Juvenile Salmon Distribution in the intertidal foreshores of Prince Rupert and Port Edward Harbours

An Interim Report

Prepared by Community Fisheries Development Centre
Bruce Hansen and Gerry O'Connor Project Managers

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Introduction

Intertidal Foreshore provides an essential component in the life cycle of salmonids and other fish. Human economic activity competes for many of the same areas of intertidal foreshore, which are utilized by salmonids in their life cycle. Activities of foreshore developers including, but not limited to, grading, infilling, wharf construction and breakwaters could affect the quality and quantity of salmon habitat and could increase conflict with regulatory agencies.

This project was developed to compliment the previous studies done on the intertidal foreshores in Prince Rupert and Port Edward harbours. In 1996 J.O. Thomas and Associates conducted ground truthing in numerous areas of the intertidal zone on Ridley Island, Kaien Island and Digby Island. The teams involved in this project performed forty transects in each of these areas to record position (GPS) as well as substrate type and cover. Also in 1996 the Port Corporation hired G.A. Borstad Associates Ltd. to do airborne multispectral imagery of the foreshore areas of Prince Rupert and Port Edward harbours to acquire detailed maps of the marine vegetation of this area. The project presently underway, surveying juvenile fish distributions, would be the last phase of these studies since it would correlate the density and species composition of juvenile salmonids in the mapped areas of marine vegetation.

Fisheries and Oceans Canada (D.F.O.) in the early part of May 2000 contracted with the Community Fisheries Development Centre in Prince Rupert to perform a Juvenile Salmonid Density Study (Beach Seine Programme) in the vicinity of Prince Rupert and Port Edward Harbours. This programme consisted of a small crew using a beach seine to capture, enumerate, speciate, measure using the nose-fork method and then release juvenile salmonids in specific areas over the course of several weeks. Twelve sites were selected and each site was partnered with a control site in close proximity, which was similar in slope and strata. The main difference between the paired sites was that one site had been heavily impacted by human economic activity whereas the second site was as much as possible considered pristine.

The crew fished the paired sites on the same day and, as far as possible at the same state of the tide. All salmonids captured were to be processed as described above, in addition a random sample of each specie were to be weighed and the weights recorded. In the event that too many fish were captured in any set a random sample of approximately one hundred fry were processed from the set and this sample was considered representative of the set.

All data collected was recorded on data sheets designed for the study[1] and the data was entered on a database designed for this purpose.

The original proposal was designed to capture information from one brood year. However, given the timing of the smoltification process of the fish of interest, from approximately March 15th until late August, and the problems this caused given the financial constraints of the D.F.O.'s financial year this proved impossible. Bruce Shepherd and Uriah Orr of D.F.O. decided that the programme would be split into two phases: the first to begin as soon as budgetary approval was received with the second phase to start April 1st of the following year.

Budgetary approval was received in early May 2000 and the Community Fisheries Development Centre hired Bruce Hansen and Gerry O'Connor as project managers. Once budget approval was received the project managers began meeting with D.F.O. officials to develop an operational plan. May 30th was the first day of the assessment and the project continued five days a week until July 14th. After this date we fished one day a week at the Okabe Shipyard site to track the presence of fry until September 8th. At that time after discussion with D.F.O., it was decided to suspend operations until Spring 2001 due to the lack of fry at the test site.

