Now Now **Now** or or **Never** Never Never

Endangered Salmon of the Great Bear Rainforest

Now or Never

GREENPEACE

Front Cover (l–r)
Sockeye salmon migration on the Lowe River. Gifford Creek clearcut streamside "riparian" zone. Grizzly bears depend on salmon as a mainstay of their diet
(McAllister)

Contents

Written by:
Terry Glavin
Additional writing, research & editing by:
Ben Parfitt & Catherine Stewart

EXECUTIVE SUMMARY:

Every year in British Columbia, the provincial government sanctions the logging of more than 71 million cubic metres of trees, the vast majority of which come down in industrial clearcutting operations. This volume of wood is staggeringly large, almost beyond our ability to comprehend. But think of this: an average telephone pole is equivalent to just one cubic metre. No matter how you choose to visualize it, 71 million cubic metres is a lot of wood.

A substantial percentage of this wood comes from the coastal temperate rainforest, one of the world's most unique and most threatened ecosystems. This complex forest of ancient and large trees spills across some of the steepest and wettest ground found anywhere on earth. In some coastal watersheds as much as 440 millimetres of rain has fallen in a single day. That volume of water is capable of doing a great deal of damage if the circumstances are right.

Over the course of the past several decades, much of the primeval temperate rainforest on Vancouver Island, the southern mainland coast, and Haida Gwaii (the Queen Charlotte Islands) has disappeared. As clearcuts have stripped centuries-old spruce, fir, hemlock and cedar forests away, something else of incalculable value has been lost too. In the hundreds of streams and rivers cutting into the rainforest, genetically distinct runs of salmon have steadily declined. In some cases, they have disappeared all together. These losses have hit coastal villages and towns hard, particularly First Nations communities who relied for centuries on abundant salmon stocks for a variety of food, social, ceremonial and economic purposes.

> "I have seen change upon change, development upon development, clearcut upon clearcut strip the life away from streams and rivers that are home to salmon..."
>
> —The Honourable David Anderson, Federal Minister of Fisheries and Oceans, Times Colonist, June 20, 1998

The remaining intact old-growth forests and salmon streams on BC's Mid and North coasts, in the region that has come to be known as the Great Bear Rainforest, represent perhaps the best opportunity to stem the tide of losses that have occurred with depressing frequency elsewhere. If the clearcutting that devastates salmon stocks is stopped here, there is a chance that indigenous fish species may rebound to the benefit of all communities, both human and wild.

The major forest companies operating in this region are Western Forest Products (WFP or Doman Lumber), International Forest Products (Interfor), West Fraser and, to a lesser extent, MacMillan Bloedel Ltd. These companies are part of a larger group with a less than enviable track record in protecting the rainforest's fish. As we will see in the coming pages, attempts to protect salmon through voluntary compliance with industry-developed fish-forestry guidelines have failed abysmally. So too have new and allegedly tough laws such as BC's Forest Practices Code.

If we are to protect our remaining coastal salmon stocks, we must end the destructive practices of clearcutting ancient forests, particularly in those valleys where little or no industrial deforestation has yet taken place. As this report documents, BC's current logging practices cause substantial damage to salmon habitat. The urgency of the current situation cannot be overstated.

Salmon stocks in many of the coast's pristine valleys are already at drastically low levels. An appendix accompanying this report outlines the state of endangered salmon populations in some of the undeveloped watersheds on the Mid and North coasts. Genetically distinct coho, chinook, sockeye, chum and pink salmon stocks are depleted almost across the board. In many cases, they are perilously low and at high risk of imminent extinction. In others they are gone all together.

In 1996, an American Fisheries Society study painted a grim picture of salmon declines in BC and the Yukon Territories. Using data from the Department of Fisheries and Oceans, the study noted that 142 salmon populations had been driven to extinction, 624 were at "high risk" of extinction, and another 308 were either at "moderate risk" or classified as "of serious concern." Tim Slaney, a co-author of the report also noted that the status of more than 4,000 salmon runs in BC and the Yukon was unknown to Department staff. Of those 4,000, 920 stocks had mean escapements (the average number of spawning salmon) of zero for the previous decade. These stocks were not classified as extinct, although, as Slaney notes, they may well be.

Many of these runs of salmon were small in numbers to begin with. Unlike some of the major, commercially targeted runs of pink and sockeye salmon that can number in the hundreds of thousands, a healthy run of coho salmon in a small stream in the Great Bear Rainforest could be only 1,500 fish at best. What really counts is that the fish are there at all. Their presence is a vital link in the chain of life in these magnificent forests. Their loss will unleash consequences we can only imagine.

Allard Creek, the Aaltanhash River, Dallary Creek, the Koeye River, the Klekane watershed—to most of us these are just names on a map. In reality, they are rich rainforest valleys, home to grizzly and black bears, wolves, eagles, migratory birds, ancient cedar and spruce trees and endangered runs of salmon. For centuries the salmon have nourished all other life in these forests and provided sustenance to the First Nations people who harvested the bounty of the streams and rivers. Now most of these valleys are names on Forest Development plans and the logging companies are preparing to move in.

For reasons relating to over-fishing in mixed-stock commercial fisheries and poor survival rates due to changing oceanic and climatic conditions, salmon numbers have dropped throughout the Great Bear Rainforest region. We cannot afford to let these numbers decline any further by allowing clearcutting and road-building to proceed in remaining intact coastal rainforests. If we do, we run the risk of losing indigenous wild salmon stocks for good. And if the salmon are gone, gone too are one of the most vital sources of nutrients needed to sustain the bears, the eagles and the forests themselves.

INTRODUCTION

The salmon of the Great Bear Rainforest on the central coast of British Columbia are following the path carved by the herds of bison that once roamed the wide open prairies of Canada's heartland. Like the Bison, the salmon are not about to vanish as a species. But in the hundreds of small streams of the temperate rainforests, where salmon are the ocean's gift to the bears, eagles and trees, the salmon are disappearing.

The reasons for their decline are numerous and complex. Climate change is affecting ocean survival and the web of life in the North Pacific ocean. Industrial and municipal pollution, urban development and habitat loss, fish farming, cattle ranching and agribusiness are all impacting salmon and their habitat. Years of overfishing and indiscriminate harvesting of the small runs of salmon that swim with the big commercial stocks have taken their toll. And decades of clearcut logging have devastated countless salmon spawning streams.

The deep-sea impacts of climate change, ozone depletion and pollution on salmon are difficult both to assess and to repair. And addressing the global effects of climate change will only begin if the political will exists to even seriously tackle the problem. But some of the threats to salmon survival are more straightforward. We can implement changes to the fishing industry to protect weak stocks and increase selective harvesting. And we can change the way we log, protect the streams that nurture the salmon and protect some of the last intact rainforests where salmon are teetering on the edge of extinction.

In the heart of the Great Bear Rainforest, in the traditional territory of the Kitasoo and Hartley Bay people, is a beautiful pristine forest valley known as the Khutze. The crystal clear waters of the Khutze River have long supported runs of chinook, pink, chum, sockeye and coho salmon. The salmon, in turn, support a large population of grizzly bears. The valley is home to wolves, mountain goats, deer and wolverine. It is a migratory staging area for trumpeter swans and the ancient forests provide shelter to the endangered seabird, the Marbled Murrelet.

In this lush, interdependent web of life the salmon play an absolutely critical role. And the salmon are vanishing. In 1965, the Department of Fisheries counted 1,500 chinook salmon on the spawning beds. In 1994, the count was 20 fish.

In 1985, the Khutze River pink salmon count numbered 100,000 fish reproducing in the river. By 1997, that number had plummeted to 14,000.

Khutze coho have declined from a high of 7,500 in 1964 to a mere 400 by 1997.

The factors driving the decline of salmon in this valley do not yet include the destruction caused by industrial logging. But in light of the already perilous state of many of the salmon stocks, if International Forests Products is allowed to log this pristine rainforest, the clearcuts will likely sound the death knell of the last remaining salmon runs in the Khutze River.

Forests and Salmon

The relationship between salmon and trees on North America's west coast is unique on the planet. Nowhere else on earth does a marine species contribute so much to the functioning of forest ecosystems, and nowhere else do forests play so crucial a role in the survival of a creature of the sea. The relationship between the salmon of the west coast, and the west coast's temperate forest, is so ancient, complex and significant, that one could not exist without the other.

In The Beginning: The Evolution of the Salmon Forests

It all began 12,000 years ago, at the close the Pleistocene epoch.

Geologists and paleobotanists have sketched a rough picture of this coast at the close of the ice age, before salmon returned: It was a barren, empty place of glacier-scarred mountains, sparsely-forested valley bottoms, vast coastal plains and tidal flats, all newly exposed by a rising continent, relieved of the weight of kilometres-thick ice sheets. On British Columbia's south coast, the emerging forest was a mix of lodgepole pines and conifers. On the north coast, the landscape was a tundra of dwarf shrubs and groves of spruce, pine and alder.

In the cultural memory of the Katzie people, whose descendants still live in the Pitt River country of the Lower Fraser, there exists a remarkably similar picture of the time before salmon.

By the 1860s, the responsibility of maintaining the historical records encoded in the Katzie oral tradition had been passed down to Peter Pierre, who was still alive, in 1936, when he described the time before salmon to anthropologist Diamond Jenness: "The land was strangely different than what it is now," he explained.

"There were no leafy trees to cast deep shadows. The dark-green firs stood as they stand today, but they were grim and silent; no winds rocked their summits, no birds nested in their branches, no animals roamed by day or night past their motionless trunks. In the waters of the sea and the rivers there were clams and mussels, but no salmon, eulachon or sturgeon, no seals, and no sea lions..."

It was into this grim landscape that the first salmon, during a period of rapid evolutionary change, began recolonizing coastal valleys from far-off ice-age refugia. From the spawned-out bodies of these first salmon, trees took root. From barren valleys and river bottoms, strewn with the carcasses of millions of salmon, the elaborate arboreal web of the rainforest arose.

Within the forest arose distinct populations of six separate salmon species: Sockeye, pink, chinook, chum, coho, and steelhead. The forest stabilized the landscape, provided salmon spawners with necessary stream-cover, and regulated the flow of cool, clean water across the salmon's spawning beds; By about 5,000 years ago, cedar had bloomed from the Columbia River to the Nass River, and down through the ages, salmon continued to elaborate upon themselves, adapting to widely-varying local conditions, establishing distinct, genetic dialects in a conversation between trees, canyons, eagles, waterfalls, bears, and people. Nothing quite like it had ever occurred in the planet's history.

The Salmon People

Salmon once returned to the coast every year in the hundreds of millions. The predictable, abundant runs of salmon that characterized this coast down through the millennia gave rise to the most populous complex of indigenous societies on the continent north of the Valley of Mexico. The most conservative estimates put the pre-smallpox population of what is now British Columbia at about 200,000 people. In each of

Salmon struggle homeward through the white water rapids of Verney Falls. (McAllister)

these cultures, salmon was at the heart of an intricate tapestry of economies, languages, belief systems and ways of life. Estimates of the pre-smallpox harvest of salmon by aboriginal peoples put the annual consumption as high as 240 million pounds—more than twice the average annual production of the industrial salmon fisheries from California to Prince Rupert since the 1960s.

"All the watershed is gone to logging, clearcut logging around the lake. There used to be 200,000 to 300,000 spawners. Now there's only 6,000 to 8,000 spawners. Since they started clearcut logging, there's been something wrong."

—Ernest David, Elder of the Tla-O-Qui-Aht First Nation. Fisheries for the Future, A Nuu-Chah-Nulth Perspective. Published by the Nuu-Chah-Nulth First Nation, 1997. Used with permission.

Linking the Forest and the Sea

The aboriginal civilization of this coast was made possible because it arose at the intersection of a high-volume energy exchange between the earth's hydrographic sphere and the earth's terrestrial sphere, an exchange between land and sea, in the form of protein, carbon, nitrogen and other life-giving nutrients—hundreds of thousands of tonnes of marine biomass, every year for thousands of years—in the bodies of salmon. All this energy was carried back and forth across the northern hemisphere of the planet, between the depths of the ocean and the continent's interior, in predictable, ancient cycles. By the time of the first European explorers, what had evolved from all of this was a huge arc of temperate rainforest from Northern California to Southeast Alaska, and a complex of rich marine ecosystems at the rainforest's edge.

Grizzly bear in the beautiful Koeye River estuary. The Koeye supports grizzly and black bears, wolves, deer, cougar, mountain goats and river otter and an endangered run of Chum salmon. (McAllister)

Seals, sea lions, killer whales and a variety of fish and bird species indirectly rely on the forest for the salmon the forest produces. The forest contributes significantly to the productivity of estuaries and other habitat types in the terrestrial/marine ecotone, which in turn support a staggering diversity of seabirds and non-migratory fish species. Marbled murrelets forage at sea, but require old-growth forests for their nests. Without autumn-spawning chum salmon, the coast's eagle populations would wither away.

While salmon contribute to tree growth and plant life through the nutrients they bring from the sea, salmon also provide a key food source to 22 forest animal species. Analyses of the bones of grizzly bears from the Upper Columbia watershed, more than 1,000 kilometres from the sea, show that 90% of the carbon and nitrogen in the bears' diets came from salmon.

"Since coastal bears depend upon salmon for 95% of their food in late fall, their ability to survive winter hibernation is at stake."

—Dr. James C. Bergdahl, Northwest Biodiversity Centre in Wild Pacific Salmon as Biological Indicators, Valhalla Wilderness Society, 1997

On the Edge of Extinction

It is difficult to describe in words how much has been lost as a result of the disruption to these ancient processes over the past 150 years. The salmon runs that remain are remnants. Salmon are gone from almost half their former range. South of the 49th parallel, almost all the Pacific watersheds contain remnant salmon populations that have been declared either "threatened" or "vulnerable" under the U.S. Endangered Species Act, or are considered "candidates" for ESA listing.

