

2019 ANNUAL MANAGEMENT PLAN

WALLY NOERENBERG HATCHERY

Prince William Sound Aquaculture Corporation

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. Inseason assessments and project alterations by Prince William Sound Aquaculture Corporation (PWSAC) or Alaska Department of Fish and Game (ADF&G) may result in changes to this AMP in order to reach or maintain program objectives. PWSAC 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 PWSAC. This policy applies to all hatchery operations covered under the AMP.

I. OPERATIONAL PLAN

1.1 Egg-Take Goals by Species

Chum Salmon: The chum salmon egg-take goal is 153 million (131 million plus 22 million permitted for AFK per section 1.8). Broodstock requirements of 100,500 females and 100,500 males, assuming:

- (a) Average fecundity of 2,110 eggs/female
- (b) 1/1 female to male ratio
- (c) 15% holding mortality
- (d) 15% green/over-mature spawners

Pink Salmon: The pink salmon egg-take goal is 148 million. Broodstock requirements are 141,500 females and 141,500 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 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.

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.

Coho Salmon: The coho salmon egg-take goal is 4.0 million eggs. Broodstock requirements are 1,350 females and 1,350 males assuming:

- (a) Average fecundity of 4,100 eggs/female
- (b) 1/1 female to male ratio
- (c) 15% holding mortality
- (d) 15% green/over-mature spawners

If the required broodstock for the coho salmon egg-take goal is not available from returning fish to the hatchery, PWSAC will confer with VFDA on the feasibility of obtaining eggs or confer with ADF&G about conducting an egg take at the Mile-18 location (broodstock source) in Cordova. Mile-18 and Corbin Creek stocks will not be mixed at WNH.

1.2 Broodstock

The expected broodstock collection schedules for chum and pink salmon are derived from historic run timing curves for Wally Noerenberg Hatchery (WNH). The chum and pink salmon curves are an aggregate of all years (chum salmon 1987–2016; pink salmon 2005–2015 even years) SHA hatchery harvests and Esther Subdistrict commercial fishery catch data from ADF&G 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, then PWSAC must 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, protects potential broodstock fish staging directly in front of the hatchery from being harvested in common property fisheries. 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.

A portion of the SHA hatchery escapement is kept separate by means of a barrier net near the mouth of Esther Creek. Brood fish will be collected by volitional entry through the fishway leading to the brood holding pond.

1.3 Egg-take Schedule and Data Reporting

Ultimately, the egg-take schedule depends upon broodstock recruitment and 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 each year. Data will be provided in electronic format (Excel file) and include all the categories presented in the template attached as Table 6. Data to be collected specifically includes the numbers of green and over-ripe females from the broodstock and associated cost recovery.

Anticipated Egg-take Schedule			
Percent Complete	Chum Salmon	Pink Salmon	Coho Salmon
25%	July 7	August 29	October 19
50%	July 13	September 3	October 27
75%	July 18	September 7	November 4
100%	July 27	September 15	November 11

For a complete listing of PWSAC hatchery egg-take schedules, see Table 4. For a complete listing of PWSAC’s egg-take goals, see Table 2.

1.4 Egg Transport and Carcass Disposal Plans

Approximately 22 million green chum salmon eggs will be allowed to develop to the eyed-egg stage, and then transported off-station to Armin F. Koernig Hatchery (AFK) for incubation, 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.

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.

Approximately 50,000 BY19 king salmon eyed eggs will be transferred from the William Jack Hernandez Sport Fish Hatchery to WNH to complete the incubation cycle. The resultant fry will emerge volitionally into a freshwater raceway and reared at WNH. In May 2021, the smolt will

be transported to saltwater net pens in Crab Bay. Pending approval of the PAR submitted 2/4/19 the smolt will be moved to the new site location. The king salmon smolt will be reared for approximately two weeks and released.

During egg take PWSAC may sell broodstock carcasses and inviable eggs if a market is available. 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 (DEC) requirements. If carcasses are not sold, inviable eggs and carcasses may be disposed of in accordance with Alaska Department of Environmental Conservation (DEC) requirements. If an additional broodstock carcass disposal log is required by ADF&G, all disposals will be logged on the carcass disposal form and reported to the department within 30 days after egg take and disposals are completed.

1.5 Incubation Plans

The following tables contain egg take goals, incubation plans, and estimated releases for brood year 2019 (BY19) chum salmon, pink salmon, and coho salmon.

Chum Salmon Production Summary

Program Name	Egg Take Site	Current Year Green Egg/Fry Goal	Eyed Eggs	Fry/Smolt Released¹	Permitted Maximum
WNH Chum Salmon	WNH	84,000,000	76,500,000	73,000,000	111 million green eggs
Port Chalmers Chum Salmon	WNH	47,000,000	42,400,000	40,500,000	41 million fry
AFKH Chum Salmon ²	WNH	22,000,000	20,000,000	- ³	34 million green eggs

¹ Release goals assume that egg-take goals and standard survivals are achieved. If egg-take goals are not achieved or survivals are lower than anticipated, remote release transport and rearing logistics may be impacted, and release goals may be altered through an amendment to this plan.

² Approximately 20 million chum salmon will be transferred to the AFK hatchery at the eyed-egg developmental stage.

³ Fry release provided in AFK Hatchery AMP.

Pink Salmon Production Summary

Program Name	Egg Take Site	Current Year Green Egg/Fry Goal	Eyed Eggs	Fry/Smolt Released¹	Permitted Maximum
WNH Pink Salmon	WNH	148,000,000	140,000,000	134,000,000	148 million green eggs
WNH Pink Salmon	AFKH ¹	148,000,000	140,000,000	134,000,000	148 million green eggs
AFKH Pink Salmon	WNH	162,000,000	153,000,000	- ²	162 million green eggs

¹ If the required broodstock for egg-take goals at WNH is not available, up to 148 million green eggs may be taken at AFKH and transferred to WNH at the eyed-egg development stage for release at Lake Bay.

² Fry release provided in AFK Hatchery AMP

Coho Salmon Production Summary

Program Name	Egg Take Site	Current Year Green Egg/Fry Goal	Eyed Eggs	Fry/Smolt Released	Permitted Maximum
WNH Coho Salmon ¹	WNH	4,000,000	3,800,000	3,500,000	4,000,000 green eggs
Whittier Coho Salmon ¹	WNH	- ²	- ²	100,000	100,000 smolt
Crab Bay/Chenega Cove (PAR pending) Coho Salmon ¹	WNH	- ²	- ²	50,000	50,000 smolt
Fleming Spit Coho Salmon	WNH	- ²	- ²	100,000	100,000 smolt

¹ Mile-18 and Corbin Creek stock are both permitted at WNH with Corbin Creek stock releases limited to WNH and the Whittier and Crab Bay terminal areas.

² Permitting allows for a total of 4 million green eggs at WNH with releases permitted for numbers of smolt.

The above tables were generated with the following assumptions:

- (a) survival from green to eyed stage of:
 - 94.5% for pink salmon
 - 91.5% for chum salmon
 - 95.0% for coho salmon
- (b) survival from eyed stage to emergence of:
 - 96.0% for pink, chum, and coho salmon
- (c) survival from emergence to fed fry of:
 - 99.5% for pink salmon
 - 99.0% for chum salmon
 - 97.0% for coho salmon
- (d) survival from fed fry to smolt release of 99.5% for coho.

All eggs will be incubated at WNH. During the fall incubation period, 100% of pink, chum, Chinook and coho salmon production will be thermally otolith-marked at the eyed-egg stage. See section 4.1 for more details.

1.6 Rearing and Release Plans

Pink Salmon: Pink salmon fry will emerge non-volitionally from incubators, pass via separate flume and then into saltwater rearing pens. The saltwater net pen rearing complex consists of 16 12.2m x 12.2m x 3.0m rearing pens. Maximum loading densities will be 11 kg/m³.

Approximately 134 million pink salmon will be released at WNH in 2019. Based on the predicted outmigration curve and zooplankton bloom timing, all of the pink salmon fry will be reared for an average of six weeks and released in two groups into the zooplankton bloom.

Chum Salmon: Chum salmon fry destined to be released in Lake Bay will emerge non-volitionally from incubators, pass via separate flume, and then into saltwater rearing pens. The Lake Bay saltwater net pen rearing complex consists of 32 12.2m x 12.2m x 3.0m rearing pens. Maximum loading densities will be 11 kg/m³.

