**APPLICATION**
**PRIVATE NONPROFIT SALMON HATCHERY PERMIT**

**STATE OF ALASKA**
**DEPARTMENT OF FISH AND GAME**

## I. IDENTIFICATION OF APPLICANT

### A. Private Nonprofit Corporation

Name: Southern Southeast Regional Aquaculture Association, Inc. (SSRAA)

Address: 14 Borch St.

Ketchikan, AK. 99901

Phone: (907) 225-9605

(Please attach a copy of Articles of Incorporation for the above nonprofit corporation organized in accordance with Alaska Statute 10.20)

See Appendix A. SSRAA Articles of Incorporation

### B. Individual Completing This Form

Name: Jeff Lundberg

Address: PO Box 554

Craig, AK. 99921

Phone: (907) 755-2231

### C. Relation to Above Nonprofit Corporation

Manager of Prince of Wales Hatchery Association (POWHA), which is being absorbed by SSRAA.

## II. STATEMENT OF APPLICANT'S GOALS AND OBJECTIVES

Explain why you have decided to apply for a hatchery permit and what you generally expect to accomplish by the operation of the proposed hatchery.

Continue to produce chinook salmon to benefit the common property fisheries of Southern Southeast Alaska, specifically off the west coast of Prince of Wales Island. Permitted capacity is 770,000 chinook eggs. 150,000 eyed eggs are used for the current program.

Develop a summer chum program at Port St. Nicholas/Port Asumcion in conjunction with Burnett Inlet Hatchery. This would be done through PAR's.

8 million green summer chum eggs were permitted for Port Saint Nicholas at the spring 2014 RPT meeting to be released at Port Asumcion, Baker Island. There are no chum eggs currently being cultured at PSN. The bio criteria in the permit application will be for Kitoi boxes, although NOPAD incubators may be used.

There are no facilities at Port Saint Nicholas Hatchery to allow for returning broodstock so any future chum program would be with eyed eggs from Burnett Inlet Hatchery.

## III. PRODUCTION GOALS AND HATCHERY SITE INFORMATION

| A. Egg Capacities by species | Millions of eggs required for hatchery at start-up | at capacity |
|---|---|---|
| Chinook | 770,000 | 770,000 |
| Summer Chum | 8,000,000 | 8,000,000 |

### B. Location Description

#### 1. Site (stream and/or lake name, ADF&G stream number, and exact geographical coordinates)

Hatchery is located adjacent to Craig of City water treatment plant, mile 5 of Port Saint Nicholas road, Craig, AK. 55.27.371N – 133.00.171W. Water source is North Fork Lake. 55.27.171N – 132.57.290W

#### 2. Site Physical Description (attach topographic map and photographs of proposed site).

**a. Topography**

See Appendix B. Existing hatchery. 60 feet above sea level. Gradual slope behind hatchery.

**b. Geology**

Existing facility. Glacial deposit of gravel.

**c. Soils**

Existing facility. Six inch layer of clay loam over 12 inches of sandy clay with small stones. Underneath this level is material consistent with alluvial fan.

## C. Current Land Use and Ownership Status

### 1. Have the land or usage rights been acquired?

Land rights have been acquired by the City of Craig. See Appendix C

### 2. What is (will be) the legal form of any usage rights?

Landowner is City of Craig; copy of lease between POWHA and Craig is Appendix D. Lease is annual.

A new lease will be developed between City of Craig and SSRAA.

### 3. List the additional state and federal permits needed by the applicant to build and operate the proposed hatchery. Examples may include: U.S. Army Corps of Engineers Permit; Department of Natural Resources Water Use, Land Use, and Tidelands Lease Permits; and U.S. Forest Service Land Use Permit.