In 1996, an American Fisheries Society study painted a grim picture of salmon declines in BC and the Yukon Territories. Using data from the Department of Fisheries and Oceans, the study noted that 142 salmon populations had been driven to extinction, 624 were at "high risk" of extinction, and another 308 were either at "moderate risk" or classified as "of serious concern." Tim Slaney, a co-author of the report has also noted that the status of more than 4,000 salmon runs in BC and the Yukon is unknown to Department staff. Of those 4,000, 920 stocks had mean escapements (the average number of spawning salmon) of zero for the previous decade. These stocks were not classified as extinct, although, as Slaney notes, they may well be.

Cuts to Department of Fisheries staff and budgets over the years have decreased the ability of staff and contractors to get out into the field. This, combined with changes to how data has been calculated over the years, means the enumerations that the American Fisheries Society used are not as reliable as they should be. The situation could be somewhat better than what was reported. It could also be a lot worse.

Overall, the west coast temperate rainforest once covered about 25 million hectares. By the 1990s, almost half of this primeval forest had been lost to clearcutting and urban development.

In spite of these declines, salmon remain at the heart of the temperate rainforest's biological diversity, from grizzly bears and wolves to raccoons and shrews, and from the tallest trees to the smallest thimbleberry, stream bed algae and lake-bottom phytoplankton. In the same way, the forest, in all its complexity, is necessary for the remaining salmon runs to survive.

"Each salmon is a large package of calories and nutrients from the sea. It's the way the sea communicates with the land. So we have these tons and tons and tons of fish coming from the ocean, through these fjords and up into the rivers, bringing with them valuable nutrients that permit very large populations of eagles and bears to survive here. It is unlike any other part of the world."

—Dr. Michael Soule, Department of Environmental Studies, University of California at Santa Cruz, Greenpeace video, August, 1998.

The Failure of the Techno-Fix

In the early years of colonization and settlement, little thought was given to such things; salmon, like the forests, were considered an inexhaustible resource. When declines in salmon abundance were observed in the earliest years of the industrial fisheries, governments responded with artificial propagation, such as hatcheries. Hatcheries were seen as the solution to the problem of habitat destruction, and forests were cleared without regard to the impacts upon salmon runs. It is only in recent years that fisheries scientists have shown that hatcheries cannot replace wild salmon, and in many cases, hatcheries have hastened declines in the biological diversity and abundance of wild salmon. Similarly, it is only in recent years that science has provided conclusive evidence that industrial forestry practices routinely and unavoidably disrupt ecosystem functions that are vital to the protection of salmon.

Forests and Salmon Habitat

An Infinte Variety

All salmon require stable and productive spawning habitat, but that is just a small part of the picture. Different salmon species rely on freshwater environments in different ways, for different purposes. Similarly, runs within each species have evolved in different directions, and spend varying amounts of time within watersheds, and at different zones within those watersheds, from the estuaries to the headwaters.

Sockeye almost always spawn in streams that feed lakes, and will spend from a year to three years in a lake before heading to sea. Pink salmon spawn almost exclusively at two years of age, and, like chum salmon, their fry head to sea almost immediately after hatching. Chum salmon spawn almost exclusively in coastal streams and in the lower reaches of rivers, only a few kilometres from the sea; coho are more or less the same. Coho, however, spend up to a year in their natal streams, and in nearby rivers, before heading to sea.

Chinook salmon defy generalization. They have been known to reach 45 kilograms in size, although they're usually much smaller. Some precocious males have been known to attempt spawning after spending their entire lives without leaving their home rivers. Chinook usually spend a few months in freshwater before heading to sea.

For every salmon run that fits the textbook description for its species, there is another, from the same species, that does things a little differently. All that can be said of these fish is that they are "anadramous," which means they're sea-run fish, and they're "semelparous," which means they die shortly after spawning—except for steelhead.

Once thought to be of the genus Salmo, steelhead are now generally held to be among the Oncorhynchus species, with the rest of the coast's salmon. Steelhead, unlike the rest, can spawn more than once.

Coastal temperate rainforests, with their thin layers of soil on rock, have been compared to a hydroponic garden where life revolves around the regulated flow of water.
(McAllister)

Salmon are often believed to spawn only in the autumn. In fact, there isn't a month of the year when salmon are not spawning somewhere on the coast. There isn't a forest on this coast that has not been home to salmon. Salmon are there, always, in the forest. The "forest," however, is a term that requires some definition. It not only includes trees, but also plants, animals, birds and fish. The west coast temperate rainforest, particularly, is a complex of inter-related systems and processes, all of which contribute to healthy salmon habitat. It is about geology, hydrology and ecology.

Water for Life

The geological and hydrological components of healthy salmon habitat include high-elevation gulleys and rivulets, natural springs, ground water seepage and discharge sites, porous soils, and sources of substrates and sediments that release cobbles and allow the steady recruitment of gravel supplies for salmon spawning beds. The Pacific coast is an assemblage of watersheds, and the shape and form of the land itself is related to the watersheds' biological components, such as root systems, which prevent erosion and regulate waterflow, and forest canopies, which trap moisture and provide cool, wet microclimates. The movement of water through forest ecosystems determines where skunk cabbage grows, how dense the devil's club is, and how productive and healthy the "riparian" zone is.

A watershed's riparian zone is more than just a riverbank. It is the intersection between the terrestrial ecosystem and the aquatic ecosystem, the critical, narrow corridor of nutrient flow between the mountains and the sea.

In the coastal temperate rainforest, the riparian zone is often characterized by plant communities that have become adapted to high soil moisture, and the vegetation is more diverse than anywhere in the watershed. The riparian forest is composed of cedar, hemlock, fir, alder, maple, spruce and cottonwood. The understorey is dense with salmonberry, Indian plum, ferns and vine maple. It is the busiest place on

the coast. No habitat type supports more birds and wildlife. It is rich in food, water and shelter, and it is where the relationship between trees and salmon is most intimate.

Thick riverbank vegetation and dense, mixed-species forest provide the final controls over the hydrology of the entire watershed, and provide stable, clean, cold water for spawning salmon.

No Salmon Without Forests

Organic debris from the forest itself provides a rich and fecund environment for salmon alevins—those first, tiny eruptions from salmon nests—half-egg, half-salmon. Fallen trees, exposed root wads and snags create riffles and back eddies, and act as a kind of hydraulic control valve that slows stream velocity, forming stable and oxygen-rich water for salmon fry, as well as cover against predators.

Leaf litter and detritus form micro-ecosystems of benthic or bottom-dwelling invertebrates, algae and bugs that provide a food source for salmon fry and for juvenile salmon in those final weeks before they swim downstream to the sea.

"Even the trees depend on the salmon. It's been estimated that as much as 30% or more of the nitrogen that used to come to these forests came from the salmon and that's a lot. If you think about taking away 30% of the fertilizer from a corn field or a soybean crop, that's a very significant amount of growth foreclosed and opportunity lost."

—Dr. Michael Soule, Department of Environmental Studies, University of California at Santa Cruz, Greenpeace video, August, 1998

Regardless of the complexities involved in the relationship between salmon and trees, what is clear is something quite simple: Healthy salmon populations require healthy forests, healthy rivers and healthy streams. And, in turn, the health of the temperate rainforests is linked to the salmon.

The Impact of Industrial Forest Practices

A History of Sustainable Harvests

For thousands of years, aboriginal societies harvested timber. The native people of the coast lived in cavernous, cedar-plank longhouses, and went to sea in huge, ocean-going canoes. Smokehouses, community buildings, mortuary poles and heraldic poles were all built from the wood of the west coast temperate rainforest, as were intricately carved chests, storage boxes and cooking vessels. Just as important was the processing of cedar bark for basketry, clothing, and a variety of household goods.

Apart from minor operations—mainly those undertaken by the Hudson's Bay Company and the Royal Engineers—commercial logging in British Columbia did not begin until after the Fraser River goldrush of 1858. In the early years of the industry, deforestation and salmon-habitat damage tended to be localized and fairly small-scale by today's standards. Logging was dangerous and labour intensive, and relied on simple technologies, donkeys, horses and oxen.

Steam-powered log-hauling equipment radically altered the industry, as did the use of railroads to carry logs to tidewater. It was not until after World War II that large-scale logging began to cut deep into the landscape, aided by gas-powered saws, logging trucks, and networks of roadways that cut deeper into the forest every year. As the easily-accessible timber dwindled, roads were punched further up the mountainsides and deeper into the coastal inlets.

Industrial Destruction Escalates

By 1960, about three billion board feet of timber was being removed from British Columbia's forests, almost all of it from the coast. By the late 1980s, the cut had more than doubled. Almost half the provincial forest has been logged. Most of that logging has occurred in valley bottoms, in and around the riparian zone that is such a critical corridor in the ancient exchange of nutrients between the land and the sea.

Throughout its history on this coast, industrial forestry has consisted almost exclusively of clearcutting, a practice in which all the timber from a forest is removed, in large blocks, on the theory that plantations can replace, and even improve, the "productive" capacity of the forest. Even if this were true, it is based on the assumption that one economic value — merchantable timber — must take precedence over all others. This is a perfectly "rational" viewpoint, from a forest-company perspective, and it was quickly adopted by the BC government, which owns about 94% of all the land in British Columbia.

Skewed Values

From the earliest days of BC forest policy, timber has been seen as the only forest component of any worth, or at least the component that must be afforded the highest priority of resource allocation. It is a viewpoint that is bolstered by an unbridled faith that science, engineering and "resource management" will provide remedies for the acknowledged impacts of industrial forest practices, either by plantations, fish hatcheries, spawning channels, or other rehabilitative measures.

The problem with industrial forest practices is that in their execution, the ancient relationship between fish and trees is disrupted beyond recognition, and ecological and hydrological processes that took thousands of years to evolve are broken. Decades of studies, commissions, investigations and research have proven that conventional logging practices unavoidably alter the necessary requirements of healthy salmon habitat.

Clearcutting Kills Salmon

When forest cover and streamside vegetation is removed, water temperature increases, and the egg-to-alevin ratio declines. When upland forests are clearcut, streambanks become destabilized and soil stability is undermined, reducing once-clear streams and rivers to muddy waterways. Under these conditions, fry-to-smolt survival ratios diminish.

Surges in water volume and velocity tear out large organic woody debris, eliminating rearing habitat, shelter and nutrients. The very structure of a stream is radically altered. The density of suspended solids increases, smothering salmon egg nests in silt and mud. Nutrient supplies dry up. Salmon disappear.

"……salmonid populations may decline after logging because of detrimental changes in physical habitat. These changes include excessive sedimentation, less dissolved oxygen and elevated temperature, loss of large woody debris, collapsed stream banks and decreased channel stability."

— Murphy, Heifetz, Johnson et. al. National Marine Fisheries Service in the Canadian Journal of Fisheries and Aquatic Science, Vol. 43

Scotia River clearcut. Interfor, 1996-97. Streamside protection zone requirements in B.C. are woefully inadequate under the Forest Practices Code. The thin lines of trees left to shelter the streams often fall victim to blow-down. (McAllister)

Decades of Mounting Destruction

Damage of this kind is not limited to the brief duration of logging activity, but can continue to cause cumulative and persistent damage over several decades.

The proximity of logging to a salmon-bearing stream is a factor that determines only the time it will take for impacts to become evident. When an ancient forest is removed from a mountainside, it may take years for the root systems of the former forest to finally give way in landslides that expose steep slopes to barren rock that had been covered since the last ice age. "Torrenting" in high-elevation gulleys disrupts the hydrology of watersheds that had been stable for thousands of years.

The size of a clearcut is also often irrelevant to impacts clearcutting produces. Studies in Oregon watersheds, conducted over a 34-year-period, demonstrate that there is little difference between the health of watersheds that have been completely clearcut and watersheds that have been subjected to only 25% clearcutting. In both cases, water volume and velocity during peak discharges were 50% higher than they were prior to clearcutting, and abnormal surges in volume and velocity persisted for 25 years after logging had been completed.

Feeder creeks and salmon streams less than 1.5 metres in width receive no protection at all under B.C.'s forestry regulations. (Pawlie?????)

Road Construction: Building a Path to Crisis

It is not just the cutting of trees that disrupts soil stability and watershed hydrology. Logging roads often do just as much damage. Logging and road building, even in side valleys, produce downstream impacts in salmon habitat that are not confined to the tributaries. Mud and sediments choke the tributaries, and bedload sediments are carried into the mainstream river. Creeks and rivers suffer "blowout"—persistent flash-floods caused by the simple fact that there is little left to hold back the rain—and mainstem rivers become widened and shallow. Winter freshets, by their very ferocity, destroy egg nests, and kill salmon fry and over-wintering juvenile salmon.

"Throughout the North Coast of B.C. forest harvesting and related road development has been and continues to be the most widespread land use activity adversely affecting fish habitat."

—Department of Fisheries and Oceans, Coho Response Team Final Report, 1998

On the San Juan River on Vancouver Island, during a period of long-term and precipitous declines in coho and steelhead populations, 428 landslides were recorded in the San Juan watershed. Also on Vancouver Island, salmon populations on the Gordon River underwent similar declines during a period in which 495 landslides occurred throughout the watershed, mainly a result of collapsing logging roads. Up the Fraser Valley, at Jones Creek, after several decades of public investment in artificial spawning channels for pink and chum salmon, a series of 20-year-old logging roads collapsed in 1993, causing the spawning channels to fill with mud. Since 1993, efforts at staunching the losses have been hampered because the spawning channels keep filling with sediment.