Approximately 123.3 million chum salmon fry will be released in three locations in 2019. Approximately 83.5 million will be released at WNH, 20.6 million at Port Chalmers, and 19 million at AFK.

The AFK saltwater net pen rearing complex consists of ten 12.2m x 12.2m x 3.0m rearing pens. Maximum loading densities will be 11 kg/m³.

Based on the predicted outmigration curve and zooplankton bloom timing, all of the chum salmon fry will be reared for an average of 12 weeks in saltwater net pens and released in one group per release site at a target size of 1.8 grams.

Coho Salmon: Approximately 2.1 million brood year 2017 (BY17) coho salmon smolt will be released in three locations in 2019. Approximately 1.85 million will be released at WNH, 100,000 at Cordova, 100,000 at Whittier, and 50,000 at Crab Bay/ (Chenega Cove PAR pending). The coho salmon will be reared in raceways at WNH. At WNH, the smolt will be transferred to saltwater pens for 4 to 6 weeks prior to release. The smolt released at Cordova, Whittier and Crab Bay/ (Chenega Cove PAR pending) will receive at least 14 days of saltwater rearing at their release location. Maximum rearing densities will be 50 kg/m³ in fresh water and 11 kg/m³ in salt water. All coho salmon smolt will be released in mid-May with a target size of 15 grams.

Coho Salmon: Approximately 3.6 million BY18 coho salmon fry will begin feeding in the raceways in mid-June 2019 and remain there until the spring of 2020.

Chinook Salmon: Approximately 49,000 BY17 king salmon smolt will be released in Crab Bay/ (Chenega Cove PAR pending) and will receive at least 14 days of saltwater rearing prior to release in mid-May with a target size of 18 grams.

For a complete listing of PWSAC's estimated 2019 releases see Table 5.

1.7 Fry Transport Methods

Coho Salmon:

All coho salmon smolt will be transported by barge in eight 600-gallon stainless steel tanks with supplemental oxygen at 100–200% saturation. The water source used during transport will be Esther Lake, with the addition of NaCl and potassium chloride (KCl) to achieve a five ppt saline solution. The saline solution helps to reduce stress to the fish during transport. Maximum transfer densities will be 120kg/m³.

1.8 Permitted Capacity

WNH was issued PNP Hatchery Permit #20 in 1983. It is permitted to incubate 148 million pink salmon eggs, 131 million chum salmon eggs, 4 million coho salmon eggs, and 4 million king salmon eggs. An additional 34 million chum salmon eggs permitted for AFK may be taken and incubated at WNH annually (see FTP # 15A-0051).

Fish Transport Permit Summary

FTP Number	Expiration Date	Purpose
PINK SALMON		
96A-0048	6/30/21	Allows the egg take, incubation, and resultant release of 148 million Larsen, Ewan, and Galena Creek stocks pink salmon eggs at WNH.
16A-0058	4/30/26	(AFK FTP) Allows for backup egg take of 162 million pink salmon green eggs at WNH, transport to AFK for incubation and release.
16A-0059	4/30/26	Allows for backup egg take of 148 million pink salmon green eggs at AFK, transport to WNH for incubation and release.
CHUM SALMON		
94A-0006	6/30/20	Allows transport of 41 million WNH/Wells River/Bear Trap stocks chum salmon fry for release at Port Chalmers.
16A-0056	4/30/26	Allows the egg take of up to 131 million green eggs, incubation, and release of resultant progeny of 111 million Wells River/Bear Trap stocks chum salmon eggs at WNH.
COHO SALMON		
17A-0050	04/30/27	Allows transport and release of 100,000 Mile 18 Copper River Delta stock coho salmon smolt at Fleming Spit, Cordova.
98A-0053	6/30/19	Allows transport and release of 100,000 Mile 18 Copper River Delta stock coho salmon smolt at Whittier, near a freshwater outlet.
99A-0049	6/30/20	Allows transport and release of 50,000 Mile 18 Copper River Delta stock coho salmon smolt at Crab Bay, Evans Island.
99A-0073	12/31/20	Allows for the backup egg take at Fleming Spit of 1.18 million Mile 18 Copper River Delta stock coho salmon eggs for WNH. Eggs will be incubated, reared, and resultant progeny released at WNH.
18A-0038	8/30/2028	Allows for the egg take, incubation, rearing and release of 4.0 million Mile 18 Copper River Delta stock coho salmon eggs at WNH.
16A-0061	4/30/26	Allows for the backup egg take and transport of 4.0 million Corbin Creek stock coho salmon eggs from Solomon Gulch Hatchery to WNH.

16A-0062	4/30/26	Allows for the backup egg take and transport of 2.0 million coho salmon eggs from Mile 18.
19A-0017	6/30/23	Allows for the transfer and release of 100,000 Corbin Creek stock coho salmon smolt from WNH at Whittier, near a freshwater outlet.
19A-0018	6/30/23	Allows transport and release of 50,000 Corbin Creek stock coho salmon smolt at Crab Bay, Evans Island

KING SALMON

11A-0061	6/30/21	Allows transport of up to 50,000 William Jack Hernandez Sport Fish Hatchery/Ship Creek stock king salmon eyed eggs for incubation and freshwater rearing to the smolt stage at WNH and then release at Crab Bay, Evans Island.
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II. DONOR STOCK MANAGEMENT

If the required broodstock for the coho salmon egg-take goal is not available from fish returning to the hatchery, PWSAC will conduct an egg take at the remote release location in Cordova (Fleming Spit Pond) to make up the balance of the goal.

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% 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 the 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 5, 2019, the PWSAC BOD approved the annual corporate budget for Fiscal Year 2020 detailing potential sources of revenue and expenditures. The pink and WNH chum salmon revenue goals are \$5,968,865 and \$5,607,053 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 returning hatchery-produced salmon. Based on these assumptions, PWSAC estimates that approximately 27% of the total value of the enhanced run will be required to meet the revenue goal in the Fiscal Year 2020 financial plan.

Pink Salmon Returns: The AFK, CCH, and WNH pink salmon runs will be managed collectively through openings and closures of respective hatchery subdistricts. Managing the enhanced pink salmon runs in aggregate may result in site-specific common property fisheries

(CPF) contribution rates being above or below the approximate target of an 87% CPF pink salmon harvest.

WNH Chum and MBH Sockeye Salmon Runs: The WNH chum salmon and the MBH sockeye salmon runs will be managed collectively through openings and closures of respective 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 58% and 99% for the WNH chum and MBH sockeye salmon harvest, respectively.

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

Reduction of CPF opportunity in respective 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 goals as rapidly as possible to allow for orderly and consistent CPF.

3.1 Hatchery Fish Migration Routes and Timing

Chum Salmon: WNH chum salmon donor stocks were originally selected to contribute primarily to the early drift gillnet fishery in the Coghill District, and to the mixed seine and drift gillnet fishery later in the season.

In 2005, the Alaska Board of Fisheries revised regulation 5 ACC 24.370 to utilize WNH and Port Chalmers chum salmon fisheries as a means of correcting exvessel value allocation disparities between the purse seine and drift gillnet fleets. The 2013–2017 five-year average value percentages calculated by ADF&G for each gear type are 43.1% drift gillnet, 56.9% purse seine, and 4.7% set gillnet. As a result, the drift gillnet gear group will have exclusive access to the Port Chalmers Subdistrict through July 30 this season. WNH chum salmon released off-station at AFK will be harvested by the purse seine fleet in the AFK terminal harvest area (THA) and SHA between June 1 and July 20.

Pink Salmon: WNH pink salmon stock originated from the AFK Hatchery pink salmon stock. The timing and distribution of the two hatchery returns appear to be very similar. A percentage of WNH pink salmon are expected to be harvested by seiners in the Southwestern District, as well as in Perry Passage, Culross Passage, and other areas in the Northern District. Pink salmon are also expected to be harvested by both purse seiners and drift gillnetters in the Esther Subdistrict and by drift gillnetters and set gillnetters in the Eshamy District.

