

What's to Become of Pacific Salmon?

by Melissa Tupper

Canada's northwest coast is one of the few remaining areas of greatest biodiversity on earth. Twenty-five percent of the planet's remaining coastal temperate rainforest is found here. There is still much to learn about the ecology of coastal temperate rainforests and the connections between marine and terrestrial wildlife that inhabit them.

Wild Pacific Salmon are a vital part of coastal temperate rainforests. They are important to the health of streams, forests and other wildlife that rely on them. However, within the past 150 years, Pacific salmon have disappeared from almost half of their original range along the northwest coast of North America. Most reports indicate that salmon populations continue to decline at a disturbing rate today.

There are many reasons why salmon populations have thrived for hundreds of years and only now face extinction. Over-fishing is a major contributor to the weakening of salmon stocks. The government has initiated "buy back" programs to deal with declining salmon fisheries however, these have not been entirely successful. Since 1996, the government has bought back more than 1500 fishing licences. This has primarily removed smaller, less efficient boats and left newer vessels, which actually do more damage. The fishing fleets of Canada and the U.S. have often been involved in disputes over territory. This has led to fishing

which is extremely competitive and volume-based, rather than conservation-based.

Humans have also impacted salmon populations by degrading and destroying salmon habitat. Urbanization, dam-building, mining and logging have polluted and damaged streams and oceans. The Federal Fisheries Act requires that Canada prevent destruction of fish habitat. By law, logging companies are not permitted to cut to the banks of fish-bearing streams, fall and yard heavy logs through these streams or log in landslide-prone areas that are above these streams. However, these practices are carried out despite these rulings. Recently, the Commission for the Environmental Cooperation of North America (CEC) ruled that a full investigation should take place into Canada's logging-related damage to B.C. salmon streams.

Human impact has also led to great ecological changes such as global and ocean warming. Reports have indicated that global warming could kill off the Fraser River Salmon Fishery because an increase of one or two degrees in water temperature would be very detrimental to salmon. A short term solution for isolated areas, such as releasing water from the Kenney Dam into the Nechako River system to cool down the Fraser River, have been suggested but these solutions do not address the greater problems that face salmon, and all species, if global temperatures increase.

The causes of the decline in salmon populations are complex and there is not one, simple solution to this problem. There are many projects underway by government and various agencies to attempt to restore salmon stocks. The success of these interventions are unknown.

What is clear is that if we do not make efforts to conserve salmon, we risk losing them completely, as hundreds of salmon runs have already been lost. In Canada, where we are still struggling to come up with an Endangered Species Act, six hundred runs are currently at high risk of extinction. This will have far reaching effects as more than 120 terrestrial animals and insects, let alone the number of organisms in rivers and oceans, rely on salmon to survive. Salmon also donate a tremendous amount of nutrients to the environment that are vital to the streams and forests of B.C.'s coastal temperate rainforest.

Salmon have thrived in British Columbia's waters until the last century. It is now critical that we establish conservation efforts and practices to save this precious resource.

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*Testing the Salmon Stream
(Photo by Margaret Butschlet)*

"Salmon Crossing" at Stanley Park

by Lyle Nelson

As I stood on the seawall near Dead Man's Island in Stanley Park, a large shadow passed over me. I looked around for the plane I assumed had passed over—wondering that it made no noise—and instead saw a full-grown bald eagle circling over the flotsam in the water near the shore. As I watched, the eagle dove toward the water, grabbed something between his talons and flew away.

Although that meal was probably not a salmon returning to spawn, the chances that it will be in the future got a lot better with the completion of the BC Hydro Salmon Stream Project in Stanley Park. Built to replicate the salmon's natural spawning beds, a 300m. stream made up of waterfalls, pools and natural debris like fallen trees, now flows from the Vancouver Aquarium to Coal Harbor. The stream was built by the Vancouver Aquarium

Marine Science Centre, in partnership with the Vancouver Board of Parks and Recreation. The primary sponsor for the project is B.C. Hydro.