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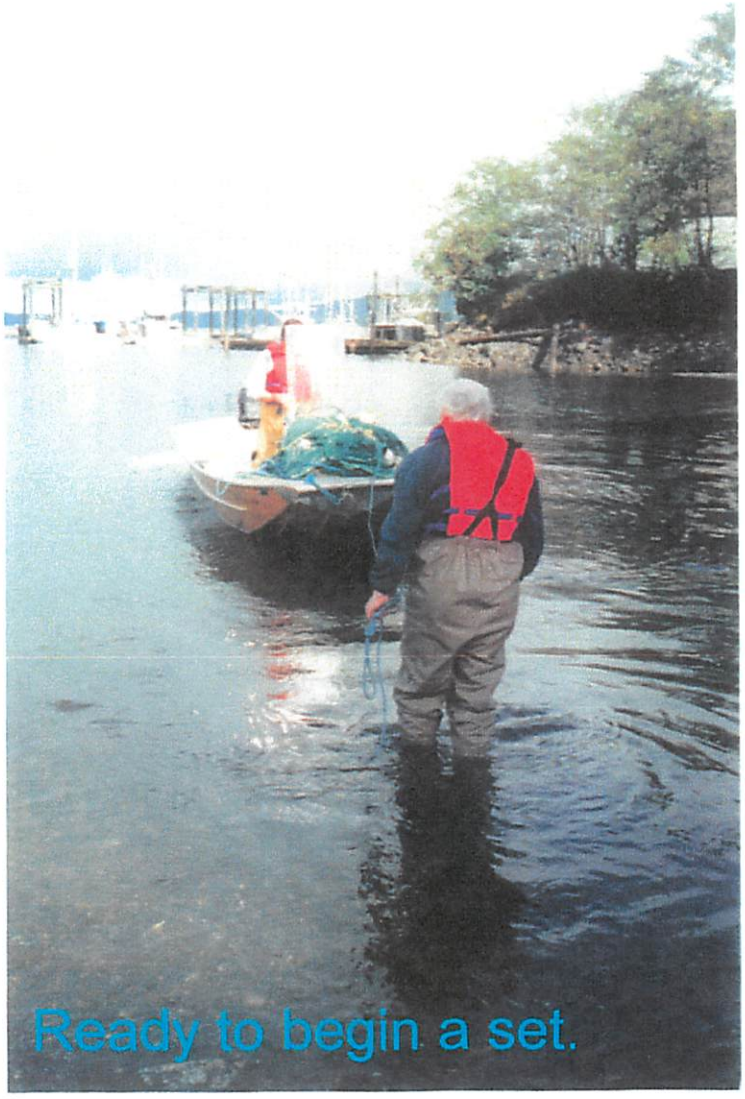
[1] See Appendix 1

The beach seine study was so successful in providing important data that it prompted D.F.O. to suggest that if we could expand the study within budget constraints there would be significant benefits to the study from running a mark/recapture programme in conjunction with the Juvenile Salmon Density Study. This mark/recapture programme would help identify migration routes and patterns used by the fry in the area and provide information on the length of time the fry spend in different areas of the harbours

The D.F.O. has indicated its preparedness to allow the funds earmarked for the beach seine study in the spring of 2001 to be used to partially fund a mark/recapture programme to run in conjunction with the beach seine study provided that no more funds have to be raised through HR/SEP funding sources. The project managers have agreed to solicit funding from other sources.



Ready to begin a set.