Coho Salmon: WNH coho salmon are present in the fishery from early August through September. Although some fish are undoubtedly intercepted in the southern areas of Prince William Sound, substantial portions of the coho salmon run are expected to be harvested by purse seine and drift gillnet fishermen in the Esther Subdistrict. There is no direct cost recovery from coho salmon; however, incidental catch of coho salmon during later pink salmon cost

recovery and brood collection can amount up to 20% of the run.

The Esther and Perry Island subdistricts are shown in Figures 1–2.

3.2 Special Harvest Area

The boundaries of the hatchery SHA and the THA are illustrated in Figure 3. The SHA is used by the hatchery operator to harvest hatchery fish for cost recovery. The THA is normally closed to commercial and subsistence fishing and provides a buffer between the hatchery SHA and open waters of the Esther Subdistrict.

The SHA is defined as the waters of Lake Bay north of 60°47.56'N lat (5 AAC 24.368(d)). The THA includes all waters inside of a line from Hodgkin Point at 60° 46.93' N. lat., 148° 02.10' W. long. to Esther Light at 60° 47.14' N. lat., 148° 06.02' W. long., excluding the waters of the Wally Noerenberg Hatchery SHA (5 AAC 24.368(c)). All latitude and longitude coordinates are based on the North American Datum of 1983.

During periods when the Esther Subdistrict closure is in effect to provide protection to cost-recovery fish, the department is willing to permit cost-recovery operations in waters outside of the regulatory SHA/THA boundaries to maintain fish quality. While the department views PWSAC achieving its revenue goals using existing hatchery subdistricts in a timely and efficient manner as beneficial for maintaining fish quality and providing for increased common property fishing opportunity outside of those districts, there is concern over the harvest of wild stock salmon outside of the SHA. When the Esther Subdistrict is open to the CPF, the SHA will not be expanded.

The SHA shall be opened and closed to commercial fishing by emergency order (EO). Sport fisheries will be managed in accordance with regulations as provided in 5 AAC 47 – 5 AAC 75. Emergency orders may be issued to liberalize or restrict sport fisheries based on achievement of broodstock goals.

The following requirements must be adhered to for permitted cost-recovery operations to be conducted outside the regulatory SHA/THA boundaries:

- PWSAC will agree to pay all costs associated with sampling, otolith preparation, and reading of otoliths from permitted cost-recovery harvest(s).
- PWSAC will notify the department with reasonable time prior to any cost-recovery operations to request an emergency order (EO) permitting the activity and to provide notice for scheduling of sampling personnel.
- All EOs issued to permit cost-recovery operations will be for discrete dates.
- Cost-recovery harvest(s) from these areas will not be mixed with any other harvest at any time until after sampling. No sorting of cost-recovery harvest(s) is permitted until after sampling.

- No further EOs permitting cost-recovery operations outside the SHA will be issued until the previous harvest has been evaluated for wild stock interception.
- The department may discontinue permitted cost-recovery operations outside the SHA at any time.

3.3 Hatchery Returns

3.3.1 On-Station Returns

Chum Salmon: PWSAC’s anticipated 2019 run of chum salmon to WNH is 1,990,000 assuming a 2.75% marine survival (Table 1). Assuming a broodstock goal of 201,000 fish, and approximately 642,000 chum salmon sold for cost recovery, the total hatchery harvest will be approximately 42% of the run.

Chum Salmon Projected Run Summary

Total Return	Broodstock	Cost Recovery	Hatchery Harvest	CPF Harvest
1,990,000	201,000	642,000	843,000	1,147,000
% of Total	10%	32%	42%	58%

Chum Salmon Projected Run and Age Composition Summary

BY	Fry Released	Anticipated Marine Survival	Anticipated Total BY Return	Return Age	2019 Projected Run	% of Total
2013	76,300,000	7.36 %	5,619,093	Age-6	102,000	5.2%
2014	81,000,000	0.70 %	569,835	Age-5	163,000	8.2 %
2015	71,700,000	3.47%	2,485,992	Age-4	1,615,000	81.2 %
2016	67,100,000	3.47%	2,326,500	Age-3	107,000	5.4%
				Total	1,990,000	100.0%

Historical average return age composition: 2% age-6, 28% age-5, 65% age-4, and 5% age-3.

Pink Salmon: PWSAC’s anticipated 2019 adult return of pink salmon to WNH is 5,000,000 fish, assuming 3.84% marine survival (5 odd-year average) from the BY17 fry release of 130.1 million (Table 1). Assuming a broodstock goal of 283,000 fish and approximately 419,000 pink salmon sold for cost recovery, the hatchery harvest will be approximately 14% of the return.

Pink Salmon Projected Return Summary

Total Return	Broodstock	Cost Recovery	Hatchery Harvest	CPF Harvest
5,000,000	283,000	419,000	702,000	4,298,000
% of Total	6%	8%	14%	86%

Coho Salmon: PWSAC’s expected 2019 return of coho salmon to WNH is 233,000 fish, assuming a marine survival of 11.14% (Lake Bay Corbin Creek average) from the BY16 smolt release of 2.09 million (Table 1). Assuming the hatchery harvest rate will be insignificant (interception during pink salmon cost recovery) and a broodstock goal of 2,700 fish, approximately 99% of the coho salmon will be available for the CPF.

Coho Salmon Projected Return Summary

Total Return	Broodstock	Cost Recovery	Hatchery Harvest	CPF Harvest
233,000	2,700	-0-	2,700	230,300
% of Total	1%	0%	1%	99%

3.3.2 Off-Station Returns

Chum Salmon: PWSAC’s expected 2019 run of chum salmon to Port Chalmers is 250,000, assuming a 0.65% marine survival (Table 1). All fish will be harvested by the CPF. The expected 2019 run of chum salmon to Sawmill Bay is covered under a separate plan (AFK Hatchery Annual Management Plan).

Port Chalmers - Chum Salmon Projected Run Summary

Total Return	Broodstock	Cost Recovery	Hatchery Harvest	CPF Harvest
250,000	-0-	-0-	-0-	250,000
% of Total	0%	0%	0%	100%

Chum Salmon Projected Run and Age Composition Summary

BY	Fry Released	Anticipated Marine Survival	Anticipated Total BY Return	Return Age	2019 Projected Run	% of Total
2013	43,600,000	0.84 %	368,044	Age-6	5,000	3.2%
2014	0	0.00%	0	Age-5	0	0%
2015	38,300,000	1.00 %	383,000	Age-4	233,000	93.2 %
2016	34,900,000	0.69%	240,855	Age-3	9,000	3.6 %
				Total	250,000	100.0%

Historical average return age composition: 1% age-6, 34% age-5, 61% age-4, and 4% age-3.

Coho Salmon: PWSAC’s total expected 2019 return of coho salmon to Crab Bay and Whittier is 16,700 assuming a marine survival of 11.14% (Lake Bay Corbin Creek average) from the BY16 smolt releases of 150,000 (Table 1). All Crab Bay and Whittier-released fish are designated to be harvested by the CPF. If the required broodstock for the coho salmon egg-take goal is not available from fish returning to the hatchery, PWSAC will confer with VFDA on the feasibility of obtaining eggs or confer with ADF&G about conducting an egg take at the remote Mile-18 location in Cordova. Mile-18 and Corbin Creek stocks will not be mixed at WNH.

Crab Bay - Coho Salmon Projected Return Summary

Total Return	Broodstock	Cost Recovery	Hatchery Harvest	CPF Harvest
5,600	-0-	-0-	-0-	5,600
% of Total	0%	0%	0%	100%

Cordova - Coho Salmon Projected Return Summary

Total Return	Broodstock	Cost Recovery	Hatchery Harvest	CPF Harvest
0	-0-	-0-	-0-	0
% of Total	0%	0%	0%	0%

Whittier - Coho Salmon Projected Return Summary

Total Return	Broodstock	Cost Recovery	Hatchery Harvest	CPF Harvest
11,100	-0-	-0-	-0-	11,100
% of Total	0%	0%	0%	100%

3.4 Separation of Hatchery Escapement

The hatchery escapement goals summarized in the table below are the midpoints of the special harvest area (SHA) escapement goal ranges, 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.

SHA Escapement Goals Summary

Species	Hatchery Escapement Goal	SHA Escapement Goal Range
Chum Salmon	843,000	723,000 – 965,200
Pink Salmon	702,000	606,500 – 808,000

In 2013, PWSAC designated a Hatchery Escapement Exclusion Zone (HEEZ) within the WNH SHA. The HEEZ consists of the waters of the SHA north of a latitude line at 60°47.78'N.

