 are nine areas of historical  
 fleet concentration to intercept  
 500 wild stocks in this, the  
 principal entrance area of the Sound.



Final concentration from  
 ocean distribution of  
 Cross Sound to Kod.



**Table 1:**  
**PRINCE WILLIAM SOUND AQUACULTURE CORPORATION**  
**2017 HATCHERY RETURN FORECAST**

SITE/ LOCATION	SPECIES	RUN TIME	ADULT RETURN ESTIMATE			EST. MARINE SURVIVAL
			LOW	POINT	HIGH	
MBH	COGHILL SOCKEYE	JUN 15 - AUG 01	687,000	763,000	839,000	7.56%
GH - Fry to Adult Survival						
GH	CROSSWIND LAKE SOCKEYE		43,000	56,000	70,000	0.56%
	PAXSON LAKE - GI SOCKEYE		18,700	24,600	30,500	0.53%
	PAXSON LAKE SOCKEYE		4,200	5,100	5,900	0.38%
	SUMMIT LAKE SOCKEYE		3,600	5,100	6,500	0.09%

**RETURNS TO REMOTE RELEASE LOCATIONS**

PORT CHALMERS	CHUM	JUN 1 - JUL 27	110,000	150,000	180,000	0.34%
CORDOVA	COHO	AUG 01 - SEP 20	2,900	5,500	8,300	7.34%
WHITTIER	COHO	AUG 01 - SEP 20	2,900	5,500	8,300	7.34%
CHENEGA	COHO	AUG 01 - SEP 20	1,900	3,700	5,500	7.34%
CHENEGA	CHINOOK	MAY 25 - JULY 10	510	660	820	1.49%

**TOTAL PWSAC RETURNS**

PINK			6,300,000	15,400,000	33,800,000	3.68%
<div style="border: 1px solid black; width: 100px; height: 15px; margin: 0 auto;"></div>						
CHUM			3,180,000	3,720,000	4,240,000	1.95%
COHO			53,700	101,700	153,100	7.34%
CHINOOK			510	660	820	0.00%
MBH - SOCKEYE - PWS			687,000	763,000	839,000	7.56%
GH - SOCKEYE - COPPER RIVER			69,500	90,800	112,900	0.39%

TABLE 2. 2018 Planned Egg Takes

le 2.

**PRINCE WILLIAM SOUND AQUACULTURE CORPORATION**

**2018 EGG-TAKE GOALS**

SPECIES	HATCHERY	ORIGINAL DONOR STOCK	EGG-TAKE LOCATION	EGG-TAKE GOAL
CHUM	WALLY NOERENBERG	WELLS RIVER	WNH	153,000,000
SOCKEYE	MAIN BAY	COGHILL LAKE	MBH	12,400,000
	GULKANA I	GULKANA RIVER	GHI	35,000,000
	GULKANA II	GULKANA RIVER	GHII	1,750,000
			TOTAL	49,150,000
PINK	ARMIN F. KOERNIG	LARSEN, EWAN, GALENA	AFK	190,000,000
	CANNERY CREEK	CANNERY CREEK	CCH	187,000,000
	WALLY NOERENBERG	LARSEN, EWAN, GALENA	WNH	148,000,000
			TOTAL	525,000,000
COHO	WALLY NOERENBERG	MILE 18, COPPER RIVER	WNH	4,000,000
			TOTAL PWSAC	731,150,000

[Empty box]



TABLE 3. 2018 AFK Adult Return Summary.

