



Lead Stewardship Coordinator Performing Kluane Chum Dissection to Classroom

**Salmon Stewardship Coordinators for Yukon Schools  
August 2014- July 2015**

**Final Report R&E Project CRE 02-14  
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## Table of Contents

Table of Contents.....	2
Abstract.....	3
Introduction .....	4
Methods.....	4
Results and Discussion .....	5
Conclusions and Recommendations.....	13

## Abstract

This report is on the final and third year of the Yukon Salmon Stewardship Coordinator project to deliver the DFO Stream to Sea program to Yukon Communities and increase capacity so that individuals have the capacity to provide the program independent of significant DFO support. In 2014, a single individual was contracted to coordinate the overall implementation of the Salmon Stewardship initiative in Yukon Schools. This lead steward position sought capable stewards in communities to conduct supervisory and educational activities in their local communities. Services were provided to Yukon schools assisting teachers with the delivery of DFO's Stream to Sea program over the 2014-15 school year, and to build community capacity for delivery of the program in subsequent years. This is the final of 3 years that this effort was undertaken to provide education to students and teachers about the program and foster capacity in communities to deliver an effective educational program to their students about salmon, salmon life history and fish habitat. The lead Steward coordinated work with another steward to engage 17 teachers at 16 schools and 1 learning center in 10 Yukon communities. The stewards engaged approximately 400 students, 17 teachers, and 20 other community members engaged in salmon-related educational activities. SSCs worked with Fisheries and Oceans Canada (DFO) and partners that included Whitehorse Rapids Hatchery, McIntyre Salmon Incubation Facility, Blind Creek weir project and Ta'an Kwachan Fox Creek Project to provide salmon eggs, education services and aquatic studies field trip opportunities.

Stewards worked to increase their own capacity and capacity within the schools to deliver the Stream to Sea program. They also sought community support from outside of the schools, and longer term commitment to support the program. Stewards worked primarily with biologists from other agencies, First Nation language teachers, local environmental non-profit groups and other salmon incubation projects to foster partnerships that will strengthen the community capacity. DFO provided assistance as necessary to complete the project in the form of technical assistance and equipment support from existing supplies. With the assistance of the Yukon River Panel, this project has successfully provided the Stream to Sea program to students of Yukon communities for 3 years and has increased the capacities of involved individuals including teachers, local volunteers and local contractors. Some schools and communities were able to develop more capacity than others due to familiarity with the program and or the equipment used. Over the past 3 years the project has increased the capacity of the teachers involved and many are much more informed on how to manage program delivery and the egg incubator aquariums in the classrooms.

## Introduction

In the 2014/15 school year this project engaged a central Salmon Stewardship Coordinator to pursue local community stewards and teachers to assist with the delivery of DFO's Stream to Sea program in Yukon Schools. The program provided educational resources to teach students from Kindergarten to Grade 12 about salmon and their habitats. The Salmon Stewardship Coordinators provided technical support to help teachers with related fisheries education activities, including salmon incubation equipment set-up and operation, coordination of classroom activities, delivery of presentations, and facilitation of field trips to study aquatic habitat and release salmon fry; they focussed on the value of the local resource. Over the duration of the project, the lead steward was also responsible for building support within each community, including within the school, to allow the continuation of the Stream to Sea program at the local level where feasible. The stewards were successful in implementing the projects with increased local capacity and educated others to enhance additional local support and understanding of the program.

The focus on local salmon resources helped students to develop an understanding of salmon and local aquatic habitat, and to develop a stewardship ethic which they will be able to integrate into their decision making in future careers and recreational pursuits. Parents of students and people in the broader community were also reached indirectly through communication of students with other family and community members and directly through involvement in field trip support. These informed citizens who value the resource are better able to make decisions that contribute to ensuring the long term sustainability of Yukon River salmon.

## Methods

### Contract Preparation

DFO (SEP personnel) contacted prospective individuals or organizations through a Request for Proposals advertisement according to Contracting process requirements. Applicants were then screened against cost and experience criteria and the contract was awarded to provide support for the Stream to Sea program in Yukon Schools for the second year of the project. The contract was able to encompass both fiscal years in accordance with support to schools throughout the school year period.