A Perilous Future

Just as conventional logging causes long-term, persistent damage to salmon habitat, salmon populations often take decades to recover, if at all. Not only does the forest itself rely on nutrients from salmon carcasses, but salmon fry rely on these nutrients as well. As the number of spawners declines, the nutrients available to salmon fry also diminishes, causing a downward spiral in the spawning population, exacerbated by persistent disruptions to spawning and rearing habitat. When riparian vegetation and forest canopy re-emerges, it is not the same as it was before logging. It is not unlike the bleak forest that salmon first encountered when they recolonized this coast after the ice age. It can take a century or more for such badly-damaged riparian zones to recover.

"Because recovery of fish habitat from the effects of extensive logging in a watershed may take a century or more, recovery may never be complete if forests are clearcut harvested and watersheds are disturbed extensively on rotation cycles of about 100 years."

—United States Department of Agriculture, Forest Service. Report to Congress, Anadramous Fish Habitat Assessment. January, 1995.

British Columbians have been told that logging's "bad old days" are gone. Most British Columbians believe that the days of large-scale clearcuts, and logging down to streambanks, are over. Unfortunately, these things are not true, and the remaining, unlogged watersheds of the coast are in peril.

The Consequences of Clearcutting

Abdicating Responsibility

Until the late 1980s, it was common practice in British Columbia to clearcut forests without regard to the presence of salmon-bearing streams. Logging damage to salmon streams occurred as a rule—rather than the exception to the rule—even though Canada's Fisheries Act contained provisions that clearly outlawed damage to salmon habitat, and provided severe penalties for violating the law. The law was rarely enforced. Hillsides were clearcut from summit to streambank, and the damage these practices inflicted on salmon—damage that was obvious to aboriginal

Minimum Legal Widths of Reserve Zones & Management Zones

Riparian Class	Avg Channel Width (m)	Reserve Zone Width (m)	Management Zone Width (m)
S1–large rivers	**100**	**0**	**100**
S1–not large rivers	**>20**	**50**	**20**
S2	**>5 ≤20**	**30**	**20**
S3	**1.5≤5**	**20**	**20**
S4	**<1.5**	**0**	**30**
S5 (no fish)	>3	0	30
S6 (no fish)	3	0	20

Source: Forest Practices Code *Riparian Management Area Guidebook*, December 1995

people, fishermen, and environmentalists—was routinely justified on a variety of grounds. Lack of enforcement was routinely explained as a consequence of conflicting jurisdictions—BC owned the land, forest-tenure holders were ostensibly responsible for their conduct, the federal government maintained jurisdiction over fish habitat—and on it went.

The consequences of conventional logging were said to be easily remedied by engineering, resource-management techniques, salmon hatcheries and artificial spawning channels. It wasn't until 1988 that decades of contrary evidence, and significant public pressure, resulted in amendments to government policy. That year, federal fisheries officials, forest companies and provincial agencies adopted the "Coastal Fisheries Forestry Guidelines," which were intended to reconcile the conflicting purposes of industrial forestry and healthy salmon habitat.

Voluntary Guidelines Don't Work

The guidelines were based on the 1987 federal habitat policy described as "no net loss," which presumes that natural salmon habitat should be protected, but losses can nonetheless be made up by the creation of artificial habitat. Similarly, the provincial government had embarked on a policy of integrating the management of various forest resources.

The Coastal Fisheries Forestry Guidelines failed to meet even their own modest objectives.

Unveiled to a skeptical public, the guidelines were accompanied by government promises to review their effectiveness. Four years after the guidelines were adopted by the forest industry, the BC environment ministry conducted a study to evaluate whether the guidelines were working.

In March, 1992, an independent environmental consulting firm, D. Tripp Biological Consultants, was retained to conduct an audit of coastal forest operations to determine what the guidelines had achieved. The audit included a review of 21 cut blocks, randomly selected on Vancouver Island.

The Tripp report found that in the four years that followed the adoption of the Coastal Fisheries Forestry Guidelines, half the waterways in the surveyed cut blocks had been rendered unstable as a result of logging. "Complete habitat loss" occurred on 12 streams in the surveyed cut blocks, while another 21 waterways sustained either partial or minor habitat loss.

After years of public protests, the glare of international scrutiny, and the obvious failure of both federal and provincial governments to protect salmon habitat, the BC government, in 1993, unveiled its intention to introduce a new regulatory regime in forestry, known as the Forest Practices Code.

Salmon stream in Green Inlet. B.C.'s Forest Practices Code does not apply to private land logging and streams rich in salmon can be clearcut right to the banks if located on privately owned land.
(Ian Hunter/Greenpeace)

A New Era in Forestry?

The Forest Practices Code was presented as the foundation for a "new era" in forest practices in the province. The BC government spent hundreds of thousands of dollars on television, radio and newspaper advertisements, pledging that the Forest Practices Code would significantly restrict the way logging would be allowed. One such advertisement, in a December, 1993 edition of The Vancouver Province newspaper, boasted: "The massive clearcutting of the past will no longer be acceptable. And in sensitive areas—such as wildlife habitat areas and near fish-bearing streams—clearcuts will be outlawed."

When the Forest Practices Code was unveiled, BC's premier was Mike Harcourt. He repeatedly assured weary voters, and skeptical observers in the United States and Europe, that the logging's bad old days were gone. At the Globe 94 Conference in Vancouver, Mr. Harcourt said: "We are reducing the size of clearcuts, and we are banning clearcuts where necessary to protect critical wildlife habitat, fish-bearing streams and other sensitive forest values." In July, 1994, the Washington Times reported: "Wide chunks of forest the size of football fields are no longer cut."

The Forest Practices Code of British Columbia Act was finally adopted in 1995. Mindful that Canada's international reputation had been badly tarnished by television images of denuded coastal mountains and frequent protests by environmentalists, Canadian embassies praised the new regime. California consul-general Robert Richard, in a March, 1996 letter to Santa Monica city council, hailed BC's new forest regime as "replacing conventional logging methods with new leading edge approaches."

The British Columbia public believed that the Forest Practices Code would severely curtail clearcutting. In a November, 1996 poll conducted for the Sierra Legal Defence Fund, 71.6 of respondents said they believed clearcutting had either been brought to an end in the province, or was being phased out, or was otherwise rarely employed as a logging practice.

Unfortunately, nothing of the kind had happened. Clearcutting continued much as it had before, with one noteworthy exception. As Premier Harcourt and other high-profile salesmen of the Code repeatedly said, the size of individual clearcuts was coming down. What they didn't say was that this was arguably worse for the environment than what was previously the case.

Because the province continued to allow companies to log the same volume of trees as before, all that smaller clearcuts accomplished was to fragment a wider area of land. More roads and more cut blocks were required to get the same amount of wood out. That means that until the government reduces the Annual Allowable Cut, fragmentation of the rainforest and threats to salmon and other forest-dependent wildlife will continue.

The Forest Practices Code: Another Failure

In a review of harvest plans for 10,000 cut blocks approved by the BC government over an 18-month period after the Forest Practices Code became law, the Sierra Legal Defence Fund (SLDF) conducted an audit which found that clearcutting continued as the only type of logging practice underway in 92% of the cut blocks. In the forest ministry's sprawling Vancouver region, 97.8% of the cut blocks were being clearcut.

The Forest Practices Code did not require clearcuts to be smaller than football fields (which are less than a hectare). The Forest Practices Code allows clearcuts up to 60 hectares in size. Even so, the SLDF audit found cut blocks in excess of 100 hectares in size. As for salmon-habitat protection, most small forest streams were being clearcut to the streambank. SLDF field biologist John Werring concluded: "In virtually every area being harvested there are rivers and streams that support salmon and/or trout and other important fish species. These streams are being systematically destroyed by clearcut logging practices."

"The real concern is the extent to which our forest streams continue to be clearcut up to both banks, while the logging companies claim to be in full compliance with the Forest Practices Code. Of the 1,086 streams reviewed, the Ministry of Forests had approved 897 for the complete elimination of the riparian area by clearcutting."

—Stream Protection Under the Code: The Destruction Continues. Sierra Legal Defence Fund. February, 1997

In February, 1997, SLDF published a second, more in-depth audit of forestry in British Columbia under the Forest Practices Code. In a review of logging "prescriptions" that had been applied in the vicinity of 1,086 streams, the BC forests ministry had approved plans that resulted in the complete elimination of riparian areas by clearcutting. In field investigations, SLDF staff found that 10% of the streams within cut blocks were not identified in clearcutting plans submitted to the forests ministry for approval, and one-third of the streams that were identified were improperly classified. Of the streams that were identified in forest company cutting plans, forest ministry officials permitted yarding timber across half of them.

Accuracy of Stream Classification

Stream Class	Number of Stream Reaches Assessed	Number of Stream Reaches Correctly Classified	Number of Stream Reaches Overclassified	Number of Stream Reaches Underclassified	Total Number of Stream Reaches Incorrectly Classified
S1	**18**	**18**	**0**	**0**	**0**
S2	**29**	**23**	**0**	**6**	**6**
S3	**43**	**21**	**0**	**22**	**22**
S4	**42**	**20**	**4**	**18**	**22**
S5	**33**	**21**	**0**	**12**	**12**
S6	**190**	**163**	**8**	**19***	**27**
All	**355**	**266**	**12****	**77**	**89**

*Stream classified as S6 by the field teams, though operators had not previously classed them as streams.

**In addition to these were 25 watercourses classed as streams but subsequently determined by the field teams not to be streams.

Source: Forest Planning and Practices in Coastal Areas with Streams, Technical Report, Forest Practices Board. June 1998.

In 1998, the B.C. Provincial government undertook its own assessment of stream protection and compliance with the Code. The Ministry of Forests selected a sample of 96 cutblocks within six coastal forest districts. The field investigation studied 355 streams within the selected logging blocks. In fish-bearing streams between 1.5 and 5 metres in width, where a riparian protection zone of 20 metres is mandatory, the Ministry study found a compliance rate of only 65% by the forest companies. 22 of the 43 streams in the category were "misclassified." Ultimately, 15 of these streams were not protected and the riparian zones were logged.

In addition, the government study determined that 18 out of 42 streams that should have been identified by the forest companies as supporting fish were underclassified as "non-fish-bearing." This led to the dumping of wood debris in the streams, an activity strictly prohibited if the companies had correctly classified the streams as fish-bearing.

In spite of mounting evidence that the Code needed to be strengthened and more vigorously enforced, the B.C. government's response to continued stream destruction by the logging industry was to weaken the Code even further. In April of 1998, reacting to industry pressure, the government announced roll-backs to "streamline" the Code. Claiming the changes would only reduce paperwork and bureaucracy while not affecting environmental protection, the B.C. government implemented over 500 "cost-cutting" slashes to the Code requirements. These included the elimination of key planning measures and information submissions which forest district managers relied on to evaluate impacts related to logging and road building. For instance, fish stream inventories and terrain stability assessment reports no longer require review by government staff. Nor will these reports be made available to the public. Logging may proceed even before fish streams have been properly identified. In effect, the Ministry of Forests has turned over almost all planning to company-paid foresters and will allow the corporations to "approve" their own logging plans. The government's own announcement of procedural changes included allowing the maximum soil disturbance requirements to be exceeded during road construction, providing the logging company includes plans for rehabilitation to be undertaken after harvesting is completed. By then, it may be too late to prevent stream damage.

And, in a dismal failure of government responsibility to protect biodiversity, the Forest Practices Code still does not apply to logging conducted on private lands. Endangered salmon stocks dependent on streams running through private land receive no riparian protection at all, and all the worst and most destructive logging practices can be undertaken with impunity.

Another glaring deficiency of the Code relates to its provisions for leaving buffers of trees along fish streams. The Code calls for 50-metre leave-strips of trees along fish rivers greater than 20 metres in width. The buffers decline to 30 metres on streams 5- to 20-metres in width, and to 20 metres on streams between 5 metres wide and 1.5 metres wide. For streams less than 1.5 metres in width, the very streams that often nurture runs of endangered coho and steelhead salmon, the Code affords no protection at all. Clearcutting these small streams right to the banks is still allowed. Furthermore, even if there are no fish present, these small creeks flow directly into the larger streams where buffer zones are required.

This is a major flaw in the Forest Practices Code. It makes little or no provision for the protection of forests alongside feeder streams and tributaries. This leaves the door open for widespread logging-related damage to smaller streams, which in turn carry sediments and debris into the allegedly "protected" water bodies they empty into.

On national forest lands in the US Pacific Northwest, far more protection is afforded fish habitat. Any fish-bearing river or stream regardless of its width is required to have a 92-metre buffer strip of trees. All tributaries and creeks receive a buffer zone at least half the size (46 metres) of the zone along fish-bearing streams, and even seasonal streams receive a 30-metre riparian protection zone. The bottom line is that Washington State offers more protection to non fish-bearing feeder creeks than B.C. gives to our top salmon streams.