**Use Permits (land and water)**

LAS 28075: Port Saint Nicholas Netpens
LAS 29518: Port Saint Nicholas River Weir
USACOE – POA-2011-265: PSN Netpens

## D. Water Supply

The water quantity, minimum and Maxim temperatures, and the amounts of silt loading will be critical factors in the evaluation of water supply adequacy. **Care should be exercised in the evaluation of these questions.**

### 1. Source (e.g., lake, stream, well, spring). Have the water usage rights been acquired?

North Fork Lake. Water delivered via the City of Craig 12" domestic water pipeline. Unrestricted flow of pipeline is 12-16 thousand GPM. See Appendix E for water usage rights. Permit currently being re-authorized due to dam being raised in 2015. Permit #CRG-100205

### 2. Water source characteristic (e.g., substrate, size of drainage area, gradient, ground water characteristics).

The lake drains approximately 3 square miles. Substrate is primarily mud/organic matter.

### 3. Water quality characteristics (in every case, cite the qualifications of the individual making the assessment and the method(s) used).

#### a. Recommended parameters to measure for evaluating potential hatchery water supply. Either fill out the table below or attach a copy of the water quality analysis conducted.

| Water Qualities | Standards | Levels for the hatchery water source |
|---|---|---|
| Alkalinity | at least 20 mg/L as $caCO_3$ | |
| Ammonia (unionized) | <0.0125 mg/L | |
| Arsenic | <0.05 mg/L | |
| Barium | <5.0 mg/L) | |
| Cadmium | <0.0005 mg/L (< 100 mg/L alkalinity<br><0.005 mg/L (≥ 100 mg/L alkalinity) | |
| Carbon dioxide | <1.0 mg/L | |
| Chloride | <4.0 mg/L | |
| Copper | <0.006 mg/L (< 100 mg/L alkalinity)<br><0.03 mg/L (≥ 100 mg/L alkalinity) | |
| Dissolved oxygen | >8.0 mg/L | |
| Hydrogen sulfide | <0.003 mg/L | |
| Iron | <0.1 mg/L | |
| Lead | <0.02 mg/L | |
| Magnesium | <15 mg/L | |
| Mercury | <0.0002 mg/L | |
| Nickel | <0.01 mg/L | |
| Nitrate ($NO_3$) | <1.0 mg/L | |
| Nitrate ($NO_2$) | <0.1 mg/L | |
| Nitrogen ($N_2$) | <110% total gas pressure<br>(<103% nitrogen gas) | |
| Petroleum (oil) | <0.001 mg/L | |
| pH | 6.5 - 8.0 | |
| Potassium | <5.0 mg/L | |
| Salinity | <5.0 ppt | |
| Selenium | <0.01 mg/L | |
| Silver | <0.003 mg/L (fresh water)<br><0.003 mg/L (salt water) | |
| Sodium | <75.0) mg/L | |
| Sulfate $SO_4^{-2}$ | <50.0 mg/L | |
| Total dissolved solids | <400.0 mg/L | |
| Total settleable solids | <80.0 mg/L (25 JTU) | |
| Zinc | <0.005 mg/L | |

Hatchery has been operational since 2005. All water qualities in North Fork Lake are within acceptable parameters. No catastrophic mortality has occurred due to poor water qualities.

Note: Synergistic and antagonistic chemical reactions must be considered when evaluating a water source against these criteria.

**b. Attach a temperature profile (minimum of one year of data) of the hatchery water source. Also, provide vertical profiles if a lake water source is proposed.**

See Appendix F

**c. List monthly levels of dissolved oxygen in the hatchery water source. If a lake source, provide seasonal oxygen profiles**.

See Appendix G

**d. If a lake source, provide information on surface area, depth, and water storage capacity.**

North Fork Lake has a surface area of 3.42 m², is 30' deep (avg. depth: 10 ft.) and a storage capacity of 1,264 acre/ft. (429,500,000 gallons).

**e. Describe the silt load (include consideration of possible seasonal high water).**

Silt load has been minimal to non-existent since inception of hatchery.

**4. <u>Water Flow Data</u>.**

This information should be based on the equivalent of long-term USGS stream gauge data (10 years or more data) or the U.S. Forest Service Water Resources Atlas synthetic hydrograph model.