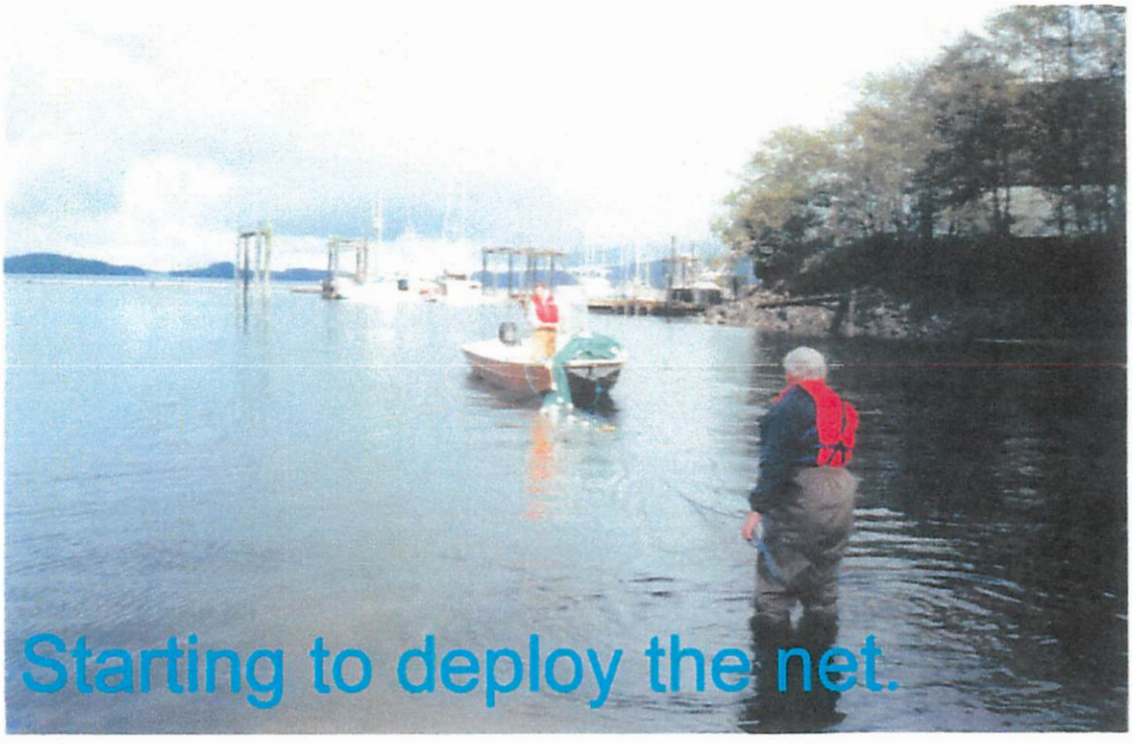
Methodology

The crew was equipped with an eighteen-foot long Smokercraft aluminum skiff powered by an eighty-five-horse power Mercury outboard with a jet attachment. The net used exclusively for the study was a beach seine measuring 6' X 100' using one quarter inch mesh in the wings and one eighth inch mesh in the bunt.

The net was set out of the skiff, backing out from the beach until all the net was in the water and then towing on the one end directly into the beach. The net was not towed for any length of time. To ensure that the data collected from each set was representative the fry were not herded in any way. On arrival at the site the beach crew were dropped on the beach and the first set was made immediately. Similarly for the second and third set of the three set "cluster" the catch was processed from the previous set, the net was then fleeted onto the bow of the vessel and the set made immediately.

The fish captured prior to the third set in the cluster were held until all three sets were completed.

The fish captured were enumerated, identified as to species, measured, and random samples were taken of weight. All this information was recorded on a data-recording sheet. In addition the crew recorded site location, date, time of set, weather conditions, surface water temperature and tide.



Starting to deploy the net.

Synopsis

The project was submitted to HR/SEP in 1998 in the hope of securing funding to allow the project to proceed from March 1999 and run through August 1999. Due to the time restraints of the federal fiscal year the project was unable to secure funding for fiscal 1999.

After meeting with Habitat and Enhancement North Coast D.F.O. it was agreed to re-submit the proposal in the fall of 1999 with the project to run between May 2000 and August 2000. The project would then go on hiatus until March 2001 and continue on until May 2001. This proposal was accepted in April 2000.

Bruce Hansen and Gerry O'Connor were appointed Project Managers in May 2000 and immediately began a series of meetings with D.F.O. personnel to plan the study.

