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Canada-British Columbia Agreement on the
Management of Pacific Salmon Fishery Issues

**The Federal & Provincial Statutory Regimes
for the Protection of Fish Habitat in British
Columbia: *Comparative Analysis***

September 1999

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Abstract

Review of twenty-four statutes (8 federal; 16 provincial) and related regulations identified 129 statutory provisions (including statute sections; regulations, and codes) for the protection and management of fish habitat in British Columbia. The review also generated a set of eleven Conclusions [physical habitat (3), instream flow (2), water quality (1), and general (5)] and a set of Recommendations (13; not tied directly to the Conclusions, but consistent with them). The review also identifies opportunities for integrated management, and some impediments. Conclusions, Recommendations, Opportunities, Impediments, and Statutory Relationships are outlined separately below.

The review, conducted under the mandate of the *Canada-British Columbia Agreement on the Management of Pacific Salmon Fishery Issues*, addresses two of the four central themes identified therein: (a) habitat protection; (b) reduced duplication and overlap, and improving efficiency in service. The review also documents the comparative expenditures (federal and provincial) for protection and restoration of habitat for two consecutive fiscal years. Two other themes of the *Agreement*—(c) stock assessment, scientific advice and co-ordination; and (d) other areas of co-operation—are not explicitly addressed, but are tacitly acknowledged.

(1) *Conclusions*: these deal variously with four areas, [i. Physical Habitat] (¶complementary nature of federal and provincial statutes ¶potential benefits of some statutes are circumscribed by policies and provisions that place emphasis on economic development at the expense of environmental protection ¶riparian management provisions of the Forest Practices Code hold the promise of improved protection of fish habitat); [ii. Instream Flow] (the *Fish Protection Act*, and to a lesser extent the *Water Protection Act* have potential to complement minimum flow provisions of the *Fisheries Act* ¶Water Use Planning under the *WPA* is more effective than § 22 of the *Fisheries Act*); [iii. Water Quality] (¶provincial *Waste Management Act* complements federal *Fisheries Act*); [iv. General] (¶*Fisheries Act* applies only to fish species that support a fishery whereas provincial statutes apply more broadly ¶federal statutes require replacement of physical habitat damaged by a proposed development, whereas provincial statutes only help to prevent damage but do not require habitat compensation ¶resource managers need better direction regarding the balance between discretion decision-making and consistency (several examples of guidance documents given) to avoid undermining successful policy ¶lack of statutory protection for fish habitat on private land is an ongoing problem despite the attempts (several examples given) to close this gap. Exemption of agricultural land from the streamside directive provisions of the *Fish Protection Act* is a foregone opportunity for such protection ¶DFO's minimal presence in eastern British Columbia increases the likelihood of widespread loss of fish habitat there, large projects excepted.

(2) *Recommendations*: these deal variously with ¶delegation of key statutory provisions for protection of fish habitat (§35 of the *Fisheries Act*) ¶the potential for greater division of labour between federal and provincial levels ¶the need for provincial guidelines that

deal with its broader mandate for wildlife, bio-diversity, and its different staffing levels and distribution of effort ¶the challenge of regulating activities on private land (e.g., forestry, agriculture, urban development) ¶clear, effective guidance, pursuant to the *Fish Protection Act*, on when and how fish flows are to be taken into account, and the need to minimise arbitrary flow decisions inimical to the salmon fishery ¶future amendments to the Forest Practices Code to expand the scope for intervention by DFO in matters to do with habitat protection ¶mutually supportive roles for federal and provincial agencies to forestall harmful amendment of the Forest Practices Code inimical to habitat protection ¶continued support for environmental provisions in the *Municipal Act* and *Fish Protection Act* in initiatives such as urban salmon habitat protection ¶reconciliation of discrepancies in federal-provincial policies on toxic discharges to streams, and the concept of initial dilution zones ¶monitoring of the state and fate of fish habitat on private land ¶compensatory action under the federal *Fisheries Act* to protect forested land in the face of a new policy—removal of 10% of the annual allowable cut from protection under the Forest Practices Code in any year; and, ¶standardization of riparian protection regimes in the province.

(3) *Opportunities*. Within the existing statutory context, the review identifies opportunities for improved efficiency of management activity. Federally, two approaches—delegation of non-key statutory provisions, and, improved division of labour—should help to streamline the delivery of the mandate. The review also identifies an impediment for improved division of labour: court decisions in the 1980s established that the federal government has no authority to delegate the habitat function to provincial governments.

(4) *Impediments*. Major impediments to integrated management, include (a) the challenge of private land, currently excluded from the traditional forms of habitat protection, (b) the lack of a clear provincial policy for fish habitat (there is no provincial parallel to DFO's *No Net Loss Principle*); and (c) the challenge of adaptive harmonisation of workload and staffing levels.

(5) *Statutory Relationships*. The relationships between provincial legislation and the (federal) *Fisheries Act* and related habitat management policy (federal) are examined in substantial detail throughout the report.

Prepared by C. P. Newcombe, Habitat Protection Branch, Ministry of Environment, Lands and Parks, Victoria, British Columbia. (February 2001)

Preface

This report on the statutory protection of fish habitat helps to define new roles for the province, as set out by the *Canada-British Columbia Agreement on the Management of Pacific Salmon Fishery Issues* (April 1997). The *Agreement* seeks to reverse downward trends in salmon stocks; and it ought to help restore our salmon fishery to levels that approximate, if not equal, historical norms—in some parts of the province, if not all parts.

Salmon stocks, once abundant, declined sharply after the mid-1950s. Governments responded in several ways. They eased fishing effort by reducing the number of commercial licences. They cancelled some fisheries and shortened the duration of others. Concurrently, they enhanced salmon production by building hatcheries and spawning channels. And they worked to reduce harm and loss of habitat caused by human development. Salmon stocks continued to dwindle in spite of these efforts.

The *Canada-British Columbia Agreement* builds on this experience by linking salmon and society in ways not previously considered. It promotes change in five areas including

- (a) increased provincial involvement in the management of the salmon fishery;
- (b) more opportunity for provincial stakeholders and communities to influence decision-making;
- (c) a stronger joint commitment to protect fish stocks, and restore and protect habitat;
- (d) greater accountability to the public in the management of a public resource (the salmon fishery); and,
- (e) better working relationships between federal and provincial governments in the interest of sustainable fisheries, jobs and communities.

Change in these areas ought to diminish or remove obstacles that hinder the success of salmon stewardship efforts. Thus they lead us in the right direction. How *far* in the right direction depends on our society and the strength of its collective resolve.

Success under the *Agreement*: how might it be measured? Many observers will be satisfied, justifiably, with objective measurements of improved distribution and abundance: that is, more salmon in more of the traditional areas. Others who are technically inclined will look for statistical measures of ecological complexity and stability. By these measures they can know which patterns are real, and which are not. Still others, enlightened in non-statistical measures of success, will look for and be satisfied to see the synthesis salmon and society: the creation of a cultural amalgam in which salmon are held as a core value. By this alchemy the neglected landscape that once gave rise to salmon-bearing streams can be marked for protection, and allowed to heal for the natural regeneration of dwindling stocks. This goal—enduring yet elusive—can be attained, but only by concerted effort at all levels in society.

In the real world of fisheries management there is no guarantee of success: (human) population growth continues unabated, and the landscape that gives rise to the fishery continues to be developed in ways that interfere with sustainable production. But the

Agreement provides a solid context for success. It shows us better ways to spend our fiscal resources; and it opens the way for public participation in decision-making—the first step toward unified resolve.

This report—designed to implement part of the *Agreement*—is foundational. It describes existing, shared (federal and provincial) regimes for protection of fish habitat; it endorses emerging public-stewardship efforts and thereby fosters co-ordination at all levels of society. It documents the scale and nature of habitat protection and restoration activity; and it identifies potential opportunities for the use of provincial legislation in support of the federal role. It identifies potential failure points (lack of consistency, uncertainty; and gaps in legislation or policy); and it makes recommendations to bolster these. So, the report is a variety of things—a foundation, a benchmark in time, and a compass to guide our next steps.

Prepared by C. P. Newcombe, Habitat Protection Branch, Ministry of Environment, Lands and Parks, Victoria, British Columbia. (February 2001)

Executive Summary

The three allied agencies* responsible for management of fish habitat in British Columbia face a complex challenge: they represent two levels of government—federal and provincial—and they have different legislative mandates. Yet each shares common goals and must work in harmony to achieve these.

Our joint review (known colloquially as the "John Payne Report") is a means to this end. It documents the constitutional and statutory regimes for management of fish habitat; and it describes the scope of federal and provincial "habitat" programs. Importantly, it identifies opportunities for mutual support: for example, it tells us how provincial legislation can be used in support of federal "habitat" policy; and it also identifies ways that the federal agency can lend support to the provincial agencies. In various ways it defines areas of congruence in the delivery of fisheries policy. But it also draws attention to gaps and ambiguities that would prevent our agencies from working effectively together. Thus the Report is a catalogue of opportunities for the improved delivery of fisheries policy and more efficient deployment of agency resources. In this sense, the Report is much more than the sum of its parts.

But each part adds dimension to our understanding of the complexities of fish habitat management, without which the Report would seem incomplete. Chapter 1 outlines the objectives. One key objective is to provide recommendations to address gaps and improve consistency and co-operation among the allied agencies. Chapter 2 explains the recent Constitutional background for fish habitat management, without which the actions and policies of each agency would be difficult to comprehend. Chapter 3 provides brief descriptions of most of the acts, regulations, policies, guidelines and programs on which the remainder of the Report is built. Chapter 4 provides a record of expenditures for fish habitat protection and restoration for two consecutive years in federal and provincial programs (including crown corporations). It also provides a complete description of all the programs for management, protection and enhancement of fish habitat. This Chapter is a useful summary, but it is also a benchmark for future reference. Chapter 5, the largest of all, is a comprehensive treatment of the "tools for managing fish habitat." Originally this chapter was set out in tabular form, but this proved unwieldy for the final publication. Tabulated material was re-formatted as text in paragraph form under the original four headings—"Name of the Legislation," "Objective" (of the legislation), "Actual Outcome," and "Comments." Material in the "Comments" sections helps to shape the Conclusions and Recommendations. Chapter 6 deals with the relationships between provincial legislation and the (federal) *Fisheries Act*, and (federal) habitat management policy. As with Chapter 5, matters of interest or concern that emerge here, influence the Conclusions and Recommendations.

If chapters one through six are the heart of the Report, Chapter 7 is the soul. This Chapter offers conclusions about statutes, and the level of protection these provide for the elements of fish habitat (including physical habitat, instream flow, and water quality) and

"general" concerns. The Conclusions are highly specific. Some even explain how a political decision (e.g., the exclusion of riparian agricultural lands from the streamside directive provisions of the *Fish Protection Act*) adds complexity to the already difficult task of managing fish habitat.

Recommendations offered in the Report represent the highest level of integration. They focus on issues and point to remedies. Most of the Recommendations are straightforward and pragmatic (e.g., the need for guidelines that align various kinds of activity at both levels of government). But some touch on the sensitive (and in some cases political) issues of fish habitat management. Recommendations inspired by these issues deal with (a) regulatory gaps, (b) low levels of staffing in some parts of the province, (c) potential harm caused by discretionary powers of some environment officials, and (d) the need for monitoring and enforcement of the *Fisheries Act* on some private lands. This focus on *issues* is consistent with the purpose of the Agreement (the Canada-British Columbia Agreement on the Management of Pacific Salmon Fishery Issues) under which the John Payne Report was created.

The Conclusions and Recommendations thus show us how to improve the delivery of programs for protection and restoration of fish habitat in the province; and to do this in the best way possible—with open discussion and active, informed leadership.

Prepared by C. P. Newcombe, Habitat Protection Branch, Ministry of Environment, Lands and Parks, Victoria, British Columbia. (February 2001)

* Fisheries and Oceans Canada (federal); and Ministry of Environment, Lands and Parks (provincial), and Ministry of Agriculture and Fisheries (provincial).

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1 INTRODUCTION

The federal and provincial governments share the responsibility for the management of fish habitat in British Columbia. Recognising that improved co-ordination of their respective activities in this area would be beneficial, in April 1997 they signed the *Canada-British Columbia Agreement on the Management of Pacific Salmon Fishery Issues*. In order to facilitate the implementation of the *Agreement* there is a need for a comprehensive review and analysis of the various fish habitat protection programs currently being undertaken by each government. This report presents the results of that review.

1.1 Objectives

The objectives of this report are to:

- describe and analyse federal and provincial fish habitat protection regimes in British Columbia;
- document and compare the scope and magnitude of fish habitat protection and restoration activities;
- analyze how provincial legislation may be considered to support federal legislation and policy;
- determine areas of consistency, uncertainty and gaps; and,
- provide recommendations to address any gaps and to improve consistency and co-operation.

2 CONSTITUTIONAL BACKGROUND

The *Constitution Act* of 1982 grants to the federal government legislative authority over "seacoast and inland fisheries", including the ultimate statutory authority for the protection of fish habitat. However, the province has the constitutional right of ownership for the various components of fish habitat (including water, substrate, and riparian land and vegetation) and has developed a complex legislative regime to manage those components, typically incorporated in legislation designed to regulate resource development. This shared responsibility has led to a situation where both orders of government allocate substantial resources to fish habitat protection, with the primary federal operational agency being the Department of Fisheries and Oceans (DFO) and the provincial agency the Ministry of Environment, Lands and Parks (MELP).

Historically in British Columbia, DFO restricted its fish habitat involvement to salmon habitat, with MELP managing habitat for resident species. In situations where habitat was utilized by salmon only or by both salmon and resident species, DFO made the final decision regarding if, and how, fish habitat could be modified by a specific development proposal. In situations where habitat was utilized by resident fish only, MELP made the final decision with no input from DFO. However, this state of affairs was altered in the

1980's following several court decisions on environmental assessment which affirmed that the federal government had no authority to delegate the habitat protection function to provincial governments. These decisions compelled DFO to become involved in habitat protection in the Peace and Columbia River drainages for the first time, and, at least in theory, to make final decisions on permissible alterations to fish habitat in all streams in the province, regardless of the presence or absence of salmon.

In the last few years several of the provinces have asked the federal government to amend the *Fisheries Act* to allow for formal delegation of these habitat decision-making powers. The federal government agreed in 1996 and introduced a bill which would have provided for the delegation to "any minister of the government of a province or any person or class of persons employed by the government of a province" of the power to, among other things, authorise the harmful alteration, disruption or destruction of fish habitat. The bill was not passed before the 1997 election and did not become law. There are no current plans to re-introduce the bill.

3 LIST OF LEGISLATION, POLICIES AND PROGRAMS RELEVANT TO FISH HABITAT PROTECTION AND RESTORATION

(Brief descriptions of the key sections of most of the acts, regulations, policies, guidelines and programs listed below can be found in the tables in Chapters 4 and 5 of this report. More detailed descriptions can be found in Chapter 5, "Legislation, Policy and Regulation—Roles and Responsibilities of the Various Levels of Government", of Rosenau and Angelo's *Freshwater Habitat Background Paper of the 1998-1999 Annual Report of the Pacific Fisheries Resource Conservation Council*).

3.1 Fish Habitat Protection

3.1.1 Federal

Canadian Environmental Assessment Agency

- *Canadian Environmental Assessment Act*

Department of Environment

- *Canadian Environmental Protection Act*, plus:
 - Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations
 - Pulp and Paper Mill Defoamer and Wood Chip Regulations
- *International Rivers Improvement Act*

Department of Fisheries and Oceans

- *Fisheries Act*, plus:

- Fishery (General) Regulations Part IX: Authorization to Alter Fish Habitat
- Pulp and Paper Effluent Regulation
- Metal Mine Liquid Effluent Regulation
- Policy for the Management of Fish Habitat
- Habitat Conservation and Protection Guidelines
- Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat
- New Directions for Fisheries and Oceans in the Pacific; A Departmental Strategy for 1998-2001
- A New Direction for Canada's Pacific Salmon Fisheries
- Canada-British Columbia Agreement on the Management of Pacific Salmon Fishery Issues
- *Oceans Act*
- Stewardship guides and other key guidelines (Note: Jointly produced and implemented with the provincial Ministry of Environment, Lands and Parks)
 - Stream Stewardship: A Guide for Planners and Developers
 - Community Greenways: Linking Communities to Country and People to Nature
 - Stewardship Bylaws: A Guide for Local Government
 - Watershed Stewardship: A Guide for Agriculture
 - Access Near Aquatic Areas: A Guide to Sensitive Planning, Design and Management.
 - Land Development Guidelines for the Protection of Aquatic Habitat

Department of Health

- *Pest Control Products Act*

Department of Transport

- *Canada Shipping Act*, plus:
 - Oil Pollution Prevention Regulation
 - Pleasure (and Non-Pleasure) Craft Sewage Pollution Prevention Regulations

3.1.2 Provincial

Environmental Assessment Office

- *Environmental Assessment Act*

Forest Land Commission

- *Forest Land Reserve Amendment Act* (proposed, Bill 56), plus:
 - Private Land Forest Practices Regulation (proposed)

Land Use Co-ordination Office

- Protected Areas Strategy
- Land and Resource Management Planning

Ministry of Energy and Mines

- *Mineral Tenure Act*
- *Mines Act*, plus:
 - Health, Safety and Reclamation Code
- Oil and Gas Handbook

Ministry of Environment, Lands and Parks

- *Fish Protection Act*
- *Water Act*, plus:
 - Changes In and About a Stream Regulation
- *Waste Management Act*, plus:
 - Pulp Mill and Pulp and Paper Mill Liquid Effluent Control Regulation
 - Municipal Sewage Regulation
 - Contaminated Sites Regulation
 - Antisapstain Chemical Waste Control Regulation
 - Aquaculture Waste Control Regulation
 - Agriculture Waste Control Regulation
- *Pesticide Control Act*
- *Environmental Management Act*
- *Wildlife Act*
- *Water Protection Act*

Ministry of Fisheries

- *Fisheries Act* (BC)
- Urban Salmon Habitat Program
- The BC Fisheries Strategy: Towards a "Made-in-BC" Vision to Renew the Pacific Salmon Fishery
- Conserving Our Fish Resources: Fisheries Program Strategic Plan
- Canada-British Columbia Agreement on the Management of Pacific Salmon Fishery Issues

Ministry of Forests

- *Forest Practices Code Act*, plus:
 - Operational Planning Regulation
 - Timber Harvesting Practices Regulation
 - Forest Road Regulation
 - Riparian Management Area Guidebook
 - Identified Wildlife Management Strategy
 - Coastal (and Interior) Watershed Assessment Procedure Guidebooks
 - Mapping and Assessing Terrain Stability Guidebook
 - Gully Assessment Procedure Guidebook

Ministry of Municipal Affairs

- *Municipal Act*

3.2 Fish Habitat Restoration

3.2.1 Federal

Department of Fisheries and Oceans

- Salmonid Enhancement Program
- Habitat Restoration and Salmon Enhancement Program
- Resource Rebuilding Program

3.2.2 Provincial

BC Hydro

- Water Use Planning Process
- System Operations Fund
- Peace/Williston Compensation Program
- Columbia Basin Compensation Program
- Bridge River/Coastal Compensation Program
- Power Facilities Fisheries Enhancement Programs

Fisheries Renewal BC

- Salmonid Renewal Program

Forest Renewal BC

- Watershed Restoration Program

Ministry of Environment, Lands and Parks

- Habitat Conservation Trust Fund

Ministry of Fisheries

- Urban Salmon Habitat Program

4 PROGRAM EXPENDITURES FOR 1998-99 AND 1999-00 BUDGETS

4.0 Summary

The fish habitat protection and restoration expenditures of the federal and provincial governments (including crown corporations), as detailed in the following tables, can be summarized as follows (see Footnote, below):

Category	Federal		Provincial	
	1998/99	1999/00	1998/99	1999/00
Regulatory/management agencies	\$12.825m	\$13.070m	\$6.745m	\$6.470m
Mitigation/compensation expenditures associated with current projects	\$0.385m	\$0.385m	\$10.400m	\$10.400m
Restoration expenditures associated with past forestry, hydro, highway and railway construction	\$0.130m	\$0.175m	\$51.170m	\$36.185m
Funding programs for inventory, stewardship, and non-specific restoration	\$11.325m	\$15.900m	\$26.180m	\$23.895m
Costs of foregone power generation	0	0	\$10.000m	\$15.000m
Total	\$24.665m	\$29.530m	\$104.495m	\$91.950m

Note: additional data from the federal Department of Environment and the provincial Ministry of Forests have yet to be included in the above table; and data for y 2000-2001 were not available before completion of this report.

