

## **Environmental Hazards and Conflicts Threatening Fish Habitat in the Lower Fraser River and its Estuary – A Fisheries Perspective.**

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### **Overview:**

This introductory chapter outlines the general fishery and fish habitat issues in the Lower Fraser River from Hope to Steveston. It is of course realized that any section of a river is not an entity unto itself. In this case the creation and health of the Lower Fraser River (LFR) depends on the well-being of the whole and not just what takes place in that isolated part of the river. The Lower Fraser may be the aorta of the Fraser but as in any animal the aorta cannot serve much of a purpose unless connected into the welfare of the entire organism. The concept of an ecosystem and an ecosystem approach to habitat protection is not new but its understanding and application is still in its infancy especially in the fishery and environmental agencies of the Federal and British Columbia governments.

If we were to look at the entire river system, it would take a whole book to describe environmental conditions and risks associated with human development of the river, its tributaries and its watershed. I will briefly outline basin and river conditions upstream of Hope and then dwell on those same conditions in the Lower Fraser River in greater detail.

The Fraser River is B.C.'s largest river and it drains about one quarter of the province – an area the size of England. It originates in the Mt. Robson area and follows a stylized 'S' pattern for some 1300km to the Pacific Ocean. The system from its headwater to the ocean is home to over 100 species of fish. Despite that, when some people think of the Fraser, they think only of salmon. Despite recent setbacks in salmon production it is still a large producer of salmon. However, that production is a shadow of what it was 100 years ago – before the advent of the modern commercial fishery and the exploitation of the water, land and forest resources of the river and its numerous tributary river basins.

The Fraser River drainage basin almost entirely exists upstream of Hope and if you exclude the two large tributary valleys of the Harrison and Stave River systems, 97.2% of the basin is outside of the settled Lower Fraser Valley. That means that the area of the Lower Fraser Valley (LFV), from the North Shore mountains to the Canada - US border, covers only 2.8% of the basin or 0.7% of B.C.'s area. Although this LFV area is relatively small, it is home to about 65% of the population of B.C. These statistics alone will give you a good pulse on the environmental pressures in and along the Fraser River downstream of Hope.

### **The Fraser Upstream of Hope:**

This vast watershed drains the Upper Fraser proper, the Nechako system, Chilcotin, Cariboo, Thompson and Bridge-Seaton watershed areas. All lakes and rivers and streams in these areas are home to good populations of over 40 species of freshwater fish and six salmon species. These areas have been developed since the 1860s and each has its own unique history. Since post European contact history human attitudes, values and technology have impacted the various parts of the watershed in different ways.

The Upper Fraser was relatively pristine until the 1960s when pulpmills in Prince George and upper basin logging began to significantly change the hydrology and water quality in the upper Fraser Basin and of course areas downstream of Prince George. The same deforestation pressures also exist in the Nechako and Stuart-Takla areas of the upper watershed. In addition, Alcan's Kinney Dam on the Nechako River and river diversion of the 1950's made irreversible changes to that part of the river and its fish populations.

The Chilcotin was similar to the Upper Fraser until the logging interests moved into that plateau during the past 30 years. The Cariboo Plateau had the earliest development history in the entire basin when gold was found there in the 1860s. Fish runs were decimated by mining, sediment releases and dam building largely in the Quesnel and Cottonwood River systems. Now logging and pulpmill effluent discharges into the Fraser at Quesnel are significant concerns in that sub-basin.

The Thompson and Bridge River areas share similar threats to their fish habitats. Much of these areas were originally claimed for ranching and the many irrigation dams and water diversions have caused significant impacts on fish populations. The Bridge-Seaton and Shuswap Rivers are controlled by hydro dams. The large hydro dam on the Bridge River largely decimated a once highly productive river and a large Chinook salmon run disappeared. Since the development of the modern logging era of the past 50 years, excessive logging has been a significant concern in many watersheds from the North Thompson River to Scotch Creek on Shuswap Lake. Road construction and logging has often caused changes in stream flows, temperatures and increased sedimentation.



**(Left) Bad logging road building practices in very unstable soil in the Upper Fraser Rocky Mountain trench causing sedimentation of salmon streams. The much promoted Forest Practices Code did nothing to stop this type of environmental damage (Photo by Otto Langer).**

The Fraser River canyon was formed millions of years ago by a rift in the earth's crust and it was not influenced by humans until about 150 years ago. Tectonic plate shifts, glaciers, lava flows and other natural events directed the evolution of the river. After the last ice age, less than 5000 years ago, salmon and other species of fish made their way back into the river system and have thrived despite minor natural geologic events like the Texas Creek slide downstream of Lillooet - about the time William the Conqueror was invading England.