Site selection was the first priority. The parameters for the sites were as follows: twelve sites were to be selected with several other sites to be available on an on-call basis. The twelve main sites were to be in two groups. Six of the sites were to be impacted by development to a noticeable degree while the other six sites were to be considered pristine, i.e. no development to have taken place in the vicinity. In addition each of the impacted sites was to be paired with a pristine site for comparison purposes, therefore the paired sites had to be in reasonably close proximity and similar in gradient, substrate and vegetation. Mssrs Hansen and O'Connor made several prospecting trips around Prince Rupert and Port Edward harbours and site selections were made. The sites selected were as follows

Impacted Site	Pristine Site
Okabe Shipyard	Casey Cove
McLean's Shipyard	Vigilant Island
Rivtow Straits Dock	Sunshine Bay
Wainwright Basin (Miller Bay)	Wainwright Basin (Port Edward Hwy)
Porpoise Harbour (Opposite Pulp Mill)	Porpoise Harbour (north Lelu Island)
Ridley Island (Sawmill site)	Barrett Rock light

In addition several sites were selected to be sampled on a time permitting basis, these sites were Airport Creek on Digby Island, Moresby Creek outfall, Lightering Dock, Miller Bay (by Miller Bay hospital) and Kloiya Bay. These sites were sampled but were not included in the study. Results of these samples are attached for information purposes only.

The fishing crew for the study consisted of the two project managers, Bernie Scullion as additional beach crew and Shaun Davies as data recorder. Once fishing operations began all crew members were cross-trained in aspects of beach crew and data recording.

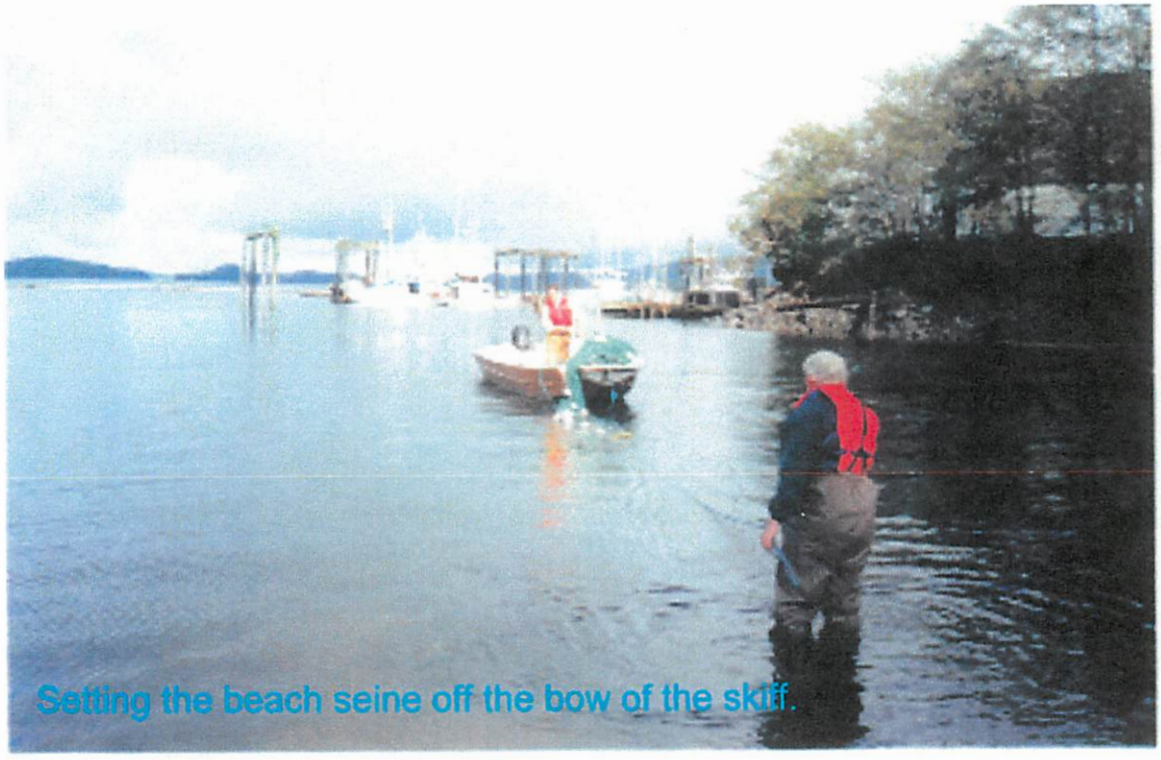
The two project managers accompanied Uriah Orr, Habitat and Enhancement, North Coast Division, D.F.O. on a short orientation trip to Wainwright Basin to satisfy Mr. Orr of their competency in boat handling, beach duties and data recording skills. After this trip fishing operations began on May 29th 2000.