**a. Attach a seasonal profile, including yearly minimum and maximum flows.**

See Appendix H

**b. List a historical range of water flow conditions, if available.**

See Appendix H

**5. <u>Water Distribution System</u>**

Describe the water distribution system in at least the following dimensions:

**a. Type, size, elevation and locations of water intake, screening, and water use/reuse system.**

Hatchery water supply is provided by City of Craig 12" steel raw water supply line from North Fork Lake. The hatchery uses the existing conduit to the water treatment plant located at 5.25 mile of the Port Saint Nicholas road. Water enters a 5'x90' concrete intake chamber with a provision for rough screening of larger organic matter on the south side of the diversion weir at an elevation of 600'. The resultant drop in elevation results in a pressure of 200PSI at the terminal end of the pipeline after it has been reduced from 250 PSI by an existing pressure reducing valve located at 412' feet elevation. The pressure is reduced to 22 PSI by PRV upon entering hatchery.

**b. Size, length, and type of pipe, insulation, and distribution system. Include elevations of water surfaces at each point in the system from intake through incubation and rearing to fishladder or other discharge.**

See Appendix I

**c. If a hydroelectric generation system will be used, will effluent from this system be used in the hatchery? If so, describe plans to address possible problems with gas supersaturation.**

No hydroelectric generation.

**d. Describe provisions for an emergency water system in the event of primary water system failure.**

Original design called for re-use system but was never installed. Currently oxygen generator with bottled oxygen as back up employed until a problem can be fixed.

**6. <u>Water Treatment System</u>**

Describe any water treatment facilities that you will employ to meet minimal water quality standards (influent or effluent).

Rough organic removal at water treatment plant for influent water. Effluent treatment of water through swirl separators. Solids flushed to settling ponds on site.

**7. <u>Annual Water Budget</u>**

Attach a graph showing seasonal variation in flow required for eyeing, incubation, freshwater rearing, freshwater lens in saltwater pens, adult holding, and fishladder operations.

See Appendix J

## IV. HATCHERY DESIGN AND CONSTRUCTION INFORMATION

### A. Biocriteria for Design and Construction

Describe the critical operational assumptions and objectives which determine the design size and capacity of the proposed hatchery. Specific reference should be made to the following (for reference, a table of CFMD assumptions for salmon survival is provided, Table I):

**BROOD STOCK – SPECIES: Chinook**

1. Eggs per female spawner: 5,500
2. Brood stock requirements at 1:1 sex ratio: 54
3. Green egg requirements:150,000
4. Estimated holding mortality: N/A, Obtain eyed eggs from Whitman Lake Hatchery(WLH)

**HATCHERY FACILITY**

5. Eyed eggs (0% loss from green egg stage) 150,000
6. Eyed egg density per incubation unit: 37,500
7. Total number of incubation units: 4
8. Number of cabinets per unit: N/A
9. Water requirements at 23L/min/unit=92L/min
10 Water requirements with 0% loss= 92L/min

**FRESHWATER REARING UNITS:**

11 Number of emerging fry (7% loss from eyed stage) 140,000

12 Initial fry weight at 0.0004/kg= 56kg

13 Final Fry weight at 0.02/kg= 2,800 kg

14 Initial freshwater fry rearing space required at 0.2 kg/$m^3$ 139 $m^3$ (4 round ponds)

15 Final freshwater fry rearing space required at 15 kg/$m^3$ 139 $m^3$ (4 round ponds)

16 Maximum number of rearing units 2 round ponds @ 18.3 $m^3$, 2 @ 51 $m^3$= 139 $m^3$

17 Maximum water requirements at _____kg/L/min and 10% loss_____L/min

18 Number of exchanges per hour (R-value) per raceway 0.6-1

**MARINE REARING UNITS**

19. Number of fry/fingerling/or smolts 140,000
20. Initial weight at 0.015/kg = 2,100kg
21. Final weight at 0.025/kg = 3,500kg
22. Initial rearing space required at 15 kg/$m^3$ = 724 $m^3$ (1 netpen)
23. Final rearing space required at 25 kg/$m^{3=}$ 724 $m^3$ (1 netpen)
24. Maximum number of rearing units (12 m by 12 m by 6 m= 724 $m^3$), 1