Over a period of five years, ending in 2002, a total of 52,000 chinook, coho, chum and pink salmon will be released from the morphaline-scented demonstration stream. Morphaline, an organic chemical is released in the man-made stream so that the salmon will 'recognize' it. The salmon life cycle ranges from 2-6 years, which means that Fall 2000 was the first possible 'return' date for the new stock. Although no salmon jacks (immature male fish) have returned yet, Dana Hamerston, the salmon program coordinator at the Vancouver Aquarium, reported that coho had been seen in Coal Harbor on October 26. Ms. Hamerston was hopeful the coho seen in Coal Harbor were on their way to re-enter the stream. In established hatcheries, up to 90% of the fry will return to spawn, but in new programs such as this, the 'success' rate takes a few years to build. In the wild, only 2% of fry can be expected to return to their spawning grounds.

The BC Hydro Salmon Stream Project is made up of two sections, a recirculating freshwater portion that runs from the Children's Zoo to a logjam just above the Alcan Salmon Pool Display, and a salt water portion that consists of the pool display and a series of stream pools that run to Coal Harbour. From the salmon pool, some of the returning salmon will be caught and moved to a hatchery created in the old polar bear pool and the rest will be sent to the B.C. Forest Headwaters Exhibit, located at the southern end of the killer whale deck of the Aquarium. Visitors will be able to view the salmon spawning at the Headwaters Exhibit.

Colourful displays posted along the stream from the Aquarium to Coal Harbor detail what makes the stream 'fish friendly' and outlines what conditions endanger salmon habitat. There are two culverts near the stream's entrance to Coal Harbor; one is under the seawall and another



is beneath Park Drive. Both culverts double as fish ladders, which, when installed correctly as they are here, help the salmon travel uphill.

In future fall months, when you pass the "Salmon Crossing" sign on Stanley Park Drive, you might see a lot more than just a few fish climbing ladders. The salmon will attract harbor seals, great blue herons, loons and bald eagles. If the Salmon Stream in Stanley Park attracts even a hundredth of the 3000 eagles that arrive in Brackendale each winter to feed on spawned-out salmon, we could have 30 eagles perched around the stream's entrance to Coal Harbor. However, I'm sure the park's resident bald eagle would rather not share!



Thinking about visiting the Salmon Stream in Stanley Park? Go here first:

<http://www.vanaqua.org/stream/about.htm>

for an interactive, on-line tour of the B.C. Hydro Salmon Stream Project. Click on the numbers on the map, to learn more about the habits and habitats of the salmon as you move down the stream from the Vancouver Aquarium Marine Science Centre to Coal Harbour.

Presentation Profile: "Oceans"



Northwest Wildlife Preservation Society is very interested in sharing its knowledge of wildlife and wildlife habitats in British Columbia with fellow British Columbians. We have worked hard to develop exciting and interactive programs for audiences of all ages.

Did you know that throughout the world, half of the human population lives within 100 km of the coast? In Canada, almost every person depends on the ocean for some aspect of life but we are often unaware of the reasons why other forms of life depend on these vast bodies of water.

In "Oceans", we introduce the ocean ecosystem and our relationship with it. We will also explore the many threats to the world's oceans and the wildlife that inhabit them. Finally, we will suggest ways that we may help to restore and preserve our valuable oceans.

If you would like to learn more about this, or other presentations offered by Northwest Wildlife Preservation Society, or for information on how to book a presentation, please call us at (604) 713-6686. We'd be happy to speak with you!



Ways We Can Help: Pacific Salmon

The best way you can help protect salmon is by protecting their habitat. There are some easy things everyone can do to help salmon:



1. Protect streams

There are several ways to maintain healthy streams:

- Eliminate or reduce the use of pesticides, herbicides and chemical fertilizers. Fertilizer run off can kill fish and their food.
- If you live in a riparian zone, create a buffer between the stream and your lawn. Plant buffer plants that can act as filters or let the grass grow.



2. Restore the Streamside

A riparian zone is the area alongside a stream and this is an especially important, and sensitive, part of salmon habitat. Salmon need cool, clean water to stay healthy and gravel beds in which to lay their eggs. Plants and trees that grow alongside streams provide shade and prevent erosion. Old logs that fall into streams are also important as they provide pools where salmon can rest from the fast moving water. In order to have healthy salmon, it is important to maintain healthy riparian zones.