In recorded history the greatest recorded impact to the Fraser system were other minor geologic events like the Farrell Canyon slide on the Chilcotin River and of course the 1913 CPR blasting of rock debris into the river at Hells Gate. That careless work devastated salmon runs upstream of that critical migratory bottleneck. Generally most scientific and lay knowledge of impacts to fish populations have related to salmon. They are large fish, come in known annual migratory patterns, can be seen and counted and they carry significant economic and cultural weight. However, one should not assume that they are the only fish of concern in the basin and that they are the only ones that have been impacted by man's industrial development of the watershed. It is well known that species such as the white sturgeon were much larger and more bountiful before the assault on the river after about 1880. Also various forms of aquatic life including fish (e.g. carp, bass) have been purposely and inadvertently introduced into the Fraser System. In addition to over-fishing and habitat destruction, the introduction of exotic species is a top threat to native fish populations.

### **The Lower Fraser Valley:**

Although the Lower Fraser River is only about 10% of the length of the entire mainstem river, it does have a greatly elevated importance. Anadromous fish such as salmon, eulachons, white sturgeon and shad must migrate through this section of the river to reach their spawning grounds. Their progeny must then return through the Lower Fraser to again reach the Pacific Ocean. Although the Lower Fraser is a very large river, it is in some ways a bottleneck or a gauntlet for migratory fish.

The Lower Fraser, home to over 65% of B.C.'s population, is a major area of exploitation of Fraser River fish stocks. It is the economic engine for British Columbia. This concentration of human industrial and urban development is most often at odds with the maintenance of good water quality and healthy and relatively undisturbed habitat. In fact, in comparison to the upstream areas discussed above, the Lower Fraser River has been subjected to the greatest development pressures and impacts of any of the other reaches of the Fraser River and its major tributaries.

The LFV is the home of 65% of the B.C. population and is the scene of significant exploitation of Fraser River fish stocks. By the 1920s, major tributaries of the Lower Fraser such as the Coquitlam, Alouette and Stave Rivers had most of their watershed areas cut off by fish impassible hydro dams.

After most flat areas were logged they were then transformed into farmland. Other parts of the valley characterized by lakes, wetlands and associated scrub forests were drained, dyked and also converted to agriculture. Much of this land clearing and development affected tributary streams more than the more robust Fraser River mainstem. High tides and annual freshets threatened developing flood plain settlement areas and dykes were built along the edge of the river where they often cut off side channel habitat essential for aquatic life including sturgeon and salmon. The loss of Fraser River associated wetlands and side channel areas can be seen on the North Arm in the estuary. In 1880 about 2000 hectares of wetlands existed that could be flooded by the river and serve as fish habitat. By 1960 this had been reduced to 100 hectares. This pattern of loss can be seen from Delta-Richmond to the Chilliwack-Agassiz areas. The loss of fish and wildlife habitat was phenomenal.



**(Left) Camp Slough after it has been isolated from the Fraser River and developed for residential and farming purposes. Some flow has been returned to this slough and that sets an example for rehabilitation of other sloughs such as Nicomen that has its upper entrance cut off from the Fraser (Photo by Otto Langer).**

The above is noted to not demoralize the reader but to make them aware that native habitat has already been greatly sacrificed and compromised to develop the Fraser Valley for settlement and industrial purposes. This must be put into perspective as developers put more and more pressure on the remnant habitat that is left. Those that are concerned about the survival of fish and wildlife resources, recreation and quality of life must take that into account when they demand that what is left has to be afforded the highest level of protection. The next time you oppose a destructive habitat proposal, do not accept the old developer argument that fish seem to get everything. It is therefore critical to emphasize that no further sacrifice of habitat can be made. Should society want what is left of the fishery resources to survive for future generations, industry and government must do a better job of respecting what has to be protected and work much more aggressively to restore some of what has been lost.



