

## **Courtenay & District Fish & Game Protective Association salmon hatchery project on Comox Lake.**

### **1. Background**

The Courtenay and District Fish and Game Protective Association (CVFGPA) has been involved in the conservation of Puntledge River fish stocks since the Association was started in 1937. We have operated a Coho hatchery program to enhance the runs in the Trent River since 1979 with our own production plans. The program relies on the CVFGPA's volunteers, with the help of DFO's Community Involvement Program, to collect brood stock in the middle reaches of the Trent River in October and to raise those eggs to the fry stage over the winter for release to the upper reaches of the Trent River, above the normal range of Coho. This program effectively doubles the rearing length of the river.

Thousands of volunteer hours have gone into the brood stock collection, egg taking, tending those eggs in the incubators, feeding the fry, clipping the fish and releasing the fish back to the upper Trent River. The result has been an increase of the Coho run into the Trent River from about 400 adults to about 1500. This has allowed a thriving fishery for Coho on the Trent delta and adjoining beaches. When fully operational the Trent River Coho program reared 50,000 fry/ year.

Over time the water supply system at this hatchery started to fail and the water quality became so bad that several of the rearing troughs had to be used for water treatment instead of fish rearing to keep the fish alive. The water was also too cold in some winters and the growth rate slowed so often the fry were too small to clip before release in June. Attempts to move the rearing activity to the CDFGPA's property at Comox Lake also proved unsuccessful because of high water temperatures and low dissolved oxygen. Without our own hatchery we have had to rely on Puntledge hatchery to provide space to hatch and rear our Coho to maintain this program. While this works for the short term we are dependent on the Puntledge hatchery having rearing space which in turn depends on their own production goals.

With the proposal for a new deep water drinking water intake from Comox Lake there is an opportunity to gain access to a dependable supply of cold water from 15 metres below the surface of the lake. The water quality will be much more reliable and the temperature will be relatively steady over the year. This will give us water that is warmer than shallow water during the winter and cooler during the summer, which will provide much better rearing condition for our fish. The pumphouse for the deep-water intake is to be sited on property previously owned by the CDFGPA. Negotiations for the sale of the property to the CVRD resulted in a deal for a 3000 l/min supply of untreated water to supply a proposed hatchery in exchange for the property required to build the new pump station. The value of the infrastructure and raw water provided to CDFGPA as part of this deal is approximately \$300,000, according to Russel Dyson, CVRD's CAO in a report to the CVRD Board on July 28, 2018.

A new hatchery on the CDFGPA property would not only provide an opportunity to restart the Trent Coho program but also to restart the Coho smolt production on the Puntledge River, which was suspended due to high river water temperatures through the summer. The plan would be to bring 50,000 Coho fry up to our hatchery in June and rear them over the summer warm period and return them to the Puntledge hatchery in October for eventual release. There would also be room to rear 50,000 Puntledge Summer Chinook to be released to Comox Lake and the Puntledge River. This is consistent with the DFO goal to imprint the Summer Chinook with Comox Lake water, which is their ancestral natal waters. DFO hopes this imprinting will draw the returning adult summer Chinook into Comox Lake where they can escape the high summertime temperatures in the Puntledge River. The

ultimate goal is to have these fish migrate higher up the watershed into the rivers flowing into Comox Lake such as the Upper Puntledge River and the Cruikshank River.

Summer Chinook have a unique life history where they migrate up to Comox Lake with the snow melt from May and July then hold in the colder water at depth in the lake all summer. They then drop back into the Lower Puntledge River or move into the Upper Puntledge River or the Cruikshank River in the fall to spawn. They live off their fat reserves all summer. Puntledge River summer run Chinook are one of only two summer runs on Vancouver Island. Once numbering about 3,000 fish, the summer Chinook population were likely affected by the original Comox Dam and declined following expansion of hydroelectric development in the early 1950s. By 1965 they numbered only a few hundred fish. Enhancement efforts (e.g., spawning channels, fishway, and fishing closures and restrictions) allowed the population to slowly recover to about 1,200 in the mid-1980s. A second, severe decline began in 1990. Escapements in the 1990s were typically in the low 100's, but stocks rebounded to the low 1000s since 2000. However there were only 400 adults returning to the Puntledge River in 2020. The population is supplemented by the Puntledge River Hatchery. The DFO has stated that recovery of summer Chinook will likely only be accomplished through a combination of restoration, fish culture and predator management. Puntledge River Summer Chinook is listed as "a stock of concern". (from Puntledge River Salmonid Action Plan, FWCP).

