Fisheries and Oceans Canada

Pacific Region

Supporting Document to the

Annual Report to Parliament
on the
Administration and Enforcement of
Fish Habitat Protection and
Pollution Prevention Provisions
of the *Fisheries Act*

April 1, 2001 to March 31, 2002

Table of Contents

Detailed Information for the *Pacific Region* in support of the 2001-2002 Annual Report to Parliament on the Administration and Enforcement of Fish Habitat Protection and Pollution Prevention Provisions of the *Fisheries Act*.

This document complements the Annual Report on the Administration and Enforcement of the Fish Habitat Protection and Pollution Prevention Provisions of the *Fisheries Act* for fiscal year 2001-2002.

Organized along the same structure and format as the report tabled in Parliament, this document provides more detailed information about the achievements of the Habitat Management Program in Fisheries and Oceans Canada, **Pacific** Region.

The report, which is published in both official languages, is tabled in Parliament by the Minister of Fisheries and Oceans Canada on an annual basis. An electronic copy of the Annual Report is available at: <http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/publications/index_e.asp>. Hard copies can be obtained by writing to:

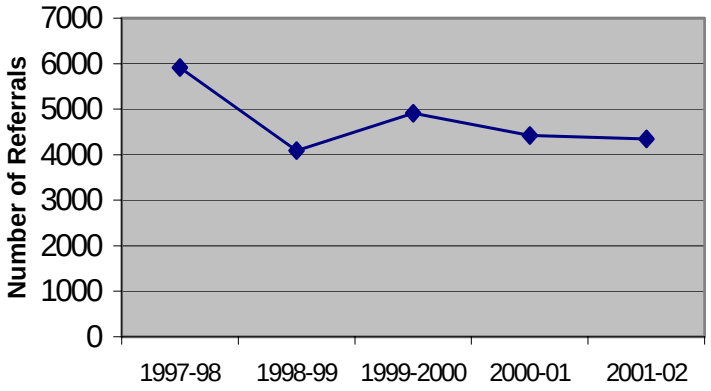
Fisheries and Oceans Canada
Habitat Management Program
200 Kent Street, 12th Floor
Ottawa, Ontario
K1A 0E6
E-mail: info@dfo-mpo.gc.ca

1.0 Regulatory Activities

1.1 Review of Development Proposals (Referrals)

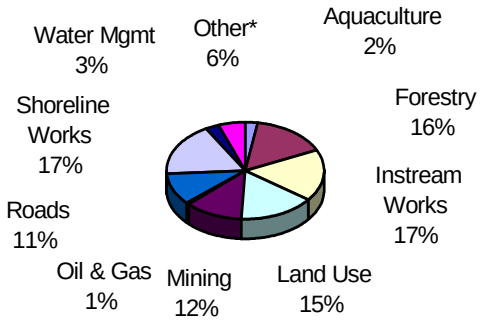
The region reported 4,643 referrals in fiscal 2001-2002. The number of referrals processed in the region has remained fairly constant over the last four years, shown in the graph below. The graph provides no information regarding demand, i.e. the number of works affecting fish habitat in the region that were eligible for Fisheries and Oceans Canada (DFO) referral review; nor on the length of time needed for referral decisions.

Figure 1: Habitat referral trend, Pacific Region (1997-1998 to 2001-2002)



In fiscal year 2001-2002, the four most common work categories of projects referred were shoreline works, in-stream works, forestry, and general land use. More than 600 referrals were received for each of these categories, making up 65% of all referrals in the region. The region reviewed fewer referrals for forestry, mining and roads than in the previous year.

Figure 2: Habitat referral work categories, Pacific Region (2001-2002)



*Referrals identified with work categories of Deleterious Substances, Hazardous Materials, Ocean Management, Ocean Dumping, Power Projects, Railway, Research and Seismic Activities and Model Class Screening Reports.

The region issued 72 authorizations (for about 4% of referrals), and 1,618 letters of advice.

Yukon Placer Authorization Review

The Yukon Placer Authorization is essentially a class authorization of placer mining projects to streamline referral processing and increase consistency. DFO is a member of the Yukon Placer Committee. The Committee completed a review of the existing authorization and reached a consensus on changes to recommend to the Minister of DFO. The Committee focused on the issue of deferrals (of habitat), acceptable levels of sediment, and governance. DFO conducted research on sediment impacts on fish habitat typically subject to deferment.

MacArthur Island Slough Compensatory Works

Compensation required from proponents for a multi-year dike construction project in Kamloops involved re-opening a backwater slough that had been cut-off from the main Thompson River channel since the 1950's. The compensatory works were large and complex, breaching two historical causeways that contained infrastructures such as sewer and water mains. Last year, the upstream causeway was opened. This winter and spring, the opening of the downstream causeway completed the project, opening up kilometres of alienated habitat and restoring the slough to a natural flow-through system. The Thompson River supports all five Pacific salmon species, including the endangered Thompson River coho. Every spring, hundreds of millions of juvenile salmon migrate down this system and rely on critical off-channel habitat to rest, feed and hide from predators. This project restored one of the largest off-channel complexes in the entire Thompson watershed.

Yoho 5-Mile Bridge Compensatory Works
The Yoho 5-Mile Bridge replacement is part of the Cache Creek to the Rocky Mountains Trans-Canada Highway Improvement Program. This bridge is a major safety hazard and bottleneck on the Trans-Canada Highway. The project will replace the old two-lane bridge with two separated two-lane bridges, allowing two lanes of travel in both directions. The project will require two other new bridges east of the original bridge, for a total of four new bridges. Construction will commence this fall and be staged over three years. Fish habitat impacts include significant encroachments into the Kicking Horse River during construction, permanent bridge footing and pile footprints within the river channel, and significant riparian vegetation loss. However, the habitat lost is primarily marginal migration habitat, and compensatory works will create critical off-channel rearing habitat for the endangered Bull trout, as well as riparian reclamation along a portion of abandoned highway right-of-way.

1.2 Compliance and Enforcement

Environment Canada (EC) generally administers the pollution prevention provisions of the *Fisheries Act*[1]. However, under a Regional Working Agreement with EC, DFO in Pacific Region administers and enforces section 36 for matters involving the release of sediment, filling material, debris, and for deleterious deposits that do not involve effluent treatment facilities or structures. DFO provides advice regarding all fish habitat water quality issues.

In DFO Pacific Region on a yearly average (1997-1998 to 2001-2002), 70% of prosecutions for harmful alteration of fish habitat have involved charges under section 35 alone, whereas 30% involved charges under both section 35 and 36 or section 38. DFO has also taken enforcement action under section 36 in Pacific Region for chemical discharges, often in cooperation with EC, the Province of British Columbia (BC), or Yukon Territory agencies.