**(Left) Annual early summer flooding of low bench shrub and cottonwood forests at Strawberry Island. This flooding of such low bench areas allows fish to directly use these habitat areas and by law they are an important component of fish habitat. These habitat areas have been lost by filling and dyking and what remains of these areas must get full protection (Photo by Otto Langer).**

In terms of fish habitat on the LFR there are three general habitat types as determined by river gradient. The upper reach, from Hope to Mission / Chilliwack is fast flowing and is characterized by a rubble and gravel bottom. It is called the 'gravel reach'. This section is essential habitat for many spawning and rearing fish that depend upon gravel as a spawning substrate (e.g. salmon, sturgeon and eulachons). Fish such as juvenile

Chinook salmon will over winter in the rubble bottom of this part of the river.

At Mission the river gradient flattens out and is under tidal influence. Here the river current lacks the hydraulic energy to transport gravel into downstream reaches so the bottom and banks largely consists of sand and silt. From here to Steveston, the river is often described as the 'sand reach'. At the bottom end of the sand reach, the estuary habitat extends from New Westminster to the Gulf of Georgia. This section can be referred to as the delta or estuary. Within these three general habitat types I have divided the river into four alternative reaches for discussion.

### **Hope to Jones (Wahleach) Creek Reach:**

At Hope the Fraser River breaks out of an incised canyon but the reach from Hope to the Jones Creek confluence is still confined to a relatively narrow valley. This reach is above any tidal influence and is the fastest flowing section of the Lower Fraser. Due to its confined nature this section of the Fraser has few significant side-channels and to a large degree has better remained in a natural state than downstream reaches of the river.

Other than the Coquihalla River, this section has few large tributary streams and side-channels. The local streams are of high gradient and the high fishery values are in the sections of the streams crossing the Fraser floodplain. Unfortunately these streams have been greatly impacted by linear facilities (highways, power lines, pipelines and railways). A look at Jones Creek as it joins the Fraser indicates some of the problems these streams have adjacent to the Fraser. Thirty years ago the lower reach and mouth of



Jones creek was good fish habitat and a good spot to drop a line. Hydro operations on Jones Lake, totally excessive and careless logging and the building of the freeway has resulted in what was once good fish habitat to what is little more than a cleared and rip rapped section of stream that often is short of flow and is filled in with giant volumes of sediment. The 40 year old spawning channel that existed adjacent to the Fraser River was indeed destroyed by logging related debris flows in 1996.

(Left) Jones Creek spawning channel after debris torrents of 1997 totally destroyed the channel and harmfully altered Jones Creek. Recovery period is expected to be from a few decades to up to 100 years. The problem was created by 50 years of excessive logging and in the mid 1990s dozens of slides were initiated from old abandoned logging roads (Photo by Otto Langer).

The fish habitat issues that must be stressed in this reach of the Fraser is the need to protect the riparian zone and restore damaged habitat such as in Jones Creek.

## Jones Creek to Mission/Chilliwack Section:

This reach of the river is somewhat similar to the above reach but at Jones Creek the narrow valley gives way to a wide open valley. The river spreads out to cover the floodplain as permitted by dykes and other river training works installed over the past century. As is the case upstream of Jones Creek, the dominant substrate of the river reach is gravel which serves as important spawning habitat for many species of fish including pink and chum salmon, eulachons, and sturgeon.

Historically, each spring the river would flood the scrub and cottonwood forest areas and maintain active side channels such as Maria, Wahleach and Camp-Hope Sloughs. This allowed the river to have diverse and complex habitats that serve as refugia for many fish and wildlife species. These areas serve as spawning grounds, rest and rearing areas for many species of fish from minnows to young salmon. Unfortunately side channel sloughs get in the way of linear facilities such as dykes and roads and they are the first to suffer as an area is developed and the sloughs are cut off from the Fraser.

The most significant issues that must be stewarded in this reach include:

1. The greatest threat to this area is the constant demand to use the Fraser River as a source of gravel for the aggregates industry. Most often this is rationalized as flood control but many gravel removal projects are economically based and do not have a proper flood control rationale. The Department of Fisheries and Oceans (DFO) and the Province placed a several year moratorium on gravel removal but local political pressure caused the Liberal governments in Victoria and Ottawa to lift the moratorium in 2005 to allow the removal of large volumes of gravel removal over the next several years.



(Left) Poorly thought out or illegal removal of gravel in the gravel reach of the Lower Fraser River can harm and destroy critical habitat for fish like salmon, sturgeon and eulachons. This operation occurred at Agassiz and was not approved by any regulatory agency (Photo by Otto Langer).