2018 AFK Adult Return Summary										ADULT RETURN SUMMARY											
PROJECTED RETURN: 5,300,000 BROODSTK: 341,000 FISH SALES: 697,000 HAT. TOTAL: 1,038,000 CPF TOTAL: 4,262,000 % EXPLOIT.: 80.4% CPF PWSAC 19.6%										HATCHERY: AFK SPECIES: PINK YEAR: 2018											
Date	RUN-TIMING PERCENTAGES		SHA HATCHERY ESCAPEMENT ESTIMATES				HATCHERY ESCAPEMENT SCHEDULE				C.P.F. HARVEST				TOTAL RETURN						
	Projected % Cum.	Projected % Female	Actual % Cum.	Actual % Female	Fishway Estimate	INSIDE Barrier Seine Estimate	HEEZ Estimate	OUTSIDE HEEZ Estimate	Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily	Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily	Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily	
7-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
8-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
9-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
10-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
11-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
12-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
13-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
14-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
15-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
16-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
17-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
18-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
19-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
20-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
21-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
22-Jul	0.0%							0	0	0	0	0	0	0	0	0	0	0	0	0	
23-Jul	0.0%							110	110	0	0	1,596	1,596	0	0	0	0	1,706	1,706	0	0
24-Jul	0.1%	9.5%						298	188	0	0	4,337	2,741	0	0	0	0	4,635	2,929	0	0
25-Jul	0.4%	8.4%						1,379	1,081	0	0	20,047	15,710	0	0	0	0	21,426	16,791	0	0
26-Jul	0.7%	12.2%						2,481	1,102	0	0	36,079	16,032	0	0	0	0	38,560	17,194	0	0
27-Jul	0.9%	15.9%						3,185	634	0	0	45,252	9,214	0	0	0	0	49,408	9,848	0	0
28-Jul	1.2%	17.1%						4,018	903	0	0	58,427	13,134	0	0	0	0	62,445	14,037	0	0
29-Jul	1.6%	12.3%						5,497	1,479	0	0	79,939	21,512	0	0	0	0	85,436	22,991	0	0
30-Jul	2.5%	11.6%						8,678	3,181	0	0	126,205	46,266	0	0	0	0	134,883	49,447	0	0
31-Jul	3.6%	13.6%						12,309	3,631	0	0	179,007	62,802	0	0	0	0	191,316	56,433	0	0
1-Aug	5.0%	12.7%						17,077	4,768	0	0	248,348	69,341	0	0	0	0	265,425	74,109	0	0
2-Aug	6.1%	14.7%						20,805	3,728	0	0	302,551	64,203	0	0	0	0	323,356	57,331	0	0
3-Aug	6.9%	17.4%						23,626	2,821	0	0	343,580	41,029	0	0	0	0	367,206	43,850	0	0
4-Aug	8.4%	16.3%						28,797	5,171	0	0	418,775	75,195	0	0	0	0	447,572	80,366	0	0
5-Aug	11.3%	19.2%						38,409	9,612	0	0	558,563	139,788	0	0	0	0	596,372	149,400	0	0
6-Aug	13.4%	21.3%						45,715	7,306	0	0	684,816	106,253	0	0	0	0	710,531	115,559	0	0
7-Aug	16.3%	23.4%						55,692	9,967	0	0	809,752	144,936	0	0	0	0	865,434	154,903	0	0
8-Aug	18.3%	26.6%						62,280	6,598	0	0	809,752	0	0	95,959	95,959	0	967,991	102,557	0	0
9-Aug	21.5%	29.0%						73,410	11,130	0	0	809,752	0	0	257,822	161,863	0	1,140,984	172,993	0	0
10-Aug	23.7%	32.4%						80,776	7,366	0	0	809,752	0	0	364,942	107,120	0	1,255,470	114,486	0	0
11-Aug	26.5%	37.6%						90,272	9,495	0	0	809,752	0	0	503,025	138,083	0	1,403,048	147,578	0	0
12-Aug	30.3%	35.9%						103,276	13,005	0	0	809,752	0	0	692,146	189,121	0	1,605,174	202,126	0	0
13-Aug	33.4%	38.4%						113,822	10,546	0	0	809,752	0	0	845,604	163,358	0	1,769,078	163,904	0	0
14-Aug	37.7%	46.1%						128,528	14,706	0	0	809,752	0	0	1,059,365	213,661	0	1,997,645	228,566	0	0
15-Aug	40.4%	44.9%						137,836	9,308	0	0	809,752	0	0	1,194,724	135,359	0	2,142,311	144,567	0	0
16-Aug	47.1%	50.0%						160,676	22,840	0	0	809,752	0	0	1,526,876	332,153	0	2,497,304	354,993	0	0
17-Aug	49.7%	52.2%						169,637	8,961	0	0	809,752	0	0	1,657,195	100,219	0	2,636,594	133,280	0	0
18-Aug	54.5%	48.2%						185,875	16,238	0	0	809,752	0	0	1,893,339	236,143	0	2,889,966	252,381	0	0
19-Aug	59.6%	50.8%						203,405	17,530	0	0	809,752	0	0	2,148,269	254,331	0	3,161,426	272,461	0	0
20-Aug	65.5%	52.1%						223,382	19,987	0	0	809,752	0	0	2,438,925	290,696	0	3,472,069	310,642	0	0
21-Aug	69.0%	52.5%						235,152	11,761	0	0	809,752	0	0	2,609,958	171,033	0	3,654,863	182,794	0	0
22-Aug	73.4%	50.6%						250,456	15,304	0	0	809,752	0	0	2,832,516	222,558	0	3,892,725	237,862	0	0
23-Aug	77.6%	57.8%						264,639	14,183	0	0	809,752	0	0	3,038,769	206,253	0	4,113,161	220,436	0	0
24-Aug	81.7%	55.0%						278,692	14,052	0	0	809,752	0	0	3,243,128	204,358	0	4,331,571	218,410	0	0
25-Aug	83.8%	58.5%						285,882	7,190	0	0	809,752	0	0	3,347,695	104,567	0	4,443,329	111,758	0	0
26-Aug	87.9%	47.1%						299,689	13,807	0	0	809,752	0	0	3,548,489	200,794	0	4,657,931	214,602	0	0
27-Aug	90.2%	58.5%						307,656	7,967	0	0	809,752	0	0	3,654,344	185,955	0	4,781,752	123,821	0	0
28-Aug	92.4%	58.9%						314,970	7,313	0	0	809,752	0	0	3,770,700	106,956	0	4,935,421	115,659	0	0
29-Aug	94.2%							321,319	6,249	0	0	809,752	0	0	3,863,034	92,334	0	4,994,105	98,683	0	0
30-Aug	95.4%							325,159	3,840	0	0	809,752	0	0	3,918,876	55,842	0	5,053,787	59,682	0	0
31-Aug	96.4%							328,841	3,483	0	0	809,752	0	0	3,969,521	50,646	0	5,107,915	54,128	0	0
1-Sep	97.1%							331,260	2,619	0	0	809,752	0	0	4,007,609	38,088	0	5,148,622	40,707	0	0
2-Sep	97.6%							332,766	1,505	0	0	809,752	0	0	4,029,502	21,893	0	5,172,020	23,399	0	0
3-Sep	98.2%							334,893	2,127	0	0	809,752	0	0	4,060,432	30,929	0	5,205,077	33,056	0	0
4-Sep	98.6%							336,366	1,473	0	0	809,752	0	0	4,081,852	21,420	0	5,227,970	22,893	0	0
5-Sep	98.9%							337,165	789	0	0	809,752	0	0	4,093,331	11,479	0	5,240,238	12,268	0	0
6-Sep	99.1%							337,852	697	0	0	809,752	0	0	4,103,473	10,143	0	5,251,078	10,840	0	0
7-Sep	99.3%							338,707	655	0	0	809,752	0	0	4,115,906	12,433	0	5,264,365	13,287	0	0
8-Sep	99.5%							339,226	519	0	0	809,752	0	0	4,123,453	7,547	0	5,272,432	5,066	0	0
9-Sep	99.6%							339,579	352	0	0	809,752	0	0	4,128,577	5,124	0	5,277,908	5,476	0	0
10-Sep	100.0%							341,000	1,421	0	0	809,752	0	0	4,149,248	20,671	0	5,300,000	22,092	0	0
11-Sep	100.0%							341,000	0	0	0	809,752	0	0	4,149,248	0	0	5,300,000	0	0	0