This is a once in a lifetime opportunity to gain access to a dependable cold-water supply for the hatchery. Access to this cold-water supply from the deeper reaches of Comox Lake has been sought for many years by DFO because the high summertime temperatures in the Puntledge River have compromised their summer Chinook and Coho production at the Lower Puntledge hatchery. The Puntledge hatchery Coho smolt program supports an in-river Coho fishery in the Puntledge River and provides fishing opportunity for the public with the resulting economic spin off to the community.

## **2. Hatchery Plan**

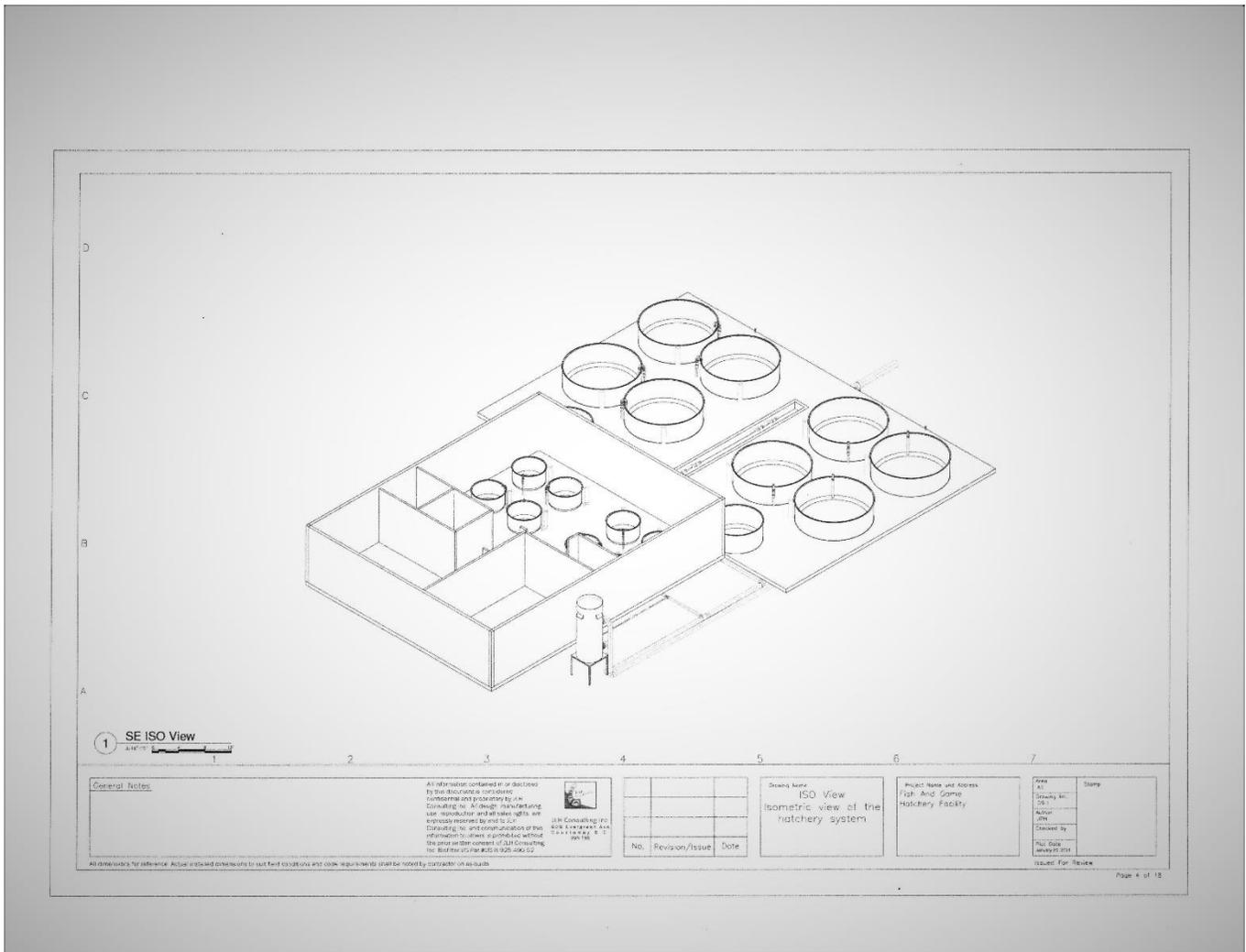
Once the agreement for sustainable cool water supply was agreed by the CVRD and CDFGPA, a hatchery design team comprised of several staff from the Puntledge Hatchery, DFO Community Advisors, JLH Consultants (an international hatchery design consultancy) and several volunteers from CDFGPA, including our hatchery manager and one member who has had many years of experience in hatchery construction. The hatchery design has gone through several iterations as equipment and tanks have been donated and for efficiencies in building the facility. During the hatchery design process a production schedule was proposed including annual targets of 50,000 summer Chinook raised from the egg stage to release as juvenile sub-yearling smolts into Comox Lake; 50,000 Puntledge River Coho reared over the summer and returned to the Puntledge Hatchery for release in the spring; and 50,000 Trent River Coho, the main fish population which CDFGPA has enhanced since 1979. These fed fry will be released back to the Trent River in the spring above the falls to increase the productivity of the Trent River.