Assessment continued five days a week until July 15th 2000. At that time assessment effort was reduced to one day a week at the Okabe shipyard site. This continued until September 8th 2000 when operations were suspended until April 2001. Operations were scaled back on July 15th due to a reduction in the number of juvenile salmon encountered. There was still enough salmon in the area to justify one day a week effort to attempt to discover when the migration of fry to the ocean ended for the year. September 8th there was no

salmon encountered and after consultation with Uriah Orr fishing operations were suspended. The other reason for this approach was to husband the financial resources available to the project for use in the next phase of the study.

All the data recorded was then transferred to the database and is being turned over to D.F.O. with this report for analysis.

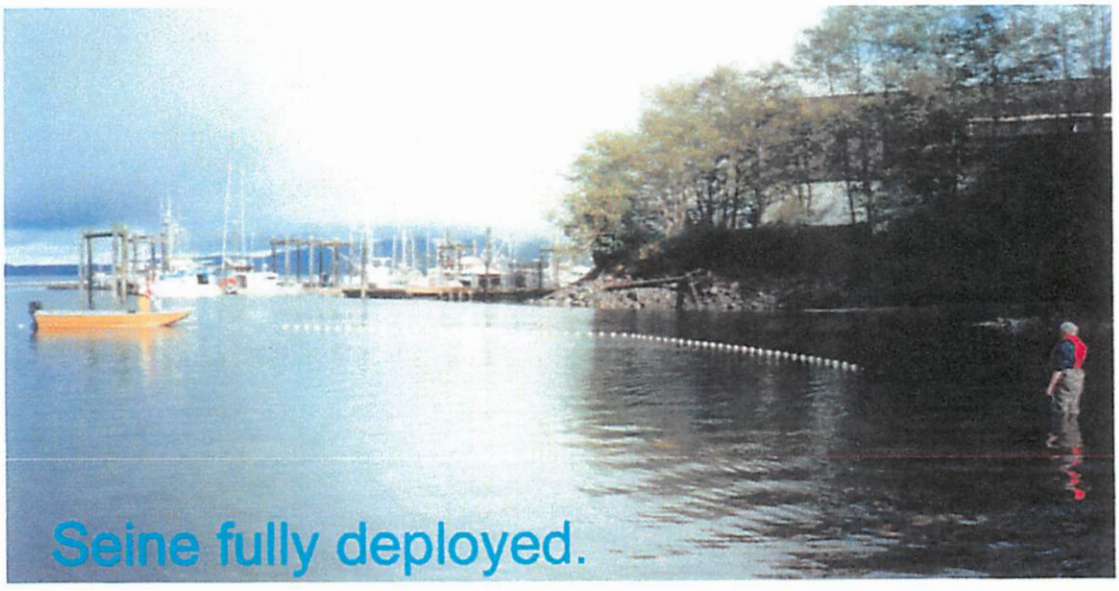
The results of the study are of course not yet available, however the "rough" data was discussed with Mr. Orr at meetings, which took place every week, and the preliminary indications are positive. Mr. Orr has expressed satisfaction with the methodology used and the results achieved. He has indicated to the project managers that if they can source additional funding to include a mark/recapture programme in the next phase of the project, he would support such a programme.



Setting the beach seine off the bow of the skiff.