**PROJECTED RETURN**

25. Number of returning fish at 3% ocean survival = 4,200

## A. Biocriteria for Design and Construction (continued)

**BROOD STOCK – SPECIES: Summer Chum**

1. Eggs per female spawner: 2,250
2. Brood stock requirements at 1:1 sex ratio: 7,110
3. Green egg requirements: 8,000,000
4. Estimated holding mortality: N/A, obtain eggs from Burnett Inlet Hatchery

**HATCHERY FACILITY**

5. Eyed eggs (8% loss from green egg stage): 7,360,000
6. Eyed egg density per incubation unit: 200,000/Kitoi box
7. Total number of incubation units: 40
8. Number of cabinets per unit:
9. Water requirements at 38L/min/unit= 1,520L/min
10 Water requirements with 0% loss= 1,520L/min

**FRESHWATER REARING UNITS**

11 Number of emerging fry (_%loss from eyed stage)

12 Initial fry weight at _/kg= _kg

13 Final Fry weight at _kg= _kg

14 Initial freshwater fry rearing space required at _ kg/$m^3$ _ $m^3$

15 Final freshwater fry rearing space required at _kg/$m^3$ = __$m^3$

16 Maximum number of rearing units (m x m x m) = __ $m^3$

17 Maximum water requirements at _____kg/L/min and 10% loss_____L/min

18 Number of exchanges per hour (R-value) per raceway:

**MARINE REARING UNITS**

19. Number of fry/fingerling/or smolts: 7,360,000
20. Initial weight at 0.00038/kg= 2,800kg
21. Final weight at 0.0025/kg=18,400kg
22. Initial rearing space required at 1.0kg/$m^3$ = 2,900 $m^3$ 4- 40'x40'x20' netpens
23. Final rearing space required at 6.9kg/$m^3$ = 2,900 $m^3$ 4- 40'x40'x20' netpens
24. Maximum number of rearing units (12m by 12m by 12m= 2,900 $m^3$) 4 netpens

**PROJECTED RETURN**

25. Number of returning fish at 3% ocean survival = 240,000

## B. GENERAL DESCRIPTION

Attach a written description of the proposed facility. This description should represent a solid concept of the proposed hatchery design. Also include preliminary sketches and drawings of at least the following in an appendix.

1. Incubation and rearing site plan.
2. Hatchery floor plan.
3. Water supply system.
4. Incubation/operation building.
5. Facility layout.

The site plan should include a plan view of all facilities at a scale of 1:100 or larger, a USGS 1:63360 scale topographical map showing the entire watershed and all facility locations, and a NOAA marine chart of the largest scale available showing all tidewater-based facilities and local data.

See Appendix K Location of hatchery site and netpens in Port St. Nicholas are shown in Appendix B

## C. PROPOSED CONSTRUCTION TIMETABLE

Prepare a timetable for the construction period which indicates the critical milestones for the project.

See attached Appendix: HATCHERY ALREADY CONSTRUCTED

## V. BROOD STOCK

### A. Initial Donor Stock

#### 1. Identification of source.

Indicate stream name, ADF&G number or geographic coordinates, and salmon species for each proposed donor stock.

a. Species: Chinook

Stream name: Chickamin River (from Whitman Lake Hatchery)

ADF&G number or geographic coordinates: 101-71-10040 (Chickamin River)

c. Species: Summer Chum

Stream name: Carroll River (from Burnett Inlet Hatchery)

ADF&G number or geographic coordinates: 101-45-10780 (Carroll River)

**2. Capture techniques and holding facilities at the donor stream.**

**a. Capture techniques**

Describe in detail the capture techniques you will use to harvest adults and take eggs. Please provide a map identifying the exact location of the holding facilities.