4.1 Fish Habitat Protection

Habitat protection programs are those programs that contribute to the maintenance of the current productive capacity of fish habitat (i.e. in DFO's terminology they support the No Net Loss goal). Included in this category are habitat inventory and assessment, project

review, enforcement, stewardship, partnerships, planning, and mitigation/compensation expenditures.

Table 4.1.1 Federal Habitat Protection Expenditures in \$000s

Habitat Protection Program Component	98/99	99/00
1. Department of Fisheries and Oceans		
• Habitat and Enhancement Branch	6,855	6,855
• Habitat Restoration and Salmon Enhancement Program	3,500	2,210
• Resource Rebuilding Program	990	8,150
• Habitat Enforcement	780	805
• Habitat Science	5,040	5,260
• Aboriginal Fisheries	385	425
• Small Craft Harbours	300	300
2. Department of Environment	*	*
3. Canadian Environmental Assessment Agency	150	150
4. Department of Public Works	85	85
Total	18,085	24,240

* Denotes data in the process of being obtained.

Program descriptions and notes to Table 4.1.1

1. **The Department of Fisheries and Oceans** administers the federal government's responsibilities under its constitutional statutory authority for fisheries in Canada, including habitat protection.

- **The Habitat and Enhancement Branch** has staff in Vancouver headquarters and in those areas of the province that contain watersheds supporting salmon populations. Its habitat management functions include policy development, inventory, project review and assessment, approval of mitigation and habitat compensation measures, guideline development, input to water, land use and coastal zone planning, stewardship, and restoration. The Branch also administers major sections of the two programs described immediately below.

- **The Habitat Restoration and Salmon Enhancement Program** is a \$35 million, six year program (initiated in 1996/97) to increase the quantity and quality of salmon habitat and conserve salmon stocks in British Columbia. The Program funds habitat restoration, resource and watershed stewardship and salmon stock rebuilding projects operated and administered by a variety of community groups and agencies. Expenditures are divided approximately one third each on stewardship, restoration and stock assessment/enhancement projects; the expenditures shown in the table relate to the stewardship component only (restoration expenditures are shown in Table 4.2.1).
- **The Resource Rebuilding Program** is a \$100 million program (initiated in 1998) of measures to protect and rebuild salmon habitat. The Program includes: a permanent fund to provide financing for habitat restoration and salmon enhancement initiatives; community-based stewardship projects; the establishment of stewardship co-ordinators and habitat auxiliary officers to promote public awareness, assist community watershed stewardship groups, and work with developers in making decisions that incorporate fish habitat requirements; \$20 million to extend the Habitat Restoration and Salmon Enhancement Program from its original three years to six; and an expansion of the Salmonid Enhancement Program with emphasis on hatcheries. The expenditures shown in the table relate to the stewardship co-ordinator and habitat auxiliary components; funding for the community-based stewardship program is included in HRSEP and the permanent fund for habitat and enhancement has not yet been established.
- **The Habitat Enforcement** function (enforcing the fish habitat protection and pollution prevention provisions of the federal Fisheries Act) is carried out by some members of the Habitat and Enhancement Branch area offices (expenditures included above), plus some of the 125 full time and 50 seasonal Fishery Officers located throughout the portion of BC that supports salmon. Fishery Officers spend approximately 9% of their time on habitat related issues (as recorded on standard category time reporting sheets completed up until a few years ago).
- **Habitat Science** contributes to habitat protection through the acquisition and delivery of scientific information and advice for both marine and freshwater environments, including impacts caused by physical disruption, chemical contamination and exotic species, the designation of marine protected areas, integrated coastal zone management, and marine environmental quality criteria.
- **The Aboriginal Fisheries Program** establishes partner agreements with First Nations for the management of the aboriginal fishery. A wide variety of program elements includes habitat planning, assessment and monitoring, feasibility studies, and restoration.
- **Small Craft Harbours** is responsible for the operation and maintenance of a national system of fishing and recreational harbours. All new and renovation projects are reviewed for their potential impacts on fish habitat and measures are incorporated to

mitigate those impacts. The costs for project review, modifications to incorporate habitat protection requirements, and pre-and post-construction monitoring are shown in the table.

2. The Department of Environment's role in fish habitat protection arises from its administration of the pollution prevention provisions of the *Fisheries Act*, and of the *Canadian Environmental Protection Act*. Its staff are mostly located in the lower mainland, with one area office in Prince George. Relevant water quality programs include ocean dumping control, pollution abatement, waste management and shellfish monitoring.

3. The Canadian Environmental Assessment Agency is responsible for ensuring that an environmental assessment of a project is carried out where a federal authority is a proponent for a project, makes a financial contribution, or issues an approval. The Agency also maintains a central registry of decisions and co-ordinates its activities closely with the provincial assessment agency under a harmonization agreement. Its mandate includes socio-economic impacts (estimated at 15% of the agency's workload) as well as environmental (85%); of the environmental workload more than half relates to fish owing to the strong federal fisheries legislation.

4. The Department of Public Works provides engineering and environmental consulting services to other government departments and is directly responsible for some major construction projects such as the upgrading of the Alaska Highway. Expenditures for staff providing fish habitat protection advice, including environmental assessment, and routine environmental maintenance (\$10K) along the highway are shown here.

5. The Department of National Defence operates several military bases in BC and is responsible for new construction and maintenance. Fish habitat mitigation measures are incorporated into those projects, particularly in the case of marine facilities. It has not been possible to determine the specific costs associated with those measures.

6. The National Energy Board regulates the construction and operation of interprovincial and international pipelines and power lines. The Board is responsible for ensuring that companies comply with regulations concerning the environment as it may be affected by the design, construction, operation, maintenance and abandonment of a pipeline. All of the Board's regulatory work is cost recoverable, however, so it does not represent a charge to the federal government.

Table 4.1.2 Provincial Habitat Protection Expenditures in \$000s

Habitat Protection Program Component	98/99	99/00
1. Ministry of Environment, Lands and Parks		
• Resource Stewardship Branch	700	650
• Fish, Wildlife and Habitat Protection	2,020	1,885
• Enforcement	230	240
• Planning and Assessment	205	185
• Water Management Branch	695	595
• Provincial Emergency Program	150	150
2. Ministry of Fisheries		
• Fisheries Inventory Section	495	495
• Conservation Section	95	95
• Research Section	110	110
3. Environmental Assessment Office	385	385
4. Ministry of Forests		
• Forest Practices Branch	*	*
• Regional Operations	*	*
5. Forest Practices Board	900	920
6. Land Use Co-ordination Office	125	125
7. Urban Salmon Habitat Program		
• Community Stewardship	325	325
• Local Government	500	500
8. Forest Renewal BC		
• Research	540	400
• Operational Inventory	14,000	9,600
9. Fisheries Renewal BC		
• Salmonid Renewal Program	2,500	2,600
• Planning and Partnership Program	200	200
10. Habitat Conservation Trust Fund	285	285
11. Corporate Resource Inventory Initiative	350	345

12. BC Hydro		
• Current habitat mitigation/compensation costs	250	250
13. Ministry of Transportation and Highways		
• Current habitat mitigation/compensation costs	10,000	10,000
14. Oil and Gas Commission	150	150
Total	35,210	30,490

* denotes data in the process of being obtained.

Program descriptions and notes to Table 4.1.2

1. The Ministry of Environment, Lands and Parks is responsible for the management, protection and enhancement of British Columbia's environment, including fish, wildlife, habitat, water and land.

- **The Resource Stewardship Branch** is located in Victoria, consists of a Habitat Protection Section and an Environmental Assessment Section (until a July 1999 reorganization) and supports several ministry activities and programs that are jointly undertaken by regional and headquarters staff, through co-ordination, technical assistance, training, policy development, inter-agency liaison, and information exchange. The Habitat Protection Section advocates diversity of habitats and ecosystems, and promotes protection of habitats through resource management alternatives that favour ecological integrity. Its activities parallel those of the Habitat Section of the Habitat and Enhancement Branch of DFO. However, its mandate covers both wildlife and fish habitat; 35% of the branch resources are expended on the fish habitat portion of its mandate.
- **Fish, Wildlife and Habitat Protection** staff are located in regional and district offices throughout the province. Their activities are similar to those of the habitat staff in DFO's area offices with the emphasis on resident fish species rather than salmon. As in the case of the headquarters organization, 35% of resource expenditures can be assumed to be directed to fish and 65% to wildlife.
- **Enforcement** staff (Conservation Officers) are located in regional and district offices throughout the province. They enforce a wide variety of provincial legislation and the federal *Fisheries Act*. Much of their effort is devoted to wildlife and fishery management issues, with less than 3% being spent on fish habitat (as recorded on standard category time reporting sheets until the mid-1990s).

- **Planning and Assessment** staff are located in regional offices and provide operational input on behalf of MELP to environmental assessments and land use planning exercises. Approximately 20% of their effort is related to fish habitat issues.
- **The Water Management Branch** has staff in Victoria and regional and district offices. It is responsible for administering the *Water Act* and managing the province's water resources through the implementation of standards, programs and strategies in the areas of water allocation, water quality, groundwater management, and water utility regulation. New responsibilities have recently been given to the Branch in the *Fish Protection Act* (FPA) for the consideration of fish habitat impacts when making decisions on water licence applications. The salary costs of HQ staff working on fish habitat aspects of the FPA and water quality objective setting are shown in the Table (\$415K in 98/99 and \$315K in 99/00). (The Branch is also spending \$450K in salaries and \$350K in studies to support the Water Use Planning initiative. These numbers are included under #7 in Table 2A). In addition, regional water management staff have traditionally liaised with DFO and FWH staff via the referral system on licence applications. On average approximately 0.5 of an FTE per region of this effort has been estimated to relate directly to fish habitat protection. No inclusion has yet been made in the table for regional *Fish Protection Act* staff.
- **The Provincial Emergency Program** spends \$3 m per year (plus \$1 m local government funds) on the maintenance of flood control works. The fish habitat protection restrictions can be assumed to equal approximately 5% of the total.

Other

1. **The Pollution Prevention Branch** has staff in Victoria and regional and district offices. It is responsible for developing and implementing environmental management systems within the municipal, industrial and small business sectors that prevent pollution and remediate sites where pollution is occurring. Traditionally managers have liaised with DFO and FWH staff via the referral system on waste management permit applications and many of the branch's other activities could be considered as contributing, in part, to preserving fish habitat. However, it has not been possible to determine the expenditures associated with those activities.

2. **The Ministry of Fisheries** was established to provide a strong, co-ordinated focus to provincial efforts to protect fish and renew BC's commercial and recreational fisheries. It reflects the provincial government's recognition of the changing dynamics and challenges affecting BC's fish resources and fisheries, including the need to protect fish and fish habitat from expanding urban and industrial development. Except for hatchery operations and research, all its staff members are currently located in Victoria. Its regional operations are delivered through MELP staff.

- **The Inventory Section** is responsible for standardizing, assembling, maintaining and distributing fish and fish habitat information for the Province of British Columbia. An extensive inventory program has been conducted over the past few years using funds provided through the Forest Renewal Program. The data are used primarily for planning and assessment purposes and the expenditures are, therefore, included in the habitat protection category. The salary costs for the staff in headquarters are shown here and in the Corporate Resource Inventory Initiative category (#11 below), and the operational dollars are included in the Forest Renewal BC category (# 8 below).
 - **The Conservation Section** is located in Victoria. It provides professional expertise to regional staff and liaises with other agencies such as DFO and BC Hydro in the areas of stock assessment, water use planning and stream flow issues associated with habitat restoration. It has been determined that approximately 15% of staff time is spent on protection issues.
 - **Habitat Research** undertakes scientific investigations in support of freshwater fisheries management, habitat protection and restoration, and biodiversity. All habitat related operational funding is derived from external sources (Forest Renewal BC, Habitat Conservation Trust Fund) and is indicated elsewhere in the tables. Salary dollars only are shown here. Approximately 88% of the research effort is directed towards habitat protection research.
3. **The Environmental Assessment Office** is a neutral agency located within the Ministry of Government Services and responsible for the administration of the *Environmental Assessment Act*. It provides the province with a single, comprehensive environmental assessment process that balances the needs and interests of business, the environment and the public. An integral part of most environmental assessments is a consideration of potential impacts on fish habitat. Agency staff spend approximately 25-30% of their effort on fish habitat issues.
4. **The British Columbia Forest Service** is the steward of the timber, range and recreation resources of British Columbia's unreserved public (Crown) forest land, which covers two-thirds of the province (about 59 million hectares). The Forest Service manages this land for many uses, including recreation, forage, timber, and wilderness, and, in co-operation with other agencies, for water, fish, wildlife, tourism, heritage, and minerals. The Forest Practices Code (FPC) is now a major factor in the protection of fish habitat on public forest lands, with provisions for fish stream identification, riparian zone preservation, watershed assessments and control of logging practices adjacent to streams.
- **The Forest Practices Branch** is located in Victoria and plays a major role in the development of environmental policy for MOF and the continual amendment of the Forest Practices Code.
 - **Regional Operations** staff are responsible for administering Ministry of Forests legislation in the field. With the advent of the FPC a portion of regional resources can

be considered to be directed towards fish habitat protection; due to the broad scope of the various pieces of legislation administered by MOF staff, only a small proportion of their effort is directed to fish habitat issues.

5. The Forest Practices Board is an independent government body established under the *Forest Practices Code of British Columbia Act*. The Board conducts audits and special investigations and then reports to the public and government about compliance with and enforcement of the Code, and achievement of its intent. For example, in 1997 the Board conducted a special investigation into forest planning and practices around streams in coastal British Columbia. A internal review of Board programs has determined that approximately 17% of the budget is directed towards fish habitat issues.

6. The Land Use Co-ordination Office was created in January 1994 to define a corporate vision for land use planning in British Columbia and to oversee, co-ordinate, evaluate and report to Cabinet on ministries' work to deliver the provincial land-use strategy. The Office facilitates land-use decisions by ensuring that all values are identified and all issues and impacts are presented to decision-makers objectively. In as much as the various high level land use planning exercises have the potential for offering increased protection for some sensitive fish bearing watersheds, a portion of the Office's budget could be deemed as being in support of fish habitat protection. A figure of less than 5% has been used.

7. The Urban Salmon Habitat Program is a five-year plan (currently in its last year) focused on protecting and restoring salmonid habitat in the urban areas of the Georgia Basin in order to ensure sustainable wild salmon and other salmonid stocks and habitats in populated areas.

- **Community Stewardship** projects encourage community involvement in the protection of urban watersheds through habitat assessment and mapping, public awareness and education, community-based watershed planning, partnerships between community groups and landowners, and monitoring. 65% of the program funding is spent on these habitat protection activities and the remainder on habitat restoration (See Table 4.2.2).
- **The Local Government Program** cost-shares opportunities such as the placement of environmental co-ordination staff in municipal governments to assist in land management planning, development of environmental by-laws, liaison with community groups and other levels of government, definition of environmentally sensitive areas, etc. 100% of the program funding can be considered as contributing to habitat protection.

8. Forest Renewal BC is a crown corporation with a mandate to plan and implement a program of investments to renew the forest economy of British Columbia by enhancing the productive capacity and environmental values of forest lands, and by creating jobs, providing training for forest workers, and strengthening local communities that depend on

the forest industry. Much of the agency's environmental operations focus is on restoration of watersheds damaged by past forest harvesting (see Table 4.2.2), but a significant portion of the effort is directed towards environmental protection.

- **Research:** this program is designed to improve knowledge of natural biological and physical processes and includes, for example, studies on the functions of riparian ecosystems and how they are affected by forest management practices. The results will be useful in future refinements to the Forest Practices Code.
- **The Operational Inventory Program** was designed to develop new inventories and accelerate existing ones to aid forest development planning and the implementation of the Forest Practices Code. Data collection is being carried out for a variety of natural resources including fish and their habitat, water quality and quantity and traditional use by First Nations. The fisheries inventory is managed by staff in the Ministry of Fisheries.

9. **Fisheries Renewal BC** is a crown corporation with a mandate to lead the renewal of BC's fish resources. The corporation is working with partners to make investments in programs that improve fish stocks and habitats, etc. The majority of the agency's initial funding is coming from Forestry Renewal (\$7.6 million per year for three years) although BC Hydro is also making substantial contributions.

- **The Salmonid Renewal Program** supports program delivery partners to fund and manage projects that enhance wild fish stocks, restore habitat and promote public awareness. Projects include inventory, stock assessment and mapping, salmonid enhancement and public education. Habitat protection projects utilised 42% of the \$6 million program expenditures in 98/99 but this is projected to drop to 31.5% (of \$8.4 million) as more emphasis is placed on physical restoration of streams in 99/00.
- **The Planning and Partnership Program** is designed to bring together groups and individuals with a shared interest in renewing fisheries and assisting them to develop effective working partnerships. Some watershed planning is carried out under this program, together with establishment of round tables. 50% of the \$400K program expenditures can be associated with fish habitat protection and the remainder with fisheries development.

10. **The Habitat Conservation Trust Fund** is funded from surcharges on hunting and fishing licences and is used to finance projects that conserve and maintain the natural productivity and biodiversity of fish and wildlife. \$3 to \$4 million are spent annually on fisheries projects with most of this funding going to fish stock assessment and management projects rather than habitat projects. However, some habitat work is funded including habitat assessments for sturgeon and steelhead stocks, and wetland protection. Most projects extend over several years and funding tends to remain relatively constant.

11. **Corporate Resource Inventory Initiative** funds are used to provide information on fish, fish habitat and fishing to sub-regional land use planning exercises. An associated exercise (**Common Land Information Base**) also supports fisheries inventory, providing information to pre-treaty and treaty negotiations with First Nations. The funds shown are used to support staff in the Ministry of Fisheries.

12. **BC Hydro's** Transmission and Distribution department constructs and maintains transmission lines. In the course of these operations habitat mapping and assessment are carried out and mitigation measures (riparian protection, tower location, etc.) undertaken.

13. **The Ministry of Transportation and Highways** (with some funding provided through the BC Transportation Financing Authority) carries out all the major highway and bridge construction work in the province. Over the past 20 years fish habitat considerations have been significant factors in their construction projects, with extensive habitat mitigation and compensation measures being implemented on such projects as the Coquihalla and Vancouver Island Highways. Expenditures that fall into the protection category include incremental costs of structures to accommodate fish concerns (e.g. longer bridges to avoid infills), the construction of compensatory habitat, and long term post-construction monitoring.

14. **The Oil and Gas Commission** has been recently established to expedite the issuing of approvals for natural gas exploration and development in the northeast. Four staff members were transferred from MELP to carry out environmental reviews of applications. 50% of their effort is spent on fish habitat protection issues.

4.2 Fish Habitat Restoration

Habitat restoration programs are those programs that are specifically directed at bringing back to a productive condition fish habitat that has been damaged in the past (i.e. in DFO's terminology they support the Net Gain goal). Included in this category are those assessments and physical works (including flow re-establishment) which are directed at returning damaged habitat to its formerly productive condition. (Note: artificial spawning channels, hatcheries and lake/stream fertilization are not included).