Compliance

Coastal BC Monitoring for Dioxins and Furans
Pacific Region collaborated with EC to design the Annual Coastal Pulp Mill Monitoring and Audit Sampling Program, for implementation in 2002. DFO conducted year 2001 sampling for contaminants in Victoria and Esquimalt harbours for submission to Health Canada for a health hazard assessment. Assessments are necessary before results can be released to the public, or any revisions made to fish harvest restrictions.

[1] Under a 1987 *Memorandum of Understanding*, EC and DFO agreed to cooperate and communicate on all matters regarding administration of section 36. However, DFO reserved the right to take direct action under section 36 where EC was unable or unwilling.

Culverted Stream Crossing Compliance Review

A review of closed bottom culverts was conducted in the Kamloops Forest District to assess whether the fish and fish habitat provisions of the *Fisheries Act* were being achieved. At each culvert site, the likelihood of juvenile fish passage and the maintenance of fish habitat were assessed. Only one of the thirty-one culverts assessed met DFO objectives for juvenile passage and maintenance of fish habitat. The results were published as a Canadian Manuscript Report of Fisheries and Aquatic Sciences:

Chestnut, T.J. 2002. A Review of Closed Bottom Stream Crossing Structures (Culverts) on Fish-bearing Streams in the Kamloops Forest District, June, 2001. Can. Manuscr. Rep. Fish. Aquat. Sci. 2602: 40pp.

Placer Mining Compliance Monitoring

DFO conducted a compliance monitoring program focussed on placer mining activities in the BC Cariboo area, and discovered significant issues affecting fish and fish habitat. DFO is attempting to work with provincial regulatory agencies and the placer mining community, to establish an acceptable regime with the placer industry in this area.

Habitat Compensation Evaluation Program (update)

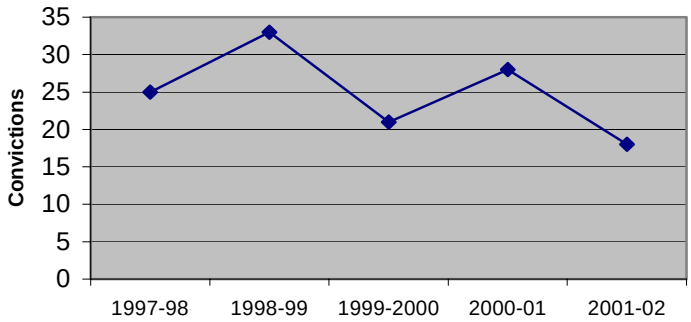
In April 2000, DFO Pacific Region initiated a Habitat Compensation Evaluation Program to evaluate habitat compensation projects. The scientific evaluation examines both compliance to conditions under subsection 35(2) authorizations; and the effectiveness of those conditions that were used to achieve "no net loss" of fish habitat productivity. At this time, files for 139 Pacific Region authorizations have been reviewed, field audits of 37 of those authorizations (randomly selected) have been conducted, and data entry to a Habitat Accounting Database is in progress. The program was expanded to a national initiative by including files and field audits of 20 compensation projects from Central and Arctic, Gulf, Maritimes, and Newfoundland Regions.

More information is provided on the DFO Pacific Region internet site: <http://www_heb.pac.dfo-mpo.gc.ca/english/assessment/intro.htm>.

Enforcement

The region reported 18 convictions in fiscal year 2001-2002 under habitat sections of the *Fisheries Act*, resulting from investigations completed by DFO as the lead agency. The number of convictions has decreased over the last five years, as shown in the graph below. Over the same period, the number of convictions per prosecution has remained constant (between 1.3 and 1.6 convictions per successful prosecution, data not shown); and the success rate for prosecutions has remained constant (about 80%, data not shown).

Figure 3. Convictions as a result of investigations by DFO in Pacific Region



The eighteen convictions in fiscal year 2001-2002 came as a result of 16 prosecutions adjudicated by courts in BC and the Yukon (any single prosecution may result in multiple convictions under multiple sections of the *Fisheries Act*). The 16 prosecutions involved a wide range of offences by 23 accused individuals and corporations.

Of the 16 prosecutions, 13 (81%) resulted in one or more convictions. The offences included: placing fill material on private marine foreshore; failure to perform a court order from an earlier habitat conviction; sediment discharges from placer mining; and discharges of sewage, pulp mill effluent, and wood leachate from forestry product facilities. Three prosecutions (19%) did not result in any convictions. These court cases included: a reversal of conviction under section 36, after an appeal on the basis of due diligence; acquittal on a charge of failing to perform a court order, on the basis of reasonable doubt; and acquittal of charges under section 35, on the basis of reasonable doubt.

The courts assessed a total of almost $300,000 in penalties. Some examples of specific cases are given below. For more details, consult the DFO Pacific Region Habitat Enforcement internet site at <http://www-heb.pac.dfo-mpo.gc.ca/english/habitat_policy/index.htm>.

BC Ministry of Transportation fined $35,000 for fish habitat damage
In April 2001, the government of BC was convicted in Provincial Court for harmfully altering fish habitat near Smithers. The provincial Ministry of Transportation and Highways was found guilty under the *Fisheries Act*. The case began in 1998 when federal Fishery Officers received a complaint from the public. Ministry staff were using heavy machinery to install a fence, removing vegetation and damaging a tributary to the Bulkley and Skeena rivers. The stream provides spawning and rearing habitat for salmon and trout. The Ministry was sentenced to pay $35,000 for fish habitat improvement in the Smithers area.

Britannia Pacific Mining and owner fined $10,000 for sediment discharge
In November 2001, a placer mining company and its owner pleaded guilty in Yukon Territorial Court to polluting the Yukon River with sediment. In 1999, DFO officials discovered sediment-laden water entering the Yukon River from Britannia Creek, about 100 miles west of Dawson. The discharge came from a placer mine without proper settling ponds to contain sediment generated by mining. Britannia Pacific was fined $8,000 under the *Fisheries Act*. Mine owner Allen Radford was fined $2,000 under the *Yukon Waters Act*.

Nanaimo resident fined $2,000 for removing vegetation from dike and creek
In September 2001, Brian White of Nanaimo, BC, pleaded guilty to a charge of damaging fish habitat. Mr. White removed vegetation from a dike next to Holden Creek and substrate from the creek itself in December of 2000. The work was not authorized. A complaint from the public initiated an investigation, and charges were laid under subsection 35(1) of the *Fisheries Act*. White was ordered to pay a $2,000 fine and to restore the habitat to its original state. The sum of $1,500 of the fine will be spent locally on fish habitat restoration projects.