3. Check your septic system

Run off from failing septic systems can contaminate streams, and shorelines. If you notice any of the

following, it could indicate that your system is failing:

- water pooling in your yard or accumulating elsewhere
- foul odours
- dark stains in the soil near the drain field
- poorly flushing or backed-up toilets
- excessive algae growth on drainage pipe outlet

Septic systems need routine maintenance, and should be checked every three years. If you notice any of the above signs, you may need to pump your system or have some other maintenance done. Call a septic professional for advice.



4. Conserve Water & Electricity

Many dams are built because of our increasing need for power. Conserving these resources can be as simple as turning off the water while you brush your teeth or turning out the lights when you leave a room. Small actions can have a great impact!



5. Make your voice heard!

It is important that the Fisheries Minister hear overwhelming public support for protecting salmon and their habitat. Write to:

House of Commons
Minister, Fisheries and Oceans
Canada
Parliament Buildings, Wellington
Street
Ottawa, ON K1A 0A6

Conservation-based Fisheries for Today and Future Generations

by Michelle Imbeau

Of the wide range of responsibilities and challenges faced by Fisheries and Oceans Canada, one of the most important is the conservation and sustainable use of Canada's fisheries resources in marine and inland waters. When new scientific evidence about Pacific coho salmon stocks revealed they were at critically low abundance, managers in Fisheries and Oceans' Pacific Region had a choice – develop a strategy to harvest available abundance of healthy stocks of salmon, while ensuring conservation of threatened stocks, or shut down the Pacific salmon fishery. The answer, not just for salmon, but groundfish, invertebrates, seabirds, marine mammals, and all other species at risk of over-exploitation, lay in the widespread adoption of selective fishing techniques.

In June 1998, the federal govern-

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ment announced the \$400 million Pacific Fisheries Adjustment and Restructuring Program (PFAR) to address the impacts of the changes in the Pacific fishery. A key element of PFAR is the Selective Fisheries Program, which represents a fundamental and permanent change to the Pacific fishery and is designed to allow First Nations and the commercial and recreational sectors to continue to harvest more abundant stocks while protecting weaker ones.

The purpose of the Selective Fisheries Program is to develop gear and methods that allow the harvest of target species or stocks, while at the same time avoid or allow the release — unharmed — of less abundant species or stocks (by-catch), including marine mammals and seabirds. The ability of licensed fishers to fish selectively, avoiding or releasing unharmed non-target fish, invertebrates, seabirds and marine mammals, is a fundamental requirement for Canada to meet the conservation objectives of the federal Oceans Act, the possible requirements in the proposed Species at Risk Act, and our international commitments to preserve biological

Here is a drain cleaner that's inexpensive and non-toxic. Use this instead of chemical drain cleaners.

Recipe



1. Pour ½ cup baking soda down the drain.
2. Add ¼ cup vinegar.
3. Wait 15 minutes while the mixture fizzes and cleans.
4. Pour a full kettle of boiling water down the drain.



This is an easy, salmon-friendly way to unclog drains!

diversity and fish responsibly.

Some selective fishing techniques are already mandatory in the salmon fishery. Catch and release of non-targeted species is a selective fishing method that is being practised in all salmon fisheries. In First Nations salmon fisheries, beach seining is an on-going selective fishing method that is being used, together with new handling techniques, to increase the survival rate of released salmon. Fisheries and Oceans Canada has provided training to improve effective use of beach seining. In the 2001 commercial salmon fishery, salmon revival tanks are mandatory on all vessels. Non-target species of salmon requiring recovery are placed in revival tanks prior to being returned to the water. In the recreational fishery, barbless hooks are mandatory when fishing for salmon. Hooks without barbs or that have the barbs pinched flat against the shaft allow non-target species to be easily released. The survival of a salmon caught using a barbless hook has been found, in some cases, to be higher compared to using a barbed hook. Also in the recreational fishery, selective-marked hatchery fisheries are providing anglers with opportunities to retain hatchery-raised coho and chinook. With the practices of clipping the adipose fish of hatchery fish, anglers are able to easily differentiate a hatchery and a wild fish. The wild fish can be released.

As the Selective Fisheries Program winds down in 2001, the Department will continue to implement the findings of the experimental pilot projects into the fisheries management and individual harvest plans. The cost of continued research, development, catch monitoring, gear modifications, training and awareness will become the responsibility of harvesters.