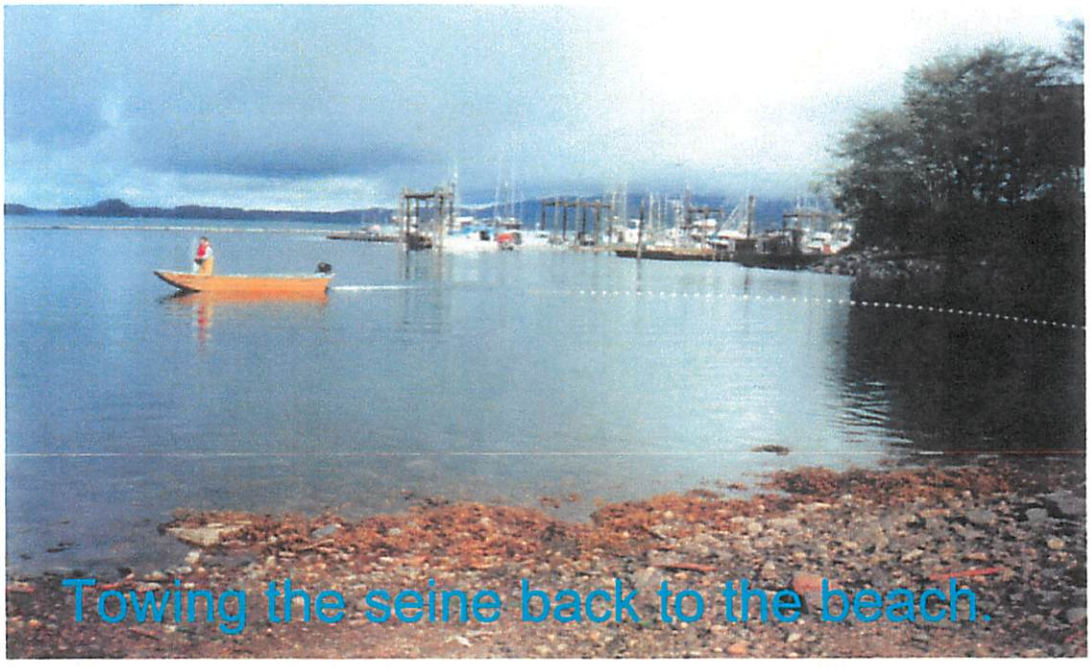
Summary

The effort to date indicates that four of the five salmonid species are fairly uniform in distribution throughout the study area. The data collected to date is presently being analysed and no conclusions can be reached until the study is completed next spring.