Town of Gibsons fined $7,500 for sewage release
In November 2001, the Town of Gibsons BC was found guilty of sewage pollution. The case began in 1999 when investigators discovered sewage overflowing from a manhole at the Gibsons Marina. No spill containment measures were in place. Nothing was done to stop the sewage from entering the ocean while city contractors worked to remove the blockage. After a four-day trial in Sechelt Provincial Court, the town was convicted under the *Fisheries Act* for depositing a deleterious substance to fisheries waters. The BC Provincial Court ordered the town to pay a $500 fine, and $7,000 for salmon habitat improvement in the Gibsons area.

Weyerhaeuser fined $40,000 for wood leachate pollution at Port Alberni
In July 2001, the Weyerhaeuser Company Ltd. pleaded guilty to allowing wood leachate to pollute Johnston Creek near Port Alberni, BC. Wood leachate results when the soluble constituents of wood are released upon contact with water. The leachate can be harmful or toxic to aquatic life. In May of 1999, DFO discovered toxic leachate discharges from the Sproat Lake Division Dryland Log Sort facility. DFO directed the company to prevent further discharges to Johnston Creek. Despite company efforts to control the run-off, investigators found toxic leachate still entering the creek in October, and charges were laid under the *Fisheries Act*. Weyerhaeuser was fined $2,000, and ordered to pay $38,000 for the Alberni Valley Enhancement Association to restore salt marsh in the Somass River estuary.

1.3 Environmental Assessments of Key Projects

In fiscal year 2001-2002, the region initiated 227 Environmental Assessments (EAs); had 272 EAs ongoing and a total of 147 EAs were either concluded or cancelled.

Aishihik Hydroelectric Facility
The existing Aishihik Facility operated by the Yukon Energy Corporation (YEC) supplies power to the hydroelectricity grid in the Yukon. YEC applied for a new operating license to the Yukon Territory Water Board. The license application included plans to build an additional turbine. YEC and DFO negotiated the conditions of a *Fisheries Act* subsection 35(2) authorization to allow this project to proceed. Conditions include detailed methods to monitor the impact of changing water levels on fish stocks over time. An EA of the project was completed, with DFO and the Department of Indian and Northern Affairs Canada as the responsible authorities.

Alcan – Tahtsa Narrows
Late in fiscal year 2000-2001, Alcan Inc. initiated discussions revisiting their proposal to dredge the Tahtsa Narrows in the Nechako Reservoir. Alcan sought the dredging to increase reservoir levels after several years of lower than average inflow. In fiscal year 2001-2002, DFO took substantial efforts to scope the proposed project for an EA; review information submitted by Alcan; assemble a Project Review Team with DFO, the Province of BC, several local First Nations, and local government representatives; and establish a formal review process. By late winter, it was apparent that reservoir inflows would be above average, and Alcan put the project on hold.

Aquaculture Renewals and Relocations
The DFO Habitat Management Program is responsible for managing impacts of aquaculture operations on fish habitat, and for conducting EAs triggered through requirements for *Navigable Waters Protection Act* (NWPA) permits. In fiscal year 2001-2002, Pacific Region initiated 104 EAs of proposals for shellfish sites and finfish aquaculture tenure renewals and relocations. The Province of BC moratorium for new finfish aquaculture sites remained in effect for this year.

Bella Coola Gravel Mine and Port (update)
Plans had been submitted for a large gravel mining operation and deep-water port facility near Bella Coola. Key issues included the large amount of dredging required to accommodate gravel transport ships, and the impacts of such vessels on fish and fish habitat in the confined spaces of the North Bentinck Arm of Burke Channel. The proponent has placed the proposed development on hold, and has not undertaken environmental studies.

DFO has ceased data collection and site monitoring; no EA or project development will occur until further information is received.

Brilliant Powerplant Expansion
DFO and the Province of BC completed a harmonized EA of a conceptual design for a 100 megawatt powerplant addition to the Brilliant Powerplant, an existing dam and power facility. Considerable benefits in reducing total gas pressures in the lower Columbia River will be realized. The proponent proceeded to the next stage of a Design-Evaluate-Build stage of review in developing a final design.

Georgia Strait Pipeline Crossing
Public hearings commenced under a joint National Energy Board and EA Panel Review process. Comments from the public and First Nations were received on a document setting out the scope of the project that assigns studies for the proponent to conduct. DFO is asserting its responsibilities for fisheries resources, navigation and First Nations consultation under the status of "intervenor" in this review.

Nisga'a Highway
The BC Ministry of Transportation proposed to construct 24 kilometres of two-lane gravel road along the Nass River, connecting the First Nations community of Kincolith to an existing road system currently ending at Greenville. The proposal also included upgrading sections of existing connecting roads, and a request to add rock armour to a section of Fishery Bay (site of an important traditional eulachon fishery and habitat) to protect this First Nations cultural heritage site. This project was first proposed in 1996, and its scope triggered a Comprehensive Study under CEAA. During fiscal year 2001-2002, the Province of BC and DFO Habitat Management staff developed mitigation and compensation plans for three major sections of this new or upgraded route. Discussions continue on other aspects of the proposal.

Seatech Float Fabrication Facility
The project involved construction of a float fabrication facility in Discovery Passage, about nine kilometres north of Campbell River. The facility included a pier structure supported by piles, and three moored barges to be used as construction platforms. Following an EA of potential impacts to the adjacent foreshore, representatives of EC, the Canadian Wildlife Service, DFO and the proponent agreed on a plan for compensatory works to offset the loss of fish habitat, and impacts to migratory bird habitat. The compensation included constructing a sub-tidal reef and an inter-tidal island, as well as replanting an inter-tidal marsh area.

Tulsequah Chief Mine (update)
The Province of BC's EA of the proposed Tulsequah Chief Mine was suspended as the result of a court decision, and the matter was referred back to provincial ministers. DFO and other agencies are continuing a screening-level assessment pursuant to CEAA, independent of the provincial government process.

1.4 Regulations, Policies, and Guidelines

Aquaculture Guidelines
DFO staff contributed to a number of aquaculture-related guides. These included the *Interim Guide to the Application of Section 35 of the Fisheries Act to Salmonid Cage Aquaculture Developments*, and the *Interim Guide to Information Requirements for Environmental Assessment of Marine Finfish/Shellfish Aquaculture Projects*. Both are documents of the DFO Office of Sustainable Aquaculture.