The pump station will have a back-up diesel powered electrical generator to protect against power loss at the pumps. There will also be a reserve capacity of approximately 85,000 US gallons of water in the pipeline from the pump station to the height of land approximately 0.5 km from the hatchery site which will be available for fish culture during any short power outages.

We have had all the tanks donated; three 5 foot tanks from BC Hydro, five 5 foot tanks from DFO Rosewall Hatchery and eight 12 foot tanks from Mowi from the decommissioning of their hatchery near Rosewall Creek. We have two 8 foot tanks at our decommissioned hatchery near the campsite entrance.

When we put out a call for hatchery designers John Holder and his son John Holder Junior came forward to offer their services. After graduating from the University of Guelph in 1973, John worked and consulted for aquaculture companies on six continents. John also worked for DFO before starting his consultancy. John Jr. has expertise in CAD programs and produces all the drawings. A hatchery design team was struck with representatives from Puntledge Hatchery, DFO Community Advisors and CDFGPA volunteers to work with John and John Jr. on the design.

Below is an isometric drawing of the hatchery showing the general layout. The building will have 10 foot high walls with a trussed roof and will contain a large classroom/display area, a small office, a washroom and a large storage area in the front and the hatching and fry rearing area with eight 5 foot tanks and two stacks of Heath trays. The outside tank yard will be fenced and contain eight 12 foot tanks and two 8 foot tanks for rearing Coho and Summer Chinook smolts. The aeration tower is sits beside the building and will treat incoming water to assure a healthy oxygen content for the fish.



We have received two grants from the Pacific Salmon Foundation for the hatchery, one for \$18,012 in 2020 and one for \$63,721 in 2021. We have a pending application for \$86,030 with the Fish and Wildlife Compensation Program of BC Hydro. We have received a \$26,250 contribution from Upland Contracting, \$10,000 from an anonymous donor and \$250 from a past member of the Conservation Committee. We have also had several in kind donations for work and supplies including, \$2800 from McElhanney for Geotech work, \$2000 from Andrew Sheret for plumbing supplies in 2020 and \$4820 for a discount on the water supply pipe in 2019. Aecon, the CVRD contractor has cleared and grubbed the hatchery site in exchange for using it as a temporary laydown site which is an approximate \$10,000 value. The Board also transferred \$90,000 from the hatchery reserve fund to the capital budget for this project in this year's budget.

### **3. Progress of the Project**

The hatchery construction will be completed during 2021 with a phased production of the Trent River Coho in the fall of 2021 when the pumping from the new intake begins. The Puntledge Coho and Summer Chinook production would be phased in in June of 2022 as the Puntledge River's temperature increases and additional experience is gained with operations at the new hatchery.

The proposed timeline is as follows:

#### **Phase 1:** Jan 2017 to Nov 2018 - Water for land negotiations

Negotiation of a water supply agreement in conjunction with the land sale agreement for the deep-water pumps station. Negotiations started in January 2017 and the land sale agreement was signed on Nov 5, 2018 agreeing to supply 3000 l/min of cool water for 20 years from the CVRD's new drinking water intake in exchange for the land and easements they need to construct their facility. The CVRD estimates the cost of supplying the water at \$300,000 (Dyson 2018).