Since the inception of the Selective Fisheries Program, \$18.3 million has been invested, which includes over 100 experimental pilots testing innovative ideas and gear modifica-

tions in gillnet, seine, troll, recreational and First Nations salmon fisheries. Funds have also contributed to scientific research; monitoring by independent on-board observers to ensure that conservation objectives are attained; increased enforcement to ensure compliance with selectivity practices; and training support for fishermen and anglers about effective selective fishing practices.

Selective fishing represents a fundamental change to conservation-based fisheries for the benefit of present and future generations. In meeting conservation objectives, fishing opportunities and resource allocation will be shaped by the ability of all harvesters — First Nations, commercial and recreational anglers — to fish selectively.

Fish Facts

- When salmon are swimming upstream, they can jump 2 meters into the air!
- When baby salmon, called alevins, first hatch, they have a yolk sac attached to their bellies. They use this yolk as food during the beginning part of their lives.
- A female salmon can lay up to 6,000 eggs in one redd!
- Salmon can travel hundreds, even thousands of kilometers. The longest known trip ever taken by a salmon was a Chinook salmon that travelled 3,845 km upstream to spawn!
- The largest salmon on record is a Chinook salmon that weighed 57 kilograms!





Resident killer whale during a salmon chase. Photo by Lance Barrett-Lennard

The Food Chain is as Strong as its Weakest Links

by Nic Dedeluk

Last week while I was out kayaking near Cates Park I was pleasantly surprised to see large numbers of salmon jumping. As I sat there observing, it was very apparent that the local harbour seals were feasting on the abundance of fish. It is inspiring to observe the natural food chain taking place, and reassuring to see fish returning to their natal streams and rivers. I wonder if 100 years down the road future generations will be able to enjoy the same experience.

As the human population increases, so do the pressures on our natural resources. Habitat degradation and overfishing are now very real problems for salmon stocks, and these problems are being felt all the way up the food chain. BC is home to many species of whales, dolphins, and porpoises, collectively known as cetaceans, the best known being the killer whale. Conservation concerns affecting killer whales are closely linked to those affecting salmon. It is estimated that the average resident killer whale eats 80-90 kg of salmon a day. With just over 215 killer whales in the northern resident community and just fewer than 80 in the southern community a lot of

salmon is being consumed daily to feed these animals. This is in addition to the number of salmon caught through sport fishing and commercial harvests. One has to wonder how long there will be enough salmon for both killer whales and humans, not to mention all the other marine mammals that consume salmon. Ideally, there should be an allocation for the quantity of salmon consumed within the food chain as well as that harvested by humans.

Habitat degradation is affecting streams and rivers all over BC. Soil erosion and street run-off are changing the state of the ecosystem. Silt from erosion often clogs the gravel stream bottom required for spawning ground. Run-off from our cities and towns adds oil and other harmful substances to the marine ecosystem, disrupting the natural flow of the food web. When these substances enter the marine ecosystem they are consumed by predators near the bottom of the food chain. They then work their way up the food web, concentrating in each tropic level more than the previous one. The quantity of salmon required to sustain resident killer whales and seals are substantial, and as a result these marine mammals have very high contaminant levels.¹ Transient killer whales, which eat mammals, are even higher.

Keeping all of this in mind the BC Cetacean Sightings Network is

asking for your assistance in furthering our understanding about the whales, dolphins, and porpoises that frequent BC waters. As a joint project between the Vancouver Aquarium Marine Science Centre and Fisheries and Oceans Canada, we are requesting that any time you see a cetacean you report your sighting to us. This information will be used to help identify distribution patterns, as well as possible critical habitats along the BC coast. We are hoping you can help us increase our understanding about cetaceans especially in more remote areas and during the winter months. Reporting a sighting can be done via mail, fax, and email or on-line. Check out our web site: www.wildwhales.org or contact us at sightings@vanaqua.org to learn more about the BC Cetacean Sightings Network or to report your cetacean sighting.

***BC Cetacean Sightings Network
If you see a whale, dolphin, or porpoise we want to know!***

1 Contaminant testing was for organochlorine chemicals, including PCBs, dioxins, and furans. These chemical groups are long-lived and fat-soluble.