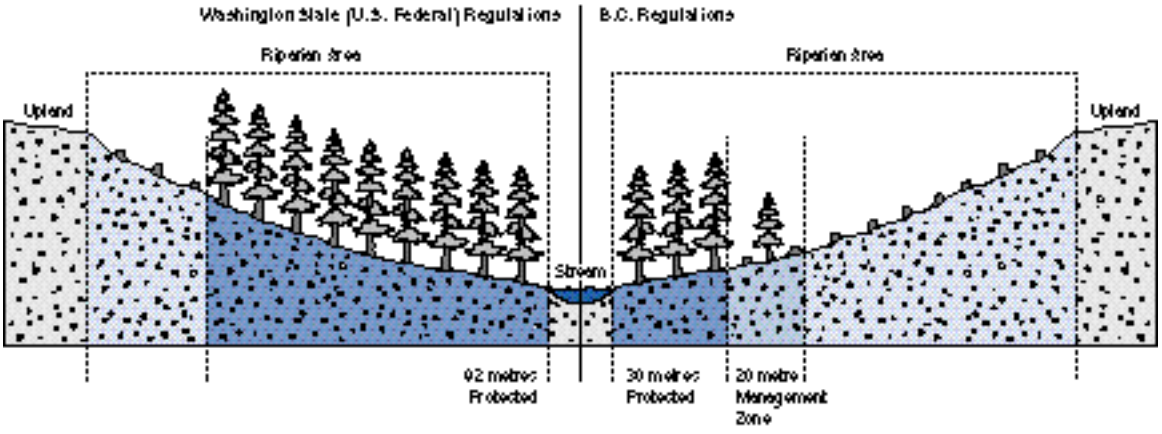
Even in the State of Alaska, which in recent years has been denounced by the BC government for its alleged over-fishing of BC-bound salmon stocks, 30-metre buffer strips along all Class 1 fish streams are required in all coastal state forests. And all Class 2 streams flowing into Class 1 streams, even those where no fish are present, are afforded the same protection. And while B.C.'s Forest Practices Code affords no protection at all to salmon streams on private lands, Alaska will soon require 20-metre buffer zones around Class A and Class B streams, with some logging allowed on a single tree approval basis.

"We need 100 metre buffer zones. Salmon streams, and the forests around them, should be sacrosanct."

—Dennis Brown, former United Fishermen and Allied Workers Union President, currently Premier Glen Clark's Special Advisor on Fisheries, in Forest Practices in British Columbia—Not a World Class Act. B.C. Wild, 1994

With its neighbours making it a legal requirement to do more to protect threatened and endangered fish stocks, BC is hardly in a position to claim that it leads the world with its forest practices.

Riparian Management Areas



No Help From the Federal Government

Meanwhile, the federal government was faring no better in meeting its objective of "no net loss" of fish habitat. The policy had undergone some refining over the years, adding a further "net gain" objective to the Department of Fisheries and Oceans' salmon-habitat mandate. But a 1997 review of how successful its policy had been in the decade since its adoption resulted in a litany of complaints. There was lack of consistency in DFO's approach to its "no net loss" mandate, and "no net loss" was simply not being achieved in the province's rural areas. The cumulative effects of natural habitat loss were not being addressed, no comprehensive mapping and inventory system existed, and fisheries staff were labouring under "unmanageable workloads." Internal DFO assessments included these: "We do not have enough people, especially field staff," and "Proponents are not required to be responsible for repair and maintenance of compensatory works for as long as their impact exists."

In December, 1997, a report by the Auditor-General of Canada reached the same conclusions, describing the federal government's ability to protect salmon habitat as "questionable," given the BC government's jurisdictional authority over land use and logging, and change "depends especially on BC being held accountable for its own habitat responsibilities." Meanwhile, "no overall status report on salmon habitat is available to assess the impact of habitat loss on the resource."

It's Now or Never

In 1998, a far more sweeping rejection of the status quo was issued by an independent panel of advisors to the Department of Fisheries and Oceans, which concluded that DFO's policy "has not prevented habitat loss and degradation."

Assigned to review the effectiveness of habitat-protection measures in BC, the panellists were not naive idealists. They included a former DFO Pacific Regional Director-General, a former chairman of the Pacific Salmon Commission's Fraser Panel, the BC Environment Ministry's former Fisheries Branch Director, and a former director of the Salmonid Enhancement Program. The panel bluntly concluded that "it's now or never" for the salmon and issued the following warning:

"The salmon's lifeline is becoming more frayed every day, and unless immediate and meaningful action is taken, the wild salmon resource could suffer a collapse from which it may never recover."

The panel's report, titled *"A Living Blueprint for BC Salmon Habitat,"* noted that at least 40% of BC's forests have been logged without due attention to salmon habitat, and the threats posed by conventional logging practices continue.

"Even when mitigation or compensation for habitat loss is prescribed by regulators, rarely are the results properly monitored and evaluated. Furthermore, we do not know how to mitigate or compensate for all losses under all conditions (this shortcoming heightens the importance of protecting the remaining productive salmon habitat)."

The panelists have identified a remedy critical to the future of salmon. "Protecting the remaining productive salmon habitat" is precisely what is required to save the endangered salmon stocks of the Great Bear Rainforest and salmon throughout B.C..

Taxpayers Fund the Wreck-It-Then-Fix-It Approach

Elaborate and costly habitat-loss remediation measures are an outgrowth of the same ideology that has justified clearcut logging throughout this century. It is an ideology that produced fish hatcheries, tree plantations, the Coastal Fisheries and Forestry Guidelines, the Forest Practices Code, and most recently, Forest Renewal BC (FRBC).

FRBC is based on the notion that clearcutting is justifiable, on the grounds that the ecosystems that clearcutting destroys can be fixed, patched up, or simply replaced with tree plantations, artificial spawning channels and a variety of public works. The folly of this approach—wrecking nature, and then relying on publicly-funded engineering and "science" to fix it—is matched only by the irony of it.

Not only has the approach failed repeatedly through the years, but it has become a function of the very damage it is ostensibly designed to fix: FRBC is a reinvestment of stumpage fees in habitat restoration projects.

In order to fund those projects, the forests ministry allows clearcut logging, which destroys more habitat, which requires massive expenditures of public funds, which come from stumpage rates applied to forest firms engaged in clearcut logging. And on it goes.

Budget approvals for the 1997/98 fiscal year illustrate the cost to the taxpayers of this approach. FRBC budgeted $32,300,000. for instream and riparian restoration programmes and a further $69,500,000 for upland restoration activities including road rehabilitation and slope stabilization.

Related to Forest Renewal BC is a sister initiative known as the Watershed Restoration Program. In 1997, BC environment ministry biologists working for the Watershed Restoration Program completed an in-depth examination of the consequences of industrial forestry on the coast, and the public resources that will be required to restore logging-related damage to coastal watersheds.

"The scale of past streambank logging in the province will likely result in costs to rehabilitate streams — at about $50,000 to $60,000 per kilometre, where feasible — that are equivalent in magnitude to the costs required for the province-wide stabilization of hillslopes," the study concluded. "The backlog of logging-impacted watersheds with significant road failures and erosion is immense. Preliminary estimates indicate that it would cost several hundred million dollars to manage all impacted hillslopes because there are an estimated 130,000 km of non-status and abandoned roads."

The study concluded that restoration of damaged coastal riparian areas will end up costing the public about $15,000 per hectare. Based on an estimate of 2,000 streams that have been logged to the streambanks for an average distance of 10 kilometres, "20,000 kilometres may require stream and/or riparian rehabilitation, or equivalent in cost to hillslope restoration (there are 2,576 known salmon streams alone in British Columbia). This equates to a potential need of 20 to 40 years of hillslope and stream rehabilitation in British Columbia at $50–$100 million per annum."

The Choice is Ours

The long-term public costs of conventional logging practices — clearcut logging — are staggering. The cost that clearcut logging has imposed upon the coast's salmon populations, to environmental integrity, and to ancient, fully-functioning ecosystems, has been immense.

As the 1990s draw to a close in British Columbia, the forest industry is now moving in on the last, pristine watersheds of the west coast temperate rainforest. The 69 remaining large, intact rainforest valleys of the Great Bear Rainforest are slated for road building and logging in the next 5 to 10 years. The forests that shelter the salmon and the salmon that are vital to the survival of grizzly bears, eagles and ancient trees are under siege. In the words of the Living Blueprint for BC Salmon Habitat, "it's now or never." Will we act to protect this global treasure? Or will we be the generation that allows it to slip through our fingers and vanish forever?

"No other place in the world has such a fantastic group of species that links the land with the ocean the way salmon do. It's such a tragedy to see these species decline to such a point."

—Dr. Michael Soule, Centre for Conservation Biology, Greenpeace video, August 1998.

Ellerslie Lake estuary in the Great Bear Rainforest near Bella Bella. One of a complex of 4 lakes including the Mooto, Ingram and Pollalie, slated for clearcutting by Western Forest Products. (Greenpeace/Lenz)

Salmon are an absolutely essential component in the diets of coastal bear populations. Clearcut logging that threatens salmon populations threatens, in turn, the very survival of bears, eagles and other wildlife dependent on the rich salmon runs. (Kozak)

Solutions:

• *According to a report by internationally renowned conservation biologist Dr. Michael Soule, up to 45% of the temperate rainforest should be deferred from logging until we can determine exactly how much is needed to protect rare and threatened species from extinction. Otherwise, Dr. Soule maintains, if B.C. continues with the policy of protecting only 12% of the land base, up to 50% of the rainforest's species could be threatened with extinction.*

• *Greenpeace is calling for protection of the remaining large, intact coastal temperate rainforest valleys and an end to industrial clearcutting and the construction of new roads in B.C.'s ancient temperate rainforests.*

• *Greenpeace is calling for immediate improvements in both the standards and enforcement of the Forest Practices Code throughout B.C. To ensure the survival of salmon runs at risk, it is imperative that riparian protection zones in B.C. be immediately upgraded to standards equivalent to those in place in Washington State. Riparian protection zones of 100 metres are essential for all fish bearing rivers and protection zones of 50 metres minimum are required for all feeder creeks and streams.*

SOURCES

1. Richard Hebda and Cathy Whitlock, *Environmental History,* in *The Rainforests of Home: Profile of a North American Bioregion,* Island Press, Washington, D.C., 1997.

2. Wayne Suttles and Diamond Jenness, *Katzie Ethnographic Notes and The Faith of a Coast Salish Indian*, Anthropology in BC Memoirs Nos. 2 and 3, British Columbia Provincial Museum, 1955.

3. Sharon Levy, *Ultimate Sacrifice,* New Scientist, September 6, 1997.

4. The Wilderness Society, *Pacific Salmon and Federal Lands: A Regional Analysis,* Wilderness Society Bolle Center for Forest Ecosystem Management, Washington, D.C., 1993.

5. Ecotrust, Pacific GIS, and Conservation International, *An Atlas of Peoples and Place,* Portland, Ore.,1995.

6. Cornelius Groot and Leo Margolis, *Pacific Salmon Life Histories,* University of British Columbia Press, 1991.

7. John Millar, Nick Page, Melody Farrell, Barry Chilibeck, and Matthew Child, *Establishing Fisheries Management and Reserve Zones in Settlement Areas of Coastal British Columbia,* Canadian Manuscript Report, of Fisheries and Aquatic Sciences, No. 2351, 1997.

8. D. Tripp, A. Nixon, R. Dunlop, *The Application and Effectiveness of the Coastal Fisheries Forestry Guidelines in Selected Cut Blocks on Vancouver Island.* Ministry of Environment, Lands and Parks, 1992.

9. P.A. Slaney and A.D. Martin, *The Watershed Restoration Program of British Columbia: Accelerating Natural Recovery Processes.* Water Quality Res. J. Canada, Volume 32, No. 2, 1997.

10. Sierra Legal Defence Fund, *British Columbia's Clear Cut Code: An SLDF Report,* November, 1996.

11. Sierra Legal Defence Fund, *Stream Protection Under the Code: The Destruction Continues.* February, 1997.

12. Quadra Planning Consultants, *No Net Loss of Habitat: Assessing Achievement—Workshop Proceedings.* Fraser River Action Plan/ Department of Fisheries and Oceans, February, 1997.

13. Auditor-General of Canada, *Report of the Auditor-General of Canada to the House of Commons, Chapter 28, Fisheries and Oceans Canada—Pacific Salmon: Sustainability of the Resource Base.* December, 1997.

14. Independent Panel report, *Living Blueprint for BC Salmon Habitat,* Pacific Salmon Foundation, 1010–409 Granville Street, Vancouver, BC, 1998.

15. Forest Planning and Practices in Coastal Areas with Streams, Technical Report, Forest Practices Board. June 1998.

16. Report to Congress, Anadramous Fish Habitat Assessment, January, 1995. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Alaska Region.

17. House of Commons, Issue No. 16, January 25, 1993. Minutes of Proceedings, Standing Committee on Forestry and Fisheries.

18. Clayoquot Biosphere Project, Upper Clayoquot River, Salmon Habitat Reconnaissance. 1993.

19. Watershed Talk, Fraser River Aboriginal Fisheries Secretariat.

20. Escapement Data 1987–1997, Department of Fisheries and Oceans, Pacific Biological Station.

21. Pacific Region Salmon Stock Management Plan, Discussion Document, 1986. Department of Fisheries and Oceans, Volumes: D-Butedale, E-Bella Bella, F-Bella Coola, G-Rivers Inlet and Smiths Inlet.

22. Salmon Expectations 1998, North Coast Areas 1-6, Central Coast Areas 7-10, Department of Fisheries and Oceans.

23. 1998 Forest Development Tracking List for the Midcoast, North Coast and Kalum Forest Districts, July 1998. John Nelson, David Suzuki Foundation.

24. Conservation Areas of Interest on the Mainland Coast of BC, Sierra Club and Raincoast Conservation Society, April 1996.

25. Canadian Technical Report of Fisheries and Aquatic Sciences, No. 1967.

26. Speaking for the Salmon, Workshop Proceedings, Simon Fraser University, Edited by Dr. Patricia Gallaugher and Laurie Wood. January, 1998.

27. Geographic Distribution of Salmon Spawning Streams of British Columbia, I.V. Williams and T.J. Brown, Department of Fisheries and Oceans, Pacific Biological Station. March, 1994.

28. Escapement Estimates, North Coast Management Areas 1-10, Department of Fisheries and Oceans, Prince Rupert. January, 1997.