Ballast Water Management Guidelines
DFO participated on the West Coast Regional Working Group on Ballast Water Management, which meets four times per year to coordinate the Pacific and Yukon Region regulation of ballast water discharge from commercial shipping for the prevention of introduction of non-indigenous species. The group promotes ballast water policies that are effective, environmentally safe, practical and cost-effective. National guidelines for ballast water discharge were developed and reviewed with Transport Canada.

Bridge Painting Guidelines
DFO staff prepared a final draft of revised guidelines for the protection of fish and fish habitat during bridge maintenance operations in BC. The guidelines are based on an earlier document that outlines mitigative strategies applicable to bridge maintenance operations. The guidelines provide information to help DFO staff review projects, promote regional consistency, and ensure the protection of fishery resources.

Fish Stream Crossing Guidebook
In March 2002, a revised *Fish Stream Crossing Guidebook* was released. The guidebook establishes new standards and best management practices for the construction of fish stream crossings on forestry roads in BC. The guidebook was developed collaboratively by the Province of BC, the forest industry (Council of Forest Industries) and DFO. The guidebook is available at: <http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/Guidetoc.htm>.

Habitat Prosecution Procedures (Revised)
The process of enforcing the *Fisheries Act* habitat provisions requires teamwork and coordinated contributions from Fishery Officers, biologists, technicians, engineers, research

scientists, and legal counsel, from different DFO branches and other government agencies. Clear and accepted procedures are required for effective and efficient prosecutions. Pacific Region completed and implemented an improved regional *Habitat Prosecution Procedures* document in November 2001.

Metal Mining Liquid Effluent Regulations
DFO staff helped develop new Metal Mining Liquid Effluent Regulations under the *Fisheries Act* proposed by EC. The new regulations are to replace current regulations in place since 1977. The new Regulations attempt to increase containment and decrease discharges of pollutants; and decrease toxicity of effluents. There would be a new requirement for mines to conduct a comprehensive Environmental Effects Monitoring program. The new Regulations would apply to all operating metal mines in Canada, of which there are about one hundred.

Seawall Construction Best Management Practices
Fact sheets on seawalls, docks, and minor foreshore construction have been developed to facilitate the large number of referrals received on such projects by DFO on the south coast of Vancouver Island. The fact sheets have proven to be a time efficient method of providing best management advice to developers requiring minimal DFO staff time. Many of the conditions on the fact sheets have been incorporated into standard conditions of the BC Assets and Lands Corporation that regulates Crown land.

2.0 Freshwater and Oceans Planning

BC Coastal Management Planning
DFO staff provided technical input and advice for a variety of planning exercises initiated by the BC Ministry of Sustainable Resource Management. These included the North Coast Land Resource Management Plan; the Chatham Sound Coastal Integrated Plan; the Central Coast Land & Coastal Resource Management Plan; and the CCIM Strategic Plan for the Central Coast Large Ocean Management Area.

BC Water Use Planning For Hydroelectric Power
The Province of BC announced in November 1998, a program to develop Water Use Plans (WUPs) as a condition of existing water licenses. The initial focus of the program has been on existing hydroelectric power facilities. WUPs may include: flow changes downstream of a dam to improve or increase fish habitat; operating protocols to avoid fish stranding and entrainment; reduced reservoir draw-down; mitigation of Total Gas Pressure impacts; habitat compensation works; fish studies; and monitoring. Flow changes may be based on specific

fisheries needs, or may be in the form of naturalized hydrographs to address broader ecological requirements.

BC Hydro is developing WUPs for each of its existing facilities over a five-year period (1998-2003), collaborating with DFO, other agencies, and stakeholders. WUP development is financed by contributions from BC Hydro ($25 million), the Province of BC ($7.5 million), and DFO ($1.4 million, primarily in personnel resources). In most cases, studies are required to understand the impacts of various alternatives for water management at each facility. DFO participates in study design, and in some cases assists in the studies themselves. The resulting information is interpreted and provided to all stakeholders.

WUPs have been completed for the Alouette, Stave, Bridge/Seton, Cheakamus, Seven Mile and Jordan facilities. All of these plans call for operating changes that should significantly improve fish habitat productive capacity. These WUPs have provided significant increases in available fish habitat, both above and below the dams. The Alouette WUP, for example, added 80,000 m^2 of fish habitat to the pre-WUP scenario. In the Stave WUP, the operating regime will reduce stranding of both adult and juvenile salmon in the Stave River while increasing littoral habitat in the Stave reservoir by over 700 hectares.

WUPs are currently being developed for BC Hydro facilities on the Campbell, Coquitlam, Ash, Wahleach, Columbia, Shuswap, Puntledge, Duncan and Peace systems. Interim orders have been implemented at several facilities while WUPs are being developed.

The interim flows stipulated have resulted in general increases to spawning and rearing habitat. For example, as part of a WUP interim order package, five km of the Bridge River channel downstream of the Terzaghi Dam was restored by DFO. This reach was de-watered in the 1950s, and was permanently re-watered in August 2000. This created a major increase in habitat for chinook, coho, sockeye and steelhead. The Bridge Seton WUP will include an adaptive management program to determine the most appropriate flow regime for this river.

Canada - BC Agreement

The Canada and BC Agreement for the Management of Pacific Salmon Fishery Issues (1997) committed both governments to work jointly in watershed-based fish production planning processes. DFO and the Province of BC jointly produced a guide, "*Watershed-based fish sustainability planning [WFSP]: Conserving BC Fish Populations and their habitat"*. The guide outlines a planning process that takes a "fish first" approach to establish regional watershed priorities. Pilot projects include the Skeena, Salmon, Nimpkish, Taku, Morice and Bella Coola watersheds. First Nations, local communities (roundtables) as well as government agencies have been involved.

As an example, Phase I of a multi-year Salmon River (Salmon Arm) WFSP process was completed. Widespread agreement was reached on the critical land and water use issues linked to fish and fish habitat sustainability, and how to manage those issues for protection, restoration and enhancement of fish and fish habitat in the context of watershed sustainability. Deliverables included a record of the process, participation, issues, agreements and recommendations of the planning process. Phase II of the plan, scheduled for fiscal year 2001-2002, awaits funding.

Lillooet Land and Resource Management Plan (LRMP)
Development of the Lillooet LRMP began in 1995 and involves a broad spectrum of land and resource management interests. The LRMP was to be finalized in March 2002. This target has now been pushed back to the fall of 2002. The Lillooet LRMP committee is awaiting direction from the Province of BC before proceeding with Phase II of the plan development.

Vancouver Wastewater Management Plans
DFO, in cooperation with EC, refined the Liquid Waste Management Plan Stage II of the Greater Vancouver Regional District (GVRD), which was approved by the Province of BC. DFO participated on a project team along with EC, the BC Ministry of Water, Land, and Air Protection, Vancouver Port Corporation, and the GVRD to assess site-specific options for treating the Clark Drive combined sewer overflow.