### Salmon Incubation Preparation- Egg Collection

Eggs for classroom incubation were collected in accordance with DFO transplant permits and collection licenses. Activities were conducted by the contractor and Whitehorse Rapids Fish Hatchery in collaboration with community partners, when run timing permitted. Stewards provided newly fertilized chum eggs to some schools, while Chinook eggs and additional chum eggs were incubated by DFO and community partners until stewards delivered them to schools at the eyed stage during the school year in October. Note Chinook egg collections occur primarily in August prior to the school season so eggs were incubated to the eyed stage at McIntyre Incubation Facility and Whitehorse Rapids Fish Hatchery to be delivered to the schools.

### Salmon Incubation Preparation- Incubator setup

Stewards contacted schools in their respective areas to inform them of the availability of the program and resources and to identify which teachers were interested in Stream to Sea activities, including incubation. Stewards worked with teachers who were interested in incubation to ensure that their

schools' had properly functioning incubation equipment, and then facilitated the delivery of salmon eggs to the classes.

### Education Program

Throughout the remainder of the school year, Stewards assisted teachers with incubator operation and maintenance, with delivery of Stream to Sea program classroom activities and presentations, and with facilitation of aquatic studies field trips.

### Capacity Building

Stewards were asked to seek community support for the Stream to Sea program, and to record the contacts they had made and the commitments they had secured that could enhance the capacity of the community to continue the program in the absence of Yukon River Panel funding and extensive agency or contractor support.

## Results and Discussion



Students from Kluane Lake School fertilizing eggs with milt obtained from chum salmon in the Kluane River on October 16, 2014.

### Contract Preparation

DFO prepared a contract with the successful applicant to the RFP by August 2014. The lead steward then established a contract with a Dawson City resident capable of delivering the program locally and assisting with program implementation in the northern communities including Dawson City, Mayo, Pelly Crossing and Carmacks. The lead steward took on responsibility for maintaining and delivering the program in the Whitehorse area schools, Ross River, Teslin, Haines Junction, Destruction Bay, Beaver Creek and Carcross.

### Salmon Incubation Preparation- Egg Collection

Approximately 500 Chinook salmon eggs were collected at Mayo River on August 13<sup>th</sup>.

Whitehorse Rapids Hatchery staff collected Chinook eggs from the Whitehorse Rapids Fishway in August 2014; eggs were taken primarily for the annual hatchery incubation program but included a portion allocated for use in Whitehorse area schools. These were incubated at Whitehorse Rapids Hatchery until the eyed stage for safe subsequent transfer to schools.

On October 16, 2014, the lead steward collected Chum eggs from the Kluane River. A portion of these eggs were delivered directly to Haines Junction, Destruction Bay and Beaver Creek schools, where they were fertilized and incubated, while a few were taken to McIntyre to be incubated to the eyed stage prior to delivery to schools.

Salmon Incubation Preparation- Incubator setup.

The Lead Steward notified schools of the availability of the program and the resources, and then worked with teachers between November 2014 and December 2014 to prepare for salmon incubation in 16 schools, as listed in Table 1.

**Table I. Salmon Stewardship Coordinators and Interested Schools.**

<b>Steward Contract Area</b>	<b>Steward (Lead/Support role)</b>	<b>Participating Schools 2014/15</b>
Carcross	Teacher Blewitt/Carcross Tagish First Nation/ Can-nic-a-nick Environmental Services	Ghùch Tlâ Community School
Carmacks & Pelly Area	Sebastian Jones/ Teachers	Eliza van Bibber School
Dawson City	Sebastian Jones/ Teachers	Robert Service School
Rural Schools: North Alaska Highway	Teachers Prestone, Wagner and Blair/Can-nic-a-nick Environmental Services	Kluane Lake School St. Elias School
Rural Schools: Ross River & Faro Area	Fran Etzel /Can-nic-a-nick Environmental Services	Ross River School
Mayo	Sebastian Jones/Teachers	JV Clark School
Teslin	Teacher Cunningham/Teslin Tlingit Council/ Can-nic-a-nick Environmental Services	Teslin School
Whitehorse Area	Numerous Teachers/Can-nic-a-nick Environmental Services	Golden Horn Elementary Ecole Emilie Tremblay Elijah Smith Elementary School Jack Hulland Elementary School Porter Creek High School

		Selkirk Elementary School
		Whitehorse Elementary School
		Dusk'a Learning Center

Stewards helped teachers to set up incubation systems, check functioning of incubators; they repaired or replaced components where necessary. Some coordinators became proficient with maintenance and were able to receive parts by mail and apply them to maintain operations without direct assistance. DFO provided its remaining inventory of replacement parts to the lead Steward; Stewards purchased parts if spare parts were not available. The Lead Steward expedited the repair or replacement of chillers.