Table 4.2.1 Federal Habitat Restoration Expenditures in \$000s

Habitat Restoration Program Component	98/99	99/00
1. Department of Fisheries and Oceans		
• Salmonid Enhancement Program	2,390	2,390
• Habitat Restoration and Salmon Enhancement Program	3,500	2,210
• Aboriginal Fisheries Program	130	145
• Fraser River fish passage	430	370
2. Department of Public Works	130	175
Total	6,580	5,290

Program descriptions and notes to Table 4.2.1

1. The Department of Fisheries and Oceans

- **The Salmonid Enhancement Program** is administered by the Habitat and Enhancement Branch. Its objectives include fish production through hatcheries, spawning channels and habitat creation, stock conservation, increased harvest and increased public education. It has been in existence for over 20 years and salmon habitat restoration projects are a continuing major element in the program.
- The habitat restoration component expenditures of the **Habitat Restoration and Salmon Enhancement Program** and **Aboriginal Fisheries Program** (described above in the notes to Table 4.1.1) are shown here.
- Improvements are being made to various points of difficult passage for upstream migrants in the Fraser River using Canada-US Agreement funding.

2. The costs of studies and actual physical works being carried out in association with the upgrading of the Alaska Highway by the **Department of Public Works** to improve fish habitat damaged by the original construction 20 years ago are indicated. As the only expenditure data readily available were for the study component, the expenditures on culvert upgrading for fish passage, improvement of side-channel habitat, etc. were calculated using the same percentage of total capital expenditures (\$20 million) as was determined from the provincial Ministry of Transportation and Highways data (0.6%).

Table 4.2.2 Provincial Habitat Restoration Expenditures in \$000s

Habitat Restoration Program Component	98/99	99/00
1. Ministry of Environment, Lands and Parks		
• Fish, Wildlife and Habitat Protection	485	485
2. Ministry of Fisheries		
• Conservation Section	135	135
• Research Section	15	15
3. Urban Salmon Habitat Program		
• Community Stewardship	175	175
4. Forest Renewal		
• Watershed Restoration: Instream and riparian	17,300	11,100
• Watershed Restoration: Upslope	26,000	16,700
• Research	490	255
5. Fisheries Renewal		
• Salmonid Renewal	1,200	3,360
6. Habitat Conservation Trust Fund	155	155
7. Water Use Planning Process	5,950	5,950
8. Systems Operation Fund	3,600	3,600
9. BC Hydro		
• Peace/Williston and Columbia Basin compensation	400	400
• Bridge River-Coastal compensation	0	750
• Power facilities enhancement programs	2,060	2,060
• Improved fish passage	1,080	1,080
• Headquarters and operational staff	1,840	1,840
• Flow releases for fish	6,400	11,400

10. Ministry of Transportation and Highways	2,000	2,000
Total	69,285	61,460

Program descriptions and notes to Table 4.2.2

1. **Ministry of Environment, Lands and Parks** regional and district staff spend some of their time on reviewing restoration proposals under the several special federal and provincial funding programs. An average of 1.67 FTE's per region are utilized on restoration activities, divided between upslope and instream projects. It has been calculated that approximately 60% of their effort is directly related to fish habitat.

2. **Ministry of Fisheries**

- **Habitat Research** undertakes scientific investigations in support of freshwater fisheries management, habitat protection and restoration, and biodiversity. All habitat related operational funding is derived from external sources (Forest Renewal BC, Habitat Conservation Trust Fund) and is indicated elsewhere in the tables. Salary dollars only are shown here (approximately 12% are spent on restoration research).
- **The Conservation Section** provides Ministry of Fisheries headquarters input to the water use planning and systems operations processes which are reviewing and correcting flow issues at BC Hydro's power facilities. These activities fall into the habitat restoration category and it has been determined that approximately 40% of staff time is spent on them. (Salary costs for two staff members are included in Water Use Planning—#7).

3. **Urban Salmon Habitat Program:** 35% of the Community Stewardship program funds are spent on fish habitat restoration.

4. **Forest Renewal BC.** The agency's restoration activities apply to watersheds adversely impacted by past forest harvesting practices.

- **Watershed Restoration: Instream and riparian.** This program component is designed to replace lost channel-structuring elements within streams to increase the amount and quality of fish habitat, and restore habitat within selected riparian and stream ecosystems to pre-logging conditions. A subsidiary objective is to improve water quality in community watersheds; this is a relatively minor component and 5% of the expenditures have been allocated to this objective, 95% to fish habitat.

- **Watershed Restoration: Upslope.** This program component is designed to reduce the generation and delivery of sediment to streams from hillslopes and roads, and re-establish natural drainage patterns and water quality. There are, however, significant benefits to forestry from re-establishment of growing sites and it has been calculated that there is a 50:50 division of benefits between improvements to water quality and tree growth. Again, 5% of the expenditures for water quality have been allocated to drinking water quality improvement.
- **Research:** Another component of the program is the investigation and development of restoration techniques for damaged streams.

5. **Fisheries Renewal BC's Salmonid Renewal Program** supports program delivery partners to fund and manage projects that enhance wild fish stocks, restore habitat and promote public awareness. Habitat restoration projects utilised 20% of the \$6 million program expenditures in 98/99 but this is projected to increase to 40% (of \$8.4 million) as more emphasis is placed on physical restoration of streams in 99/00.

6. **The Habitat Conservation Trust Fund** supports some habitat restoration projects in addition to protection projects including dam removal, low flow water storage and large woody debris restoration.

7. **The Water Use Planning Process** was initiated in 1996 to review the rights to water associated with the operation of hydroelectric and other water control facilities. The goal is to achieve a broad consensus on operating rules for each facility to satisfy the range of water use interests with particular emphasis on benefits to fish. In the first five years all of BC Hydro's facilities will be reviewed. The expenditures under the program are almost entirely for studies of flow requirements for fish at each facility, with only a small proportion being used to provide for input by First Nations. BC Hydro is contributing \$4.7 million per year with an additional \$900K in salaries and \$350K in studies split between Water Management Branch and Ministry of Fisheries in Victoria, and MELP regions.

8. **The Systems Operation Fund** provides resources for the implementation of the water use plans developed for each hydro facility. To date 9 facilities are covered by interim orders. The water released for fisheries purposes at these facilities has been calculated to be worth \$3.6m in foregone power generation benefits.

9. BC Hydro

- **The Peace/Williston and Columbia Basin compensation programs** have been established to address impacts from past hydroelectric development in those basins. The total expenditures are \$3.8 million (Peace) and \$2.0 million (Columbia), divided 50% for fish and 50% for wildlife. However, most of the fisheries expenditures are for spawning channel operations and lake fertilization, leaving only a small proportion for stream habitat restoration projects.

- **The Bridge River-Coastal compensation program** is new this year and parallels the programs noted above. It is designed to address issues at coastal facilities and is currently in the assessment phase for restoration opportunities such as gravel placement and side channel development. 50% of the annual funds (\$1.5 million) are for fish and 50% for wildlife.
 - **Power facilities enhancement programs** fund initiatives to enhance and sustain fish populations at several hydro facilities (e.g. Stave, Bridge). In this case all the program funds can be considered to be directed to fish habitat restoration. (Note: 50% of the Downton reservoir project funds have been included here).
 - Also BC Hydro is investigating and/or installing devices to **improve fish passage/migratory habitat** at several facilities (Seton, Salmon, Bridge, Downton).
 - BC Hydro has a **headquarters and operational staff** of biologists and technicians to administer and/or carry out their mitigation and restoration projects. 80% of their effort is directed to fisheries issues; 20% to wildlife. Of the fisheries effort, half is on habitat.
 - **Flow releases for fish** above those called for in the applicable water licences are made at several facilities in addition to those referred to under the Systems Operation Fund category (#8 above). The numbers in the Table are an estimate of the value of the foregone power generation benefits for the water released for fisheries purposes.
10. **The Ministry of Transportation and Highways** has an extensive annual program of restoration work including retro-fitting baffles in old culverts to improve upstream fish passage, and the installation of groynes along their old fills in high velocity areas of rivers to both improve fish passage conditions and increase rearing habitat.

5 TOOLS FOR MANAGING FISH HABITAT

(See the numbered sections below. These sections (a) contain text-formatted versions of tabulated information found in the original manuscript, and (b) retain the names and numbers of the tables in original manuscript.).

List of "tables" (5.1 to 5.9; including the headings of numbered sections in each Table.)

Table 5.1. Tools for Managing Fish Habitat: Planning.

1. Protected Areas Strategy (PAS). [P, D]
2. Land and Resource Management Plans (LRMP). [P, D]
3. *Forest Practices Code Act* Section 4: Landscape Unit Plans. [P, D]
4. *Forest Practices Code Act* (Section 10 and Operational Planning Regulation Part 3): Forest Development Plans [P, S]
5. *Forest Practices Code Act* Section 11 and Operational Planning Regulation Part 4: Logging Plans. [P, S]
6. *Forest Practices Code Act* Section 12 and Operational Planning Regulation Part 5: Silviculture Prescriptions. [P, S]
7. *Forest Practices Code Act* Section 16 and Operational Planning Regulation Part 7: Range Use Plans [P, S]
8. Local Resource Use Plans (LRUP). [P, D]
9. Water Act Section 22: Water Management Areas and Water Management Plans [P, D—M]
10. *Fish Protection Act* Sections 10 and 11: Habitat considerations in a water management plan, and reduction of water rights in accordance with the plan. [P, D]
11. Water Use Plans (WUP). [P, D]
12. *Fish Protection Act* Section 7: Recovery Plans for Sensitive Streams [P, D—M]
13. *Municipal Act* Section 875: Official Community Plans (OCP). [P, S]
14. *Municipal Act* Sections 879 and 920: Development Permit Areas (DPA). [P, D]
15. *Oceans Act* Section 31: Integrated Management Plans. [J, S]
16. *Oceans Act* Section 35: Marine Protected Areas [J, D]

Table 5.2. Tools for Managing Fish Habitat: Project Review & Assessment

1. *Fisheries Act* Sections 35 (1) and (2): Harmful alteration, etc. of habitat. [F, S, D]
2. Co-ordinated DFO-MELP project referral system. [J, D]
3. *Canadian Environmental Assessment Act* (CEAA). [F, S]
4. *BC Environmental Assessment Act* (BCEAA). [P, S]
5. Canada-British Columbia Agreement for Environmental Assessment Co-operation [J, S]
6. Memorandum of Understanding Among the Three Principal Ministries Regarding Joint Administration of the Forest Practices Code [P, D]
7. Urban Salmon Habitat Program and other partnerships with local government [J, D]

8. Guidelines in general [J, D]

Table 5.3. Tools for Managing Fish Habitat: Habitat Classification and Designation.

1. DFO Habitat Conservation and Protection Guidelines. [F, D]
2. Fraser River Estuary Management Plan [J, D]
3. *Forest Practices Code Act* Part 2: Strategic Planning, Sensitive Areas. [P, D]
4. Forest Practices Code Section 41(6): Approval by a Designated Environmental Official. [P, S]
5. Forest Practices Code Riparian Management Area Guidebook. [P, S]
6. Forest Practices Code Timber Harvesting Practices Regulation Section 6: Unidentified or incorrectly classified streams. [P, S]
7. Forest Practices Code: Managing Identified Wildlife. [P, D]
8. *Mineral Tenure Act* Section 22: Mineral reserves. [P, D—M]
9. Oil and Gas Handbook Section 4: Geophysical Exploration (under Part 4 of the *Petroleum and Natural Gas Act*), Section 5: Roads (under Section 7 of the *Petroleum and Natural Gas Act*), and Section 8: Pipelines (under the Pipeline Act). [P, S]
10. *Fish Protection Act* Steamside Protection Policy Directive. [P, D]

Table 5.4. Tools for Managing Fish Habitat: Prevention of Physical Damage to Watercourses.

1. *Fisheries Act* Sections 35(1) and 35(2): Harmful alteration, etc. of fish habitat. [F, S]
2. *Fisheries Act* Section 37: Submission of plans. [F, D—M]
3. *Fisheries Act* Fishery (General) Regulations Part IX: Authorization to Alter Fish Habitat. [F, D]
4. DFO's Policy for the Management of Fish Habitat. [F, S]
5. DFO's Directive on the Issuance of Subsection 35(2) Authorizations (May 25, 1995). [F, S]
6. DFO's Habitat Conservation and Protection Guidelines [F, S]
7. DFO's Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD). [F, S]
8. *Environmental Management Act* Section 4: Environmental Protection Orders. [P, D]
9. *Water Act* Section 9: Changes in and about a stream. [P, S]
10. *Water Act* Regulation Part 7: Changes in and about a stream. [P, S]
11. Forest Practices Code Forest Road Regulation (Drainage). [P, S]
12. Forest Practices Code Forest Road Regulation (Construction). [P, S]
13. *Mines Act* Health, Safety and Reclamation Code Part 11. [P, S]
14. *Mines Act* Health, Safety and Reclamation Code Part 11. [P, S]
15. Oil and Gas Handbook Section 5: Roads (under Section 7 of the *Petroleum and Natural Gas Act*).
16. Forest Practices Code Timber Harvesting Practices Regulation Section 10(1): Felling adjacent to streams. [P, S]

17. Forest Practices Code Timber Harvesting Practices Regulation Section 11: Yarding and skidding. [P, S]
18. Forest Practices Code Timber Harvesting Practices Regulation Section 20: Stream bank stability. [P, S]
19. Forest Practices Code Timber Harvesting Practices Regulation Section 21(2): Temporary stream crossings. [P, S]
20. Forest Practices Code Timber Harvesting Practices Regulation Section 22: Retention of streamside trees. [P, S]
21. Forest Practices Code Timber Harvesting Practices Regulation Section 23: Slash and debris. [P, S]
22. Private Land Forest Practices Regulation (Draft) Section 9: Timber harvesting near streams. [P, S]
23. Private Land Forest Practices Regulation (Draft) Section 14: Timber harvesting near streams. [P, S]
24. *Water Act* Section 40: Debris into stream. [P, S]
25. Fisheries Renewal BC: Salmonid Renewal Program. [P, D]
26. Forestry Renewal BC: Watershed Restoration Program. [P, D]
27. Forestry Renewal BC: Bridge Replacement Program. [P, D]
28. Stream Crossing Guidelines. [J, D]
29. *Wildlife Act* Section 7(1): harm to habitat. [P, S]
30. Land Development Guidelines for the Protection of Aquatic Habitat. [J, D]

Table 5.5. Tools for Managing Fish Habitat: Protection of Riparian Areas.

1. *Fisheries Act* Section 35: Harmful alteration, etc. of fish habitat. [F, S]
2. Forest Practices Code Operational Planning Regulation Part 8: Riparian Management Areas. [P, S]
3. Forest Practices Code Timber Harvesting Practices Regulation Section 10: Felling adjacent to streams, etc. [P, S]
4. Forest Practices Code Timber Harvesting Practices Regulation Section 22: Retention of streamside trees. [P, S]
5. Forest Practices Code Forest Road Regulation Part 2: Road Layout and Design. [P, S]
6. Forest Practices Code Riparian Management Area Guidebook. [P, S]
7. Private Land Forest Practices Regulation (Draft) Sections 11 and 12: Retention of tress adjacent to streams. [P, S]
8. Private Land Forest Practices Regulation (Draft) Section 13: Location of roads. [P, S]
9. Land Development Guidelines for the Protection of Aquatic Habitat. [J, D]
10. *Fish Protection Act* Section 12: Provincial directives on streamside protection. [P, D]
11. *Land Title Act* Section 219: Registration of covenants as to use and alienation. [P, D]
12. *Municipal Act* Section 343 and 845: Exemptions for riparian property. [P, D]
13. Guidance for protection of riparian zones in planning and development activities: (a) Stream Stewardship: A Guide for Planners and Developers; (b) Community Greenways; (c) Stewardship Bylaws; (d) Access Near Aquatic Areas. [J, D]
14. Watershed Stewardship: A Guide for Agriculture. [J, D]

15. *Mines Act* Health, Safety and Reclamation Code Part 11. [P, S]
16. Oil and Gas Handbook Section 4: Geophysical Exploration (under Part 4 of the Petroleum and Natural Gas Act), Section 5: Roads (under Section 7 of the *Petroleum and Natural Gas Act*), and Section 8: Pipelines (under the Pipeline Act). [P, S]

Table 5.6: Tools for Managing Fish Habitat: Protection from Indirect Impacts.

1. *Fisheries Act* Sections 35(1) and 35(2): Harmful alteration, etc. of fish habitat. [F, S]
2. Forest Practices Code Operational Planning Regulation Section 14: Watershed assessments. [P, D]
3. Forest Practices Code Coastal and Interior Watershed Assessment Procedure (WAP) Guidebooks. [P, D]
4. Forest Practices Code Operational Planning Regulation Sections 16 and 17: Terrain stability field assessments. [P, D]
5. Forest Practices Code Mapping and Assessing Terrain Stability Guidebook. [P, D]
6. Forest Practices Code Gully Assessment Procedure Guidebook. (Coast only). [P, D]
7. Forest Practices Code Forest Road Regulation Part 2: Layout and Design. [P, D]
8. Forestry Renewal: Watershed Restoration Program. [P, D]

Table 5.7. Tools for Managing Fish Habitat: Protection of Flow Regimes.

1. *Fisheries Act* (Canada) Section 22(1): Water for the descent of fish. [F, D—M]
2. *Fisheries Act* (Canada) Section 22(3): Sufficient water for river bed below dam. [F, S]
3. *Fisheries Act* (BC) Part 28: Dam or hydraulic project. [P, S]
4. *Fish Protection Act* Section 4: No new dams on protected rivers. [P, S]
5. *Fish Protection Act* Section 5: Fish habitat considerations in water licensing decisions. [P, D]
6. *Fish Protection Act* Section 6: Designation of sensitive streams for fish sustainability. [P, R]
7. *Fish Protection Act* Section 8: Streamflow protection licences. [P, D]
8. *Fish Protection Act* Section 9: Reduction in case of drought. [P, D—M]
9. *Water Act* Regulation Part 7: Changes in and about a stream. [P, S]
10. *Municipal Act* Section 551. [P, D]
11. *Water Protection Act*. [P, S]
12. *International River Improvements Act*. [F, S]
13. Land Development Guidelines for the Protection of Aquatic Habitat. [J, D]
14. *Municipal Act* Section 907: Runoff control requirement. [P, D]

Table 5.8. Tools for Managing Fish Habitat: Protection of Water Quality.