Since gravel removal is a very political issue one must relate to government diligence with a jaundiced eye. During the 1990s DFO directed several legal investigations into illegal gravel removal by the Cheam Band. Two cases went to court but by 2004 DFO had developed and funded a plan 'to facilitate a 2004 gravel removal opportunity for the excellent economic development benefit for the community and a profit for the Band Council'. Was fish habitat the priority in this compromise? Unfortunately some of the

removal will not assist flood control efforts and the quantity of removal is not sustainable. Follow the gravel removal issue as it develops annually and demand that gravel removal operations do not take place in fish spawning areas and where it is not annually renewed<sup>1</sup>.

2. The habitat provided by the braided gravel bars must get a high level of protection. This is one of the few areas where the Fraser still can meander and form new habitats. They are also key recreational areas for the bar fishermen.

3. The industrialization of the islands in the river must be closely scrutinized. Industrial forestry practices may be acceptable providing it can be shown that the bio-sludge (sewage sludge) put on the islands to fertilize the trees do not contaminate the river. Often sludge applications are flooded by the annual freshet. Also tree removal operations must respect the riparian zone and the sloughs within the islands.

4. Bold restoration moves must take place to restore key mainstem habitat areas. For instance, controlled Fraser River flows should be restored to Nicomen Slough. Off road vehicle access to areas like Strawberry Island must be controlled to not harm habitat in the slough areas. About 10 years ago a weir was installed to protect Peter's Island from erosion. This should be largely removed to allow young downstream salmon migrants to have low water fish passage into essential side-channel habitat.



(Left) All Terrain Vehicle. Intensive recreational pressure in Lower Fraser Valley (LFV) habitats has results in significant damage to habitats in Fraser River side channels and islands as well as in many tributary streams. Individuals have been charged under the criminal provisions of the Fisheries Act for crossing streams with ATVs and other off road vehicles (Photo by Otto Langer).

### **Mission to New Westminster Reach:**

At Mission the river loses its braided gravel nature and is confined to a narrower channel within dykes. This section of the river is tidal but freshwater in nature. It is at near a zero gradient and due to reduced flow energy the sands and silts settle out of the river to form the river bottom.

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<sup>1</sup> In 2006 DFO authorized the removal of gravel in the Ferry Island area near Agassiz by the Cheam Band. The approved works shut off a major side channel and millions of chum salmon eggs and alevins were destroyed. Such poorly planned gravel removal works continue to be a great threat to fish habitat in the Lower Fraser River.

Due to the sand substrate, this section of the river is not used by spawning salmon and they do not over-winter in this area. Some eulachon will spawn in this area. However, as in the gravel reaches, resident freshwater fish will be found in this section of the river throughout the year.

In this reach the more significant habitat problems and risks can be summarized as:

1. The constant need for construction sand and the need to dredge certain areas for navigation is a major habitat concern in this section of the river. Large quantities of sand are annually dredged out of the river and that sediment is therefore not available for deposit on the estuary face where it naturally would have protected and added new mudflats to replace those lost due to human development and eventual sea level rise.



**(Left) Dredge operating in the Fraser River Estuary. Dredging can harm fish during migrations and harm shallow water habitats. All dredging and removal of sand from the river does affect the amount of sand and silt available for habitat building outside of the navigation channels (Photo by Otto Langer).**

2. As in upstream gravel areas, some constantly argue that one must dredge sand out of the river to protect the Lower Fraser Valley from flooding. There is some truth to this but the argument is often exaggerated and misapplied to many areas to rationalize the Fraser River as a cheap source of sand for fill and construction purposes. For instance, in 2005 four dredging permits were issued under the auspices of flood control. A hydraulics model indicated that one operation could give marginal gain for flood control whereas two would not help flood concerns and the fourth operation could actually result in greater flood damage.

3. Whether it is sustainable or not, human population growth will continue to grow in the Fraser Valley upstream of the Port Mann area. This results in greater needs for transportation and other urban infrastructure. New bridges (e.g. Langley and Port Mann) and other developments must be closely monitored. We have reached a stage in habitat loss that any new development must be forced to enhance habitat and not just attempt to replace what it damages. Strong input by the recreational and fishery community is necessary to force government and industry to address this need. Here the new bridges and any other structure that extends into the river channel must be frowned upon. Local government and the dredge industry cry for more dredging to reduce flood risk. However, few seem to respect the integrity of the river channel to pass water when it comes to shoreline developments. For example the Alex Fraser Bridge in Delta has caused significant water backup into New Westminster by constricting the river channel with its bridge footings. The bridge footings and associated fill were extended into the

river to shorten the bridge span to save money.