### Education Program

In some schools, much of the Steward project time was spent assisting teachers with incubation system monitoring and maintenance, and expediting supply and equipment replacement and repairs. In others maintenance was completed increasingly by teachers or locals that had become familiar with the aquarium and chiller operations. Stewards assisted Yukon teachers with educational activities throughout the school year, including lessons about salmon species, life cycles, habitat, fisheries, stock assessment, management, cultural importance, traditional harvesting and processing, anatomy, and careers in fisheries. The approach taken by each steward varied with the community, the topic, and the age of the students; Stewards worked with classes from Grade 1 to Grade 12. Steward approaches included presentations, facilitated discussions, art projects, and facilitating exercises from various curricula. Stewards encouraged teachers to use the available online educational resources and to find specific local information on Yukon River Panel websites. Websites with these resources are listed in Table II: Steward Learning Resources and Websites. "I am Salmon", a Tlingit culture resource, was used in the Carcross school. DFO provided salmon life cycle posters and maps showing adult Chinook habitat utilization in Yukon for Stewards to distribute to schools. DFO also provided Stewards with salmon for dissection demonstrations.

At the end of the school year, Stewards worked with teachers to organize field trips to local aquatic habitats. Classes in Ross River, Dawson, Mayo, Carmacks, Pelly, Haines Junction, Destruction Bay and Beaver Creek released fry back into local natal streams. Some classes in Whitehorse returned their fry to the McIntyre incubation facility, for later release at Fox Creek, and carried out aquatic studies in the adjacent McIntyre Creek drainage. Other classes conducted the same at Wolf Creek where the eggs were originally destined for from WRFH. All classes had an interpretive onsite salmon habitat presentation provided upon release of their classroom incubated salmon to characterize local habitats and the importance for salmon.

**Table II. Steward Learning Resources and Websites.**

<b>Learning Resource</b>	<b>Website</b>
Fisheries and Oceans Canada. Salmonids in the Classroom Primary.	<a href="http://www.pac.dfo-mpo.gc.ca/education/documents/sicprimary-secprimaire/english/sic_primary_all.pdf">http://www.pac.dfo-mpo.gc.ca/education/documents/sicprimary-secprimaire/english/sic_primary_all.pdf</a>
Fisheries and Oceans Canada. Salmonids in the Classroom Primary.	<a href="http://www.pac.dfo-mpo.gc.ca/education/documents/sicinter-secinter/sic_intermediate.pdf">http://www.pac.dfo-mpo.gc.ca/education/documents/sicinter-secinter/sic_intermediate.pdf</a>
Other Stream to Sea online Intermediate resources links	<a href="http://www.pac.dfo-mpo.gc.ca/education/intermediate-intermediaire/index-eng.html">http://www.pac.dfo-mpo.gc.ca/education/intermediate-intermediaire/index-eng.html</a>
Other Stream to Sea online Primary	<a href="http://www.pac.dfo-mpo.gc.ca/education/primary-">http://www.pac.dfo-mpo.gc.ca/education/primary-</a>

resources links	<a href="http://primaire/index-eng.html">primaire/index-eng.html</a>
Yukon River Panel Joint Technical Committee Reports	<a href="http://yukonriverpanel.com/salmon/publications/joint-technical-committee-reports/">http://yukonriverpanel.com/salmon/publications/joint-technical-committee-reports/</a>
Yukon River Panel Restoration and Enhancement Fund Reports	<a href="http://yukonriverpanel.com/salmon/restoration-enhancement/re-fund-reports/">http://yukonriverpanel.com/salmon/restoration-enhancement/re-fund-reports/</a>
Pacific Streamkeepers Federation website and The Streamkeepers Handbook and Modules	<a href="http://www.pskf.ca/publications/handbook.html">http://www.pskf.ca/publications/handbook.html</a>

The involvement of the Stewards with Stream to Sea program activities are summarized by community in Table III.