1. *Fisheries Act* Section 36(3): Deposit of a deleterious substance. [F, S]
2. *Fisheries Act*: Pulp and Paper Effluent Regulation (PPER). [F, S]

3. *Fisheries Act*: Metal Mine Liquid Effluent Regulation (MMLER). [F, S]
4. *Fisheries Act*: other miscellaneous industry-specific effluent regulations. [F, S]
5. *Waste Management Act* Section 3: Waste disposal. [P, S]
6. *Waste Management Act* Pulp Mill and Pulp and Paper Mill Liquid Effluent Control Regulation. [P, S]
7. *Waste Management Act* Municipal Sewage Regulation. [P, S]
8. *Waste Management Act* Contaminated Sites Regulation. [P, S]
9. *Waste Management Act* Antisapstain Chemical Waste Control Regulation. [P, S]
10. *Waste Management Act* Aquaculture Waste Control Regulation. [P, S]
11. *Waste Management Act* Agricultural Waste Control Regulation. [P, S]
12. *Waste Management Act* Spill Reporting Regulation. [P, S]
13. *Canadian Environmental Protection Act* (CEPA) Section 12: Priority Substances. [F, S]
14. *Canadian Environmental Protection Act* Part IV: Ocean Dumping. [F, S]
15. *Canadian Environmental Protection Act* Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations; and Pulp and Paper Mill Defoamer and Wood Chip Regulations. [F, S]
16. *Canada Shipping Act* Pleasure Craft and Non-Pleasure Craft Sewage Pollution Prevention Regulations. [F, S]
17. *Canada Shipping Act* Oil Pollution Prevention Regulations Part III: Oil and Oily Mixture Discharges. [F, S]
18. *Pest Control Products Act* Section 5. [F, S]
19. *Pesticide Control Act* Section 6: Application in accordance with permit or approved plan. [P, S]
20. *Pesticide Control Act* Regulation Section 10: Conditions of use. [P, S]
21. Guidelines for the Protection of Fish and Fish Habitat During Use of Glyphosate and Other Selected Forestry Herbicides in Coastal BC. [J, D]
22. Guidelines for the protection of fish and fish habitat during bridge maintenance operations in British Columbia. [F, J, D]
23. *Oceans Act* Section 32(d): Marine environmental quality objectives and standards. [F, S]
24. Forest Practices Code Forest Road Regulation Section 12(1)(e): Subgrade construction. [J, S]
25. Forest Practices Code Forest Road Regulation Sections 13(c)(v), 14 and 20(1)(g): Drainage construction, road surfacing and deactivation. [P, S]
26. Forest Practices Code Timber Harvesting Practices Regulation Section 12(e): Excavated or bladed trails. [P, S]
27. Private Land Forest Practices Regulation (Draft) Section 8(1): Practices near streams. [P, S]
28. Private Land Forest Practices Regulation (Draft) Section 8(2): Practices near streams. [P, S]

Table 5.9. Tools for Managing Fish Habitat: Prevention of Direct Damage to Fish.

1. *Fisheries Act* (Canada) Sections 20 and 21: Construction of fishways. [F, D—M]
2. *Fisheries Act* (BC) Part 4: Fish protective devices. [P, D—R]
3. Recommendations for the Design and Installation of Culverts in BC to Avoid Conflict with Anadromous Fish. [F, D]
4. Standard instream timing windows. [J, D]
5. Forest Practices Code Forest Road Regulation. [P, S]
6. Forest Practices Code Timber Harvesting Practices Regulation Section 21(3). [P, S]
7. Health, Safety and Reclamation Code for Mines Part 11. [P, S]
8. Oil and Gas Handbook Section 4: Geophysical Exploration (under Part 4 of the *Petroleum and Natural Gas Act*), Section 5: Roads (under Section 7 of the *Petroleum and Natural Gas Act*), and Section 8: Pipelines (under the Pipeline Act). [P, D]
9. *Fisheries Act* (Canada) Section 30: Intake screens. [F, D—M]
10. *Fisheries Act* (BC) Part 4: Fish protective devices. [F, D—R]
11. DFO Fish Screening Directive. [F, D]
12. Guidelines for Minimizing Entrainment and Impingement of Aquatic Organisms at Marine Intakes in BC. [F, D]
13. *Fisheries Act* (Canada) Sections 28 and 30: use of explosives prohibited, and prohibition on destroying fish except by fishing. [F, S]
14. *Wildlife Act* Sections 6.1: Harm to threatened or endangered species. [P, S]
15. Guidelines for the Use of Explosives in Canadian Fisheries Waters. [F, D]

Table 5.1: Tools for Managing Fish Habitat: Planning.

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. Protected Areas Strategy (PAS). [P, D]

Objective. A set of policies to guide the selection and management of areas where resource development is not allowed. In these areas fish habitat would not be subject to potential impacts from resource development.

Actual Outcome. In the early stages of the process protected areas were selected to be representative of the 100 different ecosystems in British Columbia. Currently candidate areas for protected status are recommended at Land and Resource Management planning tables and submitted to Cabinet for approval.

Comments. The focus of this procedure is at the ecosystem level and thus it is not particularly adaptable to preserving specific areas of sensitive fish habitat. Such areas may, however, be included (by accident or design) in larger protected areas that are established to preserve broad ecosystem attributes.

2. Land and Resource Management Plans (LRMP). [P, D]

Objective. Locally-developed plans that recommend land and resource allocation. There are 22 planning areas in BC and LRMP's have been completed or are under way in 18 of them. Objectives identified in LRMP's may be designated as "higher level plans" under the *Forest Practices Code Act*, i.e. any operational plans prepared under the Code must meet the objectives outlined in the LRMP.

Actual Outcome. The plans are negotiated by representatives of government, industry and other stakeholders. The plans typically contain a zoning system, e.g. enhanced resource development zones, special management zones and general management objectives. Environmentally protected areas tend to be designated for wildlife reasons, not fisheries, with the latter typically left to the general provisions of the Forest Practices Code. Some LRMP's have recommended greater widths of riparian zones for increased fish habitat protection, but these special management zone recommendations are not binding on licensees until they are formally designated as "higher level plans" and this has not yet happened.

Comments. (a) A recently completed review (An Evaluation of DFO Involvement in Land and Resource Management Planning in British Columbia) has concluded that it is doubtful whether the process will result in enhanced fisheries protection. The report lists numerous problems with the process from DFO's point of view, for example: the direction from the process co-ordinators (Land Use Co-ordination Office) that agency staff should not be active advocates for their interests but act only as resource staff

providing information to the planning tables; staff question whether the effort required to participate fully is justified by the results; lack of provincial willingness to consider levels of protection in excess of FPC requirements; and the concern that the recommendations may be even further watered down to minimize impact on the forest economy. On the other hand others have criticized DFO for a lack of clear objectives and full commitment to the process. It would appear that to date MELP and DFO have achieved some potential gains in fish habitat protection (Goal 1 and 2 protected areas under PAS, e.g. Babine River corridor) but that DFO's future role in the LRMP process requires major re-evaluation;

(b) the process will gain credibility from a fisheries protection perspective only when the LRMP recommendations are formally translated into "higher level plans" so that they *must* be taken into account in operational plans.

3. *Forest Practices Code Act* Section 4: Landscape Unit Plans. [P, D]

Objective. The district manager may establish an area of land as a landscape unit and set objectives with the approval of a designated environmental official.

Actual Outcome. The boundaries of potential landscape units (20,000 to 100,000 ha) have been mapped across the province but none implemented, except for a pilot implementation of the planning guide on the Queen Charlotte Islands. The major potential at the landscape unit level is for wildlife rather than fisheries protection.

Comments. (a) Process is slow in getting under way. Industry has been promised that there will be no additional costs resulting from the process. Only issues to be considered in the first round are old growth areas and wildlife tree patches. Any fisheries benefits will be incidental to the protection of, for instance, old growth areas along streams in valley bottoms but, with the additional constraint that most of the areas to be considered must come from the non-operable forest land base, these benefits are likely to be negligible;

(b) the pilot implementation of the Landscape Unit Planning guide on the QCI is slow in getting under way due to problems with the accompanying computer software.

4. *Forest Practices Code Act* Section 10 and Operational Planning Regulation Part 3: Forest Development Plans). [P, S]

Objective. Must cover a period of at least five years, show the size, shape and location of cutblocks, road locations, silvicultural systems and harvesting methods, be consistent with any higher level plan and include all requirements as specified in the regulation.

Actual Outcome. Recent changes to the regulation have minimized the amount of information needed to be included in these plans and have made them practically worthless as a referral tool for fisheries agencies.

Comments. Can still be reviewed at the landscape level to identify any proposed cutblocks in areas of significant interest to fisheries agencies for future follow-up.

5. *Forest Practices Code Act* Section 11 and Operational Planning Regulation Part 4: Logging Plans. [P, S]

Objective. Must include, for the area of a cutblock, locations of roads and timber harvesting practices, details of how harvesting and rehabilitation will be carried out, be consistent with any higher level plan, and include all requirements as specified in the regulation.

Actual Outcome. Logging plans are no longer required to be submitted for most timber harvesting operations (*Act* Section 21) and have, therefore, ceased to be a referral tool for fisheries agencies.

Comments: No Comments given.

6. *Forest Practices Code Act* Section 12 and Operational Planning Regulation Part 5: Silviculture Prescriptions. [P, S]

Objective: Must include long term management objectives set out in any forest development plan or higher level plan, approximate locations of permanent access structures and temporary roads and landings, and include all requirements as specified in the regulation.

Actual Outcome: Licensees need to have a silvicultural plan approved by MOF but these are not automatically submitted to MELP for review. If MELP staff wish to review a prescription the onus is on them to seek it out in MOF's or the licensee's offices.

Comments: The amendments to the *Act* transferred some of the content requirements (e.g. riparian classifications) from the now almost extinct logging plans to silvicultural prescriptions.

7. *Forest Practices Code Act* Section 16 and Operational Planning Regulation Part 7: Range Use Plans. [P, S]

Objective: Must include a description of grazing activities, range developments, matters required by regulation and be consistent with any higher level plan.

Actual Outcome: None given.

Comments: The requirement for the development of plans under the FPC is a significant improvement over the previous situation; however, the scarcity of agency staff for monitoring and enforcement is of concern.

8. Local Resource Use Plans (LRUP). [P, D]

Objective: A planning mechanism used before the advent of LRMP's and the FPC.

Actual Outcome: No longer in use.

Comments: LRUP's have not been designated as "higher level plans" and thus the information documented therein on environmentally sensitive areas need not be considered under the FPC.

9. *Water Act* Section 22: Water Management Areas and Water Management Plans. [P, D—M]

Objective: The minister may designate an area as a water management area if the development of a water management plan would assist in addressing conflicts between water users and instream flow requirements including concerns relating to fish and fish habitat. The minister may also establish a process for the plan development.

Actual Outcome: Provisions not yet in force.

Comments: Offers potential benefits for fish habitat but almost no progress has yet been made towards the initiation of this process.

10. *Fish Protection Act* Sections 10 and 11: Habitat considerations in a water management plan, and reduction of water rights in accordance with the plan. [P, D]

Objective: The terms of reference for a water management plan under Section 22.2 of the *Water Act* may include the identification of measures to provide additional water for fish and fish habitat; and, if a plan calls for additional water, there may be a 5% reduction in the amount authorized under a licence whenever a licence is disposed of, transferred or apportioned.

Actual Outcome: Act section not yet proclaimed.

Comments: Offers potential benefits for fish habitat but almost no progress has yet been made towards the initiation of this process.

11. Water Use Plans (WUP). [P, D]

Objective: The Comptroller of Water Rights may require a WUP as a condition of a new water licence, as part of a review of an existing licence, or in response to a perceived water use conflict. A WUP is specific to a water control facility and is attached to a water licence. It sets out how water is to be managed by defining operating parameters to balance environmental, social and economic interests.

Actual Outcome: BC Hydro is preparing a WUP for each of its facilities. Significant input is being provided by DFO, MELP and Ministry of Fisheries staff. Interim orders for fish flow releases are already in place on 9 facilities.

Comments: The WUP process is proving to be very beneficial for fish and their habitat. It is determining the required baseline flows below BC Hydro facilities and the means of providing those flows. The *Fisheries Act* has proven to be a cumbersome tool for achieving those objectives and has been rarely used.

12. *Fish Protection Act* Section 7: Recovery Plans for Sensitive Streams. [P, D—M]

Objective: The minister may direct that a recovery plan be prepared, or approve a proposal for the development of a recovery plan, for a sensitive stream (Section 6). The plan may include measures to provide for a sufficient flow of water, habitat restoration, and agreements to promote co-operative efforts.

Actual Outcome: Act section not yet proclaimed.

Comments: (a) The initial list of 15 candidate sensitive streams includes only those that have an immediate need for additional protection and whose designation would have minimal impact on other resource users, i.e. difficult inter-resource allocation decisions and recovery plans are being postponed, possibly at the expense of the fish; (b) FRBC and FsRBC may be ordered to assist in the development or implementation of a recovery plan.

13. *Municipal Act* Section 875: Official Community Plans (OCP). [P, S]

Objective: Enables local governments to adopt community plans. An OCP is a bylaw which contains a general statement of broad objectives and policies respecting the form and character of existing and proposed land use and servicing requirements. An

OCP may contain policy statements and guidelines or recommendations for the protection of streams.

Actual Outcome: Some local governments are more environmentally sensitive than others and this is reflected in the content of their OCP's.

Comments: (a) There is no requirement in the *Municipal Act* for the explicit consideration of environmental issues in OCP's; however, Section 878 includes the provision that an OCP *may* contain policies relating to the preservation, protection, restoration and enhancement of the natural environment, its ecosystems and biological diversity.

(b) OCP's contain general statements of intent that are non-enforceable and may be changed by a motion of the municipal council. On the other hand, if fish protection concerns are to be addressed during development, they must be included in the OCP as development cannot be contrary to the OCP.

14. *Municipal Act* Sections 879 and 920: Development Permit Areas (DPA). [P, D]

Objective: DPA's may be designated in OCP's. Generally these are sensitive areas subject to higher standards of development than other areas. A development permit may

(a) specify areas of land that must remain free of development, except in accordance with any conditions contained in the permit;

(b) require specified natural features or areas to be preserved, protected, restored or enhanced;

(c) require natural water courses to be dedicated;

(d) require works to be constructed to preserve, protect, restore or enhance natural water courses or other specified natural features of the environment;

(e) require protection measures, including that vegetation or trees be planted or retained in order to (i) preserve, protect, restore or enhance fish habitat or riparian areas, (ii) control drainage, or (iii) control erosion or protect banks.

Actual Outcome: None stated.

Comments: DPA designation is ineffective if not included in the OCP prior to the time that development takes place. Thus local governments need an inventory of environmentally sensitive areas that should be designated as DPA's long before development is proposed.

15. *Oceans Act* Section 31: Integrated Management Plans. [J, S]

Objective: The minister, in collaboration with the provincial government, etc. shall lead and facilitate the development and implementation of plans for the integrated

management of all activities or measures in or affecting estuaries, coastal waters and marine waters.

Actual Outcome: Little progress has yet been made. The *Act* states that DFO's minister will lead the process, yet the first exercise is being undertaken in association with the Central Coast LRMP which is a LUCO-led process. Difficulties are evident regarding the relationship between LUCO and DFO and how the two planning processes mesh.

Comments: The process is constrained by federal-provincial disputes regarding jurisdiction over waters in Georgia Strait.

16. *Oceans Act* § 35: Marine Protected Areas. [J, D]

Objective: An area designated by regulation for special protection for the conservation and protection of: fishery resources, including marine mammals, endangered or threatened marine species and their habitats; unique habitats; or marine areas of high biodiversity or biological productivity. For the purposes of integrated management plans (S31), the minister will lead and co-ordinate the development and implementation of a national system of marine protected areas.

Actual Outcome: Four small pilot areas have been established.

Comments: Progress is slow with only very small areas being protected to date. No large marine sanctuary areas have been established to protect marine resources from exploitation of all types.

Table 5.2. Tools for Managing Fish Habitat: *Project Review & Assessment*

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. *Fisheries Act* Sections 35(1) and (2): Harmful alteration, etc. of habitat. [F, S, D]

Objective: (1) No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat (HADD). Designed to prevent physical damage to fish habitat including spawning, rearing, food supply and migration areas (direct and indirect dependence by fish).

(2) No person contravenes subsection (1) by causing the harmful alteration, disruption or destruction of fish habitat under any conditions authorized by the Minister or by regulation.

Actual Outcome: This section provides the federal government with its major statutory power to "regulate" resource development activities. It is applied to many thousands of development proposals across BC each year and forms the basis for DFO's involvement in the inter-agency referral system. Much of the work is done in close co-operation with MELP staff. (see item 2, below). Section 35(2) is also the major trigger for DFO to invoke the *Canadian Environmental Assessment Act*, i.e. when DFO grants an approval for HADD it must carry out an environmental assessment before doing so.

Comments: The review of development proposals received mainly through the referral system is a major task for DFO staff: for example, in a 1989 review it was calculated that about 55% of staff resources were allocated to this function. However, recent events (see item 2c, below) have meant that the effort devoted to this function is now less.

2. Co-ordinated DFO-MELP project referral system. [J, D]

Objective: A system for the co-ordinated review of projects that have the potential for an impact on fish habitat and the development of joint recommendations for preventing those impacts.

Actual Outcome: DFO and MELP field staff have co-operated for many years on the review of such projects with DFO reviewing impacts for salmon habitat and MELP for resident fish habitat. Informal agreements at the regional level, often with the involvement of other agencies such as BC Hydro, Water Management, and the Ministry of Mines, have been developed to define specific roles. Recommendations have in some cases been sent directly to proponents and in other cases have been made part of approvals/licences issued by other agencies. If a formal authorization under § 35(2) is not required, a "letter of advice" is sent detailing DFO recommendations.

Comment: (a) The *Fisheries Act* gives DFO the ultimate authority to protect fish habitat; however, DFO has traditionally relied upon MELP to carry out the responsibilities in the case of resident fish habitat. Although the courts have recently re-emphasized that DFO cannot officially delegate its powers, it still makes practical sense for the agencies to share the workload (efficient use of limited resources in both agencies, utilization of MELP expertise). MELP, however, cannot authorize HADD under §35, even for resident fish habitat: this must be done by DFO. Discussion between the agencies has been continuing for some time as to how a more formal work sharing arrangement could be developed, taking into account the existing constitutional constraints;

(b) the situation in eastern BC is somewhat different due to DFO's relatively recent presence and small number of staff allocated to the area. DFO only becomes involved in major projects and those smaller ones requiring Section 35(2) *Authorizations*. DFO relies on MELP to screen projects and forward those that have the potential to cause HADD; the fact that only 10 or 12 project proposals are forwarded each year suggests that many cases of minor habitat loss must be occurring. It appears that the informal agreement between DFO and MELP is not functioning as designed;

(c) recent developments (such as staff reductions, provincial efforts to reduce regulatory constraints and the "paper burden" as exemplified by the current lack of meaningful content in some plans required under the Forest Practices Code, and the dramatic increase in stewardship initiatives by both governments) have led to a de-emphasis in referral review, and a shift to a more monitoring and enforcement-oriented approach to operations in both DFO and MELP field offices.

3. *Canadian Environmental Assessment Act* (CEAA). [F, S]

Objective: One of its provisions requires DFO to conduct an environmental assessment of a project before issuing an approval under *Fisheries Act* sections 22 (flow releases), 32 (destruction of fish), 35(2) (authorization of harmful alteration of habitat), and 37(2) (modifications to works or undertakings).

Actual Outcome: The large majority of DFO's CEAA assessments are carried out as a result of §35(2) *Authorizations* and *Navigable Waters Protection Act* permits. Although DFO received additional resources when CEAA was introduced, it is questionable whether CEAA has represented a net increase in fish habitat protection or has had a negative impact by taking the time of DFO operational staff away from their primary role of administering the *Fisheries Act*.

Comments: DFO's environmental assessment responsibilities under CEAA represent a super-added task that adds workload with only a marginal increase over DFO's *Fisheries Act* powers to protect fish habitat. For instance CEAA has explicit

references to consideration of cumulative impacts and the effects of potential accidents and malfunctions.

4. *BC Environmental Assessment Act* (BCEAA). [P, S]

Objective: Provides for the assessment of "review-able" projects and a prohibition against undertaking such a project without a project approval certificate.

Actual Outcome: There are few incremental benefits for fish habitat under BCEAA as the powerful provisions of the *Fisheries Act* are generally adequate to protect that resource. BCEAA, however, has resulted in major gains for wildlife habitat protection.

Comments: (a) The Provincial Cabinet can exclude projects from the process, but some form of environmental assessment is invariably carried out (cf. skytrain extension);
(b) threshold levels for reviewable projects have been recently increased (this has eliminated the review of small hydro projects, for example, raising associated fish habitat concerns, but the provisions of the *Fisheries Act* always apply).