3.5 Special Management Strategies

Effective management of mixed-stock fisheries is difficult. It is the intent of ADF&G to provide stated PWSAC corporate escapement goals by species. Achieving the target revenue goal will depend upon the timing and magnitude of PWSAC salmon runs, 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, the actual percentages of PWSAC total runs by species, which are provided for 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 salmon will be managed

for PWSAC corporate escapement after July 20. Sockeye and chum salmon will be managed for PWSAC corporate escapement by stock.

Performance of the hatchery run is evaluated by comparison of daily harvest rates to a predicted run entry table. In addition, daily sex ratios in the hatchery harvest predict, by a regression equation, the fraction of the run that has returned to date. 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 remaining 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 seine (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, commercial CPF restrictions will be made in the Esther and/or Perry Island subdistricts based upon the magnitude of the shortfall and stage of the run.

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, both upstream and downstream of the barrier net, as appropriate. Fish in the raceways or brood holding ponds will be defined as broodstock.

To ensure accurate and clear reporting, the AMP Adult Run Summary table from the AMP for each hatchery and species will be submitted to the department when requested, as well as with written management recommendations.

It will be the responsibility of the PWSAC general manager or his designee, with written consent of the PWSAC Executive Committee, to advise ADF&G of any desired inseason adjustments to the 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 run 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, corporate escapement, and CPF harvests. Total hatchery and wild stock runs 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.

Chum Salmon: During the chum salmon run, the Esther and Granite Bay subdistricts are managed to attain chum salmon broodstock, cost-recovery objectives, and wild salmon

escapement into Coghill District. If these objectives are on track, time and/or areas open to fishing may be expanded. If sockeye salmon escapement into Coghill Lake is weak and/or cost recovery and broodstock objectives are behind projections, restrictions in the Esther and/or Granite Bay subdistricts will be necessary. Given a shortfall in either wild or corporate escapement, fishing time and/or area in the Esther Subdistrict may be reduced. If management of the Esther Subdistrict is not achieving either wild or corporate escapement, fishing time and/or area in the Granite Bay Subdistrict may be reduced.

Pink Salmon: Because there is no way of isolating hatchery fish from wild stocks in waters of the general purse seine districts, these districts can only be opened and closed as the wild stock run strength will allow. When the hatchery return 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 the Esther Subdistrict and waters of Lake and Quillian bays. Wild stock pink salmon escapement shortfalls have occurred several times in the Coghill District since 1988. Beginning in 1994, CPF openings in the Esther Subdistrict have been restricted to within one and a half miles of Esther Island to minimize harvest of weak pink salmon stocks destined for Port Wells. Recommendations discussed by the Salmon Harvest Task Force have included closing those waters west of Lake Bay to seine harvests during weak wild stock returns to provide a greater corridor for wild fish transiting the Esther Subdistrict.

The principal tool available to manage the hatchery pink salmon return is EO manipulation of the Esther and Perry Island subdistricts (figures 1–2). Closure of the subdistricts during the regular season can be used to decrease interception of hatchery fish to assure that the corporation can achieve its cost recovery and broodstock objectives. When it is apparent that a large hatchery surplus exists in the Esther or Perry Island subdistricts, efforts will be made to provide fishing time in such a manner to prevent a large buildup of fish from occurring and to allow for a timely harvest of the highest quality fish possible.

Coho Salmon: No special management action is anticipated for coho salmon, although fish entering the SHA will be available for PWSAC harvest. It is likely that a weekly fishing schedule in the Esther Subdistrict will be established for the coho salmon return. This schedule will be continued into mid-September to provide for harvest of coho salmon returning to the hatchery. Duration of openings may be modified dependent upon run performance.

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.

A growing sport fishery has developed targeting chum, pink, and coho salmon in the WNH THA and SHA. Minor conflicts with cost-recovery operations and the integrity of the barrier net have occurred in the past. In an effort to protect WNH broodstock, the Alaska Board of Fisheries (BOF) has designated that the area within 100 feet of the WNH broodstock holding pen is closed to sport fishing (5 AAC 55.023(3)).

WNH coho salmon returning to Crab Bay, Cordova, and Whittier release locations are expected

to contribute to local sport fisheries. The locations were chosen to enhance sport fishing opportunities. These locations have been designated by the BOF as THAs, which allow for the sport harvest of up to six coho salmon instead of three, as is the case in the remaining portions of Prince William Sound.

3.7 Subsistence Harvest

The WNH facility is within the Prince William Sound general subsistence area. Alaska residents may harvest fish for subsistence use using the legal gear type for the Coghill District.

3.8 Avoidance of Nontarget Species

Numerical abundance of stocks of fish other than WNH stocks of salmon is insignificant in the WNH THA and SHA. No particular problems are expected to occur.

IV. EVALUATION STUDIES

4.1 Otolith Marking

During the fall incubation period (September–December 2019), 100% of the pink, chum, and coho will be marked at the eyed-egg stage. The table below summarizes the 2019 thermal otolith mark–assignment by the ADF&G Mark, Tag, and Age Lab (MTAL). Voucher samples are collected and submitted along with data per the ADF&G MTAL sampling protocol.

Species	Number of Anticipated Eyed Eggs	Thermal Otolith Mark	Intended Release Location
Chum Salmon	77,000,000	3,6H	WNH, Lake Bay
Chum Salmon	42,900,000	3,2n,1H	WNH or Port Chalmers
Chum Salmon	0	3,4H3	WNH or Port Chalmers
Pink Salmon	139,900,000	8H	WNH, Lake Bay
Pink Salmon	0	8H3	WNH, Lake Bay
Coho Salmon	3,800,000	3H	WNH, Lake Bay Cordova, Whittier, Crab Bay/ (Chenega Cove PAR pending)
King Salmon	0	2,4H	Crab Bay/ (Chenega Cove PAR pending)

4.2 Otolith Recovery in Returning Adults

The recovery of otoliths from returning adult 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, and any additional otolith data from straying studies and other projects by April 1. 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. Coghill Fishery Management District

FIGURE 2. Esther and Granite Bay Subdistricts

FIGURE 3. WNH THA, SHA, and HEEZ

TABLE 1. 2019 PWSAC Hatchery Return Forecast Summary

TABLE 2. 2019 Planned Egg Takes

TABLE 3. 2019 WNH Chum Salmon Adult Return Summary
2019 WNH Pink Salmon Adult Return Summary

TABLE 4. 2019 Hatchery Egg Take Schedules

TABLE 5. 2019 PWSAC Estimated Salmon Releases

TABLE 6. 2020 PWSAC Estimated Salmon Releases

TABLE 7. Egg-take Data Template For Each Species at Each Hatchery

VI. APPROVAL

Recommendation for Approval: Wally Noerenberg Hatchery Annual Management Plan, 2019

Casey Campbell, PWSAC, General Manager 5/24/2019

Jay Baumer, Area Management Biologist, Division of Sport Fish 6/12/2019

Jeremy Botz, Area Management Biologist, Division of Commercial Fisheries 6/12/2019

Tom Vania, Regional Supervisor, Division of Sport Fish 6/12/2019

Bert Lewis, Regional Supervisor, Division of Commercial Fisheries 6/13/2019

Ethan Ford, Regional Resource Development Biologist, Div. of Commercial Fisheries 6/14/2019

The 2019 Wally Noerenberg Hatchery Annual Management Plan is hereby recommended for approval by the Prince William Sound Regional Planning Team (RPT):

Geoff Clark, Prince William Sound RPT Chair 5/24/2019

Lorraine Vercessi, PNP Hatchery Program Coordinator, Div. of Commercial Fisheries 6/12/2019

The 2019 Wally Noerenberg Hatchery Annual Management Plan is hereby approved:

Tom Taube, Deputy Director, Division of Sport Fish 6/25/2019

Peter Bangs, Assistant Director, Division of Commercial Fisheries 7/1/2019

Figure 1. Coghill Fishery Management District

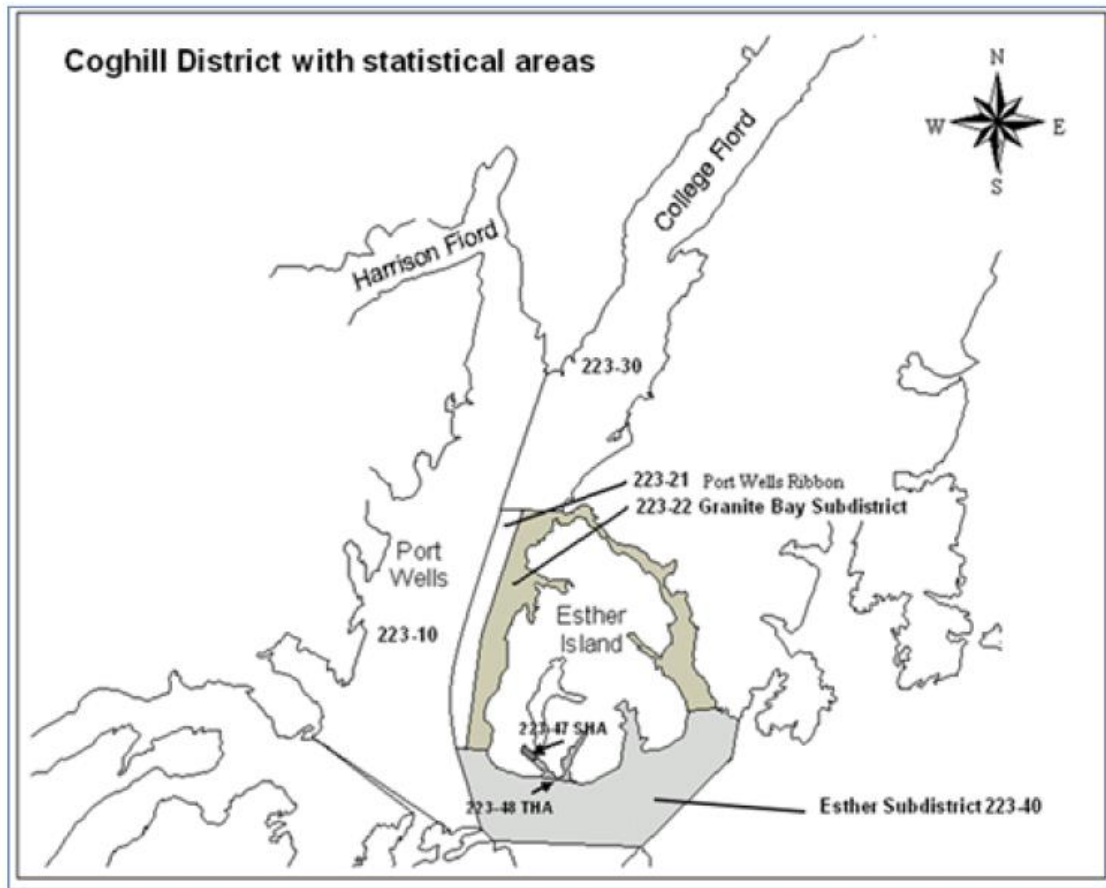


Figure 2. Esther and Granite Bay Subdistricts

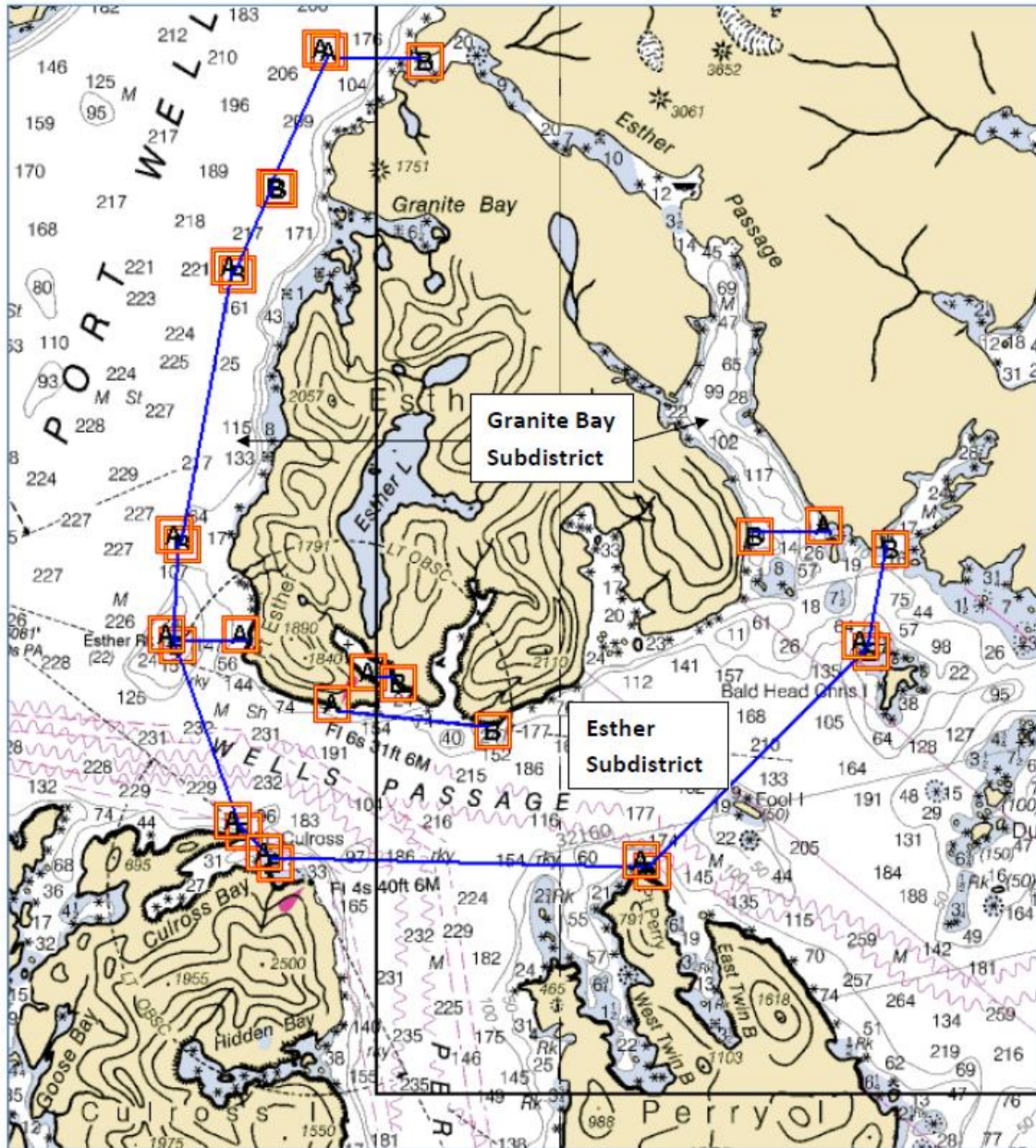


Table 1:
PRINCE WILLIAM SOUND AQUACULTURE CORPORATION
2019 HATCHERY RETURN FORECAST

SITE/ LOCATION	SPECIES	RUN TIME	ADULT RETURN ESTIMATE			EST. MARINE SURVIVAL
			LOW	POINT	HIGH	

RETURNS TO THE HATCHERIES

AFK	PINK	JUL 19 - SEP 05	1,300,000	8,900,000	11,400,000	5.14%
	CHUM	JUN 1 - JUL 27	250,000	330,000	410,000	1.33%

CCH	PINK	JUL 23 - SEP 07	2,100,000	8,400,000	10,100,000	5.12%

WNH	PINK	JUL 19 - SEP 05	900,000	5,000,000	12,400,000	3.84%
	CHUM	JUN 1 - JUL 27	1,780,000	1,990,000	2,200,000	2.75%
	COHO	AUG 01 - SEP 20	162,000	233,000	304,000	11.14%

MBH	COGHILL SOCKEYE	JUN 15 - AUG 01	1,203,000	1,378,000	1,553,000	13.41%

GH - Fry to Adult Survival

GH	CROSSWIND LAKE SOCKEYE		70,000	81,000	92,000	0.81%
	PAXSON LAKE - GI SOCKEYE		18,900	22,400	26,100	0.48%
	PAXSON LAKE SOCKEYE		3,700	4,200	4,800	0.32%
	SUMMIT LAKE SOCKEYE		1,400	1,600	1,900	0.03%