Harvest of adult chinook occurs at Whitman Lake Hatchery, Ketchikan, AK. Chum salmon adults will be harvested at Burnett Inlet Hatchery. Adults will be crowded in raceways, electro shocked (no electro shock for chinook), checked for ripeness, killed, and processed for artificial propagation.

**b. Holding facilities**

Describe the holding facilities to be used for donor stock spawners (include schematics). List the loading rate [kg fish/ (L/min)] and density (kg fish/$mg^3$).

Holding facilities are aluminum raceways and loading/densities are as Whitman Lake (chinook), or Burnett Inlet hatcheries (chum) SOP.

**3. Transportation**

Discuss method planned for transporting live fish and/or eggs

Eyed chum eggs would be transported by boat from Burnett Inlet Hatchery to Coffman Cove then driven to Port St. Nicholas hatchery. Eggs transported in an R-48 incubator at 1.5 million eggs per with damp burlap covering top of eggs. R-48 would be plumbed into water delivery system and eggs disinfected. Eyed chinook eggs are flown to Klawock by scheduled commuter aircraft in Action Packer boxes. Eggs are surrounded by damp burlap. Eggs are driven to Port St. Nicholas hatchery and seeded in incubators after disinfection.

**4. Spawning and fertilization**

Discuss the spawning, fertilization, and disinfection procedures and the procedure for estimating percent fertilization.

Chinook and chum spawned at 1:1 using standard modern procedures. Eggs rinsed, fertilized, and water hardened in 1:100 Argentyne for an hour. Fresh water turned on to incubators after an hour. 50 eggs cleared with Stockard's solution for fertilization estimation.

**B. Brood Stock Returning to Hatchery**

**1. Capture techniques and holding facilities at the hatchery**.

**a. Capture Techniques**

Describe in detail the techniques you will use to capture and ripen adults and take eggs.

**b. Holding facilities**

Describe the holding facilities to be used for hatchery brood stock spawners (include schematics) and give the loading rate [kg fish/ (L/min)] and density (kg fish/$mg^3$).

**2. Transportation**

Discuss method planned for transporting live fish and/or eggs (if different from those described in Part A).

**3. Spawning and fertilization**

Discuss the spawning and fertilization procedures (if different from those described in Part A).

## VI INCUBATION AND REARING PLAN

**A. Incubators and Rearing Units**

Describe the type of incubators and rearing facilities to be used.

Kitoi boxes for chinook (4) and chum (40). Chinook reared in 2-25' and 2-15' diameter round ponds.

Chum reared in 4-40'x40'x20' 1/8" mesh netpens.

**B. Egg Handling**

Describe the method by which you plan to handle the eggs from the spawning process through planting them in incubators.

1:1 spawning of males and females. Eggs will be fertilized, rinsed and placed in incubators with 1:100 Argentyne for one hour water hardening before fresh flowing water is turned on.

**C Chemical Treatment**

What chemicals and concentrations will be used for controlling fungus on eggs until the eyed stage?

15 minute formalin drip 3x/week per incubator @ 1:6000

**D. Enumerations**

Describe the method(s) to be used in estimating numbers of green eggs, eyed eggs, and fry.

Green eggs estimate based on historical average of 5,500 fecundity for chinook and 2,250 for chum. Eyed eggs are enumerated by weight after obtaining single egg weight. Fry estimates are based on egg loss on fry screen in incubator and wet weights.

**E. Rearing Plans**

Describe any plans to rear the salmon including type of food.

Chinook are reared to 15 grams in freshwater then transferred to saltwater netpens in late April for final rearing target size of 25 grams in late May. Chum reared in saltwater netpens starting in February to a target release size of 2.5 grams in late April. All considerations given to provide a clean and low stress environment to prevent any disease outbreaks. Fish fed a modern high protein, high quality diet.