3.0 Habitat Enhancement

BC Central Coast Projects

DFO habitat enhancement projects included the creation of side-channels to increase salmon rearing habitat in the Orford, Campbell, Salmon, Nimpkish and Kokish river systems; improved fish access to Hagensborg Slough habitat past a dike on the Bella Coola River; and construction of fish access to Dump Creek, a tributary to the Bella Coola River, past a previously impassable highway culvert.

Coldwater River
DFO has been working with the Pacific Salmon Foundation and the Nicola Tribal Association to improve fish habitat in the Coldwater River using the Pacific Salmon Endowment Fund (championed by Rick Hansen). Although some restoration activity occurred, the majority of activities in fiscal year 2001-2002 focussed on planning and organization.

Guichon Creek
Guichon Creek, a tributary of the Nicola River, has chronic problems of low flows, over-diversion and illegal use for irrigation and frequent fish kills from de-watering. DFO has been working to solve these problems through alternative water sources and designing redelivery systems. Upon completion, there will be substantially improved water flow throughout the most heavily developed portion of the creek, and elimination of regular fish kills on half the major irrigation diversions in the lower portion of the creek.

Steinhoe Creek Habitat Reclamation
Steinhoe Creek, near Terrace, had been effectively cut-off by a culvert in 1910 when all upstream migration of salmon ended. DFO staff in Smithers convinced CN Rail to rebuild the rail bed, installing a culvert to provide access for salmon back into the creek for the first time in over 90 years. This rehabilitation work also allowed for new access to a groundwater-fed slough, which provides excellent off-channel habitat. Approximately 36,000 m^2 of riffle/pool and 20,000 m^2 of slough rearing was restored. CN Rail paid for all project costs, an estimated $350,000.

Thompson River Riparian Reclamation
Within the Kamloops City limits, three levels of government, First Nations, a Community Stewardship Group and private landowners cooperated to re-plant and fence over six kilometres of river bank on the North and South Thompson Rivers. Riparian vegetation on these rivers, located in the extremely dry and hot BC Interior, is critical fish habitat. The North and South Thompson Rivers support all five Pacific salmon species, including the endangered Thompson Coho, with millions of adult salmon and hundreds of millions of juvenile salmon spawning, rearing and migrating in their watersheds.

4.0 Community Outreach and Stewardship

4.1 Public Information and Education

Habitat Enforcement Bulletin
DFO staff produced two more issues of its *Habitat Enforcement Bulletin* in fiscal year 2001-2002. The bulletin serves to inform both the public and staff of habitat enforcement activity, case law developments, and the use of enforcement powers. The bulletin continued to receive positive feedback and requests for subscriptions from the general public, private corporations, and federal and provincial government staff. The bulletin has now been expanded as a national DFO publication. Bulletins are available electronically at: <http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/publications/index_e.asp>.

Habitat Enforcement Internet Site
DFO maintained and improved its public habitat enforcement web site, launched in 1999, designed to inform the general public, interest groups, and federal and provincial staff. The site includes information on how to comply with the *Fisheries Act* habitat sections; news and statistics on habitat charges and convictions; explanations of the process of environmental law enforcement; and descriptions of court orders to restore damaged fish habitat.

Horsefly River Salmon Festival
The first ever Horsefly River Salmon Festival was held in September 2001. Hosted by the community of Horsefly, the event was supported by many businesses and agencies, including DFO staff. Dozens of volunteers also assisted at interpretive sites visited by several thousand school children over the course of the festival. The Horsefly River has a very large sockeye return on its dominant year, and DFO was able to work with the community to raise the profile of this important salmon stream. It is hoped that this will be the first of many similar events.

Offshore Oil and Gas Workshop
DFO organized and hosted an offshore oil and gas workshop bringing together federal agencies to discuss perspectives on offshore oil and gas development on the West Coast. The workshop included presentations from DFO (Habitat Management, Oceans, Science, and Coast Guard), the Canadian Environmental Assessment Agency, Indian and Northern Affairs Canada, the National Energy Board, and Natural Resources Canada.

Realtor Information Package
DFO staff in Salmon Arm developed an information package for local realtors regarding the legislative responsibilities of DFO, the values and sensitivities of streams and lakes as fish habitat, and the referral process whereby habitat staff review private land development proposals. Packages were distributed to local realtors during meetings in fiscal year 2001-2002. This program is proposed for extension to the larger Okanagan Mainline Real Estate Board area in fiscal year 2002-2003.

Salmon River Screening Information Sessions
For the benefit of Thompson River Coho and Chinook stocks, DFO conducted a Salmon River Screening Project. This project provided information to landowners regarding their responsibilities under the *Fisheries Act* and facilitated compliance. The project included public information sessions with media coverage, samples of screened water intakes for public viewing, and intake inspections by DFO staff. The inspections were followed by letters to intake owners directing them to repair or replace screened intakes where required.

Smithers Salmon Stream Signs
Around the Smithers area, DFO staff were instrumental in obtaining and installing "Salmon Stream" signs at road crossings throughout the area. In addition, in consultation with the BC Ministry of Transportation, DFO developed a set of Best Management Practices for highway maintenance contractors to avoid or minimize impacts on fish habitat.

Zebra Mussels Awareness
Pacific Region continued to develop a Zebra Mussel awareness information package for staff to recognize this potentially damaging invasive species, and a rapid response plan. The DFO *Sport Fishing Guide* also carries information on Green Crab and Zebra Mussel with reporting procedure outlined for sport fishermen.

4.2 Cooperative Action

Avola Land Acquisition
Agreements were made to transfer Land Titles for environmentally sensitive land with high fish habitat values in the North Thompson watershed to DFO for salmon conservation purposes. This is a unique partnership with Weyerhaeuser Canada, and involves local residents of Avola. The land title transfer protects restored off-channel spawning habitat and rearing habitat created by DFO for threatened Thompson Coho salmon stocks.

Habitat Conservation and Stewardship Program
In June 1998, the Minister of DFO announced a five-year Resource Rebuilding Strategy ($100 million) as part of a national Canada Fisheries Adjustment and Restructuring Program ($400 million). The Pacific Region Habitat Conservation and Stewardship Program (HCSP) is a major component of Resource Rebuilding with funding at $35 million. HCSP represents a new approach for proactive habitat protection that focuses on building long-term, local community capacity by funding positions to work with local communities to protect fish and fish habitat. The vision of the HCSP is "to establish partnerships to enhance habitat protection and expanded community capacity to steward fish habitat resources".