(Left) An upstream view of the Alex Fraser Bridge footings encroachment into the Fraser River. This encroachment obstructs river flows and although many argue that the river must be dredged to reduce flood threats, structures like this bridge significantly back up Fraser River flows and significantly adds to the flood threat (Photo by Otto Langer).

4. When dykes were built along the Fraser River many decades ago the flood control authorities had to build dams across the mouths of tributary streams. This was to prevent the higher elevation Fraser River flows from forcing flows up streams and flooding the very areas that the dykes were built to protect. To pass tributary stream flows into the river and prevent local flooding, flap gates and pumps were built into the dams on the mouths of many streams. At high tide or flood flows, the juvenile salmonids that originate in these streams have to migrate through impellor pumps installed after the 1949 flood to get into the Fraser River to migrate to the ocean. These pumps kill many fish and as these old pumps are replaced we must insist that local governments rebuild their old pump houses and install fish friendly screw pumps as has been done at the mouth of the Salmon River in Langley. These new and much more efficient pumps will eliminate about a 30% mortality of juvenile salmon.

#### **The Fraser River Estuary - New Westminster to Steveston Reach:**

Although the Fraser Estuary Management Program includes the reaches from the ocean to as far upstream as Kanaka Creek as the estuary, that upper mark is more of a political boundary than a biological or technically based break. Tidal influence reaches well upstream of Mission and that helps define river gradient and substrate types. The upper tidal limit does not define the beginning of the estuary or present delta.

The estuary can be scientifically considered as the part of a river where the salt water of the ocean mixes with the freshwater of a stream or river. Under certain conditions (high tide and little freshwater flow) the salt water wedge may extend as far upstream as Annacis Island on the South Arm and to a lesser distance upstream on the North Arm. The Fraser River delta is generally considered as the reach of the river that breaks into channels as it flows over its deposited sediments as it reaches the zero gradient of the sea.

In recent geologic time the delta migrated from Hope down to its present active area from New Westminster to the ocean. Due to dykes, dredging and training walls, the active building delta is largely a thing of the past. The natural permanent accretion of sediments is largely active only on Westham Island and Sturgeon's Bank. Jetties and

causeways have greatly interfered with sediment transport especially in the areas of Roberts Bank and the Iona Island areas. In the following, the term estuary and delta will be loosely interchanged to reflect the areas of the river downstream of New Westminster.

The fish and wildlife habitat in and adjacent to the river (connected wetlands, tributary streams mouths, and riparian zones) in the estuary has been the most harmfully altered of all reaches of the Fraser River from Mount Robson to Steveston. Historically it was first impacted by dykes in the late 1800s. Within 70 years all major wetlands, tributaries mouths and riparian forests had been largely impacted by dykes, dredging, drainage, land filling and land conversion to agricultural, industrial and urban needs.

Losses of habitat were significant right into the late 1970s. The rate of loss after 1980 was attributable to less foreshore available for conversion into industrial purposes and in 1976 the Canada Fisheries Act finally included a new law to protect fish habitat. In 1986 the Fisheries Act habitat policy was developed to assure a 'no net loss' of the capacity of the habitat to produce fish with an ultimate goal of a 'net gain' in habitat productivity. However despite that, studies have shown that in the 20 years the policy was in place, the habitat base is still under great pressure and despite attempts to restore habitat, the base is still being lost on a 'slow net loss' basis. However this is a great improvement over the losses seen prior to 1980. A more diligent approach by regulatory agencies and a greater industrial stewardship attitude could achieve a net gain in habitat without harming the overall economy.



(Above) Prior to the 1980s the discharge of sawmill waste such as here on Tilbury Island was rampant from Mission to the mouth of the river. Due to pressure on these companies and prosecutions this obvious dumping has generally stopped except for an odd sloppy operator. The major wood debris problem is now with chip spillage from barges, larger wood from upstream logging, mill pond cuttings and wood being dumped from water based construction projects such as dock building. Some wood debris is good for ecological reasons - it supplies cover, helps stabilized sediments in some areas and some organisms can live in wood and use it as a food source. If the human sources of wood debris were stopped the natural debris would be more than adequate to serve ecological needs. An excess of wood indeed causes ecological and human property damage (Photo by Otto Langer).



(Left) Tilbury Island cement plant provided an early example some 25 years ago on how industry can respect the foreshore of the Fraser River Estuary (Photo by Otto Langer).