**F. Disease Control**

Describe plans for preventing or controlling disease during rearing.

Nets and rearing containers are routinely cleaned to promote good water flow and clean rearing environment. Containers containing disinfectant are available for disinfection of equipment. Minimizing stress and good fish culture practices are implemented to avoid disease. Any suspected disease issue is confirmed with ADFG Pathology lab and a prescribed treatment is followed if necessary.

## VII RELEASE PLAN

### A. Release Site(s)

1. Give exact location and description of proposed release site(s), including maps.

Chinook: Port Saint Nicholas and Coffman Cove See appendix B (PSN) and L (Coffman Cove).

Chum: Port Asumcion, Baker Island off west coast of Prince of Wales Island. See appendix M

2. List proposed number and age of each species to be released at each site.

Chinook: Port Saint Nicholas – 100,000 smolts Coffman Cove – 40,000 smolts

Chum: 7,360,000 fry

### B. Transportation

Discuss the methods planned for transporting live fish from the hatchery to the release site(s).

Chum fry and chinook smolts are transported with a fish transport trailer which has three 600 gallon tanks. Fish are transported at 120kg/m per tank. Oxygen is provided by bottle through micro diffusers at a rate necessary to maintain a dissolved oxygen level of 12-14 ppm. Trip to Port Saint Nicholas is short, 10 minutes, and fish are not in tanker longer than an hour from start of loading to finish. Trip to Coffman Cove is 2.5 hours for chinook smolts.

Chum fry transported by boat to release sight. Fry contained in 1/8" mesh net in hold of boat. Oxygen provided by bottle through micro diffusers to maintain 12-14 PPM.

## VIII STAFFING

### A. Technical Advisors

Attach information about each technical advisor to the nonprofit corporation, indicating that person's name, address, role and responsibilities, and a brief statement of technical qualifications.

HATCHERY HAS BEEN CONSTRUCTED.

### B. Design and Construction

Attach a list of the names and qualifications of persons or corporations responsible for final design and construction of proposed facilities.

HATCHERY HAS BEEN CONSTRUCTED

## C. Administrative Personnel

List the administrative personnel who will support this facility when operational.

| Personnel Assigned (Titles) | Percentage of Time |
|---|---|
| 1. David Landis, General Manager | 10 |
| 2. Bret Hiatt, Operations Manager | 10 |
| 3. Bill Gass, Production Manager | 20 |

## D. Operating Personnel

List the operating personnel who will be assigned to this facility when operational.

| Personnel Assigned (Titles) | Percentage of Time |
|---|---|
| 1. Jeff Lundberg, Hatchery Manager | 10 |
| 2. Troy Liske, Assistant Hatchery Manager | 10 |
| 3. Rick Medlin, Maintenance Supervisor | 10 |
| 4. Paul Young, Fish Culturist | 10 |
| 5. Sheldon Sammons, Fish Culturist | 100 |
| 6. Casey Gagne, Seasonal Fish Technician | 5 |
| 7. Wiley Heppe, Seasonal Fish Technician | 5 |
| 8_____ | _____ |
| 9._____ | _____ |
| 10._____ | _____ |

## IX FINANCIAL PLAN

An estimate of hatchery construction and operating costs should be detailed here. These estimates would provide an indication of the cost recovery requirements of the proposed facility on an annual basis. Acceptance of this application by the Department of Fish and Game in no way implies agreement by the Department of Commerce and Economic Development to commit state loan funds for this project.

See Appendix N

## X. Basic Management Plan

The preparation of a draft Basic Management Plan will be completed prior to the public hearing. The applicant will be expected to work closely with ADF&G staff in developing the Basic Management Plan (see 5 AAC 40.820).

## XI DECLARATION AND SIGNATURE

I declare that the information given in this application is, to my knowledge, true, correct, and complete.

JEFFREY H. LUNDBERG
Name of Applicant

2/8/16
Date Signed

Jeffrey H. Lundberg
Signature of Applicant