#### **Phase 2:** Dec 2017 - to date - Detailed hatchery design and costing

The detailed design has been through several iterations and latest is revision 13. The design of the hatchery includes an office, a display/classroom area, a washroom, an incubation room and rearing tanks. An aeration tower will provide pre-treatment of the water. The hatchery building will need to allow operations through the winter with enough room to allow the clipping operations in the building.

These designs were used to support funding applications. The designs and the applications make clear the financial commitment from the CDFGPA for the hatchery project.

#### **Phase 3:** September 2019 to May 2021 - Site preparation and supply marshalling

Aecon, the contractor for the CVRD, cleared and graded the site for a pipe storage area. Aecon's most recent work plan is to have the major work completed by the end of April 2021 when we can start our work.

We have pre-purchased the pipe for the water supply line in 2019 with available funds. We have pre-purchased selected durable hatchery supplies with the first PSF grant in 2020. We have cut most of our lumber from the trees taken from the hatchery site and stockpiled some drain rock which became available during the construction of the raw water pump station and pipeline.

CDFGPA will install the waterline to the hatchery. The hatchery water supply will also supply a fire booster pump which CVRD is installing to provide CDFGPA with fire fighting capabilities.

Power service will be installed by BC Hydro in conjunction with Aecon's servicing of the pumpstation.

A lot line adjustment, required to allow construction of the hatchery, was initiated June 2019 and it was finally registered on Jan 29, 2021. Now that the lot line change is registered, we have applied for a Development Permit on February 17, 2021 to allow hatchery construction. We have had consultants undertake a biophysical assessment, a riparian area assessment, a riparian area tree assessment, a geophysical assessment of the hatchery site and a stormwater management plan in support of this application. CDFGPA has applied for a Water Licence that is ready to issue now that the lot line is adjusted.

We will finalize the building plans to be ready to apply for a Building Permit as soon as the grant results are known.

#### **Phase 4:** April 2021 to May 2022 - Hatchery construction

The hatchery construction schedule would see us working on the hatchery supply line installation in May 2021. This would also include installing the first part of the fire suppression system to the Geritol Heights area and the domestic water supply for the washroom in the hatchery building.

We are planning on doing the groundwork of leveling the site in May/June 2021. This will allow us to have BC Hydro our electrical pole and transformer from which we can supply a temporary electrical service to the site for construction.

Once our Development Permit is issued, we will proceed with the logging of the remainder of the site included in the riparian assessment area and removing some danger trees from the east side of the site.

Once our Building Permit is issued, we would proceed with the construction, installing the footings and foundation walls and the mechanical piping, building the hatchery building and tank yard.

We hope to complete the construction of the hatchery building and the tank farm by the end of 2021.

#### **4. Conclusion**

When completed the hatchery will be a show piece for our Association and its conservation programming. A new hatchery on the CDFGPA property, supplied with water from the deeper levels of Comox Lake, would provide an opportunity to restart the Coho smolt production on the Puntledge River and to rear summer Chinook from egg to smolt stage in their traditional waters increasing the potential for them to imprint on the Comox Lake waters and return to these waters for spawning.

CDFGPA has worked with the Puntledge River Restoration Committee to highlight the importance of restoring the health and productivity of the Puntledge River watershed and maintaining viable fish stocks to support recreational and commercial fishing. We will highlight the importance of the Puntledge River fish and wildlife resource as well as its importance in providing drinking water, hydro power and recreational activities. Recovery of the summer Chinook populations are a priority for DFO and one that is supported by the community. The fish stocks on the Puntledge River are an important economic driver in the Comox Valley for both the commercial and sports fishing industries.

Implementation of this project, as a component of an integrated strategy towards the recovery of the Puntledge summer Chinook, will increase the potential hatchery production of this stock and improve the chances of their imprinting on Comox Lake water thereby increasing their viability.

CDFGPA has a membership of over 2300 in 2020 and the new hatchery has long been anticipated by the Association. The CDFGPA was established in 1937 with the purposes of restoring fish and wildlife populations and their habitat and supporting scientifically sound conservation. In our 83 years of operation we have successfully completed many fish and wildlife projects throughout our local area and the rest of northern Vancouver Island.