Fisheries and Oceans
Canada

Pêches et Océans
Canada



VANCOUVER AQUARIUM
MARINE SCIENCE CENTRE

What's Being Done? Salmon Enhancement

by Melissa Tupper

The Salmonid Enhancement Project was started in 1977 by the Department of Fisheries and Oceans Canada. Salmon enhancement is using hatcheries, lake fertilization, spawning channels, fishways, or habitat restoration to increase the survival of salmon at some stage of its life cycle. This project involved the DFO building facilities to aid salmon enhancement like hatcheries. Hatcheries have been built on many streams in British Columbia in an effort to conserve salmon species. Eggs are taken from female salmon, fertilized with milt from males and incubated in the hatchery.

Further efforts have also been made using lake fertilization, mainly on Vancouver Island, to increase production of sockeye. Nutrients are added to selected lakes during the growing season to increase the amount of plankton food for young salmon. The purpose is to increase growth and survival of sockeye salmon in fresh-water, which will result in improved survival in the ocean and increased numbers of returning adults.

Spawning Channels are areas of engineered rivers that provide ideal spawning grounds for salmon. These are utilized when there is a large area to be used but little, natural area that is suitable for spawning grounds.

Fishways provide access for spawners to areas that were once blocked off. They are artificial passageways that allow adult salmon to swim upstream, past obstructions. They not only increase return, but also increase survival as they provide a less taxing route for adult salmon to return to spawning grounds.

Habitat restoration is also vital to salmon enhancement. Watershed habitat restoration and preservation efforts are underway by many groups and individuals working to restore damaged streams and protect others for future runs.



CHINOOK



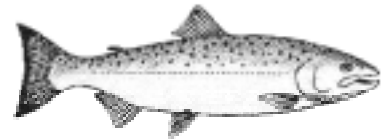
CHUM



COHO



PINK



SOCKEYE



Salmon Species: Who's Who

There are actually five salmon species found in B.C. waters. They are Chinook, Chum, Coho, Pink and Sockeye.

Although similar in many ways, these species also have differences. Each species of salmon is a different size. The biggest species is the Chinook salmon, which weighs between 4 to 16 kilograms. The largest Chinook salmon ever recorded weighed 57 kg (126 lbs)! Pink salmon are the smallest of the salmon species but there are lots of them! There are more Pinks than any other type of salmon species. Pink salmon only weigh about 1.5 to 3 kg when full-grown. Sockeye

salmon, which are the slimmest and most streamlined of the Pacific salmon, weigh 3 to 5 kg. Coho weigh 3 to 6 kg and Chum weigh 4 to 9 kg.

The salmon we find in our oceans also differ in their body colour. Sockeye salmon are a blue-silver colour. Chum salmon look a lot like Sockeye salmon but have black specks on their sides. Pink salmon are not actually pink but are silver with lots of spots on their backs. Coho salmon are also bright silver in colour while Chinook salmon are blue-green with spots on their backs.

Each salmon species spend different amounts of time in fresh water. Pink and Chum salmon will only stay in

streams for a few days to a few weeks after hatching. Coho, Sockeye and Chinook salmon stay in fresh water for a much longer time. Coho salmon will stay in a stream or lake for a year and Sockeye salmon stay in lakes for 1 to 3 years. Chinook salmon will live in streams for about 90 days, sometimes up to a year, before travelling out to sea.

Life expectancy differs for each species. Pink salmon live up to 2 years. Both Chum and Coho salmon live for 3 to 4 years. Sockeye salmon live anywhere from 4 to 5 years and Chinook, who live between 2 to 7 years, live the longest of all the Pacific salmon.

Salmon Life Cycle at a Glance!

Alevin: a newly hatched baby salmon. They have see-through bodies, big eyes and a yolk sac attached to their bellies.

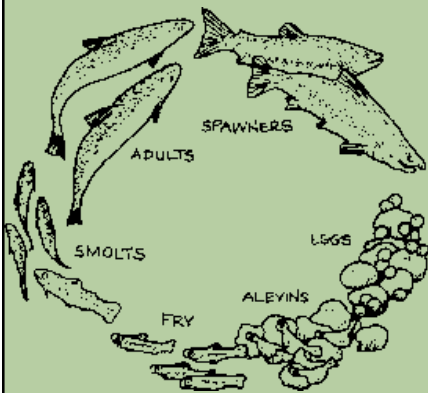
Fry: a young salmon that lives in streams and finds food on its own.