**Table III. Salmon Stewardship Coordinator School Activities and Participation.**

<b>Classes</b>	<b>Activities</b>	<b>Number of Students/community members</b>	<b>Salmon Raised</b>
<b>Carcross</b> Ghùch Tlà Community School: Grade 2/3 class Grade 5/6 class	Classroom incubation- Tank maintenance and trouble shooting  Workshops using Tlingit First Nation teaching material, on salmon life cycles and habitat (watersheds), particularly the Yukon River  Class games and activities related to life cycles and habitat.	10 students 1 teacher Guest elders	Whitehorse Rapids chinook eggs November to June
<b>Dawson</b> Robert Service School: Grade 6 (Dewell, Owen)	Classroom incubation- Tank maintenance and trouble shooting Life cycle board game Fry requirements and care Salmon habitat requirements Salmon management Field trip to release fry	20 Students (est) 2 teachers	Mayo River Chinook November to June
<b>Carmacks/Pelly</b> Tantalus School: Grade 3-4 (Einnish) Grade 1-2 (Buyk) Assistant (Wheeler)	Classroom incubation- Tank maintenance and trouble shooting Salmon art contest Lesson: Life Cycle, habitat needs Lesson: Yukon watershed and migration Discussion lesson: clean water & pollutants Aquatic invertebrates as indicators of aquatic health. Fry release and stream study with SSC assistance.	3 students (est) 2 teachers ~ 4 community adult chaperones	Mayo River Chinook November to June
<b>Carmacks/Pelly</b>	Classroom incubation- Tank maintenance and trouble shooting	20 students (est) 3 teachers	Mayo River Chinook



Eliza van Bibber School: Grade 5-6 (Mott, Ward) Grade 9 (Mott, Bryant) Senior class (Vogel)	Life cycle requirements Migration and watershed. Dissection (by teacher) Fry release and stream study with SSC assistance.	~2 community adult chaperones	November to June
<b>Whitehorse</b>  Whitehorse Elementary: Grade 5 (Levesque)	Classroom incubation- Tank maintenance and trouble shooting Incubation and life cycle presentation Dissection Fry release and stream study	30 students 1 teacher	Whitehorse Rapids Chinook November to June
<b>Whitehorse</b>  Ecole Emilie Tremblay: Grade 3 (Roy)	Classroom incubation- Tank maintenance and trouble shooting Incubation and life cycle presentation Dissection Fry release and stream study	30 students 1 teacher	Whitehorse Rapids Chinook November to June
<b>Whitehorse</b>  Golden Horn: Grade 5 (Nyman)	Classroom incubation- Tank maintenance and trouble shooting Incubation and life cycle presentation Dissection and slide presentation Fry release and stream study	15 students 1 teacher	Whitehorse Rapids Chinook November to June
<b>Whitehorse</b>  Porter Creek High School: Grades 10 & 11 (Comeau)	Classroom incubation- Tank maintenance and trouble shooting Incubation and life cycle presentation	20 students (est) 1 teacher	Whitehorse Rapids Chinook November to June
<b>Whitehorse</b>  Elijah Smith School: Grade 7 (Bradford)	Classroom incubation- Tank maintenance and trouble shooting Incubation and life cycle presentation Slide Presentation dissection Fry release and stream study	30 students 1 teacher	Whitehorse Rapids Chinook November to June
<b>Whitehorse</b>  Selkirk School: Grade 6/7 (Morham)	Classroom incubation- Tank maintenance and trouble shooting Incubation and life cycle presentation Fry Release and Aquatic Studies Field Trip:	22-30 students	Whitehorse Rapids Chinook November to June
<b>Whitehorse</b>  Jack Hulland School: Grade 4 (Moore)	Classroom incubation- Tank maintenance and trouble shooting Incubation and life cycle presentation Presentation Dissection	25 students 1 teacher 1 volunteer	Whitehorse Rapids Chinook November to June