5. Canada-British Columbia Agreement for Environmental Assessment Co-operation. [J, S]

Objective: Provides for the co-ordination of the two assessment processes to promote efficiency and avoid duplication of effort.

Actual Outcome: This agreement to harmonize the two processes is working well.

Comments: (a) There is a provision in the agreement for each party to conduct segments of its own review if the joint process does not meet its requirements. This is happening, for instance, on the Taseko Fish Lake project where DFO's requirements are more demanding than those specified by the BCEAA review committee;
(b) recent conflicting court decisions in the Prairie Provinces have raised the issue of the required scope of the federal review and an associated perceived intrusion into provincially regulated activities (stream crossings on a road leading to a review of forest harvesting operations). The decisions are under appeal and no definitive guidance is available.

6. Memorandum of Understanding Among the Three Principal Ministries Regarding Joint Administration of the Forest Practices Code. [P, D]

Objective: For each relevant section of the *Forest Practices Code Act* the MOU indicates which agencies are involved in a referral, the time frames for response, and whether joint approval is required. Although not a signatory DFO is referred to as a recipient of certain referrals.

Actual Outcome: Recent amendments to the FPC have eliminated some plans and reduced the content of others to such an extent that in many areas of the province the fisheries agencies do not bother to review them.

Comments: (a) The relevance of this MOU is now very questionable;
(b) DFO has not signed any official memoranda of understanding with the province setting out the roles DFO staff should play in the review and approval of forest harvesting operations. However, in light of the frequently changing nature of the details in the code, including the content of referred plans, DFO should not be in any hurry to do so.

7. Urban Salmon Habitat Program and other partnerships with local government. [J, D]

Objective: Cost-sharing of municipal environmental co-ordination staff, and the development of agreements between local governments, DFO and MELP to empower local governments to direct development to less environmentally sensitive areas, and to incorporate fish habitat protection restrictions in their development approvals.

Actual Outcome: Program has been well received by local government and has been very successful in improving the efficiency of the project review process by, among other things, providing fisheries input to planning exercises such as neighbourhood concept plans and master drainage plans, thus ensuring that development proposals are more likely to take fisheries concerns into account before they are submitted.

Comments: (a) The major concern of municipalities is that these agreements are a form of downloading of responsibility without an increase in resources. This concern can be overcome to some degree by the higher orders of government providing tools such as detailed sensitive area mapping and staffing assistance via programs like the USHP and DFO's recently announced stewardship co-ordinators and habitat auxiliaries under the Resource Rebuilding Program;
(b) the USHP is scheduled to terminate in March 2000.

8. Guidelines in general. [J, D]

Objective: Many sets of guidelines have been developed by DFO and MELP, mostly on a joint basis, to assist developers in minimizing impacts on fish habitat as they plan and design their projects, and to expedite agency review of project proposals.

Actual Outcome: Guidelines are in existence for such diverse activities as urban development, golf courses, marinas, dredging, stream crossings, gravel removal, water intake screens, bridge maintenance and pesticide use.

Comments: No Comments given.

Table 5.3. Tools for Managing Fish Habitat: *Habitat Classification and Designation*.

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."); [R], requires a Regulation before taking effect.

1. DFO Habitat Conservation and Protection Guidelines. [F, D]

Objective: Provides direction on the application of the Policy for the Management of Fish Habitat, including the level of protection required as a function of a habitat's productive capacity.

Actual Outcome: This broad direction is applied in many circumstances to map and classify fish habitat as a guide to habitat managers and developers as to where potential impacts would be least and, therefore, mitigation/compensation costs least.

Comments: The Guidelines recommend classifying habitat as critical, important or marginal. This three level approach is often adopted by DFO operational staff on a large scale when participating in integrated resource management planning, and on a small scale when reviewing individual development applications in the referral system.

2. Fraser River Estuary Management Plan. [J, D]

Objective: Habitat in the estuary has been mapped and colour-coded with regard to its value to fish.

Actual Outcome: The maps have been used for many years as the basis for directing potential development to the least sensitive areas, and to determine the levels of mitigation/compensation required.

Comments: This is an example of many such classification exercises currently in effect in BC. In addition to estuary planning they have been used for placer mining, pre-FPC forest harvesting, Bulkley Forest District habitat sensitivity mapping, etc.

3. *Forest Practices Code Act* Part 2: Strategic Planning, Sensitive Areas. [P, D]

Objective: If, in the opinion of a Designated Environmental Official, special circumstances require that an area be treated differently from adjacent lands, the district manager may identify the area as a sensitive area and then must establish objectives for its management.

Actual Outcome: Mechanism not used yet. Ministry of Forests requires Landscape Unit Plans to be in place first and will only consider a sensitive area designation for areas which cannot be protected under other FPC provisions.

Comments: Concept was developed to cover areas identified as sensitive in the pre-code era such as Environmentally Sensitive Area polygons and those identified in Land and Resource Unit Plans. Concept does not appear to have current acceptance and, with all the constraints, appears to have little relevance to fish habitat protection. In any event the final decision rests with the non-fisheries manager.

4. Forest Practices Code Section 41(6): Approval by a Designated Environmental Official. [P, S]

Objective: If a forest development plan covers an area meeting "prescribed requirements", it requires the approval of both the district manager and the DEO. (An area meets prescribed requirements if it is specified in a higher level plan as requiring joint approval).

Actual Outcome: There are no such areas yet as no Landscape Unit Plans have been completed to provide the direction.

Comment: Unless fisheries agencies can have fisheries issues addressed in higher level planning stages as requiring additional protection beyond the standard FPC provisions, no areas requiring joint approval under this section will be set up for particularly sensitive fish habitat locations.

5. Forest Practices Code Riparian Management Area Guidebook. [P, S]

Objective: Streams are classified on the basis of fish presence and width, and lakes on size and biogeoclimatic unit, as a guide to the allowable harvesting practices in the adjacent area. Classifications must be determined by the licensee and included in logging plans and silvicultural prescriptions.

Actual Outcome: A Forest Practices Board audit (*Forest Planning and Practices in Coastal Stream Areas: June 1998*) found that although the identification and classification of large fish bearing and small non-fish bearing streams was very good, nearly half of the small (<5m wide) fish bearing streams were underclassified, leading to inappropriate harvesting practices.

Comments: (a) Correct classification is key to the selection and application of appropriate harvesting practices. It appears that improvements in the training of field staff and the standard of inventory collection are needed;
(b) the classification scheme described in the FPC Guidebook is referenced in the Oil and Gas Handbook as being applicable to geophysical exploration, and pipeline and road construction.

6. Forest Practices Code Timber Harvesting Practices Regulation Section 6: Unidentified or incorrectly classified streams. [P, S]

Objective: A person must not harvest in a riparian reserve zone of a stream, etc. if it has not been identified or has been given an incorrect riparian classification in an operational plan.

Actual Outcome: See Item 5 (*Actual Outcome*) above:

Comment: No Comments given.

7. Forest Practices Code: Managing Identified Wildlife. [P, D]

Objective: Species at risk may be managed through the creation of Wildlife Habitat Areas (WHA's) and the implementation of general wildlife measures.

Actual Outcome: To date the only fish species formally identified for special protection under this provision is bull trout in congregations representing 20 to 80% of an adult population. No WHA's for bull trout have yet been established. Government has decreed that the impact on the harvest level caused by WHA's must be less than 1% in each district.

Comments: (a) Measures which must be implemented in an approved WHA for this species are no access roads or trails, no stream crossings and the maintenance of riparian and aquatic habitat;

(b) it is possible that additional fish species may be included in the next volume of identified wildlife. DFO has had no input to date.

8. *Mineral Tenure Act* Section 22: Mineral reserves. [P, D—M]

Objective: The minister may establish a reserve where a free miner is prohibited from locating or recording a mineral title.

Actual Outcome: Under agreement between the Ministry of Energy and Mines, MELP and DFO this section has been used to classify large areas of the province as reserves from placer staking, and streams with significant fish spawning, rearing and migration as reserves within areas open to staking, thus avoiding potential impacts from the habitat disruption associated with placer operations.

Comments: (a) Adjustments to the reserve areas are allowed (larger or smaller), with the views of the fisheries agencies being critical factors in the decision;

(b) outside of the reserve areas streams have been classified by colour code (red, yellow, green or brown) according to their fish habitat values. Specific placer mining practices are allowed according to the colour code of the stream.

9. Oil and Gas Handbook Section 4: Geophysical Exploration (under Part 4 of the *Petroleum and Natural Gas Act*), Section 5: Roads (under Section 7 of the *Petroleum and Natural Gas Act*), and Section 8: Pipelines (under the *Pipeline Act*). [P, S]

Objective: The northeast part of the province has been divided into four zones by MELP depending on their environmental sensitivity. Restrictions and requirements vary depending on each zone's level of sensitivity.

Actual Outcome: System is no longer in use.

Comments: No Comments given.

10. *Fish Protection Act* Steamside Protection Policy Directive. [P, D]

Objective: Three component classification system based on fish presence and stream function, quality of habitat and watershed features, and current riparian condition.

Actual Outcome: The system is currently being tested as part of a pilot test of a draft streamside directive under Section 12 of the *Fish Protection Act*.

Comments: No Comments given.

Table 5.4. Tools for Managing Fish Habitat: Prevention of Physical Damage to Watercourses.

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. *Fisheries Act* Sections 35(1) and 35(2): Harmful alteration, etc. of fish habitat. [F, S]

Objective: (1) No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat. Designed to prevent physical damage to fish habitat including spawning, rearing, food supply and migration areas (direct and indirect dependence by fish).

(2) No person contravenes subsection (1) by causing the harmful alteration, disruption or destruction of fish habitat under any conditions authorized by the Minister or by regulation.

Actual Outcome: A very powerful section of the *Act* which forms the basis of DFO's No Net Loss Policy and provides the federal government with its major statutory power to "regulate" resource development activities. It is applied to many thousands of development proposals across BC each year.

Comments: (a) In practice the minister's power to authorize harmful alteration of habitat has been delegated to DFO habitat managers;

(b) during the last few years there has been discussion of delegating the minister's powers under this section to the provinces. However, no amendments to the *Fisheries Act* to enable this to take place are currently in progress. It seems likely that the federal government will not delegate its powers in the foreseeable future;

(c) this section also provides one of the major triggers for the application of the *Canadian Environmental Assessment Act* (see Table 2);

(d) there are no regulations regarding the specific conditions under which works may be carried out without harm to fish habitat; each proposal has to be evaluated individually;

(e) as no actual permit is required under the *Act* before work begins (although proponents may request a formal authorization—see #3 below), failure to contact DFO and submit plans for approval is not, in itself, an offence. In such a situation DFO would have to prove in court that harmful alteration had taken place; although there might be a successful prosecution, the habitat would have been damaged and the objective of subsection (1) would not have been achieved.

2. *Fisheries Act* Section 37: Submission of plans. [F, D—M]

Objective: The minister may formally request plans, specifications, etc. from a proponent and, with the approval of the Governor in Council, require modifications in order to prevent damage to fish habitat.

Actual Outcome: The power to formally request plans and order modifications is rarely used. DFO relies on the co-operation of proponents to submit their plans for review without a formal order.

Comments: No Comments.

3. *Fisheries Act* Fishery (General) Regulations Part IX: Authorization to Alter Fish Habitat. [F, D]

Objective: A person who proposes to carry on a work that is likely to damage fish habitat may apply for an *Authorization* in the form set out in a schedule to the regulation.

Actual Outcome: Very few requests are made to DFO in BC for formal authorizations under the regulation. Most requests for project approval are received through the interagency referral system, and any authorizations required are prepared on an individual basis, taking into account the site-specific conditions where the habitat damage will occur and the associated necessary compensatory work.

Comments: As authorizations are only issued when there will be residual habitat damage that must be compensated for by (usually) the construction of new habitat, the authorizations tend to be complex documents which do not lend themselves to the simplistic format outlined in the regulation.

4. DFO's Policy for the Management of Fish Habitat. [F, S]

Objective: Sets out the broad strategies which DFO staff must follow in order to achieve a net gain in the productive capacity of fish habitat. Fundamental to this is the prevention of further erosion of the productive capacity of existing habitat through the application of the No Net Loss Guiding Principle to decisions related to the review of proposed works. Seeks to offset unavoidable losses with habitat replacement on a case-by-case basis (compensation-in-kind).

Actual Outcome: The Policy provides the direction for a substantial part of the effort of DFO habitat protection staff. Most of this effort is devoted to the review of proposals and the negotiation of conditions of approval, with minimal resources being available for compliance or efficacy monitoring. With this lack of data there is some doubt as to whether no net loss is being achieved.

Comments: (a) The professional judgement of DFO staff plays a major role in the application of no net loss as there are no simple, universal measures for the productive capacity of a habitat. This difficulty inherent in any complex biological system, plus the relative lack of monitoring, make it difficult to assess how well DFO is doing in

meeting its objectives under the Policy.(cf. recent reports of the Auditor-General and the Parliamentary Standing Committee on Public Accounts);

(b) compensation-in-kind is not a feasible option in cases involving liquid waste discharges (i.e. Section 36 pollution issues).

5. DFO's Directive on the Issuance of Subsection 35(2) *Authorizations* (May 25, 1995).
[F, S]

Objective: A ministerial directive to DFO staff to ensure national consistency in the application of §35.

Actual Outcome: The principles outlined in the document (e.g. *Authorizations* are for harmful alteration to habitat not for the projects themselves; there must be a link to a fishery; compensation to be considered only after mitigation proves impractical or impossible) are being applied by DFO to all projects submitted for review.

Comments: The topics in the Directive have since been enlarged upon in the guidelines described in items 6 and 7, below.

6. DFO's Habitat Conservation and Protection Guidelines. [F, S]

Objective: Provide DFO staff with a standard approach to the application of the No Net Loss Guiding Principle. Staff are to follow a hierarchy of preferences in the review of projects in an attempt to prevent impacts on habitat. Only if measures such as relocation and mitigation are not possible or inadequate, may habitat destruction be authorized with accompanying compensation in the form of new habitat creation.

Actual Outcome: Although described as "guidelines," they are in fact mandatory and the procedures described therein are applied universally by DFO staff.

Comments: (a) In practice, most projects reviewed by DFO staff are approved with mitigation measures only, thus avoiding harmful alteration of habitat and the necessity for habitat compensation with an associated legal agreement, and a broader environmental review under CEAA. From the implementation of CEAA to May 1998, only 80 projects out of many thousands reached the habitat compensation/ environmental review stage of the hierarchy of preferences.

(b) if direct impacts on watercourses can be avoided DFO staff will usually conclude that there will be no harmful alteration of habitat and thus no compensation measures need be negotiated and applied. This is apparent when considering the forest harvesting industry where very rarely does a harvesting plan call for instream work; thus there have been very few authorizations/compensation agreements issued for this industry;

(c) DFO does not accept cash as compensation; the proponent must create new habitat (unless the Minister considers it in the public interest to permit artificial propagation—an extremely rare circumstance).

7. DFO's Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD). [F, S]

Objective: Describes a series of steps to be followed by DFO staff when applying §35 of the *Fisheries Act*: Is fish habitat present? Could the proposed project cause HADD? Can the impacts be fully mitigated? Should the HADD be authorized? And can the HADD be compensated?

Actual Outcome: See Outcome in item 6, above.

Comments: In order for §35 to apply, the habitat in question must support a fishery. It is difficult to apply therefore to some situations involving fish of particular interest to provincial authorities such as rare and endangered species.

8. *Environmental Management Act* Section 4: Environmental Protection Orders. [P, D]

Objective: The minister may declare that an existing or proposed work or undertaking has or potentially has a detrimental environmental impact, and the Lieutenant Governor in Council may order restrictions, modifications or prohibitions.

Actual Outcome: Very rarely used provision.

Comments: Similar in effect to §37(2) of the *Canada Fisheries Act*, but much more general; not targeted on fish habitat.

9. *Water Act* Section 9: Changes in and about a stream. [P, S]

Objective: Approval required before a person makes a modification to the nature of a stream including the land, vegetation or natural environment, or carries out any activity or construction within the stream channel.

Actual Outcome: Although there is no statutory requirement for the comptroller, regional water manager or engineer to consider biological values in their decisions, in practice water licence applications have traditionally been referred to provincial and federal habitat staff for their review. Their comments have usually been incorporated into the water licence.

Comments: (a) Applies to all streams not only those supporting fish;
(b) staff shortages have recently prompted provincial MELP staff in the West Kootenay area to stop reviewing water referrals.

10. *Water Act* Regulation Part 7: Changes in and about a stream. [P, S]

Objective: Streamlines the approval process by listing 24 changes which can be carried out without an approval or licence, subject to various restrictions such as the requirement to notify a MELP habitat officer 45 days in advance and to comply with federal enactments, e.g. *Fisheries Act*.

Actual Outcome: The regulation was designed for relatively benign projects. However, some proponents are sending notifications for proposals that should have been submitted for a permit or approval. Most MELP regions are reviewing the notifications and forwarding to DFO only those that may potentially require a *Fisheries Act* authorization, and to Water Management those that should have been sent there in the first place.

Comments: (a) The habitat officer has 45 days after receipt of a notification to set terms and conditions for the work concerning timing windows, minimum instream flow, protection of natural materials and vegetation, requirement to obtain DFO approval, etc. Does not apply to FPC and *Mines Act* permit holders. See below;
(b) regulation was developed co-operatively between MELP and DFO as a means of reducing workload/paperwork. It has succeeded as far as Water Management is concerned but MELP Habitat Protection has the same or even greater involvement. The Kootenay Region has particular workload problems and has eliminated completely the review of water use applications in part of the region.

11. Forest Practices Code Forest Road Regulation (Drainage). [P, S]

Objective: Design, construction and deactivation must address bridges and culverts so as to prevent or mitigate channel and bank disturbance and protect adjacent fish habitat (9.1.c; 13.1.h; 20.1.f) in compliance with timing windows and measures specified by a DEO.

Actual Outcome: Regulation is working well. Regional MELP staff are developing local timing windows and approved measures for use by licensees. DFO are collaborating to ensure the procedures satisfy the requirements of both agencies.

Comments: (a) Definition of a fish stream includes rare and endangered species and regionally important species, not just those supporting a fishery as specified in the *Fisheries Act*;

(b) the DEO's power to define required practices is a significant departure from most of the code's wording. It would be useful to incorporate such language in other sections.

12. Forest Practices Code Forest Road Regulation (Construction). [P, S]

Objective: Slash, debris or erodible soil must not be deposited in a lake, wetland, stream, etc. if the deposit is capable of damaging fish habitat (11.7).

Actual Outcome: Regulation is working well.

Comments: No Comments given.

13. *Mines Act* Health, Safety and Reclamation Code Part 11. [P, S]

Objective: A permittee constructing an exploration access shall construct bridges and culverts to prevent or mitigate streambank disturbance, and construct crossings in a way that protects adjacent habitat (11.5.1.7.f; 11.5.4.1.f); and when reclaiming an exploration trail shall, to the extent possible, restore channel and bank stability (Schedule A.A.1.1).

Actual Outcome: Limited level of exploration activity currently and little monitoring carried out by MELP/DFO staff, but no major concerns evident.

Comments: (a) Definition of a fish stream includes rare and endangered species and regionally important species, not just those supporting a fishery;
(b) note instances of qualifiers in this Code such as "to the extent possible."

14. *Mines Act* Health, Safety and Reclamation Code Part 11. [P, S]

Objective: A permittee constructing an exploration access shall, to the extent practicable, avoid depositing woody debris, etc. into a stream, wetland or lake or onto an area where it could be transported into one (11.5.1.5a; 11.9.1.1); and when constructing or modifying a temporary access road shall directionally fell trees away from a stream and use methods that prevent stream bank destabilization (Schedule A.C.5.1.c).