RETURNS TO REMOTE RELEASE LOCATIONS

PORT CHALMERS	CHUM	JUN 1 - JUL 27	220,000	250,000	280,000	0.65%

CORDOVA	COHO	AUG 01 - SEP 20	0	0	0	0.00%
			Corbin Creek stock, no release for this BY			

WHITTIER	COHO	AUG 01 - SEP 20	7,800	11,100	14,500	11.14%

CHENEGA	COHO	AUG 01 - SEP 20	3,900	5,600	7,300	11.14%

CHENEGA	CHINOOK	MAY 25 - JULY 10	510	670	830	1.08%

TOTAL PWSAC RETURNS

	PINK		4,300,000	22,300,000	33,900,000	4.70%
	CHUM		2,250,000	2,570,000	2,890,000	1.58%
	COHO		173,700	249,700	325,800	11.14%
	CHINOOK		510	670	830	0.00%
	MBH - SOCKEYE - PWS		1,203,000	1,378,000	1,553,000	13.41%
	GH - SOCKEYE - COPPER RIVER		94,000	109,200	124,800	0.41%

TABLE 2. 2019 Planned Egg Takes

PRINCE WILLIAM SOUND AQUACULTURE CORPORATION

2019 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	Corbin Creek	WNH	4,000,000
			TOTAL PWSAC	731,150,000

TABLE 3. 2019 WNH Stock Adult Return Summary.

ADULT RETURN SUMMARY																								
RETURN:	5,000,000																							
BROODSTK:	283,000																							
FISH SALES:	419,000																							
HAT. TOTAL:	702,000																							
CPF TOTAL:	4,298,000																							
% EXPLOIT.:	86.0% CPF																							
	14.0% PWSAC																							
RUN-TIMING PERCENTAGES					SHA HATCHERY ESCAPEMENT ESTIMATES				HATCHERY ESCAPEMENT SCHEDULE						TOTAL RETURN									
Date	Projected % Cum.	Projected % Female	Actual % Cum.	Actual % Female	Fishway Estimate	INSIDE Barrier Seine Estimate	HEEZ Estimate	OUTSIDE HEEZ Estimate	BROODSTOCK			FISH SALES			C.P.F. HARVEST			TOTAL RETURN						
									Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily	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	0	0	0
8-Jul	0.0%								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jul	0.2%								566	566	0	0	0	0	0	0	9,434	9,434	0	10,000	10,000	0	0	0
10-Jul	0.2%								566	0	0	0	0	0	0	0	9,434	0	0	10,000	0	0	0	0
11-Jul	0.4%								1,132	566	0	0	0	0	0	0	18,868	9,434	0	20,000	10,000	0	0	0
12-Jul	0.5%								1,415	283	0	0	0	0	0	0	23,585	4,717	0	25,000	5,000	0	0	0
13-Jul	0.5%								1,415	0	0	0	0	0	0	0	23,585	0	0	25,000	0	0	0	0
14-Jul	0.6%								1,698	283	0	0	0	0	0	0	28,302	4,717	0	30,000	5,000	0	0	0
15-Jul	0.7%								1,981	283	0	0	0	0	0	0	33,019	4,717	0	35,000	5,000	0	0	0
16-Jul	0.9%	15.5%							2,547	566	0	0	0	0	0	0	42,453	9,434	0	45,000	10,000	0	0	0
17-Jul	1.0%	14.3%							2,830	283	0	0	0	0	0	0	47,170	4,717	0	50,000	5,000	0	0	0
18-Jul	1.3%	11.7%							3,679	849	0	0	0	0	0	0	61,321	14,151	0	65,000	15,000	0	0	0
19-Jul	1.6%	13.3%							4,528	849	0	0	0	0	0	0	75,472	14,151	0	80,000	15,000	0	0	0
20-Jul	1.8%	12.3%							5,094	566	0	0	0	9,434	9,434	0	75,472	0	0	90,000	10,000	0	0	0
21-Jul	2.2%	11.9%							6,226	1,132	0	0	0	28,302	18,868	0	75,472	0	0	110,000	20,000	0	0	0
22-Jul	2.7%	12.2%							7,641	1,415	0	0	0	51,887	23,585	0	75,472	0	0	135,000	25,000	0	0	0
23-Jul	3.8%	13.1%							10,754	3,113	0	0	0	103,774	51,887	0	75,472	0	0	190,000	55,000	0	0	0
24-Jul	4.8%	14.7%							13,584	2,830	0	0	0	150,944	47,170	0	75,472	0	0	240,000	50,000	0	0	0
25-Jul	6.0%	15.2%							16,980	3,396	0	0	0	207,548	58,604	0	75,472	0	0	300,000	60,000	0	0	0
26-Jul	7.1%	15.9%							20,093	3,113	0	0	0	259,435	51,887	0	75,472	0	0	355,000	55,000	0	0	0
27-Jul	8.2%	18.3%							23,206	3,113	0	0	0	311,322	51,887	0	75,472	0	0	410,000	55,000	0	0	0
28-Jul	10.3%	19.9%							29,149	5,943	0	0	0	410,379	99,057	0	75,472	0	0	515,000	105,000	0	0	0
29-Jul	12.5%	25.3%							35,375	6,226	0	0	0	419,000	8,621	0	170,625	95,153	0	625,000	110,000	0	0	0
30-Jul	14.4%	24.2%							40,752	5,377	0	0	0	419,000	0	0	260,248	89,623	0	720,000	95,000	0	0	0
31-Jul	16.3%	27.7%							46,129	5,377	0	0	0	419,000	0	0	349,871	89,623	0	815,000	95,000	0	0	0
1-Aug	17.8%	26.5%							50,374	4,245	0	0	0	419,000	0	0	420,626	70,755	0	890,000	75,000	0	0	0
2-Aug	20.2%	27.8%							57,166	6,792	0	0	0	419,000	0	0	533,834	113,208	0	1,010,000	120,000	0	0	0
3-Aug	22.1%	28.0%							62,543	5,377	0	0	0	419,000	0	0	623,457	89,623	0	1,105,000	95,000	0	0	0
4-Aug	24.5%	29.3%							69,335	6,792	0	0	0	419,000	0	0	736,665	113,208	0	1,225,000	120,000	0	0	0
5-Aug	27.0%	32.0%							76,410	7,075	0	0	0	419,000	0	0	854,590	117,925	0	1,350,000	125,000	0	0	0
6-Aug	30.6%	32.7%							86,598	10,188	0	0	0	419,000	0	0	1,024,402	169,812	0	1,530,000	180,000	0	0	0
7-Aug	32.6%	33.9%							92,258	5,660	0	0	0	419,000	0	0	1,118,742	94,340	0	1,630,000	100,000	0	0	0
8-Aug	35.5%	34.4%							100,465	8,207	0	0	0	419,000	0	0	1,255,535	136,793	0	1,775,000	145,000	0	0	0
9-Aug	37.0%	39.9%							104,710	4,245	0	0	0	419,000	0	0	1,326,290	70,755	0	1,850,000	75,000	0	0	0
10-Aug	40.0%	43.2%							113,200	8,490	0	0	0	419,000	0	0	1,467,800	141,510	0	2,000,000	150,000	0	0	0
11-Aug	43.4%	47.0%							122,822	9,622	0	0	0	419,000	0	0	1,628,178	160,378	0	2,170,000	170,000	0	0	0
12-Aug	46.6%	46.9%							131,878	9,056	0	0	0	419,000	0	0	1,779,122	150,944	0	2,330,000	160,000	0	0	0
13-Aug	51.9%	48.8%							146,877	14,999	0	0	0	419,000	0	0	2,029,123	250,001	0	2,595,000	265,000	0	0	0
14-Aug	54.3%	48.0%							153,669	6,792	0	0	0	419,000	0	0	2,142,331	113,208	0	2,715,000	120,000	0	0	0
15-Aug	61.0%	50.9%							172,630	18,961	0	0	0	419,000	0	0	2,458,370	316,039	0	3,050,000	335,000	0	0	0
16-Aug	64.0%	51.7%							181,120	8,490	0	0	0	419,000	0	0	2,599,880	141,510	0	3,200,000	150,000	0	0	0
17-Aug	69.9%	53.0%							197,817	16,997	0	0	0	419,000	0	0	2,878,183	278,303	0	3,495,000	295,000	0	0	0
18-Aug	72.3%	53.5%							204,609	6,792	0	0	0	419,000	0	0	2,991,391	113,208	0	3,615,000	120,000	0	0	0
19-Aug	75.7%	54.2%							214,231	9,622	0	0	0	419,000	0	0	3,151,769	160,378	0	3,785,000	170,000	0	0	0
20-Aug	77.7%	55.8%							219,891	5,660	0	0	0	419,000	0	0	3,246,109	94,340	0	3,885,000	100,000	0	0	0
21-Aug	80.7%	57.4%							228,381	8,490	0	0	0	419,000	0	0	3,387,619	141,510	0	4,035,000	150,000	0	0	0
22-Aug	82.8%	58.4%							234,324	5,943	0	0	0	419,000	0	0	3,486,676	99,057	0	4,140,000	105,000	0	0	0
23-Aug	85.6%	58.8%							242,248	7,924	0	0	0	419,000	0	0	3,618,752	132,076	0	4,280,000	140,000	0	0	0
24-Aug	87.2%	58.9%							246,776	4,528	0	0	0	419,000	0	0	3,694,224	75,472	0	4,360,000	80,000	0	0	0
25-Aug	89.1%	58.2%							252,153	5,377	0	0	0	419,000	0	0	3,783,847	89,623	0	4,455,000	95,000	0	0	0
26-Aug	90.7%	60.3%							256,681	4,528	0	0	0	419,000	0	0	3,859,319	75,472	0	4,535,000	80,000	0	0	0
27-Aug	92.0%	61.5%							260,360	3,679	0	0	0	419,000	0	0	3,920,640	61,321	0	4,600,000	65,000	0	0	0
28-Aug	93.1%	65.0%							263,473	3,113	0	0	0	419,000	0	0	3,972,527	51,887	0	4,655,000	55,000	0	0	0
29-Aug	94.1%	66.4%							266,303	2,830	0	0	0	419,000	0	0	4,019,697	47,170	0	4,705,000	50,000	0	0	0
30-Aug	95.0%								268,850	2,547	0	0	0	419,000	0	0	4,062,150	42,453	0	4,750,000	45,000	0	0	0
31-Aug	95.9%								271,397	2,547	0	0	0	419,000	0	0	4,104,603	42,453	0	4,795,000	45,000	0	0	0
1-Sep	96.9%								274,227	2,830	0	0	0	419,000	0	0	4,151,773	47,170	0	4,845,000	50,000	0	0	0
2-Sep	97.5%								275,925	1,698	0	0	0	419,000	0	0	4,180,075	28,302	0	4,875,000	30,000	0	0	0
3-Sep	98.0%								277,340	1,415	0	0	0	419,000	0	0	4,203,660	23,585	0	4,900,000	25,000	0	0	0
4-Sep	98.5%								278,755	1,415	0	0	0	419,000	0	0	4,227,245	23,585	0	4,925,000	25,000	0	0	0
5-Sep	98.9%								279,887	1,132	0	0	0	419,000	0	0	4,246,113	18,868	0	4,945,000	20,000	0	0	0
6-Sep	99.3%								281,019	1,132	0	0	0	419,000	0	0	4,264,981	18,868	0	4,965,000	20,000	0	0	0
7-Sep	99.6%								281,868	849	0	0	0	419,000	0									