TABLE 4. 2018 PWSAC Hatchery Egg Take Schedules

TABLE 4

PRINCE WILLIAM SOUND AQUACULTURE CORPORATION

2017 EGG-TAKE SCHEDULE

SITE	SPECIES	DATE																			
		30-Jun	07-Jul	14-Jul	21-Jul	28-Jul	04-Aug	11-Aug	18-Aug	25-Aug	01-Sep	08-Sep	15-Sep	22-Sep	29-Sep	06-Oct	13-Oct	20-Oct	27-Oct	03-Nov	
AFK	PINK									24-Aug		15-Sep									
CCH	PINK									24-Aug		17-Sep									
GHI	SOCKEYE								15-Aug										15-Oct		
GHI	SOCKEYE					25-Jul			10-Aug												
MBH	SOCKEYE MBH-COGHILL						01-Aug		20-Aug												
WNH	CHUM	01-Jul						01-Aug													
	PINK									24-Aug		15-Sep									
	COHO																	13-Oct			11-Nov



TABLE 5. 2018 PWSAC Estimated Salmon Releases

Table 5.

**PRINCE WILLIAM SOUND AQUACULTURE CORPORATION**

**2018 ANTICIPATED SALMON RELEASES**

SPECIES	HATCHERY	ORIGINAL DONOR STOCK	BROOD YEAR	RELEASE LOCATION	ESTIMATED FRY/SMOLT RELEASE
CHUM	WALLY NOERENBERG	WELLS RIVER	2017	WNH	73,000,000
			2017	PORT CHALMERS	40,400,000
			2017	AFK	19,000,000
			TOTAL		132,400,000
SOCKEYE	MAIN BAY	COGHILL LAKE	2016	MBH	10,000,000
			TOTAL		10,000,000
	GULKANA I	GULKANA RIVER	2016	PAXSON LAKE	2,970,000
			2016	SUMMIT LAKE	0
			2016	CROSSWIND LAKE	10,000,000
	GULKANA II	GULKANA RIVER	2016	PAXSON LAKE	1,310,000
TOTAL		24,280,000			
PINK	ARMIN F. KOERNIG	LARSEN, EWAN, GALENA	2017	AFK	173,800,000
			2017	CCH	163,000,000
	WALLY NOERENBERG	LARSEN, EWAN, GALENA	2017	WNH	134,000,000
			TOTAL		470,800,000
COHO	WALLY NOERENBERG	CORBIN CREEK	2016	WNH	2,630,000
			2016	CORDOVA	0
			2016	WHITTIER	100,000
			2016	CHENEGA	50,000
			TOTAL		2,780,000
CHINOOK	WALLY NOERENBERG	SHIP CREEK	2016	CHENEGA	49,000
				GRAND TOTAL	630,309,000