Actual Outcome: Limited level of exploration activity currently and little monitoring carried out by MELP/DFO staff, but no major concerns evident.

Comments: Note instances of qualifiers such as "to the extent practicable".

15. Oil and Gas Handbook Section 5: Roads (under Section 7 of the *Petroleum and Natural Gas Act*).

Objective: Stream crossings should not damage fish habitat (5.4.1).

Actual Outcome: None given.

Comments: None given.

16. Forest Practices Code Timber Harvesting Practices Regulation Section 10(1): Felling adjacent to streams. [P, S]

Objective: A person carrying out harvesting must not fell timber into a stream, etc. unless worker safety is an issue, it has been approved in a silviculture prescription or logging plan, or with respect to a Fisheries Sensitive Zone (FSZ) the district manager authorizes it.

Actual Outcome: Although no DEO approval is required for felling into a FSZ, MOF district managers are sensitive to the issue and are not authorizing it.

Comments: No Comments given.

17. Forest Practices Code Timber Harvesting Practices Regulation Section 11: Yarding and skidding. [P, S]

Objective: A person carrying out harvesting must not yard or skid timber through a stream unless it is authorized in a silviculture prescription or logging plan, it is authorized by the district manager if no plan exists or a FSZ is involved.

Actual Outcome: Although no DEO approval is required for yarding through a FSZ, MOF district managers are sensitive to the issue and are not authorizing it.

Comments: No Comments given.

18. Forest Practices Code Timber Harvesting Practices Regulation Section 20: Stream bank stability. [P, S]

Objective: A person carrying out harvesting or stream cleaning must not remove stable natural material or a root system unless authorized by the DEO.

Actual Outcome: Some instances of overzealous stream cleaning.

Comments: No Comments given.

19. Forest Practices Code Timber Harvesting Practices Regulation Section 21(2):
Temporary stream crossings. [P, S]

Objective: A person carrying out harvesting must locate, construct and use a temporary stream crossing in a manner that protects the stream channel and bank adjacent to the crossing, and mitigates disturbance at the crossing.

Actual Outcome: Regulation working well.

Comments: No Comments given.

20. Forest Practices Code Timber Harvesting Practices Regulation Section 22: Retention of streamside trees. [P, S]

Objective: A person who harvests timber adjacent to an S4, S5 or S6 stream that is a direct tributary to an S1, S2 or S3 stream and has trees that provide bank or channel stability, must retain a sufficient number to maintain that stability.

Actual Outcome: There is a continuing issue of professional differences of opinion regarding the windfirmness of trees to be left along small streams with no reserve zones.

Comments: No Comments given.

21. Forest Practices Code Timber Harvesting Practices Regulation Section 23: Slash and debris. [P, S]

Objective: A person carrying out harvesting must not deposit slash or debris capable of damaging fish habitat into a lake, wetland, stream, etc.

Actual Outcome: As most slash or debris is capable of damaging fish habitat and licensees do not want to take the risk, the regulation is discouraging such activity.

Comments: The wording of this regulation is similar to a previous section of *the Fisheries Act* which was challenged and struck down in court as unconstitutional. This is an example of the provincial regime being able to regulate an activity that the *Fisheries Act* can only address indirectly.

22. Private Land Forest Practices Regulation (Draft) Section 9: Timber harvesting near streams. [P, S]

Objective: An owner of identified land must ensure that harvesting, silviculture or road construction do not damage or destabilize stream channels, banks or gully sidewalls; soil erosion into streams is minimized; and accumulations of woody debris or slash do not result in harm to fish or fish habitat.

Actual Outcome: The enabling legislation (*Forest Land Reserve Amendment Act*) received Royal Assent in July 1999 but the regulation is not yet in force.

Comments: Note the difference between the private land regulation (slash must cause actual harm) and the FPC (slash capable of causing harm—see item #20, above).

23. Private Land Forest Practices Regulation (Draft) Section 14: Timber harvesting near streams. [P, S]

Objective: An owner of identified land who carries out cross-stream yarding across a fish stream must ensure that the timber is suspended over the stream and the yarding does not result in damage to the streambank or bed, or the accumulation of woody debris or slash that causes damage to fish or fish habitat.

Actual Outcome: The enabling legislation (*Forest Land Reserve Amendment Act*) received Royal Assent in July 1999 but the regulation is not yet in force.

Comments: The private land regulation requires no pre-approvals for cross-stream yarding, unlike the FPC (see #16).

24. *Water Act* Section 40: Debris into stream. [P, S]

Objective: A person must not introduce debris (defined as clay, silt, sand, rock or construction/demolition material) into a stream if, as a result, harm is caused to the stream or fish habitat.

Actual Outcome: Section not yet in force.

Comments: (a) An addition to the *Water Act* brought in as a consequential amendment to the *Fish Protection Act*;
(b) the deposit of debris is tied to stream damage; it is not an offence in itself, as it is in the FPC.

25. Fisheries Renewal BC: Salmonid Renewal Program. [P, D]

Objective: Includes a habitat restoration component that is delivered through partnerships with local groups.

Actual Outcome: In the first full year of operations 53 km of stream habitat were restored.

Comments: Restoration work is concentrated on the stream channel itself.

26. Forestry Renewal BC: Watershed Restoration Program. [P, D]

Objective: Accelerates the recovery of watersheds that have been affected by forest harvesting and helps to reverse deterioration with its associated harmful impacts on fish habitat. Subprograms include the replacement of lost channel structuring elements to increase the amount and quality of fish habitat.

Actual Outcome: In the 1998/99 fiscal year 222 km of stream habitat were restored.

Comments: Restoration work includes a major element of upslope activity (slope stabilization) and road rehabilitation as well as instream work. Over the next five years, Forest Renewal plans to complete restoration of 130 (20 per cent) of the highest-priority watersheds.

27. Forestry Renewal BC: Bridge Replacement Program. [P, D]

Objective: Rehabilitates or replaces bridges on Forest Service Roads which represent a threat to stream habitat because of their state of deterioration.

Actual Outcome: No Outcome stated.

Comments: No Comments given.

28. Stream Crossing Guidelines. [J, D]

Objective: Provide recommendations to minimize fish habitat damage during the installation of bridges, fords, culverts, causeways, pipelines.

Actual Outcome: No Outcome stated.

Comments: (a) Among the key guides used by agency staff and proponents are: Environmental Objectives and Procedures for Water Crossings (MELP); Stream

Crossing Guidebook for Fish Streams (Forest Practices Code); and A Decision Framework for Pipeline Watercourse Crossings;

(b) measures for instream work including stream crossings are now being specified by each MELP region (in consultation with DFO) under their authority as Designated Environmental Officials for certain sections of the Forest Practices Code.

29. *Wildlife Act* Section 7(1): harm to habitat. [P, S]

Objective: A person commits an offence if the person damages wildlife habitat (including fish) or aquatic plant habitat in a wildlife management area (WMA). (Section 4 of the *Act* gives the minister power to establish WMA's).

Actual Outcome: To date 19 WMA's have been established; none specifically for fish but approximately 10 of the 19 have major fish habitat components such as Boundary Bay, the Englishman River estuary and the Columbia River wetlands.

Comments: (a) Consequential amendment under the *Fish Protection Act* added aquatic plant habitat;
(b) similar to the *Fisheries Act* in that harm must be proven in court;
(c) applies to all fish not only those supporting a fishery.

30. Land Development Guidelines for the Protection of Aquatic Habitat. [J, D]

Objective: Contain recommendations for the conduct of instream work, within the allowable timing windows.

Actual Outcome: No Outcome stated.

Comments: No Comments given.

Table 5.5 : Tools for Managing Fish Habitat: *Protection of Riparian Areas*.

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. *Fisheries Act* Section 35: Harmful alteration, etc. of fish habitat. [F, S]

Objective: Prevention of physical damage to fish habitat.

The definition of fish habitat in the *Act* includes food supply areas on which fish depend directly or indirectly. Riparian areas have been acknowledged by the courts as being included in this definition.

Actual Outcome: A very powerful section of the *Act* which forms the basis of DFO's No Net Loss Policy. However, its application to riparian areas has been mainly indirect, via guidelines. For instance DFO has not generally used this section to ensure the preservation of wide riparian areas during forest harvesting operations.

Comments: In addition to food supply, riparian areas contribute to fish habitat values through shading, bank stability, source of large organic debris, and buffer zones. DFO has not specified minimum widths for riparian leave strips in regulations but relies on non-mandatory guidelines for urban areas (see #7 below): 15m in residential, 30m in industrial zones. In the past DFO was also a signatory to joint guidelines for leave strips for forest harvesting operations (10 to 30m) but, with the advent of the Forest Practices Code, DFO has relinquished this function to the Province

2. Forest Practices Code Operational Planning Regulation Part 8: Riparian Management Areas. [P, S]

Objective: Establishes minimum widths for riparian areas (comprising reserve and management zones) for streams (six classes), wetlands (five classes) and lakes (four classes). Reserve zones (where cutting of trees is highly restricted) are specified for all fish streams at least 1.5m wide. The district manager requires the approval of the DEO to vary the specified widths. Logging plans and silvicultural prescriptions must identify the classes of streams, etc. in the relevant area.

Actual Outcome: A Forest Practices Board audit (Forest Planning and Practices in Coastal Stream Areas: June 1998) indicated that riparian protection for larger fish streams was high, a marked improvement over the pre-code situation. However, compliance with the requirements for fish streams between 1.5m and 5m wide was only 65%, due mainly to misclassification of streams.

Comments: FPC does not apply to private forest lands (see #7 and #8 below).

3. Forest Practices Code Timber Harvesting Practices Regulation Section 10: Felling adjacent to streams, etc. [P, S]

Objective: Trees must not be harvested from a riparian reserve zone except under specific conditions approved by the MOF district manager and/or the DEO.

Actual Outcome: Except for the issues noted above, riparian reserve zones are being well protected.

Comment: Riparian management zones are more problematic, however. Often harvesting is carried from areas with little consideration for the potential wind-throw danger to the reserve zone and, as licensees set their own riparian management objectives (Operational Planning regulation 18(1)(v)), often the best management practices as specified in the Riparian Management Area Guidebook are not obtained.

4. Forest Practices Code Timber Harvesting Practices Regulation Section 22: Retention of streamside trees. [P, S]

Objective: A person who harvests trees in a riparian management zone for an S4, S5 or S6 stream must retain a sufficient number of those streamside trees whose crowns provide shade to the stream to prevent the stream temperature from increasing if the stream is a direct tributary to an S1-S4 stream that is a known temperature sensitive stream.

Actual Outcome: As an alternative to informal negotiated agreements between government agencies and licensees regarding the number of trees to be left along temperature sensitive streams, consideration is being given in some areas to identifying them as "known" items and which must then be given consideration by licensees in their forest development plans.

Comment: In addition to identification of temperature sensitive streams as "known" items, recommended management prescriptions would be provided as to numbers of trees, harvesting patterns, etc. required to maintain temperature regimes. This would be done initially in areas where baseline monitoring is under way to provide a standard against which the efficacy of the recommendations (if implemented by licensees) may be assessed.

5. Forest Practices Code Forest Road Regulation Part 2: Road Layout and Design. [P, S]

Objective: A road must be located outside a riparian management area unless no other practicable option exists.

Actual Outcome: Regulation is being implemented in the main; however, there has been at least one case of major contravention where the alternative option was not considered.

Comment: No comment.

6. Forest Practices Code Riparian Management Area Guidebook. [P, S]

Objective: Detailed recommendations (but once included in a plan, prescription or contract they become legally enforceable) for forest practices, including range use, within riparian management areas.

Actual Outcome: A Forest Practices Board audit (Forest Planning and Practices in Coastal Stream Areas: June 1998) concluded that the recommended practices are generally being used, except for the retention of vegetation along stream banks and the retention of vegetation in the riparian management zone for small streams. When they are used, the recommended practices are effective in minimizing impacts on riparian areas.

Comment: (a) No reserve zones are specified for small fish streams (S4's). In some areas of the province this has led to clearcutting of riparian trees with resulting temperature fluctuations in the stream that have caused rearing fish to abandon their habitat. Some district managers have recognized the problem and have issued a policy requiring a 10 m reserve zone on S4 streams (best management practice as specified in the Guidebook for interior streams). There is also an issue regarding wind-firmness of the trees along S4 streams;

(b) riparian areas associated with range use do not have specified widths but are defined in the Operational Planning Regulation as areas that contain vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas. The riparian objectives are the same as for other forest practices, but their achievement is based on a more subjective assessment of "properly functioning condition" rather than specific quantitative targets as is the case for forest harvesting.

7. Private Land Forest Practices Regulation (Draft) Sections 11 and 12: Retention of trees adjacent to streams. [P, S]

Objective: Specifies the number and size of trees that must be left adjacent to streams either 1.5 m to 3 m or 3 m and greater in width.

Actual Outcome: The enabling legislation (Forest Land Reserve Amendment Act) received Royal Assent in July 1999 but the regulation is not yet in force.

Comment: (a) No riparian reserve zones at all and no riparian management areas for streams less than 1.5 m are specified in the regulation. Thus protection for fish streams will be significantly less than for such streams covered by the FPC;
(b) Designated Environmental Officials can allow the removal of the specified leave trees if the owner agrees to place coniferous logs in the stream channel. This ignores the long-term need for steady-rate introduction of coarse woody debris and all other attributes which riparian vegetation provides;
(c) the effectiveness of the regulation in terms of the usefulness of the specified numbers of trees to be left and their susceptibility to windthrow, should be assessed as soon as possible.

8. Private Land Forest Practices Regulation (Draft) Section 13: Location of roads. [P, S]

Objective: An owner of identified land must not construct a road wider than 5.5. m within 30 m of a fish stream.

Actual Outcome: The enabling legislation (Forest Land Reserve Amendment Act) received Royal Assent in July 1999 but the regulation is not yet in force.

Comment: No restrictions on bladed or excavated trails in riparian areas.

9. Land Development Guidelines for the Protection of Aquatic Habitat. [J, D]

Objective: Recommendations for riparian leave strips (15m to 30m wide) along urban streams. Not enforceable unless incorporated into statutory instruments.

Actual Outcome: Several municipalities use the guidelines in the review of development proposals; only when a development cannot meet the guidelines is a referral made to the fisheries agencies for consideration of a variance. Other municipalities, with less staff or a less environmentally friendly outlook, let the fisheries agencies review all proposals.

Comment: Guidelines have no direct legal force. Failure to comply with the minimum riparian zone widths would not automatically result in a breach of the *Fisheries Act*. However, the guidelines to establish the standard of care required of land developers, and several successful prosecutions have demonstrated that the removal of streamside vegetation from riparian zones can expose a developer to liability under Section 35.

10. *Fish Protection Act* Section 12: Provincial directives on streamside protection. [P, D]

Objective: After consultation with the Union of British Columbia Municipalities the Lieutenant Governor in Council may establish policy directives regarding the

protection of riparian areas. If a directive is issued, a municipal government must include in its zoning and rural land use bylaws riparian area protection provisions in accordance with the directive, or ensure that its bylaws and permits provide a level of protection that, in the opinion of the local government, is comparable to or exceeds the directive.

Actual Outcome: A regulation to provide this section with practical application is under development and was recently pilot-tested in the Lower Mainland, Vancouver Island and the Southern Interior.

Comment: (a) The provision to allow local governments to decide if their bylaws and permits are equivalent to the provincial directive is of concern: development-oriented councils are not likely to make unbiased decisions in favour of fish habitat preservation;
(b) the final wording of the regulation and how local governments implement it will determine whether Section 12 will have a meaningful impact on the preservation of riparian zones in urban areas, a challenge which has proven to be extremely difficult in the face of private property rights and real estate development pressures.

11. *Land Title Act* Section 219: Registration of covenants as to use and alienation. [P, D]

Objective: A covenant may be registered against the title to a piece of land for the protection, preservation, conservation, maintenance, enhancement or restoration of environmental values associated with the land.

Actual Outcome: Covenants have been used as a tool to try to protect riparian leave zones on private property in urban areas, particularly in the lower mainland. However, a survey conducted under the Fraser River Action Plan in Surrey in 1995 found that 75% of the areas covered by covenants had been encroached upon, indicating that they are a relatively ineffective tool.

Comment: Section 219 now permits conservation groups to hold covenants but this appears to be practical only where large tracts of private land are concerned.

12. *Municipal Act* Section 343 and 845: Exemptions for riparian property. [P, D]

Objective: An owner of riparian property that is under covenant to a local government may be exempted, by bylaw, from the payment of property tax.

Actual Outcome: None stated.

Comment: None stated.

13. Guidance for protection of riparian zones in planning and development activities: (a) Stream Stewardship: A Guide for Planners and Developers; (b) Community Greenways; (c) Stewardship Bylaws; d) Access Near Aquatic Areas. [J, D]

Objective: Four publications which provide guidance to municipalities, developers and the public on the protection of natural values, including fish habitat, during urban planning and development. Riparian zones are key elements in all four.

Actual Outcome: The guides have been used in pilot projects in some more progressive municipalities such as the Regional District of Comox-Strathcona with a high degree of success.

Comment: To date, not many municipalities have embraced the stewardship concept or formally adopted riparian protection bylaws. However, initiatives such as the USHP, the *Fish Protection Act* Provincial Directive and DFO's recently announced Habitat Conservation and Stewardship Program should steadily improve the situation.

14. Watershed Stewardship: A Guide for Agriculture. [J, D]

Objective: Recommendations for environmentally sound practices including the preservation of riparian areas (15m) from grazing and damage from livestock watering.

Actual Outcome: No statutory requirements for riparian area protection; relies on the co-operation of individual ranchers and farmers.

15. *Mines Act* Health, Safety and Reclamation Code Part 11. [P, S]

Objective: Standards for mineral exploration and development including setback distances from streams, wetlands and lakes to protect riparian areas from exploration trails and roads (11.5.1.3) and drilling operations (11.7.2.4).

Actual Outcome: Limited level of exploration and development activity currently and little monitoring carried out by MELP/DFO staff, but no major concerns evident, except for possible violations associated with the construction of a powerline for Kemess mine. Currently under investigation by the Forest Practices Board.

Comment: (a) The riparian zone widths are taken from the FPC: reserve zone widths for drilling and overall management area widths for exploration. The width of riparian zones may be modified by the chief inspector for exploration access, and the district inspector with the agreement of the DEO for drilling sites;

(b) the current standards for placer mining (basically a 10 m reserve zone) are less than those specified in the FPC which, in theory, should apply in full. No resolution of this

issue has yet been reached but urgency has decreased recently with the falling price of gold having a major impact on the amount of placer activity taking place. However, it remains an outstanding issue which should be addressed if consistency between the treatment of various resource development sectors is to be achieved.

16. Oil and Gas Handbook Section 4: Geophysical Exploration (under Part 4 of the Petroleum and Natural Gas Act), Section 5: Roads (under Section 7 of the Petroleum and Natural Gas Act), and Section 8: Pipelines (under the Pipeline Act). [P, S]

Objective: Each of these sections references the stream classifications and riparian width requirements of the Forest Practices Code. If timber cutting is required for exploration (4.1.4.4), or road (5.1.3.4) or pipeline (8.1.3.6) construction, the FPC riparian management area widths must be adhered to.

Actual Outcome: The rules are written for forest harvesting operations and oil and gas companies have some difficulty in seeing their relevance to their own operations. Limited monitoring in northeastern BC makes it difficult to assess the effectiveness of the provisions.

Comment: The Oil and Gas Commission has been established as the single window agency for exploration permits with transferred staff from line ministries. Its development-oriented mandate, short time limits for approvals and the limited time available to environmental staff to carry out field inspections, are not conducive to adequate protection of fish habitat.