Krill: tiny, pink creatures that look like shrimp. These are a big part of the adult salmon's diet in the ocean.

Redd: a salmon nest in the gravel on the bottom of streams where the female salmon lays her eggs.

Smolt: a young salmon that goes through changes that make its body ready to live in saltwater.

Spawn: when the female salmon lays her eggs and the male salmon fertilizes these eggs.



Graphic printed with permission from Department of Fisheries and Oceans Canada



ESTUARIES: IMPORTANT SALMON HABITAT

by Melissa Tupper

When we think of salmon habitat, we often think of streams and oceans. However, an essential part of salmon habitat, and a place where a very important step in the life cycle of salmon takes place, is the estuary. An estuary is a place where freshwater from a river mixes with the saltwater of the ocean. The mixing of fresh river water and saltwater creates brackish water, semi-salty sea water. To make the change from fresh to saltwater and back again, salmon need the transition areas provided by estuaries. Estuaries also provide nutrients and shelter that allow salmon a required feeding and resting period before they make their long journey.

Estuaries are found around the world at the mouths of great rivers. One of the largest, and most important estuaries on the coast of British Columbia is the Fraser River estuary. Although this estuary is in our own backyards, few of us know the value of it. So what can we do to stop polluting this fragile ecosystem?

Here are some ideas:

- reduce car exhaust, take transit or ride a bike
- don't pour left over motor oil, paints, solvents, gasoline, or other chemicals down your home drain or a sewer drain
- use an alternative to pesticides in your garden such as soap flakes and water
- pick up after your dog
- build a compost pile which will provide chemical free fertilizer



NWPS Fundraising Efforts by Wayne Miller

Since our last newsletter we all have worked our way through some hard economic times.

I had the privilege of joining NWPS this summer as Partner Liaison, a position focused on building our relationship with the corporate community, and building our presence at the grass roots level.

We are pleased to announce this format is working. We have a stronger grass roots foundation than ever, and it's growing.

Working up from this base, we have already drawn the attention of strong, community focused corporations such as Coast Capital Savings, The Royal Bank, and The Garfield Weston Foundation.


This is only the beginning. We are looking to make great strides forward in the coming year. We will have a larger presence in the community and by this, more opportunity to enlarge our good work.

You can help simply by making


people and businesses you come in contact with aware of who we are and the important work we do.

We believe that the best long-term way of protecting our wildlife and environment is by ensuring that Community, Business, and Government work together through Education.

For information on how you can support NWPS, all Wayne Miller at (604) 713-6686.



Critters
NWPS Newsletter for
Youth and Educators



DON'T MISS CRITTERS

Critters is a newsletter from NWPS for kids and educators. Critters has lots of pictures and easy to read articles. It's perfect for the classroom.

NWPS Would Like To Thank:

**W. GARFIELD WESTON FOUNDATION
AND
RBC FINANCIAL GROUP FOUNDATION**

for their generous donations for the 2001/2002 Youth Estuary Stewardship Projects

VOLUNTEER DREAM TEAM

NWPS thanks Nic Dedeluk, Michelle Imbeau and Lyle Nelson for their contributions to this newsletter!

NWPS appreciates the efforts of all our volunteers. On behalf of the Board, staff, and NWPS members, we sincerely thank you all for your time, involvement, and support.

We couldn't do it without you!

Northwest Wildlife Preservation Society

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Northwest Wildlife Preservation Society is a registered charity, incorporated in 1987 in British Columbia as a non-profit Society. Our MISSION is to develop and provide educational, research, and advisory services that advance the public's awareness and knowledge of wildlife and wildlife habitat in northwest North America. In doing so NWPS works to ensure that healthy wildlife systems throughout northwest North America are preserved for their own intrinsic worth and for the appreciation of all.

"News and Views" is intended to be a forum for discussion. Opinions of authors of articles contained herein are not necessarily the position of NWPS

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