29. BC Investments in Fisheries Conservation, Restoration and Enhancement, Budget Approvals for Fiscal Year 1997/98. B.C. Fisheries Secretariat, October, 1997.

30. Ministry of Forests, News Release/Backgrounder, April 2, 1998. *Forest Practices Code Amendments.*

The Canadian Raincoast

Undeveloped rainforest watersheds over 5,000 hectares (12,500 acres) and ecologically important islands and watersheds under 5,000 hectares in Coastal British Columbia.

Note: This is a preliminary map. Some watersheds or other significant areas may have been omitted. Cartography by Baden Cross, Raincoast Conservation Foundation.

Verney Falls in the northern Great Bear Rainforest. (Ian Hunter/Greenpeace)

1 Lower Walbran
2 Clayoquot Valley
3 Upper Bolson
4 Sydney
5 East
6 Klaskish
7 Shushartie
8 Douglas
9 Sims Valley
10 Upper Elaho
11 North
12 Boulder
13 Salal
14 Upper Stafford
15 Kwalate
16 Ahnuhati
17 Upper Kakweikan
18 Ahta
19 Waump
20 Canoe
21 Takush
22 Smokehouse
23 Nekite
24 Pier-Rhind
25 Lockhart-Gordon
26 Allard
27 Johnston
28 Sandell
29 Dallery
30 Doos
31 Phinney-Reeve
32 Ashlulm
33 Amback
34 Elizabeth Lake
35 Koeye
36 Cold Lake
37 Namu Lakes
38 Ickna
39 Talheo/Hotsprings
40 K'iskwatsta
41 Nusash
42 Jump Across
43 Swallop
44 Humpback
45 Sutslem
46 Skowquiltz
47 Nascall
48 Green
49 Ista
50 Paradise
51 Four Lakes
52 Shack Bay/Ripley Bay
53 Roscoe
54 Quartcha
55 Neekas
56 Ellerslie
57 Ingram Mooto/ Pollalie/Western
58 Pooley Island
59 Bloomfield Lake
60 Carter Lake
61 Nias
62 Arnoup
63 Green Inlet
64 Yule Lake
65 Canoona
66 Khutze
67 Aaltanhash
68 Klekane
69 Kiltuish
70 Kowesas
71 Barrie
72 Wahoo
73 Brim/Owyacumish
74 Bish, Emsley, Jesse
75 Giltoyees
76 Foche
77 Quaal
78 Lowe-Gamble
79 Ecstall
80 Khtada Lake
81 Khyex
82 Exchamsicks
83 Chambers
84 Johnston
85 Burton
86 Iknouk
87 Stagoo
88 Olh
89 Kshwan
90 Security
91 Government
92 Tlell
93 Hancock
94 Otun
95 Jalun
96 Beresford
97 Otard
98 Cave
99 Coates
100 Ursus Valley

First Nations people have depended on the salmon for millenia. Harvesting at Moricetown on the Bulkley River. (Kozak)

Status of Endangered Salmon in Threatened Rainforest Valleys

The following provides an overview of pristine or largely undeveloped valleys on the Mid-coast and North coast of British Columbia which are slated for roading and logging. Salmon species present in each valley are listed. Historic abundance is compared with the most up-to-date information on salmon counts.

The figures given are for escapement counts—the total number of salmon that have "escaped" capture in the commercial, sport and aboriginal fisheries and have returned to their stream of origin to spawn (reproduce). The next generation of salmon is dependent on healthy escapements. Runs below 100 fish are generally considered to be at high risk of extinction. However, even counts of "zero" salmon spawners do not mean the run is extinct. Counting methods used by the Department of Fisheries vary widely from field staff walking the streams to aerial surveys so the numbers are not necessarily accurate. Extinctions can be prevented, but only if government and industry are prepared to act now to prevent further loss.

It is important to remember that many of these runs of salmon were small in numbers to begin with. While some of the large, commercially targeted runs of pink and sockeye salmon can number in the hundreds of thousands, a good run of salmon in a coho stream could be as small as 1,500. What matters is that the fish are there—in numbers that the ecosystem needs. Their presence is a vital link in the chain of life. Their loss could unleash consequences we can only imagine.

These unique runs of salmon cannot be easily replaced with hatcheries or artificial propagation methods. Every salmon returns to spawn in the stream where it was born, and in every stream each species is genetically unique, adapted over millenia to the conditions of that particular stream. As the Department of Fisheries notes, eggs from southern sockeye stocks don't incubate successfully in colder northern streams. According to DFO, "Man-made or natural disasters which wipe out a particular stocks are devastating, since it takes tens of thousands of years for evolution to create the proper genetic program for a stock."

Dramatic declines in salmon abundance have occurred in all valleys and across almost all species in these forested rivers and streams. The damage caused to stream habitat by industrial logging in the last remaining pristine valleys of the Great Bear Rainforest could seal the fate of these threatened salmon runs.

ENDANGERED SALMON

Sockeye

Alias: *Red*
Small (avg. 7kg) but valued mainstay of the commercial fishing industry in B.C.

Chum

Alias: *Dog*
Abundant and widely distributed; often preferred smoked.

Steelhead

Actually a sea-going rainbow trout.
Highly prized sport fish. Many runs at risk.

Chinook

Alias: *Spring, Tyee, King*
Largest Pacific salmon, prized sport fish, (up to 57kg), increasingly rare

Coho

Alias: *Silver*
Up to 14kg; valued sports fish, spawns in small streams, many runs at high risk.

Pink

Alias: *Humpback*
Smallest Pacific salmon but most abu

Aaltanhash River

Endangered: Chum salmon

The Aaltanhash estuary on the north coast is an important tidal holding area for migrating fish. A beautiful river, it has great potential for sportsfishing use. The river is navigable by canoe or kayak. It has hotsprings and high tourism potential. The remnants of an old native fish trap are visible. Resident wildlife species of note include grizzly bears, wolves and deer.

Status of Logging

The forest tenure in the Aaltanhash is Tree Farm Licence 25, which is held by Western Forest Products (WFP). Western's original FDP was submitted with a 60 day public review period. The FDP was rejected due to the omission of assessments under the Operational Planning Regulations. WFP is submitting a new Forest Development Plan (FDP) for the area.

Status of Salmon

Chinook: The Department of Fisheries reported a high of 400 fish in 1963. No chinook were observed in the river in 1996 or 1997.

Pink: In 1964, a DFO count of pinks set the number on the Aaltanhash's spawning grounds at 15,000 fish. In 1996 pink salmon numbered only 2,500.

Sockeye: Resident sockeye spawners numbered 600 in 1989. In 1997, DFO found 9 fish.

Coho: Between 1983 and 1992, there an average of 853 coho spawners were in the Aaltanhash, down from a maximum of 3,500 in 1964. By 1997, there were only 100 coho spawning in the river.

Chum: In 1967 there were 3,500 spawning chum. By 1997, the count rested at 20.

Steelhead: The Aaltanhash is home to winter-run steelhead, but no stock assessments were made available.

Historical Data	1950s Avg	1960s Avg	1970s Avg	1980	1981	1982	1983
Chum	**13,030**	**21,694**	**6,428**	**1,427**	**1,890**	**3,528**	**1,800**

Note: The above historical run-size figures are for the combined escapement of chum from 11 streams including the Aaltanhash
Target escapement: 20,100

Species Summary	Avg. 1983–1992	High / Year	1993	1994	1995	1996	1997
Chum	**37**	**3,500 / 1967**	**35**	**25**	**55**	**25**	**20**
Coho	**853**	**3,500 / 1967**	**385**	**275**	**220**	**125**	**100**
Chinook	**0**	**400 / 1963**				**n.o.**	**n.o.**
Pink	**2,055**	**15,000 / 1964**				**2,500**	**3,100**
Sockeye	**200**	**600 / 1989**				**n.o.**	**9**

Department of Fisheries Abbreviations for all stream data:

Non Observed = n.o.
Not Inspected = n.i.
Unknown = unk.
Present = pst

Blank spaces indicate no data provided by DFO

Allard Creek

Endangered: Coho salmon

This creek on the Mid-coast is in the traditional territory of the Oweekeno First Nation. The beautiful lagoon at the entrance to the valley provides sheltered anchorage to recreational boaters and excellent crab fishing. Mudflats in the estuary are used by waterfowl, the creek has a plentiful run of cutthroat trout and the upper valley is used by grizzly bears. The creek is home to endangered coho salmon.

Status of Logging

The forest tenure in this area is held under a forest license by International Forest Products (Interfor). There is no Forest Development Plan at time of writing, but one could be submitted quickly, depending on whether Interfor agrees to logging moratoria in other valleys.

Status of Salmon

Coho: In 1963, 750 resident coho were counted. In 1987 and again in 1989 no coho were observed. No coho assessments were made between 1993 and 1997.

Chum: A high of 1,500 chum spawned in the Allard in 1980. By 1994, DFO's count was down to only 120 spawners. The 1996 count was 100 chum salmon and the river was not inspected for chum in 1997.

Pink: The average number of pink spawners in the creek between 1983 and 1992 was 231 salmon. The maximum recorded was 2,400 fish in 1985. By 1991 there were only 7 spawners recorded. The creek was last inspected in 1994, when the pink count totaled 100.

Chinook and Sockeye: Not present.

Steelhead: Resident, but no counts.

Recent Counts	1987	1988	1989	1990–1992	1993–1997
Coho	**n.o.**	**7**	**n.o.**	**unk.**	**n.i.**

Species Summary	Avg. 1983–1992	High/Year	1994	1995	1996	1997
Chum	**412**	**1,500 / 1980**	**120**	**230**	**100**	**n.i**
Pink	**231**	**2,400 / 1985**	**100**	**n.i.**	**n.i.**	

Amback Creek

Endangered: Chum salmon

This creek on the Mid-coast supports an endangered run of chum salmon. The creek is home to resident grizzly bears who depend on healthy salmon returns for their survival. Amback Creek supports steelhead, cutthroat trout and Dolly Varden.

Status of Logging

The status of logging in this watershed is uncertain. The area is uncharted. In other words, no tenure has yet been awarded that would result in a Forest Development Plan being submitted.

Status of Salmon

Chum: Only 2 chum were observed in 1987, down from a modern-day estimated maximum of 400 spawners in 1980. None were observed between 1989 and 1991, and no inspections were done by DFO between 1993 and 1997.

Chinook: A high of 50 chinook was reported in 1980. Between 1983 and 1992, no chinook were reported.

Pink: From a high of 7500 in 1974, pink returns averaged 75 between the years 1983 and 1992.

Sockeye: Sockeye salmon are by far the creek's healthiest salmon species. But they too are on the decline. From a high of 180,000 in 1991, numbers dropped to an average of 34,250 fish between 1983 and 1992. By 1997, they were down to 15,000.

Recent Counts	1987	1988–1991	1992	1993–1997
Chum	**2**	**n.o.**	**unk.**	**n.i.**

Species Summary	Avg. 1983–1992	High / Year	1994	1995	1996	1997
Chum	**0**	**400 / 1980**				
Chinook	**0**	**50 / 1985**				
Pink	**75**	**7,500 / 1974**				
Sockeye	**34,250**	**180,000 / 1981**				

Canoe Creek

Endangered: Pink and Chum salmon

This watershed on the Mid-coast has high grizzly bear values because of its declining, but still productive sockeye salmon runs. It is an important corridor linking the Smokehouse, Draney, Oweekeno and Rivers Inlet system. Other resident wildlife species include black bears, wolves and a small run of big chinook salmon. Dolly Varden and Cutthroat trout are also considered plentiful.

Status of Logging

MacMillan Bloedel Ltd. holds the tenure in this area. The area comprises a small part of TFL 39.

Status of Salmon

Sockeye: While still significant, sockeye numbers appear to be on the decline. In 1993, the DFO counted 66,000 sockeye salmon spawning in the creek. The average number of sockeye reported between 1983 and 1992 was 48,550 fish. By 1997, the count was only 9,600 sockeye.

Pink: Virtually no data. DFO has not inspected the creek for pink salmon in recent years.

Chum: Virtually no data. Not inspected.

Chinook: Virtually no data, although sportsfishers say there are a small number of big chinook.

Coho: From a high of 3500 coho in 1962, coho returns averaged zero between 1983 and 1992.

Species Summary	Avg. 1983–1992	High / Year	1997
Chum	**0**	**0 / 1983–92**	
Chinook	**0**	**0**	
Pink	**0**	**0 / 1983–92**	
Sockeye	**48,550**	**60,000 / 1987**	
Coho	**0**	**3,500 / 1962**	

Canoona Creek

Endangered: Chum salmon

According to DFO reports, this North coast creek is considered one of the most important in the region for coho salmon. Fisheries Department reports note that the Canoona is consistently a large coho producer, but current escapements are estimated to be only 10% of DFO's target.

Status of Logging

This drainage is within WFP's TFL 25. A Forest Development Plan is in deferral.

Status of Salmon

Pink: The pink count in 1993 was 21,000. In 1997 it was 6,000. DFO's target escapement (escapement meaning the number of fish they aim to put on the spawning beds in Canoona Creek) is 25,000 fish. The 1997 escapement of 6,000 fish represents only 24% of the target.

Chum: From 1987 to 1997 the number of chum ranged from zero to no higher than 12 fish.

Chinook: In 1996, only 1 chinook was counted. The next year, zero.

Coho: As recently as 1993, the coho count was 1,200 fish. By 1995 the count had dropped to 300, and stayed static in 1996 and 1997. Current coho escapements are estimated to be 10% of the DFO target of 12,900 fish.

Steelhead: Winter-run steelhead are reported. Numbers unavailable.