TABLE 3. Page 2 of 2. 2019 WNH Stock Adult Return Summary.

PROJECTED										ADULT RETURN SUMMARY														
RETURN:	1,990,000									HATCHERY:	WNH													
BROODSTK:	201,000									SPECIES:	CHUM													
FISH SALES:	642,000									YEAR:	2019													
HAT. TOTAL:	843,000																							
CPF TOTAL:	1,147,000																							
% EXPLOIT.:	57.6%	CPF																						
	42.4%	PWSAC																						
RUN-TIMING PERCENTAGES										SHA HATCHERY ESCAPEMENT ESTIMATES				HATCHERY ESCAPEMENT SCHEDULE										
Date	Projected % Cum.	Projected % Female	Actual % Cum.	Actual % Female	Fishway Estimate	INSIDE Barrier Seine Estimate	HEEZ Estimate	OUTSIDE HEEZ Estimate	BROODSTOCK	FISH SALES				C.P.F. HARVEST				TOTAL RETURN						
									Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily	Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily	Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily	Proj. Cum.	Proj. Daily	Act. Cum.	Act. Daily
23-May	0.0%								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-May	0.0%								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-May	0.8%								1,640	1,640	0	0	0	14,598	0	0	0	0	0	0	16,239	16,239	0	0
26-May	1.4%								2,734	1,093	0	0	0	9,732	0	0	0	0	0	0	27,064	10,826	0	0
27-May	1.8%								3,611	878	0	0	0	7,813	0	0	0	0	0	0	35,755	8,691	0	0
28-May	2.1%								4,274	662	0	0	0	5,893	0	0	0	0	0	0	42,310	6,555	0	0
29-May	2.5%								4,596	662	0	0	0	5,893	0	0	0	0	0	0	48,968	6,555	0	0
30-May	3.0%								6,128	1,192	0	0	0	10,613	0	0	0	0	0	0	60,671	11,805	0	0
31-May	4.2%								8,410	2,282	0	0	0	20,308	0	0	0	0	0	0	83,260	22,590	0	0
1-Jun	5.7%								11,536	3,126	0	0	27,825	27,825	0	0	0	0	0	0	114,212	30,952	0	0
2-Jun	7.0%								14,067	2,531	0	0	50,354	22,528	0	0	0	0	0	0	139,272	25,060	0	0
3-Jun	8.3%								16,737	2,670	0	0	74,121	23,767	0	0	0	0	0	0	165,709	26,437	0	0
4-Jun	10.2%								20,602	3,864	0	0	108,513	34,392	0	0	0	0	0	0	203,966	38,257	0	0
5-Jun	12.7%								25,456	4,854	0	0	151,717	43,204	0	0	0	0	0	0	252,024	48,058	0	0
6-Jun	15.0%								30,215	4,759	0	0	194,078	42,361	0	0	0	0	0	0	299,144	47,120	0	0
7-Jun	17.7%	24.8%							35,645	5,430	0	0	242,412	48,333	0	0	0	0	0	0	352,908	53,764	0	0
8-Jun	21.0%	24.1%							42,182	6,537	0	0	300,594	58,182	0	0	0	0	0	0	417,627	64,719	0	0
9-Jun	23.9%	25.0%							48,043	5,860	0	0	352,751	52,157	0	0	0	0	0	0	475,645	58,017	0	0
10-Jun	26.6%	26.0%							53,458	5,416	0	0	400,953	48,201	0	0	0	0	0	0	529,262	53,617	0	0
11-Jun	29.2%	27.2%							58,744	5,286	0	0	448,003	47,050	0	0	0	0	0	0	581,598	52,336	0	0
12-Jun	32.3%	27.6%							64,861	6,117	0	0	502,444	54,441	0	0	0	0	0	0	642,156	60,558	0	0
13-Jun	34.9%	28.7%							70,211	5,350	0	0	550,058	47,614	0	0	0	0	0	0	695,120	52,964	0	0
14-Jun	37.3%	30.4%							75,021	4,811	0	0	592,871	42,813	0	0	0	0	0	0	742,743	47,623	0	0
15-Jun	40.4%	33.6%							81,243	6,222	0	0	642,000	34,392	0	0	6,249	6,249	0	0	804,943	61,800	0	0
16-Jun	43.1%	35.7%							86,656	5,414	0	0	642,000	0	0	0	54,432	48,183	0	0	857,939	53,596	0	0
17-Jun	45.2%	38.7%							90,801	4,145	0	0	642,000	0	0	0	91,327	36,894	0	0	898,979	41,040	0	0
18-Jun	45.9%	40.9%							92,342	1,541	0	0	642,000	0	0	0	105,041	13,715	0	0	914,235	15,256	0	0
19-Jun	46.4%	43.9%							93,194	851	0	0	642,000	0	0	0	112,619	7,578	0	0	922,664	8,429	0	0
20-Jun	46.8%	44.5%							93,619	426	0	0	642,000	0	0	0	116,408	3,789	0	0	926,878	4,215	0	0
21-Jun	46.8%	43.8%							93,765	145	0	0	642,000	0	0	0	117,700	1,292	0	0	928,316	1,438	0	0
22-Jun	46.8%	42.2%							94,055	290	0	0	642,000	0	0	0	120,285	2,585	0	0	931,191	2,875	0	0
23-Jun	46.9%	43.0%							94,345	290	0	0	642,000	0	0	0	122,870	2,585	0	0	934,066	2,875	0	0
24-Jun	47.4%	43.7%							95,233	888	0	0	642,000	0	0	0	130,774	7,904	0	0	942,858	8,792	0	0
25-Jun	48.1%	43.7%							96,719	1,486	0	0	642,000	0	0	0	143,997	13,223	0	0	957,567	14,709	0	0
26-Jun	48.9%	45.0%							98,205	1,486	0	0	642,000	0	0	0	157,220	13,223	0	0	972,275	14,709	0	0
27-Jun	49.2%	47.0%							98,948	743	0	0	642,000	0	0	0	163,831	6,611	0	0	979,630	7,354	0	0
28-Jun	49.6%	49.9%							99,625	678	0	0	642,000	0	0	0	169,863	6,032	0	0	986,339	6,709	0	0
29-Jun	50.9%	52.6%							102,265	2,640	0	0	642,000	0	0	0	193,361	23,499	0	0	1,012,478	26,139	0	0
30-Jun	52.9%	54.0%							105,486	3,221	0	0	642,000	0	0	0	222,027	28,665	0	0	1,044,364	31,886	0	0
1-Jul	54.8%	56.8%							110,093	4,607	0	0	642,000	0	0	0	263,033	41,006	0	0	1,089,977	45,613	0	0
2-Jul	57.1%	57.2%							114,817	4,724	0	0	642,000	0	0	0	305,076	42,043	0	0	1,136,744	46,767	0	0
3-Jul	60.5%	58.6%							121,667	6,850	0	0	642,000	0	0	0	366,044	60,968	0	0	1,204,562	67,818	0	0
4-Jul	63.9%	57.6%							128,470	6,803	0	0	642,000	0	0	0	426,593	60,549	0	0	1,271,913	67,351	0	0
5-Jul	68.0%	58.2%							136,743	8,274	0	0	642,000	0	0	0	500,231	73,639	0	0	1,353,826	81,912	0	0
6-Jul	72.5%	57.9%							145,694	9,951	0	0	642,000	0	0	0	573,896	79,664	0	0	1,442,440	88,615	0	0
7-Jul	76.2%	63.6%							153,200	7,506	0	0	642,000	0	0	0	646,707	66,811	0	0	1,516,758	74,317	0	0
8-Jul	79.6%	60.7%							160,031	6,831	0	0	642,000	0	0	0	707,508	60,802	0	0	1,584,391	67,633	0	0
9-Jul	82.3%	63.4%							165,418	5,386	0	0	642,000	0	0	0	755,451	47,942	0	0	1,637,720	53,329	0	0
10-Jul	86.0%								172,837	7,419	0	0	642,000	0	0	0	821,484	66,033	0	0	1,711,172	73,452	0	0
11-Jul	89.9%								180,171	7,334	0	0	642,000	0	0	0	886,760	65,276	0	0	1,783,762	72,610	0	0
12-Jul	92.7%								186,422	6,251	0	0	642,000	0	0	0	942,399	55,639	0	0	1,845,672	61,890	0	0
13-Jul	94.9%								190,793	4,371	0	0	642,000	0	0	0	981,304	38,906	0	0	1,888,949	43,277	0	0
14-Jul	96.3%								193,574	2,781	0	0	642,000	0	0	0	1,006,054	24,749	0	0	1,916,479	27,530	0	0
15-Jul	97.6%								196,225	2,651	0	0	642,000	0	0	0	1,029,653	23,599	0	0	1,942,730	26,251	0	0
16-Jul	98.8%								198,632	2,407	0	0	642,000	0	0	0	1,051,074	21,421	0	0	1,966,558	23,828	0	0
17-Jul	99.4%								199,893	1,251	0	0	642,000	0	0	0	1,062,208	11,133	0	0	1,978,942	12,384	0	0
18-Jul	99.8%								200,590	707	0	0	642,000	0	0	0	1,068,502	6,295	0	0	1,985,943	7,002	0	0
19-Jul	99.9%								200,817	226	0	0	642,000	0	0	0	1,070,517	2,015	0	0	1,988,185	2,241	0	0
20-Jul	100.0%								201,000	183	0	0	642,000	0	0	0	1,072,149	1,632	0	0	1,990,000	1,815	0	0
21-Jul	100.0%								201,000	0	0	0	642,000	0	0	0	1,072,149	0	0	0	1,990,000	0	0	0
22-Jul	100.0%								201,000	0	0	0	642,000	0	0	0	1,072,149							