	Fry release and stream study		
<b>Mayo or Dawson (release only)</b> JV Clark School Grade 11 Sustainable Resources (Erickson) Grade 9-10 (Erickson) Grade 4-6 (Christie)	Classroom incubation- Tank maintenance and trouble shooting Salmon Life Cycles Salmon habitat Fisheries mgmt. and legislation Environmental impact of fishing Presentation on legislation, careers, species of salmon and other fish in rivers in YK, AK (Yukon River) Presentation on importance of salmon to FN culture, methods of catching fish, methods of preparing (canning, smoking, etc.) Population Estimation techniques Sustainability in Mayo area Dissection, Fry Release	30 students 2 teachers 1 Environmental Assessment officer 3 NND elders	Mayo River Chinook November to June
<b>Whitehorse</b> St. Elias School Grades 8 to 11 (Preto)	Classroom incubation- Tank maintenance and trouble shooting Presentation/slides life Yukon salmon life cycles and habitat Dissection	30 students 1 teacher	Kluane chum eggs October to June
<b>Rural Schools</b> Kluane Lake School Grades K-8 (Blair-Smith, Prestone)	Classroom incubation- Tank maintenance and trouble shooting Presentation life cycles Fry release and Aquatic studies Kluane River:	14 students 2 teachers 4 community volunteers	Kluane chum eggs October to June
<b>Rural Schools</b> Ross River School Grade 3-4 (Etzel)	Classroom incubation- Tank maintenance and trouble shooting Class presentation life cycles Fry Release and Aquatic studies	15 students 1 teacher 1 teacher's assistant 2 volunteers 3 weir crew	Mayo Creek Chinook November to June
<b>Teslin</b> Teslin School Grade 7-9 (Postoloski) Tlingit (Jules)	Classroom incubation- Tank maintenance and trouble shooting Life cycles Salmon species Teslin Chinook and Yukon watershed Meeting regarding Tlingit language curriculum and salmon	25 (est.) students 3 teachers	Whitehorse Rapids Chinook November to June

The school projects engaged approximately 400 students, 18 teachers, and 20 other community members and the estimated 10 community partners involved from Whitehorse Rapids Hatchery, McIntyre Salmon Incubation Facility and Ta'an Kwachan Fox Creek Project. Between 50 and 100 eggs were provided to each class. Most classes had good success with incubation; some fry mortality was

attributed to a faulty chiller which unfortunately resulted in the Chum in Haines Junction being lost The percentage of Yukon Schools that worked with the SSCs is shown in Table III.

**Table III. Summary of Schools Engaged with Salmon Stewardship Coordinators in 2014-2015.**

<b>Community</b>	<b>Schools that worked with SSCs in 2014-2015</b>	<b>Number of Schools in the Community</b>	<b>Percentage of schools that worked with SSC</b>
Whitehorse (Elementary Schools)	8	11	73%
Whitehorse (High Schools)	0	4	0%
Dawson	1	1	100%
Mayo	1	1	100%
Pelly Crossing	1	1	100%
Faro	0	1	0%
Carmacks	1	1	100%
Carcross	1	1	100%
Destruction Bay	1	1	100%
Teslin	1	1	100%
Haines Junction	1	1	100%
Old Crow	0	1	0%
Ross River	1	1	100%
Beaver Creek	1	1	0%
Watson Lake (High School)	0	1	0%
Watson Lake (Elementary School)	0	1	0%
<b>Total</b>	<b>16</b>	<b>29</b>	<b>55%</b>

### Capacity Building

Stewards focussed much of their efforts on conducting the Stream to Sea program in Yukon Schools, and on developing contacts in the schools. They also continued the process of seeking longer term commitment and support for the program. Stewards worked primarily with teachers, but also with biologists from other agencies, First Nation language teachers, environmental non-profit groups and other salmon incubation projects to foster partnerships that will strengthen the community capacity. The contacts they made are summarized in Table IV.

**Table IV. Community Contacts and Committed Support for Stream to Sea Program.**

<b>Community</b>	<b>Contact Organizations, Names and Commitments of Support</b>
<b>Carcross SSC</b>	<b>Carcross Tagish First Nation: Ms. Blewett</b> provided coordination support to the program, and would like to see the program continue.
<b>Dawson</b>	<b>Robert Service School: Helen Dewell, teacher Gr.6</b> Will use available resources (Salmon in Classroom, Streamkeepers) to teach curriculum,