Recent Counts	1987	1988	1989–90	1991	1992	1993	1994	1995	1996	1997
Chum	**n.o.**	**1**	**n.o.**	**3**	**n.o.**	**12**	**n.o.**	**5**	**n.o.**	**unk.***

*reported elsewhere by DFO as zero (0)

Carter River/Carter Lake

Endangered: Coho salmon

This Mid-coast watershed is home to grizzly bears, wolves and mountain goats. Resident trout live in the lake, old First Nations fish weirs are present and a beautiful waterfall flows into the estuary.

Status of Logging

The forest tenure in this area is held by WFP. There is no Forest Development Plan at present.

Status of Salmon

Coho: From a recorded count of 1,500 in 1966, coho numbers have steadily declined. Between 1983 and 1992, there were an average of only 3 coho counted each year. No inspections and counts were carried out in 1996 or 1997.

Chum: In 1971, 10,000 chum were counted by DFO on the Carter River spawning grounds. From 1988-1992 the average chum count was 200 fish. In 1993 the count climbed to 1,500 chum, but then began to plummet, reaching a low of 10 fish in 1994. The 1997 count stood at 50 chum.

Chinook: Only 25 were counted in 1960. Between 1983 and 1992, zero were sighted. From 1990–1993, DFO inspectors reported the chinook totals as "unknown."

Pink: In 1990, there were some 26,000 pink salmon counted. In 1997, the number stood at 20,000. The average count between 1983 and 1992 was 12,587 fish.

Sockeye: The average escapement between 1983 and 1992 was 3 fish.

Recent Counts	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Coho	**1**	**12**	**n.o.**	**n.o.**	**n.o.**				**n.i.**	**n.i.**
Chum	**200**	**200**	**360**	**200**	**150**	**1,500**	**10**	**100**		**50**

Species Summary	Avg. 1983–1992	High / Year	1997
Coho	**3**	**1,500 / 1966**	**n.i.**
Chinook	**0**	**25 / 1960**	
Chum	**200**	**10,000 / 1971**	**50**
Pink	**12,587**	**26,000 / 1990**	**20,000**
Sockeye	**3**	**6 / 1988**	

Dallery Creek

Endangered: Coho salmon

This Mid-coast watershed is considered an important corridor to the southern portion of the remaining wilderness area and the fishery values are of critical importance to the Oweekeno people. Grizzly bears frequent the area, feeding on fall sockeye runs and steelhead are present in the creek.

Status of Logging

At this time, the forest is uncharted, meaning it has not been dedicated to any one industrial logging interest.

Status of Salmon

Coho: From a maximum recorded coho count of 750 in 1965, numbers have steadily declined. There were an average of only 3 coho per year between 1983–1992. The stream was not inspected in 1993, 1994, 1995 or 1997.

Sockeye: Historically, Dallery Creek supported a strong sockeye run. But from a high of 125,000 fish in 1963, there has been a steady decline. Average escapement between 1983 and 1992 was 9,750 fish. In 1987 sockeye escapement was 21,500 fish. By 1991 the count was 10,000 sockeye on the spawning beds. In 1995 DFO counted only 1,000 spawners, in 1996 it had dropped to 250. Sockeye salmon do run in cycles, with low years and high years, but overall the Dallary Creek escapement numbers continue to decline.

Chinook: Between 1983 and 1992 an average of 6 chinook per year were counted. The maximum count was 200 fish in 1969. There were no chinook found from 1992–94 and when the creek was inspected again in 1997, no chinook were found.

Chum: Between 1983 and 1992 there were an average of 33 chum counted each year, with a high of 100 fish counted in 1990. There were no chum observed in the system in 1997. The last inspection that recorded chum salmon was a count of 20 fish in 1993.

Pink: Pinks averaged 4,400 spawners between 1983 and 1992. The highest escapement of pinks was in 1986 when there were 12,000 fish recorded. In 1994 inspectors counted 300 pink salmon. The 1997 count was 1,500 pinks spawning in Dallery Creek.

Species Summary	Avg. 1983–1992	High / Year	1989	1997
Coho	**3**	**750 / 1965**	**10**	
Sockeye	**9.750**	**125,000 / 1963**		**4,400**
Chinook	**6**	**200 / 1969**	**12**	**n.o.**
Chum	**33**	**100 / 1990**		**n.o.**
Pink	**4,400**	**12,000 / 1986**		**1,500**

Khutze River

Endangered: Chinook salmon

This North coast watershed's meandering salmon river provides perfect habitat for grizzly bears. The Khutze also supports wolves, mountain goats, deer and wolverine. It is a staging area for trumpeter swans, grebes and other birds. Rare marbled murrelets are also present. In addition to salmon, Dolly Varden and winter-run steelhead are also found in the river. An ancient fish trap and old village site are at the mouth of the river. The valley also contains hot springs.

Status of Logging

The forest tenure in this area is WFP's Tree Farm License 25. A Forest Development Plan for the area has been deferred.

Status of Salmon

Chinook: From a maximum recorded escapement of 1,500 fish in 1965, chinook numbers have steadily declined. In the years 1983 through 1992, the average annual escapement was 44 fish. In 1994 the chinook count was 20 fish. By 1997, the count was slightly higher at 55. The DFO manages the Khutze chinook along with 2 other streams and acknowledges that the combined escapement is recently only 3% of the Fisheries Department's goal.

Coho: The average annual escapement between 1983 and 1992 for coho was 450, down considerably from a recorded high of 7,500 fish in 1964. In 1997, there were still 400 coho in the Khutze river.

Chum: The average chum count between 1983 and 1992 was 5,525 fish. A high of 40,000 fish was recorded in 1973. In 1996, DFO counted only 2,000 chum.

Pink: An average of 30,500 pink salmon spawned in the Khutze between 1983 and 1992. The high for this period was 100,000 fish. In 1996, the recorded number was 60,000 fish. The 1997 count was 14,000. DFO information indicates even-year escapement in recent years have been less than 5% of the Department's target.

Sockeye: No spawning sockeye were observed in 1996 or 1997. Ten were recorded in 1985.

Recent Counts	1987	1988	1989	1990	1991	1992	1993	1994	1995	1997
Chinook	**71**	**20**	**25**	**60**	**62**	**30**	**42**	**20**	**29**	**55**

1996: unknown

Species Summary	Avg. 1983–1992	High / Year	1991	1992	1996	1997
Coho	**450**	**7,500 / 1964**	**800**	**200**		**400**
Chum	**5,525**	**40,000 /1973**			**2,000**	**3,500**
Pink	**30,500**	**100,000 / 1985**			**60,000**	**14,000**
Sockeye	**0**	**10 / 1985**			**n.o.**	**0**

Kiltuish

Endangered: Coho & Chinook

This North coast watershed has seen some logging in the Kiltuish Inlet but the river valley remains intact. The river valley and estuary are frequented by grizzly bears who feed on the spawning chum salmon. The salmon spawn primarily in small feeder creeks near the mouth of the river. A waterfall upstream from the river mouth makes it impassable to salmon. The river's estuary is considered highly productive.

Status of Logging

This area is within Western Forest Products' TFL 25. There is no Forest Development Plan at present. However, WFP would likely accelerate developing a plan if a logging moratoria was agreed to in other areas such as the Mooto/Ingram.

Status of Salmon

Coho: Between 1983 and 1992, the average annual coho escapement was 150 fish. The recorded high in 1968 was 3,500 fish. In 1997, only 50 coho spawned in the river system.

Chinook: From a recorded high of 400 chinook spawners in 1959, counts have steadily dropped. Between 1983 and 1992, no chinook were counted. Over a ten-year period ending in 1997 there were no chinook observed during the annual counts. The river was not inspected for chinook in 1995.

Chum: There are still runs of chum salmon in the Kiltuish River, but they appear to be in decline as well. Between 1983 and 1992 the average escapement was 5,625 fish. From 1993 to 1997, the average escapement dropped to 744 fish. In 1968 the Kiltuish chum run was 35,000 fish.

Pink: In 1966, DFO recorded a pink salmon escapement count of 50,000 fish in the Kiltuish. Between 1983 and 1992, the pink salmon escapement was averaging only 1,550 fish. In 1996 the pink count was 800 fish, in 1997 it was 25.

Sockeye: None.

Steelhead: Present, but not counted.

Recent Counts	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Coho	**100**	**200**	**n.o.**	**unk.**	**n.o.**	**—**	**unk.**	**8**	**160**	**n.i.**	**50**
Chum	**3500**	**7000**	**9000**	**3000**	**1000**	**600**	**700**	**1200**	**800**	**900**	**120**

Species Summary	Avg. 1983–1992	High / Year	1991	1992	1996	1997
Coho	**150**	**3,500 / 1968**				
Chinook	**0**	**400 /1959**				
Chum	**5,625**	**35,000 / 1968**				
Pink	**1,550**	**50,000 / 1966**			**800**	**25**

Historical Data	1950s Avg	1960s Avg	1970s Avg	1980	1981	1982	1983
Chum	**31,400**	**66,700**	**7,500**	**3,800**	**3,300**	**4,300**	**1,195***
Pink	**22,200**	**109,500**	**18,400**	**4,700**	**2,900****		

Kiltuish plus 8 other streams (managed as a group)

*DFO's target escapement for the 9 streams is 36,000 chum

**DFO's target escapement for the 9 streams is 50,000 pinks

Klekane

Endangered: Coho & Chum

This northern-mid coast watershed is home to Grizzly bears and lovely hot springs. Sportsfishing potential is considered to be high.

Status of Logging

The forest tenure in this area is held by Western Forest Products through TFL 25. There is no Forest Development Plan at present. WFP is submitting a new FDP which will cover this area.

Status of Salmon

Coho: From a recorded high of 7,500 spawning coho in 1963, escapement plummeted to an annual average of four fish between 1983 and 1992. In four of those years no coho were spotted, an event repeated as recently as 1996.

Chum: Between 1983 and 1992, the average escapement of chum was 50 fish. In 1962, there were a healthy 7,500 spawners recorded in the system. In 1997 only 20 chum were counted.

Pink: Pink salmon had an average annual escapement of 3,943 fish between 1983 and 1992. This is down from a recorded high of 15,000 fish in 1964. In 1997, there were 950 pink spawners counted.

Sockeye: In recent decades sockeye numbers have been extremely low, with recorded counts averaging one fish between 1983 and 1992. The 1996 count was 2 sockeye.

Chinook: Not present.

Steelhead: Present, but no numbers.

Recent Counts	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Coho	**2**	**15**	**n.o.**	**n.o.**	**n.o.**	**n.o.**	**15**	**1**	**32**	**n.o.**	**unk.**
Chum	**1**	**20**	**40**	**140**	**25**	**500**	**70**	**18**	**50**	**35**	**20**

Koeye River

Endangered: Chum salmon

This Mid-coast river valley has seen some previous logging and road-building on the northern edge of the watershed. The construction of a sports fishing lodge has caused some damage to the estuary and fish habitat. The valley is felt to have some of the highest grizzly bear values on the central coast. It is a key area for traditional food and commercial fisheries. Wildlife includes grizzly and black bear, wolves, deer, cougar, mountain goat, wolverine, river otter and other fur bearers. Non-resident Grizzly travel from Rivers Inlet to the Koeye in fall to feed on salmon. Other fish stocks include rainbow trout, cutthroat trout, steelhead. There are four ancient village sites as well as fish traps in the Koeye.

Status of Logging

The forest tenure in this valley is held by MacMillan Bloedel Ltd. through TFL 39. A Forest Development Plan for the valley has been deferred. Two cutblocks are planned for 1998.

Status of Salmon

Chum: In 1970, a high of 15,000 chum spawners were recorded in the Koeye. By 1983 through 1992, the average annual escapement had fallen to 15 fish. The numbers have crept back up in some recent years, reaching 800 in 1993 and 1,000 in 1996.

Sockeye: The average escapement of sockeye from 1983 to 1992 was 2,066 fish, less than half the average number recorded in the 1970s. While sockeye are still present, they appear to be on the decline. DFO records indicate 2,500 spawners in 1988, 600 in 1992, and 300 in 1996. The Fisheries Department goal for Koeye river sockeye is 20,000 spawners.

Chinook: In recent years, the highest recorded escapement has been 10 fish.

Coho: From a high of 7,500 fish recorded in 1979, local coho numbers have all but disappeared and may be extinct. Between 1983 and 1992, zero coho were counted. No count was conducted in 1997.

Pink: Pink numbers remain fairly healthy. The average annual escapement between 1983 and 1992 was 47,375 fish. 1996 saw a huge run of pinks, with spawning totals hitting 200,000 fish, the highest since the 1970s. On the other hand, the odd-year runs of pink appear less healthy. The 1995 escapement was 75,000. Two years later, the 1997 escapement figure had dropped to 25,000 fish.

Recent Counts	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Chum	**4**	**15**	**40**	**4**	**35**	**30**	**800**	**10**	**n.i.**	**1,000**	**unk.**

Historical Data	1950s Avg	1960s Avg	1970s Avg	1980	1981	1982	1983
Sockeye	**2,695**	**938**	**4,380**	**2,500**	**5,000**	**2,000**	**n.i.**

Species Summary	Avg. 1983–1992	High / Year	1991	1992	1993	1994	1995	1996	1997
Coho	**0**	**7,500 / 1979**	**n.i.**	**n.i.**	**n.i.**		**n.i.**		**n.i.**
Chinook	**0**	**10 / 1983**			**n.i.**				
Chum	**15**	**15,000 / 1970**	**35**	**30**	**800**	**10**	**n.i.**	**1,000**	**unk.**
Pink	**47,375**	**200,000 / 1976**	**110,000**	**25,000**	**20,000**	**12,000**	**75,000**	**200,000**	**25,000**
Sockeye	**2,066**	**14,000 / 1979**	**525**	**600**	**250**	**1,000**	**n.i.**	**300**	**unk.**

Namu Lakes

Endangered: Chum & Coho salmon

This Mid-coast watershed has long been a major salmon harvesting site for First Nations. Generations of Heiltsuk people have set up summer fish camps at Namu to harvest the once bountiful runs of salmon. An ancient fish trap exists at the mouth of the creek leading up to the lake. An extensive boardwalk system connects many buildings at an abandoned commercial cannery at Namu. The boardwalk also connects the cannery with Namu Lake.