In the Pacific Region, "stewards" were hired by Community Partners using HCSP funds and deployed in many communities across BC and the Yukon. Community Partners are First Nations, members of the forestry and agricultural sectors, local government, environmental organizations, provincial agencies, and fisheries commissions. There have been over 100 stewards hired under HCSP. Steward positions include: Habitat Auxiliaries, Stewardship Coordinators, Habitat Stewards and Habitat Fishery Officers. The ultimate goal of the stewards is to proactively protect fish habitat by changing the way that people interact with the land and water.

There are many examples of stewards who have built the capacity of community groups to effectively protect habitat. These include participation in watershed planning process, landowner contact programs, educating the public about fish and fish habitat requirements, developing inventory and mapping products to aid decision makers, conducting assessments of rehabilitation projects, and teaching community groups about how to be effective fish habitat advocates.

As we begin the final year of the HCSP, most of the stewards have made progress towards the HCSP vision. In anticipation of program reductions, elements of the HCSP are being re-profiled to provide community stewardship support with reduced funding. In fiscal year 2001-2002, funding from BC agencies, such as the Fisheries Renewal BC Program, was also being phased out.

Okanagan Basin Technical Working Group

The Okanagan Basin Technical Working Group comprises federal, provincial, state and First Nation agencies from Canada and the United States committed to conserving and protecting indigenous fish stocks within this international (transboundary) watershed. Through an approach based on the ecosystem and science, the group manages stocks, and conserves and restores habitat. Stocks include the Okanagan Sockeye salmon, one of the last remaining intact Columbia River populations of this species. The working group initiated research on habitat complexity and streamflow management analysis.

White Sturgeon Recovery Efforts

The White sturgeon populations in the Columbia and Nechako Rivers in BC are considered endangered. These populations appear to be suffering from recruitment failure, that is, there are no juvenile individuals within these populations. This is likely a result of flow and habitat alterations associated with hydroelectric and flood control facilities on these rivers. Other potential impacts include channel modifications and industrial pollution. Fishing for sturgeon was recently prohibited in the Columbia and Nechako river systems.

Separate recovery initiatives for upper Columbia and Nechako White sturgeon have been undertaken by a variety of interested parties in each watershed. Within these initiatives, recovery strategies are being developed through scientifically-based processes integrated with focused consultation. The scientific basis for recovery is being developed by a Recovery Team of qualified technical representatives from fisheries agencies, First Nations, and stakeholders. The consultation process occurs through an Action Planning Group of non-technical representatives from First Nations, stakeholders, and the public. DFO is participating in the Recovery Team and Action Planning Group for both sturgeon populations.

In the upper Columbia recovery initiative, DFO is a partner with the Province of BC, United States federal and state agencies, First Nations, and BC Hydro. To date, the upper Columbia recovery initiative has established a conservation fish culture facility, conducted a variety of research programs, and engaged in public outreach. An upper Columbia white sturgeon recovery plan is to be completed in 2002.

The Nechako initiative has been undertaken by DFO, the Province of BC, First Nations, and Alcan. The Nechako recovery initiative is developing a conservation fish culture program, conducting research and consultation, and preparing a recovery plan to be completed in 2002.

4.3 Public Consultations

N'laka'pamux First Nation Comprehensive Fisheries Agreement
In fiscal year 2001-2002, DFO staff began meetings with the N'laka'pamux First Nation to develop a comprehensive fisheries agreement. This agreement will include not only fisheries management and enforcement issues but also aspects of fish habitat, including stewardship, habitat restoration and regulatory issues within the N'laka'pamux traditional territory.

Stl'atl'imx First Nation/DFO/Hydro Technical Working Group
In early 2001, DFO staff began a series of meetings with the Stl'atl'imx First Nation and BC Hydro to develop communication links between the three parties. A formal Technical Working Group was developed to coordinate future activity around fisheries planning and projects. This process has facilitated further discussions around other elements of DFO business, including enforcement, habitat protection, habitat restoration, enhancement and stewardship, with the objective of working towards a possible comprehensive agreement.

5.0 Scientific Support

5.1 Habitat Monitoring

Britannia Copper Mine, Howe Sound, BC
After 75 years of operation, the Britannia Beach Copper Mine near Squamish, BC was closed in 1974. On closure, the discharge of mine tailings to Howe Sound ceased, but discharges of acidic and metal-laden mine water continues. In support of developing a plan for site remediation, DFO published several research papers in fiscal year 2000-2001, based on a three-year study on the effects of mine water discharges on the Howe Sound ecosystem. In 2001-2002, negotiations among federal and provincial governments and other liable parties

resulted in an agreement for clean-up funding. Design of required treatment facilities and further scoping of site contamination continued; DFO presented perspectives on its studies related to contaminated sediments in the near shore areas of Howe Sound.

Effect of Dissolved Gas Supersaturation on Fish and Fish Habitat

DFO completed research of the Effect of Dissolved Gas Supersaturation (DGS) on fish and fish habitat in support of the WUP Process in BC. This research will facilitate the review and revision of the DGS guidelines for BC published in 1997 by DFO, EC, and the Province. Results were published in three reports, two of which will be published in the primary literature: Effect of DGS on the Survival and Condition of Juvenile Rainbow Trout under Static and Dynamic Exposure Scenarios; Susceptibility of Rainbow Trout and Coho Fry to Swim Bladder Overinflation due to DGS and Temperature and Ecological Implications; and Effect of Pre-Exposure to Hydrostatic Pressure on the Survival of Juvenile Rainbow Trout Exposed to Elevated DGS.

Evaluation of Compensatory Works

Pacific Region initiated a scientific evaluation of habitat compensation projects in April 2000. Projects were assessed by comparing multiple physical, chemical, and biological indicators (surrogates to productive capacity) from the project site to unaffected reference sites. Indicators of habitat productivity are collected quantitatively per unit area and include periphyton biomass, invertebrate density and diversity, fish biomass and diversity, riparian and aquatic vegetation stem density and diversity, cover, and others. For more information, see *Habitat Compensation Evaluation Program* under Compliance and Enforcement of this document.

Kenney Dam Water Release Facility

The Nechako Environmental Enhancement Fund Management Committee was established to determine the best measures to enhance the Nechako River downstream of the Kenney Dam, using funds committed by the BC government and Alcan Inc. (up to $50M each on a matching basis). In fiscal year 2001-2002, the Committee delivered a report recommending that a water release facility be constructed at the dam. DFO is conducting studies to evaluate the benefits of the current cooling flows that are released from the dam during the summer.