	<p>is committed to working with steward to deliver curriculum</p> <p>Will partner with SSC to ensure tank is on temperature, is clean, that the students monitor tank conditions and will ensure equipment is stored suitably during off season.</p>
<b>Carmacks/Pelly</b>	<b>Tantalus School: Ruth Blackjack Grade 1-2 Teacher and Donna Einnish Grade 3-4 Teacher</b> discussed program takeover in following years.
<b>Carmacks/Pelly</b>	<b>Eliza van Bibber School: Jess Ward Grad 5-6 Teacher</b> discussed program takeover in following years. The school still requires technical support for the incubation system set-up and maintenance, and with field studies.
<b>Whitehorse</b>	<p><b>Whitehorse area schools</b> provided transportation funding for field trips</p> <p><b>Whitehorse area teachers</b> discussed potentially taking on more responsibilities for incubation system maintenance and instruction in upcoming years. Some experienced teachers undertook more responsibilities.</p> <p><b>Whitehorse Rapids Hatchery:</b> Lawrence Vano, Hatchery Manager supports the Stream to Sea program and will strive to provide eggs for classroom incubation to the project when they are required. Whitehorse Rapids hatchery provided salmon food to the Whitehorse SSC for distribution to the schools.</p> <p><b>Yukon Research Centre of Yukon College: Darrell Otto, McIntyre Facility Manager</b> provides the use of the McIntyre incubation facility for incubation of salmon to the eyed stage. The Yukon Research Centre also permitted the SSCs to use the McIntyre facility for Stream to Sea program field trips and tours.</p>
<b>Mayo or Dawson</b>	<p><b>The Community Education Liaison Coordinator</b> worked with the SSC to arrange to have elders from the First Nation speak to the classes about salmon and stewardship; this partnership may be pursued again in the future.</p> <p>.</p> <p><b>JV Clark School: Laura Erickson (Grade 9-11 teacher) and David Christie (Grade 4-6 teacher)</b> had previous experience with classroom incubation and salmon curricula and are interested in providing future classes, particularly incubating local salmon.</p>
<b>Rural Schools Klwane Area</b>	<p><b>Kluane Lake School: Roxienne Prestone and Rose Mary Blair Smith (Grade K-8 teachers)</b> have many years of experience with classroom incubation and are interested in working with community members to collect broodstock and take eggs. The school has developed the capacity to operate the incubation system part of the program with little support.</p> <p>First Nation Language instruction was also linked to the salmon studies, and this will likely continue in future years.</p> <p><b>Kluane First Nation: Geraldine Pope</b> supports the program and allows renewable resource management personnel to participate in egg collection when scheduling permits.</p> <p><b>St. Elias School: Andy Preto (Grades 8 to 11 teacher)</b> has previous experience with the Stream to Sea program and is interested in future classroom incubation.</p>
<b>Rural Schools Ross River</b>	<b>Ross River School: Fran Etzel (Grade 3-4)</b> has previous experience with the Stream to Sea program and is interested in future classroom incubation.
<b>Teslin</b>	<b>Teslin Tlingit Council: Ms. Cunningham</b> provided support to the program, <b>TTC Renewable Resources technicians</b> provided support to program; TTC do not have staff available to commit to the program but are open to further involvement.
<b>Old Crow</b>	<b>Vuntut Gwichin First Nation: William Josie, Fish and Wildlife Coordinator</b> supports the program and would like to have the school involved with incubation of local salmon in the future.

## Conclusions and Recommendations

The Salmon Stewardship Coordinators provided the necessary support to conduct the Stream to Sea program in Yukon Schools. Hundreds of students at sixteen schools in ten Yukon communities benefitted from the project. The dozens of teachers and community members engaged with the project also learned about the Stream to Sea program and about Yukon salmon and habitat as a result of their involvement.

### Contract Preparation and Incubation Preparation

Contracting was achieved with greater efficiency by being able to engage the same successful contractor as the previous year and limit the significant workload in advertising and awarding contracts. This was possible due to the lone application to conduct the work that was received in the original RFP. This is unfortunate but is likely due to the limited value of the contract, attempting to achieve the program with limited expense.

Steward Services were delivered out of Whitehorse for the Whitehorse, North Alaska Highway, Carcross and Teslin areas, due to lack of availability of local qualified contractors however also due to some of these schools being self-sufficient, only requiring occasional assistance. Steward services were performed in the northern portion of Yukon communities by a Dawson resident. These included Dawson City, Carmacks, Mayo, and Pelly Crossing schools.

### Education Program

The Stream to Sea program was well-received in Yukon Schools. The program delivery strategies of the stewards varied necessarily with the interests of the schools and communities and with the ages of the students. The expertise of the two stewards was very helpful as one is a professional biologist and the other a commercial fisherman and involved local citizen, both being able to provide significant knowledge to the program. It is planned that their involvement in the program will increase the capacity of those they work with further to additionally assist the program's support complement.

Field trips were a highlight of most class programs. Coordination of the program under the lead steward has made the acquisition and sharing of field equipment more effective, ensuring all field trips are adequately equipped.