Status of Logging

MacMillan Bloedel Ltd.'s Tree Farm Licence 39 covers this area. A current Forest Development Plan calls for road building to Draney Lake, a tributary of Namu. Cutblocks are planned for Draney in 1999, with cutblocks planned for the Namu Lake area in 2000 and 2001.

Status of Salmon

Coho: Unknown. Not inspected since 1989.

Chum: Chum runs are "passively managed" for the Namu River, meaning there is no direct management of the stock and fishing plans will not be altered to protect the stock. The Namu chum run is grouped with 7 other streams in Fisher/Fitzhugh Sound region, including Evans Inlet, Hook Nose, Kiltik Cove, Kisamet, Koeye, Namu and Sagar. In the 1950s, chum returns averaged 16,700 fish. By the 1980s, the number had fallen to 3,545. In 1990, the actual count for the Namu River chum was 10 spawning fish. Since 1991 there have been no chum observed in the river.

Sockeye: There are still sockeye left in Namu River, although the numbers are dropping. For example, there were 1,700 sockeye spawners in 1988, 1,000 in 1993 and 550 in 1996. The river was not inspected in 1997.

Pink: The current status of pink salmon is unknown. DFO recorded 60 spawning pinks in 1988, none the next year, 1,000 in 1990 and none since. The river was not inspected in 1997.

Recent Counts	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Chum	**n.o.**	**2**	**50**	**10**	**n.o**	**n.o**	**n.o**	**n.o**		**unk.**	**n.i.**
Sockeye	**160**	**1,700**	**750**	**20**	**450**	**500**	**1,000**	**400**	**n.i.**	**550**	**n.i.**
Pink	**n.o.**	**60**	**n.o.**	**1,000**	**n.o.**	**n.o.**	**n.o.**	**n.o.**		**unk**	**n.i.**

Historical Data	1950s Avg	1960s Avg	1970s Avg	1980	1981	1982	1983
Chum	**16,700**	**9,000**	**10,400**	**1,700**	**13,010**	**8,500**	**3,545**

(Namu and 7 other streams)

Quaal River

Endangered: Sockeye & Chinook

This watershed on the North coast is frequented by grizzly and black bear, mountain goats, moose and large numbers of waterfowl. Along with the Kitkiata, the Quaal River is believed to be home to the region's healthiest steelhead populations. The valley provides a significant wildlife corridor to the Ecstall River and is the site of both an old village and a "grease" trail to the Skeena River. Grease trails are named for the ancient First Nations trade in oil from the harvest of Eulachon—a small, smelt-like fish rich in oil. The river valley is largely pristine, with one small clearcut near the river mouth.

Status of Logging

At this point, the Quaal is uncharted, meaning no one company is slated to log the area. There is currently no Forest Development Plan for the area.

Status of Salmon

Sockeye: From a highest recorded escapement of 7,500 sockeye in 1961, numbers steadily declined. Between 1983 and 1992, average escapement was 16 fish. Much the same pattern was recorded between 1988 and 1997. The 1997 sockeye escapement was 15 fish.

Chinook: Chinook: Between 1983 and 1992 no chinook spawners were counted in the Quaal River. The highest recorded escapement for the species was in 1962, when 400 chinook spawners were counted. Its present status is critically low, with 2 chinook counted in the river in 1996.

Pink: In 1962 an estimated 1.5 million pinks spawned in the Quaal. Between 1983 and 1992 pink escapement stood at 118,750, about a tenth of its previous high. In 1997, the pink escapement was 80,000 fish or 40% of DFO's escapement goal of 200,000 spawners.

Coho: Resident coho spawners numbered 25,000 in 1966. In the ten years ending in 1992, coho escapement averaged 3,333 fish. By 1996 there were 550 coho spawners counted. In 1997 no inspection was carried out. In 1996 DFO noted that the Quaal River is thought to be the major coho producer in the (sub)area and that stocks are at 20% of the target escapement of 45,000 fish.

Chum: Between 1983 and 1992, chum escapement averaged 22,000 fish, with a high of 65,000 recorded in 1988. A chum return of 800 fish was recorded in 1997, only 3% of DFO's target escapement of 25,000 fish.

Recent Counts	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Sockeye	**10**	**30**	**unk.**	**unk.**	**25**	**25**	**n.o.**	**16**	**10**	**15**
Chinook	**n.o.**	**2**	**n.d.**	**1**	**n.o.**	**n.o.**	**pst**	**7**	**2**	**unk.**
Pink	**250,000**	**125,000**	**50,000**	**125,000**	**45,000**	**60,000**	**32,000**	**192,000**	**120,000**	**80,000**
Coho	**2,000**	**unk.**	**2,500**	**unk.**	**1,100**	**1,800**	**620**	**518**	**550**	**n.i.**
Chum	**65,000**	**12,000**	**6,000**	**5,500**	**5,000**	**7,000**	**4,100**	**6,200**	**4,600**	**800**

Historical Data	1950s Avg	1960s Avg	1970s Avg	1980	1981	1982	1983
Sockeye	**7,300**	**9,500**	**3,500**	**1,556**	**2,450**	**2,400**	**1,600**

Quaal plus 4 other streams
Target escapement: 13,000

Roscoe Inlet & Roscoe Creek

Endangered: Coho in both creek and inlet

This Mid-coast watershed is in the traditional territory of the Heiltsuk First Nation and ancient petraglyphs can be viewed. Roscoe Inlet and Roscoe Creek are part of a group of intact watersheds supporting grizzly bear, black bear, cougar, deer and wolves. Despite its relatively small size, it is considered a prime area for salmon. A DFO Fish Habitat Inventory from 1991 notes that logging is proposed for the Roscoe Creek valley, and due to the "extreme topography" and "high productive" values of the salmon stream the Department of Fisheries recommends "no logging be carried out in this system."

Status of Logging

This area falls under the jurisdiction of the Ministry of Forests' Small Business Program. A Forest Development Plan for the area is under consideration by the District Manager of the Forests Ministry's Mid-coast offices.

Status of Salmon

Sockeye: The highest recorded escapement for sockeye in Roscoe Creek was 100 fish in 1989. The average return between 1983 and 1992 was 39 fish. In 1997, only six fish were counted.

Coho: In 1964, 7,000 coho spawners were counted in the system. From that recorded high, escapement dwindled to an average of 84 fish in the years 1983 to 1992. In 1997, 200 spawners were counted.

Chinook: None recorded as present in recent decades.

Chum: In 1966 DFO recorded 75,000 chum spawning in Roscoe Creek. Chum numbers then dropped to an average of 15,050 fish between 1983 and 1992. Then in 1996 the spawning count reached 81,000 fish, confirming Fisheries Department assessment that the creek has major potential to be an excellent salmon producer. In 1997, there were an estimated 56,000 chum spawners.

Pink: The average escapement of pink salmon between 1983 and 1992 was 15,775 fish. The high during that period was 55,000 fish recorded in 1989. In more recent years, the numbers have been much lower. In 1992, only 25 pink salmon returned to spawn in the creek. The number rose to 6,000 in 1996 and in 1997, 1,000 pinks spawners were counted.

Recent Counts	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Coho	**39**	**175**	**125**	**n.o.**	**560**	**500**	**300**	**n.d.**	**n.i.**	**n.i.**	**200**
Sockeye	**13**	**6**	**100**	**n.d.**	**2**	**10**	**8**	**n.d.**	**n.d.**	**n.d.**	**6**
Pink	**4,600**	**1,000**	**55,000**	**2,500**	**2,170**	**25**	**2,300**	**750**	**1,800**	**6,000**	**1,000**

Historical Data	1950s Avg	1960s Avg	1970s Avg	1980	1981	1982	1983
Sockeye	**14**	**0**	**30**	**0**	**0**	**6**	**16**

(Roscoe Creek and Clatse Creek combined)

Skowquiltz River

Endangered: Coho & Chum salmon

This Mid-coast watershed has traditionally been used by the Nuxalk First Nation. The river valley and estuary support populations of wolverine, grizzly bear, black bear, mountain goat, blacktail and whitetail deer and cougar. Western grebes, trumpeter swans and other birds frequent the mudflats. Fish stocks include Dolly Varden, and resident rainbow trout. The Skowquiltz is the largest intact pristine rainforest left in the Dean Channel region. There are two old village sites in the valley and many culturally-modified trees bearing witness to First Nation's use of the area.

Status of Logging

The area is under the jurisdiction of the Ministry of Forests' Small Business Program. At present, a Forest Development Plan for the area is on hold and subject to change. The area is considered an unconfirmed candidate for a community tenure.

Status of Salmon

Sockeye: Escapement between 1983 and 1992 is recorded as zero. In 1991, DFO observed 6 sockeye spawners in the Skowqultz River.

Coho: The highest recorded escapement of coho was in 1958 when 1,500 spawners were counted. Between 1983 and 1992, the average escapement was down to one fish, with a 1991 high of 5. No inspection has been carried out in recent years.

Chum: Between 1983 and 1992, the average chum escapement was 262 fish. The high, recorded in 1953, was 7,500 fish. Between 1987 and 1997 the highest return was 1,000 fish and the lowest was 15.

Pink: Average pink escapement between 1983 and 1992 was 3,650 fish. The high for that ten-year period was 13,000 fish in 1988. The 1994 count was only 125 spawners, but in 1996 and 1997, 4,000 spawning pink salmon were counted in the river.

Recent Counts	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Coho	**n.o.**				**5**	**n.i.**	**n.i.**		**n.i.**		**unk.**
Chum	**305**	**300**	**120**	**325**	**40**	**15**	**30**	**15**	**300**	**200**	**1,000**
Pink	**600**	**13,000**	**100**	**900**	**100**	**7,000**	**2,100**	**125**	**n.i.**	**4,000**	**4,000**

Historical Data	1950s Avg	1960s Avg	1970s Avg	1980	1981	1982	1983
Chum	**18,300**	**13,400**	**7,400**	**7,350**	**3,200**	**1,210**	**860**

(4 streams including Skowquiltz)
DFO's target Escapement: 25,100

SOURCES:

1. Escapement data 1987–1997 from DFO-PBS, Kim Hyatt

2. Pacific Region Salmon Stock Management Plan, Discussion Document, 1986. Department of Fisheries and Oceans, Volumes: D-Butedale, E-Bella Bella, F-Bella Coola and G-Rivers Inlet & Smith Inlet.

3. Salmon Expectations 1998, North Coast Areas 1-6, Central Coast Areas 7-10. Department of Fisheries and Oceans.

4. Living Blueprint for B.C. Salmon Habitat, An Action Plan Produced by an Independent Panel. Published 1998 by Independent Panel, Distributed by Pacific Salmon Foundation

5. 1998 Forest Development Tracking List for the Midcoast, North Coast and Kalum Forest Districts. July, 1998. John Nelson, David Suzuki Foundation.

6. Speaking for the Salmon, Workshop Proceedings, January 1998. Simon Fraser University. Edited by Dr. Patricia Gallaugher and Laurie Wood.

7. Geographic Distribution of Salmon Spawning Streams of British Columbia. By I.V. Williams and T.J. Brown. Department of Fisheries and Oceans, Pacific Biological Station, March 1994.

8. Escapement Estimates, North Coast Management Areas 1–10, January 1997. Department of Fisheries and Oceans, Prince Rupert.