Low Water Flow Monitoring

From late July to September each year, a monitoring program is undertaken in southern BC Interior streams known to suffer from chronic low flows with consequent negative impacts to fish and fish habitat. The 2001-2002 Monitoring Program was instrumental in the support and defence of habitat management decisions and actions associated with water licensing referrals, water allocation plans, water extraction activities, habitat investigations and Environmental Appeal Hearings.

5.2 Scientific Research and Advice

Scientific research in support of the Department's Habitat Policy is directed at both marine and fresh waters. Three "Eco-regions" (Strait of Georgia, Dixon Entrance and Pacific Marine Shelf) and eight "Eco-districts" (Johnstone Strait, Central Strait of Georgia, Juan de Fuca Strait, Dixon Entrance, Mainland Fjords, Hecate Strait, Vancouver Island Shelf, and Queen Charlotte Sound) have been designated in the Pacific Region. In support of the *Oceans Act*, the region has demarcated six Large Ocean Management Areas. The range of scientific research and associated activities in both the marine and freshwater habitats is diverse. The focus for the review period was on stewardship and conservation science; industrial impacts; and the fate, distribution and biological effects of contaminants in a range of aquatic environments.

Stewardship and Conservation Science
Understanding the need for indicators of marine environmental quality (MEQ), and the future role of the public in monitoring the environment, the Pacific Region continues to develop scientifically defensible protocols for volunteer stewards. Data from a three-year trial of the Shorekeepers protocol was audited to determine scientific rigour. Changes to the protocol will be forthcoming. Similarly, Reefkeepers data (data collected over three years by volunteers in the "Sidney Pier Artificial Reef Science" project) were subjected to quantitative assessment and presented at an international workshop held at the Institute of Ocean Sciences. Considerable interest was expressed in the protocol.

Pacific Region contains four Areas of Interest (AOI) that are candidates for marine protected areas: Race Rocks, Endeavour Ridge, Bowie Seamount, and Gabriola Pass. In support of their candidacies, ecosystem overviews for each one were completed, and two have been published. Considerable scientific advice was provided to the AOI management teams in support of consultations with stakeholders and First Nation's personnel.

The Central Coast Integrated Management (CCIM) initiative was supported by Science. Meetings at the Steering Committee and Working Group level were attended and advice provided. Planning for workshops on both multi-metric MEQ indicators and CCIM MEQ objectives, as per the National Ecosystem Objectives framework, took place. Funding for the former is being sought; the latter will be funded from Regional allocations to the CCIM initiative. An Ecosystem Overview is underway for the CCIM area.

In order to meet CEAA standards, the region carried out a review of scientific approaches that might be employed to ensure cumulative effects are being duly considered in habitat and oceans management decisions. Recommendations were made to senior management in relation to legal requirements.

Industrial Impacts

The Pacific Region's Central Coast Area is a major center of Salmon net-pen farming and invertebrate fishing. In an attempt to provide support for sustainable ecosystems, research continued on the impact on fish and fish habitat of both salmon net-pen farms and shrimp harvesting gear (mobile trawls and near-stationary traps). It was concluded that no single parameter would be adequate to measure the impact of waste from salmon net-pen farms throughout coastal BC. A working paper on the scientific defensibility of using provincial Performance Based Standards was presented and published:

Levings, C.D., et al. 2002. A perspective on the use of Performance Based Standards to assist in fish habitat management on the seafloor near salmon net-pen operations in BC. Canadian Science Advisory Secretariat research document 2002/075, available at <http://www.dfo-mpo.gc.ca/csas/Csas/English/Research_Years/2002/R_D2002_e.htm>.

Concerns for the impact of Placer mining on Yukon fish and fish habitat prompted a three-year research study employing both ecological and laboratory techniques. The study was completed; two scientific papers have been published in the primary literature; and meetings were attended in the Yukon where scientific information was provided to non-government organisations, citizen groups, and the Yukon Placer Committee.

Exotic species introductions can threaten an ecosystems' productive capacity and biodiversity. DFO specifically monitored the invasion by the green crab, *Carcinus maenas* in Pacific Region waters. Advice continues to be given on monitoring the invasion, along with concerns for impacts on shellfish farms. Work continued on the potential impact of foreign ballast water on Regional marine biodiversity. Science advice was provided the Vancouver Port Authority, and one manuscript was published. Science representation was provided at the Asia-Pacific Economic Cooperation meeting in Hobart, Tasmania on Introduced Marine Pests.

Studies on the impact of forestry on fish and fish habitat in both freshwater and marine waters continued. A longer term study continues in northern BC on the efficacy of the Province of BC Forest Practices Code. This study is partnered with other government agencies and university personnel. A large compendium on current results is in preparation, and considerable practical advice was extended to habitat managers. A study continues to determine the value of the riparian zone of small streams to fish and fish habitat.

Many BC salmon producing lakes have a reduced carrying capacity due to lowered primary production, which may be due to past fishing exploitation levels. One solution has been to fertilize the lakes with nutrients. Studies continue to identify those lakes that might benefit

from fertilization, and to assess the impact of such fertilizations. Other studies assess the impact of water flows related to hydro-power projects on fish and fish habitat. In addition, a study was initiated on North Coast lakes in an attempt to understand factors that might be limiting sockeye fry production.

The Cultus Lake sockeye stock has dropped to alarmingly low levels. Work was initiated to culture offspring *in vitro* from eggs captured from wild females.

The Province of BC has lifted its moratorium on oil and gas exploration in Queen Charlotte Basin. In anticipation that exploration will move ahead, a large multi-authored manuscript was delivered to the region's peer review body. The manuscript attempted to provide an overview of the knowledge base available on the Basin along with recommendations for filling important knowledge gaps.

Fate, Distribution and Biological Effects of Contaminants

With explosive human population increases around Georgia Basin, there are deep concerns about the quality of these waters for fish and their habitat. One study was completed assessing contamination of this Basin through the analysis of dated sediment cores and benthic biota. A paper from this work was recently presented at an international conference, and another ten have been published. The sediment core work produced material budgets for sediments and organic carbon entering and leaving the Strait of Georgia. These budgets have thus allowed a robust estimate of chemical budgets including dioxins, furans, industrial detergents, and hydrocarbons.

Work is continuing to produce trends and lifetimes for other contaminants in the Greater Strait of Georgia, and to produce the foundation for assessing Regional MEQ in terms of chemical loadings from multiple sources. Dynamic models for particle transport will provide the predictive tools needed to evaluate where chemicals end up in the system, and how long it takes them to clear the system. Monitoring strategies and components required for Regional quality assessments are being developed.

A three-year study was initiated to assess the fate and distribution of contaminants in the Basin through an understanding of sediment transport. A survey of local waters for the incidence of "new" chemical contaminants has been published, and a thesis is being written on the impact on salmon smoltification by chemicals prevalent in Georgia Basin waters.