What assisted in the better protection of habitat was the development of a red (protect as is), yellow (can be developed but compensation to replace losses) and green (development can proceed) color coded zoning of foreshore habitat starting in the North Arm in 1986. This was extended to the rest of the estuary FREMP program area by 1990 and then adopted by FREMP to guide sustainability along the river. Unfortunately ongoing pressure attempting to undermine this habitat management system to benefit environmentally non-sustainable new development in the estuary has not gone away. Natural habitat will always be seen by development promoters as an industrial land bank.

The public must steward the following critical issues to ensure that local government, the Province and Department of Fisheries and Oceans and Environment Canada maintain a No Net Loss of habitat and restore many harmed habitat areas:

1. Keep your eyes open as to any new industrial developments in the estuary. The estuary has had a reprieve from significant development during the past 10-15 years but now as the Asian economy develops, great development pressures will be put on the river and what is left of estuarine habitat. The greatest threat to the estuary's outer banks is the never ending plans of the Vancouver Port Corporation to expand the Roberts Bank super port. They are presently planning a significant addition to the facility and with each expansion there is absolutely no doubt that the estuary will lose habitat and its ability to produce fish and wildlife. The future plans of the port are even more grandiose and if the government environment regulators do not sit up and do their job, much of Roberts Bank will be lost to fill. This will be the largest insult to the estuary in the past 100 years. This development would be the beginning of the end of the outer banks of the estuary. The impacts of past development at Roberts Bank have greatly altered that area and significant new development will destroy it. B.C. Ferries expansion in this area also have had a great impact with fill for parking lots and souvenir sales taking priority over essential habitat. Restoration of water flows through the Roberts Bank and B.C. Ferries' causeways would do much to partly restore past losses.



(Left) Robert's Bank Coal Port. The port and fill causeway has harmed fish habitat in the Fraser Estuary. Ongoing expansion will continue to erode the ecological value of this key habitat area. Note the spilled coal dust that can harm aquatic life (Photo by Otto Langer).

2. Although Sturgeons Bank has improved after the GVRD moved its poorly treated sewage off the Iona mudflats, various developers constantly scheme to develop this area. Special concern will have to relate to the constant pressures of the Vancouver Airport Authority to yet develop another runway to YVR – the Vancouver International Airport. If any development occurs outside the dyke, it will be devastating to the fish and wildlife resources in the estuary which serves habitat needs for the West Coasts of North and South America. One must keep a constant watch out for those that continue to promote an Iona ferry terminal. Improved circulation of currents in this area should be implemented that would benefit fish and wildlife. Flow and fish movement from the North Arm must be allowed across the North Arm and Iona Jetties and across the MacDonald Slough causeway.



3. If the environmental agencies are serious about protecting the estuary, a more dedicated effort must go into preserving the sensitive and highly productive habitats that have survived over 140 years of development. Should this not be done, development will chip away at the remnant habitat base and eventually the estuary will cease to be a viable habitat area. The FREMP red zoned habitats must be better protected and augmented with newly restored habitats. All remaining mudflats, marshes and shallow waters of the estuary are irreplaceable.

(Left) Much of the Lower Fraser River and estuary marsh habitat is a remnant of what it was many decades ago. Much of this area was lost to B.C. Government development 30 years ago. This small area was saved after DFO stopped the work and the B.C. Development Corporation gave it to DFO as fish habitat. This is unique in that DFO does not own fish habitat. The Fisheries Act requires the protection of habitat regardless who owns it (Photo by Otto Langer).

4. Sand dredging is a significant industrial activity in the Lower Fraser and especially in the estuary. The maintenance of a deep water port in the river will necessitate a well thought out channel maintenance program. In the past, proposals were made to narrow down the river to make it self flushing i.e. sediment entering the delta would be flushed out into the ocean by higher velocity currents. Initial river training works were built but a more comprehensive program did not take place. That program would have been very destructive to recreation and habitat and it is truly fortunate that this scheme was abandoned. Some dredging advocates have jumped on the gravel removal bandwagon seen in the Chilliwack area. However, in this area the sea level and freshet will largely dictate water levels and enhanced dredging, as advocated by many, will have minimal flood control benefit. Also, thought must go into protecting marshes from drowning as sea levels increase. In a natural estuary the marshes could be augmented by new sediment buildup or by the marshes ability to retreat to higher elevations. Here channel maintenance, dredging and the dykes prevent such natural survival processes from taking place.