9. Conservation Areas of Interest on the Mainland Coast of BC, Sierra Club and Raincoast Conservation Society, April 1996. Salmon data 1983–1992 in Sierra report is from DFO—Canadian Technical Report of Fisheries and Aquatic Sciences No. 1967

BC Stocks at at High Risk of Extinction

Based on research by the American Fisheries Society, source: Living Blueprint for B.C. Salmon Habitat, 1998

Chinook

Queen Charlottes
Naden River
Ain River

Skeena System
Deep Creek
North Coast
Diana Lake Creek

Central Coast
Kwatna River
Noelk River
Khutze River
Kiltuish River
Tsaytis River
Dala River
Quaal River

Rivers & Smith Inlets
Dallery Creek
Ciyak River

NW Vancouver Island
Mooyah River
Sucwoa River
Deserted Creek
Tsowwin T. Espinosa Creek
Narrowgut Creek
Malksope River
Colonial Creek

SW Vancouver Island
Gordon River
Sarita River
Franklin River
Somass River
Nahmint River
Henderson River
Toquart River
Bedwell River
Cypre River
Moyeha River
Megin River
Ice River
Sydney River

Johnstone Strait
Nimpkish River
Ordord River
Adam River

Georgia Strait/ Vancouver Island
Puntledge River (winter)
Haslam Creek
Coldstream River

Georgia Strait/ Mainland
Sloquet Creek
Cheakamus River
Toba River
Klite River

Lower Fraser
Stave River
Chilliwack River

Upper Fraser/ Thompson
Thompson River
Stellako River
Endako River
Kazchek Creek

North & South Thompson
Mann Creek

Coho

Queen Charlottes
Kano Inlet Creek (outer)
Mercer Creek
Mace Creek
Lagoon Creek
Dass Creek
Sewell Inlet Creek (head)
Little Goose Creek
Dana #1 Creek
Cresent Inlet Creek
Salmon River
Echo Harbour Creek
Kostan Creek
Matheson Creek
Skaat Harbour Creek (2)
Skaat Harbour Head Creek
Forgotten Creek
Island Bay Creeks (2)
Tangle Cove Creek
Oxalis Creek
Cillision Bay Creeks (2)
Carpenter Bay Creeks (2)
Sedmund Creek
Louscoone Inlet Creek
Inskip Creek
Security Inlet Creek
South Bay Creek
Macmillan Creek
Breaker Bay Creek
Richardson Creek
Sedgwick Creeks (3)
Alder Island Creek
Heater Creek

Nass System
Vetter Creek
Kiteen River
Leverson Lake System
Toon River

Skeena System
Alastair Lake
Southend Creek
Fiddler Creek
Slamgeesh River
Glacier Creek
Goat Creek
Bulkley River below Houston
Station Creek
Suskwa River
Natlan Creek
Harold Price Creek
Blunt Creek
Trout Creek
Reiseter Creek
Morice River
Gosnell Creek
Nanka River
Boucher Creek
Morrison Creek
Bear River

North Coast
Belowe Creek
Kumealon Creek
Moore Cove Creek
Oar Point Creek
Hevenor Inlet Creek
Alpha Creek
Endhill Creek
Spencer Creek
Keswar Inlet Creek
West Creek
Foote Creek
Phoenix Creek

Central Coast
Namu River
Nootum River
Necleetsconnay River
Slowquiltz River
Eucott Bay Creeks
Roscoe Creek
Tankeeah River
Tuno Creek
West Tuno Creek
Mussel River
Green Bay Creek
Carter River
Marshall Creek
Head Creek
Scow Bay Creek
Klekane River
Kiltuish River
Crab River
Hirsch Creek
Kildidt Creek
Stewart Creek
Choke Pass Creeks (3)
Howyete Creek System
Jenny Bay Creeks (3)
Kakushdish Creek
Sally Creek
Deer Pass Lagoon Creeks (2)
Der Pass Creek
Ship Point Creek
Sound Point Lagoon Creek

Coho cont'd

Kwakuadis River/ Yeo Lake
Cull Creek
Kwakwa Creek
Mary Cove Creek
Bottleneck Creek
Duthie Creek
McKay Creek
Pyne Creek
Busey Creek
Dallain Creek
Argyh Creek
Penn Creek
Douglas Creek
Devil Creek
Fury Creek
Linnea Creek
Duffey Creek
Sentinel Creek
Clifford Creek
Flux Creek
McDonald Creek
Salmon Creek
Eagle Creek
Stannard Creek (deep Creek & Inlet)
Fish Creek
Cartwright Creek
Tuwartz Creek

Rivers & Smith Inlets
Coho Creek
Allard Creek
Beaver Creek

NW Vancouver Island
Silverado Creek
Jacklah River
Burman River
Hoiss Creek
Marvinas Creek
Owossitsa Creek
Little Zeballos River
Mamat Creek
Chum Creek
Jansen Lake Creek
Power River & Lake
Kewquoqdie Creek
Kwokwesta Creek
Pegattem Creek

SW Vancouver Island
Muir Creek
Doobah Creek
Poett Nook Creek
Sarita River System
Frederick Creek
Cous Creek
Effingham River
Lucky Creek
Smith Creek
Kennedy Lake & Tributaries
Clayoquot River
Tofino Creek
Tranquil Creek
Hootla Kootla System
Riley Cove Creek
Megin River
Ice River
Hesquiat River

Johnstone Strait
Quatam River
Ordord River
Unnamed Creek
Unnamed Creek
Read Creek
Tuna River
Unnamed Creek
Shoial Harbour Creek
Nimmo Creek
Bughouse Creek
Huaskin Creek
Cohoe Creek
Eva Creek
Warner Bay Creek
Stranby River
Shushartie River
Cluxewe River
Nimpkish River
Adam River
Amor De Cosmos Creek
Owen Creek
Christie Creek
Whiterock Pass Creek
Mohun Creek

Georgia Strait/ Vancouver Island
Cowie Creek
Chef Creek
Thames Creek
French Creek
Craig Creek
Rocky Creek
Holland Creek
Stocking Creek
Porters Creek
Mesachie Creek

Georgia Strait/ Mainland
Reay Creek
Mosquito Creek
Mackay Creek
Rodgers Creek
Cypress Creek
Eagle Creek
Nelson Creek
Pillchuck Creek
Dayton Creek
Unnamed Creek
Theodesia River
Toba River
Klite River
Little Toba River
Brem River
Brem River Tributary

Lower Fraser
Sumas River
Stewart River
Hunter Creek
Serpentine River
Bonaparte River

North & South Thompson
Besette Creek
Creighton Creek
Duteau Creek
Harris Creek
Clearwater River
Brookfield Creek
Mahood River
Reg Christie Creek

Sockeye

Queen Charlottes
Mamin River
Wright Inlet Creeks

Nass System
Tseax River
Bear River

Skeena System
Slamgeesh River
Clearwater Ceek
Wesach Creek
Douglas Creek
Clear Creek
Bulkley River above Houston
Atna River
Boucher Creek
Salmon Creek
Big Loon Creek
Bear River
Bear Lake

North Coast
Monckton Inlet Creeks
Hevenor Inlet Creeks
Spencer Creek
Bolton Creek
Kenzuwash Creeks
Lewis Creek
Ryan Creek
Keswar Inlet Creek

Central Coast
Tuno Creek
West Tuno Creek
Quaal River
Kilditt Creek
Howyete Creek System
Ship Point Creek
Cull Creek
Lagoon Creek
Mary Cove Creek
Nais Creek
Fury Creek
Sentinel Creek
Flux Creek
Eagle Creek
Fish Creek
Cartwright Creek
Cridge Inlet Creek

Rivers & Smith Inlets
Nekite River

NW Vancouver Island
Deserted Creek
Marble River

Johnstone Strait
Apple River
Glendale Creek
Klinaaklini River
Kakweiken River
Kingcome River
Mackenzie Sound Creek
Shushartie River
Adam River

Georgia Strait/ Vancouver Island
Puntledge River

Lower Fraser
Chilliwack River
Sakwi Creek
Trout Lake Creek

Upper Fraser/ Thompson
Nithi River
Leo Creek
Macdougall River
Sinta Creek

North & South Thompson
Tsuius Creek

Pink

Queen Charlottes
Lagins Creek
West Narrows Creek
Dawson Harbour Creek
Dawson Inlet Creek
Cone Head Creek
Indian Bay Creek
Rennell Creek
Unnamed Creek
Port Louis Creek (outer)
Stanley Creek
Dinan Creek
McClinton Creek
Lagoon Creek
Little Goose Creek
Arrow Creek
Skaat Harbour Creeks (2)
Bag Harbour Creek
Tangle Creek
Ove Creek
George Bay Creek
Oxalis Creek
Carpenter Bay Creeks (4)
Louscoone Inlet Creek
Staki Creek
Flamingo Inlet Creek
Fairfax Inlet Creek
Canoe Pass Creek
East Narrows Creek
Deena Creek
Skedans Creek
Alder Island Creek

Nass System
Vetter Creek
Gingit Creek
Gitzyon Creek
Seaskinnish Creek
Leverson Lake system
Cascade Creek
Turk Creek
Roberson Creek
Bear River

Skeena System
Fiddler Creek
Bulkley River above Houston
Tobaggan Creek
Nine Mile Creek

North Coast
Madeline Creek
Big Falls Creek
Sparkling Creek
Sheneeza Creek
Spencer Creek
Kingtown Inlet Creeks
Skull Creek
Rawlinson Anchorage Creek
Foote Creek

Central Coast
Noeick River
Bullock Channel Creeks (4)
Windfall Creek
Wathl Creek
Kildidt Creek
Kiididt Lagoon Creek
Sagar Creek
Green River
Ship Point Creek
Bulley Bay Creek
Osment Creek
Kwakwa Creek
Meyers Pass Creek
Bottleneck Creek
Quigley Creek
Powles Creek
Blee Creek
Bloomfield Creek
Dally Creek
Nais Creek
Packe Creek
Tyler Creek
Busey Creek
Steep Creek
Roland Creek
Linnea Creek
Duffey Creek
Noble Creek
Sentinel Creek
Clifford Creek
Mcdonald Creek
Salmon Creek
McMickling Creek
Tuwartz Creek

Rivers & Smith Inlets
Amback Creek

NW Vancouver Island
Gold River
Leiner River
Tahsis River
Zeballos River
Kaoulk River
Arlish River
Tahsish River
Kauwlnch River
Mahatta Creek
Kewquodie Creek
Klootchlimmis Creek
Waukwaas Creek
Koprino River

SW Vancouver Island
Nitinat River
Sarita River system
Somass River system
Moyeha River

Johnstone Strait
Gray Creek
Kamano Bay & Kamano Creeks
Sim River
Ahta Valley Creek
Viner Sound Creek
Mackenzie Sound Creek
Stranby River
Nahwitti River
Shushartie River
Tsulquate River
Mills Creek
Hyde Creek
Tsitika River
Pye Creek
Turston Bay Creek
Granite Bay Creek

Georgia Strait/ Vancouver Island
Englishman River
Sloquet Creek
Mackay Creek
Ashlu Creek
Shovelnose Creek

Lower Fraser
Kanaka Creek
West Creek
Whonnock Creek
Stave River
Silverdale Creek

Chum

Queen Charlottes
Chinukundl Creek
Clapp Basin Creek
Hobbs Creek
Carmichael Creek
Sewell Inlet Creek
Echo Harbour Creek
Raspberry Creek
Fanny Creek
Edwards Creek
Lomgon Creek
Bottle Inlet Creek
Douglas Inlet Creek
Peel Inlet Creek
South Bay Creek
Haans Creek
Skedans Creek
Breaker Bay Creek
Takellv Cave Creek
Burnaby Narrows Creek
Heater Creek
Luxana Creek

Nass System
Kincolith River
Chambers Creek
Ksemanaith Creek
Lachmach River
Leverson Lake system
Kwinamass River
Oth Creek
Donahue Creek
Georgia River
Bear River

Skeena System
Shames Slough
Zymagotitz River
Kleanza Creek
Lakelse River
Deep Creek
Lower Babine River

North Coast
Kumealon Creek
Denise Creek
Silver Creek
Three Mile Creek
Monckton Inlet Creeks
Mikado Lake system
Cuttle Creek
Alpha Creek
Endhill Creek
Banks Lake system
Ryan Creek

Central Coast
Koeye River
Namu River
Camp Creek
Dean River
Skowquiltz River
Deep Bay Creek
Pine River & Lake
Tankeeah River
Big Creek
Marshall Creek
Head Creek
Aaltanhash River
Klekane River
Paril River
Wathi Creek
Nalbeelah Creek
Kihess Creek
Kisameet Lake streams
Sally Creek
Deer Pass Lagoon Creeks (2)
Sound Point Lagoon Creek
Kwakwa Creek
Canoona River
Quigley Creek
Powles Creek
Fifer Creek
Packe Creek
Busey Creek
Dallain Creek
Wale Creek
Roland Creek
Chapple Creek
Salmon Creek
Fish Creek
Cartwright Creek
McMickling Creek
Tuwartz Creek
Cherry Creek

Rivers & Smith Inlets
Hogan Creek
Amback Creek

NW Vancouver Island
Silverado Creek
Jacklah River
Ban Creek
Canoe Creek
Cleagh Creek
Hawisnakwi Creek
Quashtin Creek
Dominic Creek

Chum cont'd

SW Vancouver Island
Tugwell Creek
Doobah Creek
Pachena River
Carnation Creek
Franklin River
China Creek
Snug Basin Creek
Henderson River
Holford Creek
Useless Creek
Dutch Harbour Creek east
Pipestem Creek
Little Maggie River
Twin Rivers west
Lost Shoe Creek
L. Whitepine Cove Creek
Hot Springs Cove
Debbie Creeks

Johnstone Strait
Unnamed Creek
Orford River
Unnamed Creek
Klinaklini River
Lull Creek
Gilford Creek
Wahkana Bay Creek
Charles Creek
Bamford Creek
Nahwitti River
Tsulquate River
Keogh River
Salmon River

Georgia Strait/ Vancouver Island
Oyster River
Waterloo Creek
Unnamed
French Creek
Rockey Creek
Shawnigan Creek

Georgia Strait/ Mainland
Mackay Creek
Eagle Creek
Nelson Creek
Ruby Creek
Forbes Creek
Klite River
Little Toba River
Brem River

Lower Fraser
West Creek
Siddle Creek
Sakwi Creek
Serpentine River

Design: Emdoubleyu Design, Vancouver, BC **Printed in Canada by:** Marine Printers, Vancouver, BC

Bald Eagles thrive in the coastal temperate rainforests of B.C. and are heavily dependent for food on healthy, abundant runs of salmon. (McAllister)

The Khutze River valley is home to a rich variety of wildlife including grizzly bears, wolves and the rare marbled murrelet. It supports several species of salmon including an endangered run of chinook. Western Forest Products holds the logging rights. (McAllister)

Greenpeace

Founded in Canada, 1971

Fondé au Canada, 1971

Vancouver

1726 Commercial Drive

Vancouver

British Columbia

Canada V5N 4A3

✆ 604 253-7701

FAX 604 253-0114

Toronto

Suite 605

250 Dundas Street West

Toronto, Ontario

Canada M5T 2Z5

✆ 416 597-8408

FAX 416 597-8422

Montréal

2444 Notre-Dame ouest

Montréal (Québec)

Canada H3J 1N5

✆ 514 933-0021

FAX 514 933-1017