TABLE 4. 2019 PWSAC Hatchery Egg Take Schedules

PRINCE WILLIAM SOUND AQUACULTURE CORPORATION

2019 EGG-TAKE SCHEDULE

		DATE																			
SITE	SPECIES	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								
GH I	SOCKEYE								15-Aug										15-Oct		
GH II	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																	19-Oct		11-Nov	

TABLE 5. 2019 PWSAC Estimated Salmon Releases

2019 ANTICIPATED SALMON RELEASES

SPECIES	HATCHERY	ORIGINAL DONOR STOCK	BROOD YEAR	RELEASE LOCATION	ESTIMATED FRY/SMOLT RELEASE
CHUM	WALLY NOERENBERG	WELLS RIVER	2018	WNH	83,550,000
			2018	PORT CHALMERS	20,620,000
			2018	AFK	19,000,000
			TOTAL		123,170,000
SOCKEYE	MAIN BAY	COGHILL LAKE	2017	MBH	11,090,000
			GULKANA I	GULKANA RIVER	2018
	GULKANA RIVER	2018		SUMMIT LAKE	5,006,000
	GULKANA RIVER	2018		CROSSWIND LAKE	10,000,000
	GULKANA RIVER	2018		PAXSON LAKE	446,000
	TOTAL		32,096,000		
PINK	ARMIN F. KOERNIG	LARSEN, EWAN, GALENA	2018	AFK	157,960,000
			2018	CCH	129,300,000
	WALLY NOERENBERG	LARSEN, EWAN, GALENA	2018	WNH	136,260,000
			TOTAL		423,520,000
COHO	WALLY NOERENBERG	MILE 18	2017	WNH	1,850,000
		MILE 18	2017	CORDOVA	100,000
		MILE 18	2017	WHITTIER	100,000
		MILE 18	2017	CHENEGA	50,000
		TOTAL		2,100,000	
CHINOOK	WALLY NOERENBERG	SHIP CREEK	2017	CHENEGA	49,000
				GRAND TOTAL	580,935,000

TABLE 6. 2020 PWSAC Estimated Salmon Releases

2020 ANTICIPATED SALMON RELEASES

SPECIES	HATCHERY	ORIGINAL DONOR STOCK	BROOD YEAR	RELEASE LOCATION	ESTIMATED FRY/SMOLT RELEASE
CHUM	WALLY NOERENBERG	WELLS RIVER	2019	WNH	73,200,000
			2019	PORT CHALMERS	40,800,000
			2019	AFK	19,100,000
			TOTAL		133,100,000
SOCKEYE	MAIN BAY	COGHILL LAKE	2018	MBH	11,090,000
			GULKANA I	GULKANA RIVER	2019
	GULKANA RIVER	2019		SUMMIT LAKE	6,000,000
	GULKANA RIVER	2019		CROSSWIND LAKE	10,000,000
	GULKANA RIVER	2019		PAXSON LAKE	1,313,000
	TOTAL		33,090,000		
PINK	ARMIN F. KOERNIG	LARSEN, EWAN, GALENA	2019	AFK	171,600,000
			2019	CCH	168,800,000
	WALLY NOERENBERG	LARSEN, EWAN, GALENA	2019	WNH	133,600,000
			TOTAL		474,000,000
COHO	WALLY NOERENBERG	MILE 18	2018	WNH	3,270,000
		MILE 18	2018	CORDOVA	100,000
		MILE 18	2018	WHITTIER	100,000
		MILE 18	2018	CHENEGA	50,000
		TOTAL		3,520,000	
CHINOOK	WALLY NOERENBERG	SHIP CREEK	2018	CHENEGA	0
				GRAND TOTAL	643,710,000