The unexpectedly high levels of persistent organic pollutants in marine mammals from certain Pacific Region waters prompted an overview of these pollutants in marine mammals in north Pacific waters. One conclusion is that marine mammals serve as excellent "early warning" species on marine ecosystem quality. Another conclusion is that certain

populations of killer whales found in BC waters are amongst the most contaminated marine mammals found anywhere.

High cadmium levels in certain BC farmed oysters, as opposed to wild oysters, prompted an assessment of source of contamination with the aim of advice on mitigation. A number of sources were hypothesized and a study undertaken to isolate cause. A joint industry-government workshop suggested that source was natural. Cooperation among certain farmers, levels of government, and university personnel has allowed a field project to be designed and undertaken.

6.0 Information Management

Mapster
DFO staff at Vancouver regional headquarters developed and deployed Mapster, an internet-based Geographical Information System (mapping application) that provides internal and external user access to over 135 layers of habitat and species spatial data. The Mapster application is available at: <http://www-heb.pac.dfo-mpo.gc.ca/english/maps/maps-data.htm>.

BC Central Coast Maps and Databases
DFO collaborated with provincial agencies to develop marine resource inventory maps and databases in the North Island Straits and Quatsino Sound Coastal Management Areas. These maps and databases are required for coastal land and resource planning processes.

Canada - BC Data Management Strategies
The Canada and BC Agreement for the Management of Pacific Salmon Fishery Issues (1997) committed both governments to share and coordinate fisheries information. DFO collaborated with the Province of BC in data management strategies. Federal and provincial partners are committed to the use of standardized methods for data compilation, quality assurance, and integration. In fiscal year 2001-2002, work under the strategies included ongoing maintenance of the Fisheries Project Registry, Fish Wizard, and Aquaculture Wizard. These are internet applications serving fisheries data spatially using maps, available at: <http://www-heb.pac.dfo-mpo.gc.ca/english/maps/maps-data.htm>.

Vancouver Island Sensitive Habitat Atlas
On the south end of Vancouver Island, the HCSP funded a Habitat Steward to work for the local government (Capital Regional District). They have developed a web-based Sensitive Habitat Atlas that is available to municipal planners as well as to the public. The Atlas provides a “one stop” shopping for land, water, and natural resource information available through a Community Stewardship Centre.

7.0 Program Management

Business Planning

BC Interior North Area-Based Management
A business plan was developed and included new staff to service communities in the Peace and Liard River Basins in northeast BC. There had been no previous DFO Habitat staff in those communities. Unfortunately, budget constraints have precluded delivery on most objectives of that plan.

Habitat Management /Navigable Waters Protection Cross-Delivery
In fiscal year 2001-2002, the BC Interior Area was selected as the location to run a pilot program for cross-delivery of the Navigable Waters Protection Program (NWPP) and the Habitat Management Program. Over a period of nine months, Habitat Management Program staff were trained in the delivery of the NWPA and some members of the NWPP underwent informal training on delivery of the *Fisheries Act* habitat sections. The objective of the Pilot Program was to link delivery of the two programs for increased efficiency. The regional pilot was aborted in November 2001 and the focus was shifted to a national re-design and integration of the Habitat Management and Navigation Protection Programs.

Two Pacific Region Habitat Management staff members participated in a national team to re-design the regulatory processes of the Habitat Management and Navigation Protection Programs. Comprised of eight members from various regions, the Team reviewed current processes and developed an Integrated National Regulatory Review Process to streamline referral reviews, eliminate duplication of effort and decrease project review cycle times.

New Operations in Southeastern BC
DFO opened an office in Nelson in fiscal year 2001-2002. This office will serve the southeast portion of the BC Interior Area, historically managed by the DFO Major Projects Review Unit staff in Vancouver. The new office has a Habitat Section Head and three biologists. In the first year of operations, efforts focused on developing working relationships with provincial agencies and industry groups, including the Kootenay Mine Development Review Committee, the Columbia Operations Fisheries Advisory Committee, the Columbia River Sturgeon Recovery Team, and the Columbia-Kootenay Fisheries Renewal Partnership Steering Committee.

Province of BC government adjustments
Late in fiscal year 2001-2002, the Province of BC initiated substantial reorganization of provincial ministries. This included ministries responsible for regulating activities that affect

fish habitat, creating significant uncertainty on freshwater habitat management issues. Provincial regulatory agencies will move away from project referrals, to more planning, guideline development, and monitoring. Previously, these ministries were the primary source of referrals to DFO, and managed fish habitat in the BC interior. At this point, it is uncertain how the provincial changes will affect DFO, but substantial workload increases are anticipated.

Staff Training

In Pacific Region, both Habitat Management Program staff and DFO Fishery Officers receive training and designations under the *Fisheries Act* to provide legal powers for their compliance and enforcement activities.

Primary investigating responsibility rests with DFO Fishery Officers. However, no enforcement of the *Fisheries Act* habitat sections can take place without "expert" evidence provided by Habitat Management biologists and technicians to prove habitat charges: technical measurements, samples, photographs, or industrial records; impact statements or due diligence assessments; and opinion testimony. In some cases, DFO scientists may also provide opinion evidence.

For compliance monitoring and enforcing the *Fisheries Act* habitat provisions, Pacific Region uses an integrated training program to emphasize teamwork and ensure that Habitat Management staff, Fishery Officers, and research scientists involved have the necessary skills. Due to budget constraints, only two training sessions were delivered instead of six as in previous fiscal years. The two training session delivered in 2001-2002 were: *Regional Habitat Enforcement* in Kamloops (a three-day course on *Fisheries Act* habitat enforcement legalities and compiling a court brief); and *Harmful Alteration, Disruption or Destruction* in Victoria (a pilot course with a field component on investigating offences under section 35 of the *Fisheries Act*).

List of Abbreviations

AOI	Areas of Interest
BC	British Columbia
CCIM	Central Coast Integrated Management
CEAA	Canadian Environmental Assessment Act
DFO	Fisheries and Oceans Canada
DGS	Dissolved Gas Supersaturation
EA	Environmental Assessment
EC	Environment Canada
GVRD	Greater Vancouver Regional District
HCSP	Habitat Conservation and Stewardship Program
LOMA	Large Ocean Management Areas
LRMP	Land and Resource Management Plan
MEQ	Marine Environmental Quality
NWPA	Navigable Waters Protection Act
NWPP	Navigable Waters Protection Program
WFSP	Watershed-based Fish Sustainability Planning
WUPs	Water Use Plans
YEC	Yukon Energy Corporation