Table 5.6: Tools for Managing Fish Habitat: *Protection from Indirect Impacts.*

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. *Fisheries Act* Sections 35(1) and 35(2): Harmful alteration, etc. of fish habitat. [F, S]

Objective: (1) No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat. Designed to prevent physical damage to fish habitat including spawning, rearing, food supply and migration areas (direct and indirect dependence by fish).

(2) No person contravenes subsection (1) by causing the harmful alteration, disruption or destruction of fish habitat under any conditions authorized by the Minister or by regulation.

Actual Outcome: DFO has used the powers under these sections to "encourage" proponents to implement good environmental management practices in upslope areas in order to prevent impacts such as sediment and debris eventually being carried into fish bearing watercourses. Many joint DFO-MELP guidelines contain recommendations for slope stabilization and the control of sedimentation.

Comments: (a) These sections cannot be used to directly control activities in the upland area: the rarely used powers under Section 37 would be required for this. Thus DFO relies on the co-operation of proponents to comply with good management practices. If the proponent is uncooperative DFO is obliged to wait until habitat damage occurs before taking action to stop the offending activity and lay charges. In such a situation DFO would have to prove in court that harmful alteration had taken place; although there might be a successful prosecution, the habitat would have been damaged and the objective of subsection (1) would not have been achieved;

(b) it is very difficult to apply this section to forest harvesting rate of cut/sensitive slope situations (cf. the Riley Creek incident).

2. Forest Practices Code Operational Planning Regulation Section 14: Watershed assessments. [P, D]

Objective: Before making a forest development plan available for review, a person must have carried out a watershed assessment within the previous three years for a watershed that has significant downstream fisheries values as determined jointly by the district manager and the DEO.

Actual Outcome: Jointly agreed upon lists of watersheds have not been developed in every region.

Comments: (a) Opportunity exists for development and submission of joint MELP/DFO lists together with requests for assessments and follow-up; (b) no assessment is necessary if the district manager is of the opinion that the proposed harvesting or road construction will not affect the watershed in a significant way. This begs the question of how the district manager defines "significant" and leaves much to his discretion. (Note: this is similar to the current controversy between MOF, MELP and the Forest Practices Board regarding the definition of the word "adequate" in Section 41 of the *FPC Act*. This is important as it defines how far a district manager can go in setting aside key FPC provisions).

3. Forest Practices Code Coastal and Interior Watershed Assessment Procedure (WAP) Guidebooks. [P, D]

Objective: If requested by MELP and MOF the procedure is carried out to assess the potential for changes to peak stream flows, landslides, accelerated surface erosion, and changes to the channel riparian buffer.

Actual Outcome: Exercises carried out to date have resulted in few major changes to harvesting plans. It appears that the wide range of professional opinion can lead to several interpretations of the same data resulting in major problems in reaching consensus.

Comments: (a) The guidebooks have recently been rewritten so that the results of the exercise do not affect rate of cut targets. In practice the exercises identify problem areas but, unless demanded by the MOF district manager, do not result in reductions in harvesting rate or prevent the construction of new roads. In most cases, therefore, all that changes is that the area is identified for remedial action by FRBC. Thus the value of WAP's, in general, is being questioned by MELP staff. However, in some areas of the province district managers have listened to MELP's concerns and have restricted further harvesting until issues identified in WAP's have been addressed by the licensees. In addition, in areas of the province that are prone to landslides (e.g. QCI), WAP's are considered by DFO staff to be key assessments and considerable effort is devoted to their development and review;

(b) WAP's do offer a mechanism to assess potential rate-of-cut problems with their associated indirect impacts on streams and to modify harvesting plans accordingly. The *Fisheries Act* is not a viable tool for such an undertaking although, in theory, the results of a WAP could be used as the basis of a §37 federal order.

4. Forest Practices Code Operational Planning Regulation Sections 16 and 17: Terrain stability field assessments. [P, D]

Objective: Describes the conditions under which a stability assessment must be carried out before a cutting permit may be issued. Requires pre-identification in a Forest

Development Plan as having a high likelihood of landslides, unstable terrain, or a slope greater than 60%, unless the cutblock is in an area that meets prescribed requirements when a lower threshold applies, including if identified by the DEO.

Actual Outcome: No areas meeting prescribed requirements yet established. Assessments now included in Silviculture Prescriptions which are not automatically referred to environmental agencies; they must request them from MOF or the licensee.

Comments: Effectiveness of the process is variable depending on the experience and professional competence of the practitioners. Fisheries agencies do not have much involvement in the process.

5. Forest Practices Code Mapping and Assessing Terrain Stability Guidebook. [P, D]

Objective: Provides a practical evaluation procedure for the assessment with a view to minimizing the frequency and magnitude of landslides with their potential for reaching streams and damaging fish habitat.

Actual Outcome: None stated.

Comments: Effectiveness of the process is variable depending on the experience and professional competence of the practitioners. Fisheries agencies do not have much involvement in the process.

6. Forest Practices Code Gully Assessment Procedure Guidebook. ("Coast" only). [P, D]

Objective: Direction regarding the most critical factors to be considered when evaluating gullies (S5 or S6) for a silviculture prescription or post-harvest rehabilitation. Provides management goals and strategies to prevent debris flows with their potential for reaching fish bearing streams and damaging habitat.

Actual Outcome: Assessments now included in Silviculture Prescriptions which are not automatically referred to environmental agencies; they must request them from MOF or the licensee.

Comments: Effectiveness of the process is variable depending on the experience and professional competence of the practitioners. Fisheries agencies do not have much involvement in the process.

7. Forest Practices Code Forest Road Regulation Part 2: Layout and Design. [P, D]

Objective: Lists the conditions that trigger a terrain stability field assessment (4.5) and states that the road design must address measures to maintain slope stability if the road will cross areas with a moderate or high likelihood of landslides (8.1.g).

Actual Outcome: None stated.

Comments: None stated.

8. Forestry Renewal: Watershed Restoration Program. [P, D]

Objective: Accelerates the recovery of watersheds that have been affected by forest harvesting. Subprograms include deactivation and rehabilitation of roads, and the stabilization of slopes and gullies.

Actual Outcome: Reduction in the generation and delivery of sediments from hillslopes to streams, and re-establishment of natural drainage patterns. An estimated 2,800 watersheds are in need of repair, with about 725 classified as high priority and 425 as medium priority. One-hundred and fifty (150) watersheds were restored over the five year period from 1994 to 1999 and some work done on another 320.

Comments: Over the next five years, Forest Renewal plans to complete restoration of 130 (20 per cent) of the highest-priority watersheds.

Table 5.7. Tools for Managing Fish Habitat: *Protection of Flow Regimes.*

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. *Fisheries Act* (Canada) Section 22(1): Water for the descent of fish. [F, D—M]

Objective: Sufficient flow of water over a dam spillway to permit the safe descent of downstream migrant fish.

Actual Outcome: No actual orders have been issued; rather DFO has relied on negotiations with BC Hydro to establish the required quantities and timing of flows.

Comments: No new dams have been built in BC since the 1970's. Several major dams were built by BC Hydro at that time on the Peace and Columbia River drainages but, due to a long-standing administrative arrangement between the federal and provincial governments (since overturned by the courts), DFO was not involved in their review and approval.

2. *Fisheries Act* (Canada) Section 22(3): Sufficient water for river bed below dam. [F, S]

Objective: Ensure sufficient water for spawning and to prevent subsequent desiccation/freezing of incubating eggs.

Actual Outcome: This section has rarely been used due to reluctance on the part of DFO to challenge provincial resource allocation decisions. However, it was the basis of a court case in the 1980's regarding flows in the Nechako River associated with the Kemano Completion Project, and has been used recently on the Cheakamus River to specify a flow regime below the hydro dam.

Comments: (a) There is some debate regarding the constitutionality of this federal statute. It was challenged in court by Alcan and the Province of BC in the 1980's but an out-of-court settlement left the issue unresolved;
(b) there is no universally accepted methodology for establishing the minimum flows required;
(c) the wording of the section is restricted to spawning grounds and leaves rearing areas, etc. vulnerable: amendments to the *Fisheries Act* to correct this omission were proposed in 1996, but not passed into law;
(d) The Water Use Planning Process has now established a co-operative mechanism for resolving issues concerned with fish flow releases. It appears to be very successful from a fisheries perspective.

3. *Fisheries Act* (BC) Part 28: Dam or hydraulic project. [P, S]

Objective: Adequate water for the migration of fish.

Actual Outcome: Only applies to streams designated by regulation and no regulation has been developed.

Comments: The *Act* was passed in 1979 and was, therefore, not in force when all the major dams in BC were constructed. Its value has never been tested.

4. *Fish Protection Act* Section 4: No new dams on protected rivers. [P, S]

Objective: Bans dam construction on the mainstems of 17 major rivers.

Actual Outcome: No immediate impact as no feasibility studies for new dams have been undertaken for many years.

Comments: No Comments.

5. *Fish Protection Act* Section 5: Fish habitat considerations in water licensing decisions. [P, D]

Objective: Impacts on fish habitat may be considered by the water manager when making a decision on a water licence application. Section 13(2) allows for a regulation specifying for which streams the water manager must consider fish and fish habitat.

Actual Outcome: Section not yet in force; thus no outcomes are available for assessment.

Comments: (a) This provision goes part of the way to meeting a long-standing concern with the *Water Act*, i.e. that fish have not been historically recognised as beneficial users of water. However, except for the streams to be listed by regulation, the decision on whether or not to consider potential fish habitat impacts remains the responsibility of the non-fisheries manager;

(b) a regulation is currently under development to list the streams where fish habitat considerations must be taken into account and to provide criteria upon which water managers will base their decisions. Depending on the exact wording of the regulation, it is possible that, even in the case of the listed streams, although the manager will be obligated to consider fish and habitat, he or she may not necessarily have to take any action following that consideration. This will be a critical regulation which will determine whether or not the *Fish Protection Act* will have a major impact on the preservation of flows for fish.

6. *Fish Protection Act* Section 6: Designation of sensitive streams for fish sustainability. [P, R]

Objective: Streams may be named in a regulation as being in particular need of protection due to inadequate flow. New licences may only be approved if they will not have a significant impact on fish. A recovery plan may also be ordered by the Minister (Section 7).

Actual Outcome: No regulation has yet been approved.

Comments: (a) This represents the highest level of protection under the *Act* where fish concerns must be addressed before any further water withdrawals are permitted;
(b) However, of the more than 200 watersheds identified by fisheries agencies as being stressed through shortage of water, only 15 streams have so far been identified for designation under this section. The short list includes only those that have an immediate need for additional protection and whose designation would have minimal impact on other resource users, i.e. difficult inter-resource allocation decisions are being postponed, possibly at the expense of the fish.

7. *Fish Protection Act* Section 8: Streamflow protection licences. [P, D]

Objective: A licence may be issued to a community-based organization for maintenance of instream flow rather than the usual case of withdrawal from the stream.

Actual Outcome: Section not yet in force.

Comments: (a) Recognises that water in a stream has a beneficial use in place;
(b) process to obtain such a licence is cumbersome, requiring final approval by the Lieutenant Governor in Council;
(c) a decision to issue a licence under this section is not appealable under the *Water Act*; however, it may be cancelled by the minister if considered to be in the public interest.

8. *Fish Protection Act* Section 9: Reduction in case of drought. [P, D—M]

Objective: The Minister may order existing licence holders to reduce their diversion of water if fish survival is threatened.

Actual Outcome: No experience of this circumstance yet as the section is not in force.

Comments: This will be a critical issue at times in the Southern Interior and on the East Coast of Vancouver Island. The conflicting demands of fish protection and agricultural irrigation will provide a severe test of this new provision and the political will required to implement it.

9. *Water Act* Regulation Part 7: Changes in and about a stream. [P, S]

Objective: A person making a change in or about a stream under the conditions of the regulation (i.e. without an approval or licence) must comply with the conditions specified by the habitat officer with regard to, among other things, minimum instream flow while the change is being made (§ 42).

Actual Outcome: Condition regarding the specification of minimum flow is not being used due to the difficulty of monitoring and lack of staff to carry it out.

Comments: No Comments.

10. *Municipal Act* Section 551. [P, D]

Objective: A local government council may, by bylaw, prohibit a person from polluting or obstructing or impeding the flow of a stream, whether or not it is located on private property.

Actual Outcome: None stated.

Comments: No Comments.

11. *Water Protection Act*. [P, S]

Objective: Prohibits water removal from BC and large scale transfers of water between major watersheds.

Actual Outcome: No removal or transfer has been proposed since the *Act* came into force.

Comments: (a) The *Water Protection Act* has the potential to prevent major impacts on the fisheries resource through preserving instream flow in critical reaches such as headwater reaches and estuaries, and preventing the transfer of pathogens between watersheds;

(b) removal of water from BC for export to another country could be considered to fall within federal jurisdiction and the federal government is currently considering its own legislation on the topic; there is also some doubt as to whether water is covered under

the Free Trade Agreement. Thus some sections of the *Water Protection Act* are liable to be challenged in the courts (such a challenge is, in fact, currently in progress).

12. *International River Improvements Act*. [F, S]

Objective: No person shall construct, operate or maintain an international river improvement (dam, obstruction, canal, reservoir to increase, decrease or alter the natural flow) without a licence.

Actual Outcome: None stated.

Comments: (a) Requirement is for a licence rather than an outright ban as under the provincial *Fish Protection Act*;
(b) several international rivers are included in the list of streams where dams are prohibited under the *Fish Protection Act*;
(c) trigger for assessment under CEAA.

13. *Land Development Guidelines for the Protection of Aquatic Habitat*. [J, D]

Objective: Contains recommendations for the design of urban developments to limit the post-development 1:2 year storm offsite runoff rate to the pre-development 1:2 year rate, and to maintain the natural pre-development flow pattern.

Actual Outcome: Little monitoring has been carried out to determine whether the recommendations are being implemented and, if so, whether they meet the objective as specified.

Comments: Increase in peak runoff flows due to installation of large areas of impervious surfacing during development is one of the major reasons for fish habitat degradation in urban areas. It is also one of the most difficult areas to control on a long term basis. In some cases of large developments the requirement for runoff rate control is included in the *Fisheries Act* authorization.

14. *Municipal Act* Section 907: Runoff control requirement. [P, D]

Objective: A local government may, by bylaw, establish the maximum percentage of the area of land that can be covered by impermeable material.

Actual Outcome: None stated.

Comments: The rationale for this is to prevent adverse hydrological and water quality impacts; although fish habitat protection is not the primary rationale, benefits obviously accrue to fish habitat if a local government takes steps to control runoff.

Table 5.8. Tools for Managing Fish Habitat: *Protection of Water Quality*

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. *Fisheries Act* Section 36(3): Deposit of a deleterious substance. [F, S]

Objective: No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place where it may enter such water.

Actual Outcome: The general provisions are used as the primary pollution control instrument in Canada.

Comments: The Department of Environment (DOE) has lead administrative authority for the pollution control sections of the *Fisheries Act* and associated regulations under the terms of a 1985 Memorandum of Understanding. The Minister of Fisheries & Oceans is ultimately accountable for fisheries and the *Fisheries Act*. A 1987 Regional Working Agreement between the two departments provides the detailed co-operative arrangements. DOE, whose staff are primarily located in Vancouver, focuses on provision of technical expertise and advice provision on effluent treatment technology and environmental effects monitoring for permitted discharges, and acts as a single window for provincial agencies and industry on pollution matters. DFO, which has a decentralized organization, deals with deposits of sediments from land clearing, other deleterious deposits such as spills, particularly in remote areas, and fish kills, sometimes jointly with DOE. DFO provides expert advice on the protection requirements for fisheries and has world-class scientific capability along with a large cadre of enforcement officers.

2. *Fisheries Act*: Pulp and Paper Effluent Regulation (PPER). [F, S]

Objective: Defines as deleterious substances acutely lethal effluent, BOD matter and suspended solids, and establishes the maximum levels for these parameters in effluents.

Actual Outcome: PPER is used by the federal government to establish national baseline standards for effluent quality; the provinces may set stricter limits.

Comments: Discharge effluent monitoring is mandatory. Enforcement is conducted by DOE. The provincial *Waste Management Act* permit process is used to deliver the federal effluent requirements. Environmental-effects monitoring is required of all mills in Canada pursuant to PPER. A renewed Canada-BC inspection and work-sharing agreement is currently being negotiated.

3. *Fisheries Act*: Metal Mine Liquid Effluent Regulation (MMLER). [F, S]

Objective: Applies to new, expanded and reopened mines other than gold mines. Defines as deleterious substances certain metals, total suspended matter and radium, and establishes the maximum levels for these parameters in effluents. The regulation allows (with ministerial approval and an environmental assessment under CEAA) the designation of tailings impoundment areas (artificial pond or natural lake) for the deposition of untreated tailings.

Actual Outcome: MMLER used by the federal government to establish national baseline standards for effluent quality; the provinces may set stricter limits.

Comments: (a) The regulation has been in effect since 1977, generally does not reflect current treatment technology, and is in the process of revision. Revised regulations are expected to be gazetted by December 31, 1999 and are expected to include gold mines, and contain provisions for regulating acute toxicity and environmental effects monitoring. The *Waste Management Act* permit process is used to deliver the federal effluent requirements;

(b) gold mines are presently subject to the general provisions of the *Fisheries Act*.

4. *Fisheries Act*: other miscellaneous industry-specific effluent regulations. [F, S]

Objective: To manage discharges from chlor-alkali plants, petroleum refineries, meat and poultry products processing, and potato processing.

Actual Outcome: No longer in significant use.

Comments: These regulations are decades old and outdated; the *Waste Management Act* is the primary regulatory tool for permitted discharges from these industries in BC.

5. *Waste Management Act* Section 3: Waste disposal. [P, S]

Objective: A person must not, in the course of conducting an industry, trade or business, introduce or cause or allow waste to be introduced into the environment unless authorized under, and in accordance with the conditions specified in, a permit or approval (Sections 10 and 11).

Actual Outcome: Effluent discharges are managed under a permit system administered by BC. Effluent quality characteristics are set according to industry sector objectives. Permittees are required to monitor a predetermined set of effluent characteristics and may be required to conduct limited receiving water monitoring.

Comments: (a) Unlike the *Fisheries Act*, the *Waste Management Act* calls for a site-specific permit before an effluent may be discharged from any industrial/municipal facility. This makes it easier in theory to enforce as the allowable levels are incorporated into the permit and it is an offence to exceed those levels. However the BC Supreme Court's decision in *R. v. Alcan* placed the onus on the Crown to show harm before a violation can be proven under the *Waste Management Act*. Under the *Fisheries Act*, unless a specific regulation has been developed, the prosecution has to establish in court that the deposit was deleterious.

(b) There are some discrepancies between the two regulatory regimes in that: i) the province may not necessarily stipulate a non-toxic discharge or even the measurement of toxicity; and ii) the province uses the concept of an initial dilution zone wherein water quality objectives do not apply. The *Fisheries Act* general provisions or regulation limits apply to the actual deposit, not the receiving water after mixing has taken place.

6. *Waste Management Act* Pulp Mill and Pulp and Paper Mill Liquid Effluent Control Regulation. [P, S]

Objective: Establishes discharge levels and compliance schedules for acute toxicity, BOD, total suspended solids, and adsorbable organo-halides (AOX) for 20 mills.

Actual Outcome: There is still debate as to whether the AOX standards are scientifically supportable and whether the industry can meet them in an economic manner.

Comments: The regulation specifies that any mill using chlorine must eliminate all AOX produced in the bleaching process by the end of the year 2002. DOE and DFO have adopted the approach of concentrating on dioxins and furans (*Canadian Environmental Protection Act* regulations) rather than all AOX compounds; significant progress has been made given that 600 of the 1200 sq. km originally closed to crab harvesting have been reopened, and re-openings are expected to continue.