Whitehorse Rapids Fish Hatchery provided eggs for Whitehorse area, Carcross and Teslin schools. The Kluane River was used to source chum eggs for the school programs in Beaver Creek, Destruction Bay and Haines Junction. Chinook eggs were sourced from the Mayo River for schools in Carmacks, Dawson City, Mayo and Pelly Crossing.

### Capacity Building

The goal of this 3 year project was to build the capacity of local teachers, volunteers and contractors to be able to implement the Stream to Sea program independent of significant agency and consultant

assistance and seek support within each community and school to continue the educational program in the Yukon Territory for the benefit of the students and the general public.

In the final year of the project the SSC coordinator encouraged each school to assume more responsibility for the maintenance of the aquariums to become more familiar with the operation of the equipment and additionally reduce costs of the remotely supported project. For most schools only two visits were generally made during the school year. This was an improvement over the initial year of the project where some schools required numerous visits in excess of three to provide support to the program. Other visits were associated with replacing chillers or problem solving with the mechanical aspects of the aquariums. Most of the schools had previously participated in the program and were very comfortable with the opportunity to take on more responsibility. However, a few schools had little previous experience and required more visitations by SSC coordinators. Based on recent familiarity with the program delivery all schools funded their own transportation costs associated with the field trips providing independent organisation of the students travel for the interpretive field aspects of the program. Additionally helping the program to become more resourceful, the Whitehorse Rapids Fish Hatchery donated fish feed in addition to fertilized eggs for the Whitehorse area program including the nearby Carcross and Teslin schools.

A portion of the schools are quite self-sufficient. Schools in the North Alaska highway area, Whitehorse and Ross River are able to support most of their own maintenance activities and provide instructive support to nearby schools. However, they still highly value the classroom presentations and field interpretations provided in person by the contracted biologist, Canicanick Environmental and the northern Steward, Sebastian Jones. Teachers have appreciated having stewards present for dissections and presentations in many cases due to their experience and direct knowledge of fish and fish habitat. In large part though the schools have relied on technical and program delivery assistance from the stewards in variable amounts as each school has different levels of capacity and in the case of chiller and aquarium operation, access to maintenance supplies and expertise.

Typical requests for assistance of the stewards from teachers included technical issues with the chiller systems and associated aquarium water quality and filter maintenance. This “mechanical” aspect of the program requires experience to address what the problem is and it is otherwise difficult to provide sufficient guidance in advance or remotely to diagnose and address all problems likely to occur. Solutions that can enable local efforts to address these problems and limit the requirement for onsite visits by steward’s are being explored and key frequent problems identified. An increased effort to endorse the Stream to Sea publications has also improved the presentation aspect of reliance and lead to teachers being more confident in delivering the program. Additionally the project should also further enquire within communities to determine if there are other fishers or experienced individuals that may be able to fill that role at a community level to further local capacity and further pull back from regional delivery of the program.

### Closing Remarks

Various improvements have been made in the three years of this project to increase local capacity and ease of program delivery. Some schools have developed basic skills where there was not a familiarity with the program previously while others have increased their knowledge of aspects of the program allowing them to contribute to the delivery of the program to their students more than previously. The Whitehorse Rapids Fish Hatchery has provided eggs to Whitehorse area classroom incubations greatly decreasing the amount of specialized and experienced effort to acquire eggs in the field. The lead contractor, Canicanick Environmental has developed a strong relationship with the program and the associated skills and organizing to see the annual program through. Local stewards were initially hired in year 1 by DFO amounting to 4 individuals carrying out the territory wide program however the skills

and independence of each steward varied. A lead steward was contracted in 2013/14 and 2014/15 which was a better fit to pursue a more coordinated approach to program delivery while educating interested teachers and individuals to be able take on more responsibility. The lead contractor hired a successful subcontractor that was suitable and experienced (local commercial fisherman) and lived in Dawson City during all three years to assist in the extensive Territory wide program delivery, taking on the 4 central/northern communities and further decreasing delivery costs by decreasing travel time and costs.

While it is apparent that the program will not be independently delivered by each of the territory's communities or schools at this point in time the capacity of each of those involved has increased and is closer to becoming independent in completing the program's delivery in the future. The lead steward will continue to perform program coordination and delivery in the near term which is a step towards independent program delivery. For three years now DFO support has been less necessary due to program delivery capacity developed by the stewards and teachers. The program may be partially delivered by teachers or local individuals which would be a further successful step toward independent delivery should they pursue supporting funds for maintenance of equipment and presentation supplies.