(Left) Dredge operating in the Fraser River Estuary. Dredging can harm fish during migrations and harm shallow water habitats. All dredging and removal of sand from the river does affect the amount of sand and silt available for habitat building outside of the navigation channels. Dredging in the Fraser River estuary (Photo by Otto Langer).

5. Many harmed habitats can still be restored. Illegally filled in areas such as the Fraser River Port Authority property at head of Tilbury Slough should have illegal fill removed and be restored to fish habitat. Also FREMP failed in its job to remove all log booms that were grounding on marshes and mudflats. This program should be re-activated with some urgency. Leadership must be shown by property owners and governments to restore many past losses. They are evident throughout the estuary.

6. Water quality will continue to be an issue with inadequate enforcement and never ending growth. Also most half of the pollution entering the estuary and LFV comes from land or non-point sources (e.g. stormwater from our streets, agricultural runoff) and the rest from about 100 sewer pipes. With great inertia, improvements have been made to major sewage discharges such at the Annacis and Lulu Island sewage treatment plants. However, gains in effluent quality will be offset by constant growth and consequent increases in sewage volumes. More must be done to prevent contamination of our storm waters and treat them prior to discharge to the river. One must also question why the Iona sewage treatment plant still discharges poorly treated effluent into an enclosed waterway—the Gulf of Georgia. Maybe once Victoria admits it should treat its sewage for discharge to this same waterway, then Iona should also be upgraded.



**(Left) Iona Sewage Treatment Plant primary treated effluent discharge onto the Sturgeon Banks mudflats. This discharge took place from the late 1950s to the mid 1980s. Due to severe contamination of the mudflats and local biota, and constant fish kills the GVRD was charged under the Fisheries Act by the Musqueam Band. As a result of a court order the GVRD put the effluent into a deep sea outfall into the Gulf of Georgia. The effluent is still treated at the primary level - a level inadequate to protect marine life. One could say that the sewage is now 'out of sight - out of mind'! (Photo by Otto Langer).**

7. Since much of the estuary is totally altered by dredging, the Canoe Pass and Mid Arm of the Fraser should remain as non dredge areas. In a major habitat area like the estuary some key and essential habitat areas must be maintained in as natural a state as possible.



**(Left) This view exhibits a rare piece of relatively pristine mudflat, marsh and channel habitat in the Richmond Islands area of the Fraser Estuary just downstream of Ladner (Photo by Otto Langer).**

8. Wood debris is still a real issue in the estuary and marshes upstream of the estuary. Some wood debris is good but when it clogs marshes, it is unacceptable. Unfortunately most wood seems to be of industrial origin and FREMP has to develop a program to get those industries that handle wood to keep their wastes out of the river. A decent enforcement program on this as well as many other issues could go a long way to educate industry that waste dumping into the river is unacceptable and illegal.



(Left) Excess wood debris, often discarded from wood mills, will smother river and estuarine marshes. The wood mill disposal problem is especially great downstream of Mission. Also much logging debris can be found in the river upstream of Mission (Photo by Otto Langer).

### **The Bigger Picture:**

I have provided the reader with a thumbnail sketch of issues facing the Fraser River upstream of Hope and a more detailed sketch of habitat issues in the Lower Fraser River. The reader must appreciate that what happens in the upper river will indeed have ecological consequences downstream of Hope. With that said, climate change and what happens in the North Pacific will also affect what happens in the upper and lower Fraser River in terms of the health of habitat and fish populations.

In 2004 we had yet another year of missing sockeye salmon. The missing sockeye should not be seen as an issue just related to that single species. It highlights problems facing the aquatic life in the entire Fraser River system. The overall consensus is that water temperatures had much to do with missing sockeye. Of course poaching was also an issue. In an ecosystem, there are most often many factors at play when something often reaches the threshold of a crisis situation. There are no simple explanations and solutions. However, all have to get on side to relate to global warming and the impact it is having and will continue to have affecting cold water fish species in the Fraser system.

Fishermen and outdoor enthusiasts must put much more pressure on government to better relate to the Kyoto Protocol to better reduce greenhouse gas emissions and not allow it to slip backwards as is presently the case in B.C. and the rest of Canada. Above all we must all look at our own life styles the next time we go fishing, Should we be driving a high fuel consumption truck or SUV and pretend it is not having an impact on global warming and our local fishery?