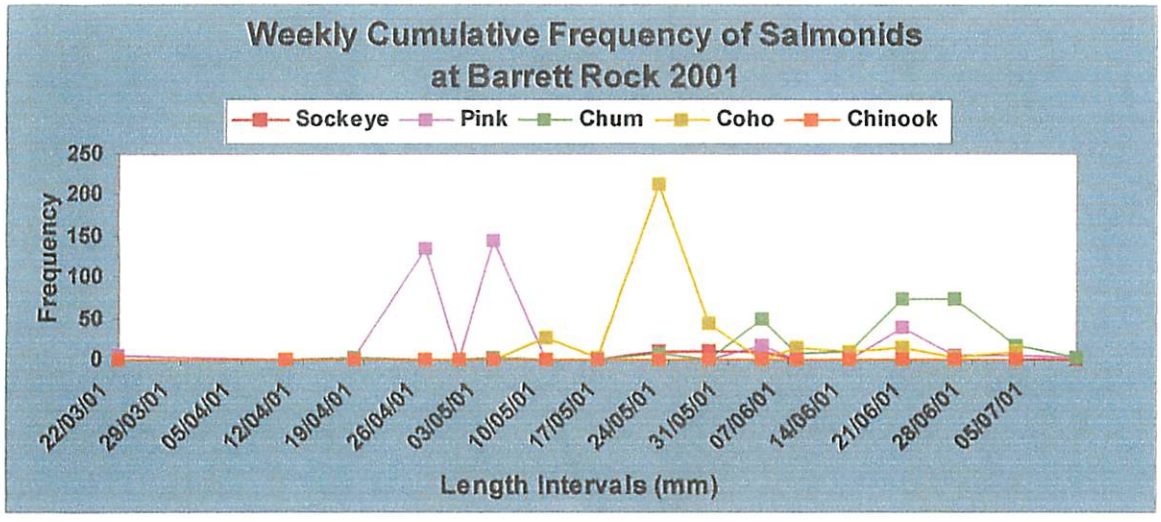


Recommendations

Recommendations would be premature at this point in the study. The proposed mark/recapture programme which would operate in conjunction with the second phase of the study would add to the validity of the information being generated as part of the study and should go forward as proposed.



Towing the seine back to the beach.


Weekly Cumulative Frequency of Salmonids
at Barrett Rock 2001
Sockeye
Pink
Chum
Coho
Chinook
Frequency
250
200
150
100
50
0
22/03/01
29/03/01
05/04/01
12/04/01
19/04/01
26/04/01
03/05/01
10/05/01
17/05/01
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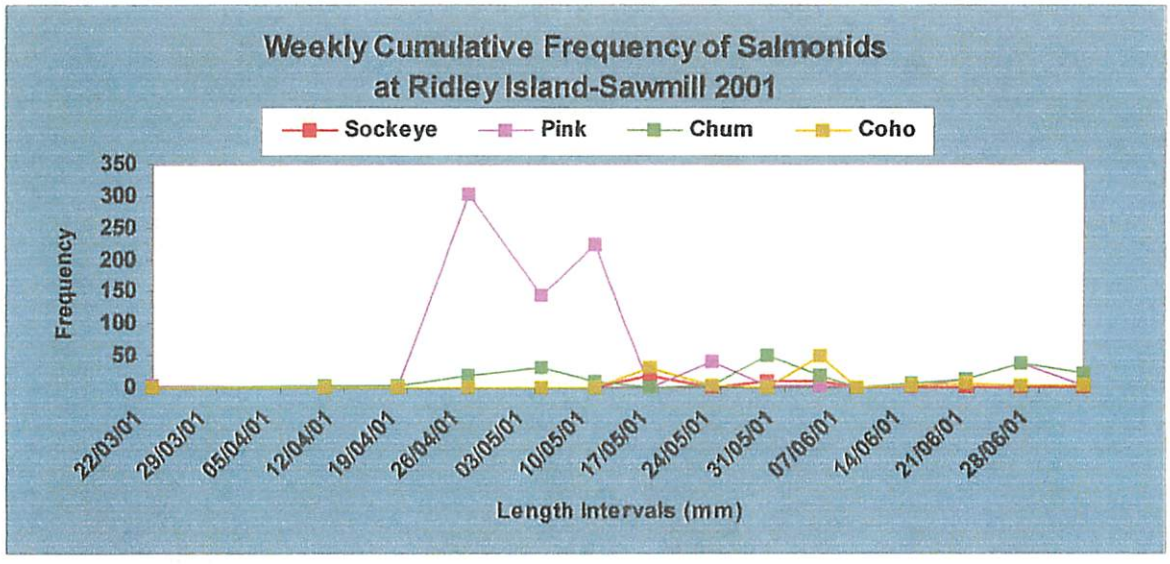
21/06/01
28/06/01
05/07/01
Length Intervals (mm)


Weekly Cumulative Frequency of Salmonids
at Ridley Island-Sawmill 2001
Sockeye
Pink
Chum
Coho
Frequency
350
300
250
200
150
100
50
0
22/03/01
29/03/01
05/04/01
12/04/01
19/04/01
26/04/01
03/05/01
10/05/01
17/05/01
24/05/01
31/05/01
07/06/01
14/06/01
21/06/01
28/06/01
Length Intervals (mm)

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