There are also government policies that are undermining the maintenance of a wild fishery in the Fraser and elsewhere on this coast and Canada. For the sake of yet another industry and a few more jobs, governments are willing to support often what is not environmentally sustainable industry. A good example of this is salmon farming. Salmon farming and the introduction of new species for aquaculture to B.C. is a real issue. One must question why an agency like DFO, established to conserve and protect wild fish would in the last 15 years become a promoter and cover for the aquaculture industry.

The view is that growth, often any growth, is good for the economy. They have and will continue to trade off government financial deficit for a growing ecological deficit. This can be done in many ways including major B.C. and DFO cuts to its habitat protection programs. The financial debt that we face can be repaid. The ecological debt is most often unidirectional and once we have lost habitat and species, it will never be returned. That will be the real debt passed on to future generations. The federal and provincial governments must get together and show that they can promote a joint 'conservation first' agenda so as to protect what is left of a diminishing natural legacy. Despite years of rhetoric about environmental protection and sustainable development, no truly serious and effective joint attempt to address this need has been made by the senior governments.

**Summary:**

Yes, we have made good progress in protecting the Lower Fraser River's habitats since the 1970s. Habitat losses in the Lower Fraser River from Hope to Steveston were great from the 1860s to the 1970s .



(Left) Little enforcement existed in the 1970s and this type of dumping was rampant along the Lower Fraser River – especially in the areas downstream of Mission. Photo 1979 (Photo by Otto Langer).

However the human population and industrial infrastructure continues to grow at a high rate as promoted by business and governments. This growth has and will continue to offset habitat protection and gains made in effluent treatment and even in car emission controls. What we put into the air does end up on our streets and in our river and contaminates our aquatic life to detrimental levels (e.g. lethal levels of PCBs and other



persistent organic contaminants in our killer whales).

(Left) Tumor on a large scale sucker in the Fraser River Estuary. Such growths are unnatural and are usually in response to excessive levels of contaminants in the river. All storm water and effluents should be properly treated prior to discharge to the river to prevent these toxic impacts to all forms of life from suckers to killer whales (Photo by Otto Langer).

The LFR did benefit from reduced development pressures from 1988 to about 2004. However as the new millennium unfolds and offshore international trade increases, the pressure for new development at the expense of habitat is heating up and governments are doing everything to promote that growth and development.

What is most disturbing is that as more and more people move to live here and as we aggressively promote development, Ottawa and Victoria have reduced habitat protection staff. Starting in about 2003 we are into an era where habitat protection is getting a distant rating to economic development. This is most unfortunate in that the Lower Fraser Valley habitats have been overly compromised to past development and a strong habitat protection ethic seen in the late 1970s–2000 seems to have been lost by the federal and provincial governments. De-regulation and fiscal responsibility have been at a needless cost to the environment.

Further to the above, it is difficult for the public to follow what is happening to Fraser River water quality and habitat. Governments have made habitat protection so complex that they often do not understand the disjointed approach taken to protect habitat in the face of creating yet another job or exporting another tonne of coal. Also, to replace budget and staff cuts to habitat protection programs, governments have adopted programs that are largely untested in Canada but have been shown to not work in many jurisdictions including here in B.C. They have concluded that past programs have been too costly and inefficient. Governments have switched to catchy phrased programs like 'smart regulations' and 'performance based regulations' and 'self compliance'. Basically they have moved away from essential enforcement, the backbone of any effective environmental protection program, and have decided under the allusion of stewardship that the coyote can now look after the chicken coop.

The new government programs will not provide a balanced approach to habitat protection and will not work. Those closest to the fishery resource, the recreationalist, the sports fisherman, the commercial fisherman and the aboriginal fisherman must stand up and demand better. It must be appreciated that industry and government most often have a short term agenda and a very weak ethic to the environment and future generations. That is not the way to protect the Lower Fraser River and estuary – a habitat area that is of global significance and is an integral part of our West Coast culture.

Otto E. Langer Oct 20, 2005

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### **Biography of Otto E. Langer, R.P. Bio**

Otto Langer received his BSc. (Zool) and his MSc. in fisheries biology from the University of Alberta. He worked for over 30 years as a water quality and habitat protection biologist for the Department of Fisheries and Oceans. Most of his work related to the Fraser River and its estuary. From 2001 to 2005 he joined the David Suzuki Foundation as director of Marine Conservation. He has written many technical articles and in 2005 won the Roderick Haig - Brown B.C. Book Prize as a co-author of *Stain Upon the Sea* - a book exposing salmon farming practices on the B.C. coast. He is a charter member and has served as president of the Association of Professional Biologists of B.C.