7. *Waste Management Act* Municipal Sewage Regulation. [P, S]

Objective: Establishes effluent quality standards for sewage discharges to streams, rivers and estuaries, lakes, and the marine environment. Calls for secondary treatment except primary only for most cases where the daily flow exceeds twice the average dry weather flow.

Actual Outcome: Regulation became effective on July 15, 1999. Current waste management permits apply to existing plants. Municipalities may develop Liquid Waste Management Plans as part of the province's de-permitting initiative.

Comments: (a) Existing permitted dischargers are exempted from the requirement to provide secondary treatment. Such a significant loophole marginalizes the regulation and its role in sewage discharge management for the foreseeable future. The regulation, depending as it does on managerial discretion for existing treatment plant upgrading, could lead to a patchwork approach, and even "pollution havens". The alternate approach of "transitional authorizations" to schedule historic polluters to meet acceptable discharge standards has worked with the *Fisheries Act* PPER; (b) effluent toxicity removal is part of the regulation. However, there are significant regulatory exemptions: where the discharge is diluted to a ratio of 100:1; if reclaimed water is used; and where a provincial manager feels no adverse environmental effects are occurring. Each of these exemptions could lead to violations of the *Fisheries Act*; (c) subsection 10(10) mentions an exemption from the initial dilution zone size limitations when reclaimed water is used for "stream augmentation". The concept of using treated sewage for stream augmentation may be premature given the attention currently being focused on chronic toxicity from endocrine-disrupting compounds in sewage, due to previously-overlooked constituents such as some detergents, hormones and drugs.

8. *Waste Management Act* Contaminated Sites Regulation. [P, S]

Objective: In accordance with §26(1) of the *Act* regarding the subdivision, excavation, development or rezoning of a commercial or industrial site, establishes the criteria for the preparation of a site profile, definition of a contaminated site, and for contaminated site remediation.

Actual Outcome: Contaminated sites are being cleaned up and this is benefiting fish and fish habitat. DFO is actively involved from a policy perspective and on a site-specific basis.

Comments: Contaminated commercial or industrial sites can pose a danger to fish habitat through leaching and runoff. In addition, offsite migration of contaminated groundwater can seriously impact fish and fish habitat. The *Fisheries Act* does not deal directly with remediation of upland contaminated sites, but if a site is a source of fish habitat contamination, the *Act* comes into play.

9. *Waste Management Act* Antisapstain Chemical Waste Control Regulation. [P, S]

Objective: Establishes effluent quality criteria (including removal of acute toxicity) and design and operation requirements for facilities that treat lumber with antisapstain chemicals.

Actual Outcome: Regulation has led to improvements in runoff quality and caused manufacturers to roof storage areas. Amendments to the regulation have been made in the past as new data on toxicity became available.

Comments: This regulation was developed with very significant input from DFO and DOE.

10. *Waste Management Act* Aquaculture Waste Control Regulation. [P, S]

Objective: Provides exemption from the requirement for a waste management permit for smaller operations.

Actual Outcome: An updated version of this regulation reflecting the recent growth in the industry is under development.

Comments: The draft revisions allow an operator to have benthic accumulations of waste feed and faecal material under a net pen. This would likely be in conflict with s 35(1) of the *Fisheries Act*.

11. *Waste Management Act* Agricultural Waste Control Regulation. [P, S]

Objective: Provides exemption from the requirement for a waste management permit for operations conducted in accordance with the Code of Agricultural Practice for Waste Management, April 1, 1992 (attached to the Regulation).

Actual Outcome: There are continuing serious problems in terms of manure management at farms, riparian destruction, and farm development in wetland, floodplain and other unsuitable areas.

Comments: Enforcement of this Regulation is not evident.

12. *Waste Management Act* Spill Reporting Regulation. [P, S]

Objective: In the case of a spill of certain specified substances above specified limits, a person who had possession, charge or control of the substance immediately before its spill shall immediately report the spill to the Provincial Emergency Program.

Actual Outcome: The system works well; industry has a very high compliance level with this regulation. However, there have been some communication problems when spill reports have gone to MELP and have not been passed on to DOE.

Comments: This provincial regulation has broad application; the federal equivalent for spill reporting under the *Fisheries Act* [§38(4)] is only required "in accordance with any regulations applicable thereto". The only such regulations are prescribed in the PPER and thus apply only to pulp and paper mills.

13. *Canadian Environmental Protection Act* (CEPA) Section 12: Priority Substances. [F, S]

Objective: The ministers shall compile a list of substances which should be given priority in assessing whether they are toxic, and then regulated under § 34 of the *Act*. (Cradle-to-grave management).

Actual Outcome: 45 substances are listed in the current schedule attached to the *Act*. Through a Strategic Options Process, regulatory controls can be implemented for chemicals which are "CEPA toxic".

Comments: This is enabling legislation and requires regulations to give it effect. (See entry #15, below).

14. *Canadian Environmental Protection Act* Part IV: Ocean Dumping. [F, S]

Objective: A person may not dump any substance into the sea from a ship, aircraft or platform unless so authorized under a permit. Certain listed substances are totally prohibited. Criteria are included for assessing the degree of risk and the characteristics of dumping sites.

Actual Outcome: A Regional Ocean Dumping Advisory Committee has been established (including provincial representation) to advise DOE on the issuance of permits for specific applications. Disposal at sea is only permitted at designated sites and for substances within specified contamination limits.

Comments: Waste that exceeds the contamination limits can still be considered for ocean disposal through the use of "management techniques or processes" such as confined aquatic disposal. However, bioassay tests would still be required before approval was given and no such permits are currently under consideration in BC.

15. *Canadian Environmental Protection Act* Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations; and Pulp and Paper Mill Defoamer and Wood Chip Regulations. [F, S]

Objective: Regulations applicable to the pulp and paper industry made pursuant to section 34 of CEPA to eliminate the release in effluents of measurable concentrations

of chlorinated dioxins and furans; and to prohibit the manufacture, import, sale or use of defoamers containing precursors of chlorinated dioxins and furans.

Actual Outcome: These regulations have been effective in controlling dioxin and furan discharges from the pulp and paper industry.

Comments: There has been a substantial environmental dividend in the reopening of 600 sq km of contaminated shellfish fisheries.

16. *Canada Shipping Act* Pleasure Craft and Non-Pleasure Craft Sewage Pollution Prevention Regulations. [F, S]

Objective: To prevent the discharge of sewage from vessels into named bodies of water. Any named water body under the Pleasure Craft Regulation automatically becomes named under the Non-Pleasure Craft Regulation.

Actual Outcome: The only bodies of water so far named are Shuswap Lake, Mara Lake and Okanagan Lake.

Comments: The province has submitted a list of additional lakes and sounds for consideration by DFO and the Department of Transport. Until pump-out facilities are in existence near key anchorages, vessels will have to go outside the closed marine area to discharge. Problems have arisen because of concerns from non-pleasure craft operators (tugs and ferries) about lack of consultation; and their inability to hold sewage during the transit of a named marine area. Corridors for non-pleasure craft transit and discharge have been considered but the water quality objectives for shellfish-growing might not be met.

17. *Canada Shipping Act* Oil Pollution Prevention Regulations, Part III: Oil and Oily Mixture Discharges. [F, S]

Objective: No oil or oily mixture shall be discharged from a ship in waters under Canadian jurisdiction unless the discharge originates from machinery spaces and is processed through oil filtering equipment that produces an undiluted effluent that has an oil content of no more than 15 ppm.

Actual Outcome: The regulations are administered by Transport Canada's Marine Safety Branch which carries out any necessary prosecutions. In addition, the Canadian Coast Guard (now part of DFO) has the power to collect evidence for prosecutions, and to direct ships to take action if there has been a pollution incident or there is an imminent threat of one.

Comments: No Comments given.

18. *Pest Control Products Act* Section 5. [F, S]

Objective: No person shall sell in or import into Canada any pest control product unless the product has been registered as prescribed by regulation and conforms to prescribed standards.

Actual Outcome: The administration of this *Act* has been relocated from Agriculture Canada to Health Canada's Pesticide Management Regulatory Agency. This agency reviews new pesticides for use in Canada based on advice from their own scientists and from DOE and DFO.

Comments: Serious differences of opinion currently exist between the Pesticide Management Regulatory Agency and DOE and DFO with regard to how the environmental impact of pesticides should be weighted in the review as opposed to health effects and pesticide efficacy.

19. *Pesticide Control Act* Section 6: Application in accordance with permit or approved plan. [P, S]

Objective: Except as provided by regulation, a person must not apply a pesticide unless in accordance with a permit or approved pest management plan. The administrator may include requirements, restrictions or conditions in a permit.

Actual Outcome: Although not common, Pest Management Plans are intended to incorporate integrated pest management solutions to pest problems, which can mean reduced pesticide use.

Comments: (a) Traditionally, applications for *Pesticide Control Act* permits were referred to DOE and DFO for review and comment. Over the past few years both agencies have set standard environmental protection conditions (see guidelines noted in #21) to protect fish and wildlife. As a result, only key applications are reviewed by DOE (i.e. those with no 10 metre Pesticide Free Zone; those using particularly toxic or persistent chemicals) and DFO does not now review any pesticide applications; (b) there has been very little monitoring of pesticide residues in the environment in recent years because of budget reductions; (c) interagency Pesticide Control Committees function at the regional level to discuss policy and adjudicate contentious applications. The Environmental Appeal Board exists to hear submissions from people in disagreement with permit issues.

20. *Pesticide Control Act* Regulation Section 10: Conditions of use. [P, S]

Objective: No person shall use a pesticide on public land, on a body of water that is not man-made and self-contained on private land, or on private land used for forestry, transportation or public utility purposes, unless that person has a permit.

Actual Outcome: The pesticide use permitting process has been effective in directing industry using chemicals on private land to adopt best management practices.

Comments: This regulation ensures that permits and accompanying restrictions are in place for pesticide applications to railway, highway and transmission line rights-of-way, and forestry operations but does not cover agriculture on private land (which is the vast majority of agriculture in the province). Even Section 10(3) of the regulation calls for a person who wishes to use a pesticide within 10 m of a body of water, on land leased by the Crown for agricultural purposes, only to provide written notice, not apply for a permit. The fact that agriculture is not subject to the permit process has meant that the 10 metre Pesticide Free Zone is not applied there. Owing to that and because of language barriers, untrained operators and comparatively toxic chemicals, agricultural pesticide use is more of a problem for fish and wildlife habitat protection than is use on Crown land.

21. Guidelines for the Protection of Fish and Fish Habitat During Use of Glyphosate and Other Selected Forestry Herbicides in Coastal BC. [J, D]

Objective: A fish and fish habitat protection strategy for use by herbicide applicators developed jointly with Industry based on different criteria depending on stream classification and the provision of a ten metre pesticide-free zone around watercourses.

Actual Outcome: These and other guidelines have provided the basis for herbicide application standards incorporated into the former Fisheries/Forestry Guidelines and other operational manuals. The effort of regulators is no longer spent defending the 10 metre Pesticide Free Zone along streams.

Comments: With the advent of the *Forest Practices Code of BC Act* and new riparian management and riparian reserve zones, these guidelines have been rewritten and will soon be published.

22. Guidelines for the protection of fish and fish habitat during bridge maintenance operations in British Columbia. [F, J, D]

Objective: None stated.

Actual Outcome: A widely used set of guidelines currently being updated for reissue.

Comments: No Comments.

23. *Oceans Act* Section 32(d): Marine environmental quality objectives and standards. [F, S]

Objective: For the purpose of implementing integrated management plans the minister may establish marine environmental quality objectives and standards respecting estuaries, coastal waters and marine waters.

Actual Outcome: No such standards have yet been established.

Comments: A marine environmental quality standard or objective could involve anything from the abundance of a fish stock to the levels of contaminants in habitats. DFO plans to adopt an ecosystem approach in establishing marine health indicators, which will not be limited to a chemical-based approach. Any chemical objectives or standards that are established will represent a departure from the traditional *Fisheries Act* approach of regulating that which is deposited rather than the receiving water after the deposit has been diluted.

24. Forest Practices Code Forest Road Regulation Section 12(1)(e): Sub-grade construction. [J, S]

Objective: Locate borrow pits, quarries, waste areas and end-haul disposal sites in areas where eroded soil materials or other harmful materials will be prevented from entering streams.

Actual Outcome: None stated.

Comments: Although harmful to fish sediment has not been formally defined as a deleterious substance for the purposes of Section 36 of the *Fisheries Act*; in each instance of a prosecution under the *Act*, expert witnesses must demonstrate deleteriousness in court.

25. Forest Practices Code Forest Road Regulation Sections 13(c)(v), 14 and 20(1)(g): Drainage construction, road surfacing and deactivation. [P, S]

Objective: Minimize the amount of sediment entering streams.

Actual Outcome: None stated.

Comments: See Comments for item 24, above.

26. Forest Practices Code Timber Harvesting Practices Regulation Section 12(e):
Excavated or bladed trails. [P, S]

Objective: A person constructing an excavated or bladed trail must do so in a way that minimizes soil erosion and the amount of sediment entering streams.

Actual Outcome: None stated.

Comments: See Comments for item 24, above.

27. Private Land Forest Practices Regulation (Draft) Section 8(1): Practices near streams.
[P, S]

Objective: An owner of identified land must implement measures to ensure that the construction of borrow pits, quarries, waste areas and end-haul disposal sites does not result in soils entering streams.

Actual Outcome: Not yet in force.

Comments: No Comments.

28. Private Land Forest Practices Regulation (Draft) § 8(2): Practices near streams. [P, S]

Objective: An owner of identified land who constructs, deactivates or rehabilitates a road, landing or excavated or bladed trail must minimize soil erosion into streams and ensure that excavated soil does not enter directly into streams.

Actual Outcome: Not yet in force.

Comments: No Comments.

Table 5.9. Tools for Managing Fish Habitat: *Prevention of Direct Damage to Fish.*

[F] federal; [S] statutory/obligatory; [P] provincial; [J] joint; [D] discretionary; [D—M] "the Minister may order ..."; [R], requires a Regulation before taking effect.

1. *Fisheries Act* (Canada) Sections 20 and 21: Construction of fish-ways. [F, D—M]

Objective: Where the minister considers it necessary, the owner or occupier of an obstruction shall provide an approved fish-way to permit the free passage of fish. In specific cases the minister may require the owner to pay for the construction and operation of a hatchery.

Actual Outcome: These sections were used in the past to require fish-ways at some dams constructed on salmon bearing streams in BC. No such dams have been built for many years.

Comments: (a) Most recent fish-ways have been constructed by DFO at natural obstructions;
(b) because of its historical lack of presence in non-salmon watersheds DFO did not play a role in the approval of the major dams built on the Peace and Columbia rivers in the 1960's and 70's. Upstream migration of fish was blocked at dams constructed on both these rivers.

2. *Fisheries Act* (BC) Part 4: Fish protective devices. [P, D—R]

Objective: On designated streams all dams and hydraulic projects shall provide fishways for the safe passage of fish.

Actual Outcome: No streams have been designated in a regulation.

Comments: (a) The *Act* was not in force when all the major dams in BC were built. Thus it has not been of use to date;
(b) there is some question as to whether this provision in the *BC Fisheries Act* is *ultra vires* given the supremacy of the federal power over fish.

3. Recommendations for the Design and Installation of Culverts in BC to Avoid Conflict with Anadromous Fish. [F, D]

Objective: Recommendations for culvert design and installation so that they do not become obstructions to upstream fish passage.

Actual Outcome: Has been in use for two decades as the standard reference for culvert design. When followed, the guidelines are successful in maintaining fish passage.

Comments: Culverts on fish streams can be considered as potential obstructions under section 20 of the *Fisheries Act* and be required to incorporate fish-friendly hydraulic design features and simple fish-ways. The recommendations were developed with respect to salmon and may not be adequate for smaller, resident fish. A revised edition should be developed to take into account recent research data and the requirements of resident fish.

4. Standard instream timing windows. [J, D]

Objective: Least-risk instream work windows have been developed jointly by DFO and MELP for all areas of the province.

Actual Outcome: These windows are reproduced in many sets of codes and guidelines to provide direction to proponents in their initial planning as to the safest times to carry out necessary instream work. Actual windows are determined on a site specific basis by field staff.

Comments: Timing windows must be specified by DEO's for certain activities regulated under the FPC (see #5 and #6).

5. Forest Practices Code Forest Road Regulation. [P, S]

Objective: Road drainage must be designed (9.1.a) and constructed (13.1.h) and roads deactivated (19; 20.1.f, h) in a manner to provide safe passage for fish and in compliance with timing windows and measures specified by a DEO.

Actual Outcome: Regional MELP staff are developing local timing windows and approved measures for use by licensees. DFO are collaborating to ensure the procedures satisfy the requirements of both agencies.

Comments: (a) Definition of a fish stream includes rare and endangered species and regionally important species, not just those supporting a fishery as specified in the *Fisheries Act*;

(b) this has proven to be a very useful regulation and the notable improvement in fish passage conditions in many small streams is one of the major benefits of the FPC;

(c) the DEO's power to define required practices is a significant departure from most of the code's wording. It would be useful to incorporate such language in other sections.

6. Forest Practices Code Timber Harvesting Practices Regulation Section 21(3). [P, S]

Objective: A person must carry out construction, repair or removal of a temporary stream crossing and other operation in a fish stream in accordance with timing windows or measures required to adequately manage aquatic resources and as provided by the DEO.

Actual Outcome: Regional MELP staff are developing local timing windows and required measures.

Comments: No Comments.

7. Health, Safety and Reclamation Code for Mines Part 11. [P, S]

Objective: A permittee constructing or modifying an exploration access shall construct crossings in fish streams at a time and in a way that provides safe fish passage (11.5.1.7f)

Actual Outcome: Regional MELP staff are developing local timing windows and required measures.

Comments: Definition of a fish stream includes rare and endangered species and regionally important species, not just those supporting a fishery as specified in the *Fisheries Act*.

8. Oil and Gas Handbook Section 4: Geophysical Exploration (under Part 4 of the *Petroleum and Natural Gas Act*), Section 5: Roads (under Section 7 of the *Petroleum and Natural Gas Act*), and Section 8: Pipelines (under the *Pipeline Act*). [P, D]

Objective: Required timing windows, fish passage.

Actual Outcome: None stated.

Comments: No Comments.

9. *Fisheries Act* (Canada) Section 30: Intake screens. [F, D—M]

Objective: Every intake shall, if the minister deems it necessary, be provided with an approved screen built and maintained by the owner of the intake.

Actual Outcome: Numerous intake screens have been installed in BC streams, lakes and marine areas in accordance with DFO specifications. Screens at facilities such as

BC Hydro dams are usually well maintained and effective; screens at sites such as irrigation ditches are more problematic.

Comments: Some major facilities were built without provision for screening, perhaps owing to a lack of appropriate technology at the time of construction. BC Hydro has recently installed a major downstream migrant fish diversion screen at its Puntledge River facility and is retrofitting intakes at other locations such as the Seton and Salmon rivers.

10. *Fisheries Act* (BC) Part 4: Fish protective devices. [F, D—R]

Objective: On designated streams all dams and hydraulic projects shall have approved fish screens installed.

Actual Outcome: No streams have been designated in a regulation.

Comments: There is some question as to whether this provision in the *BC Fisheries Act* is *ultra vires* given the supremacy of the federal power over fish.

11. DFO Fish Screening Directive. [F, D]

Objective: Recommendations for the design and installation of screens to prevent the ingress of salmon at water intakes in streams and lakes.

Actual Outcome: Effective guidelines which have been in use for many years.

Comments: No Comments.

12. Guidelines for Minimizing Entrainment and Impingement of Aquatic Organisms at Marine Intakes in BC. [F, D]

Objective: Recommendations for the design and installation of screens to minimize the ingress of larvae, etc. at water intakes in estuarine and marine areas.

Actual Outcome: None stated.

Comments: No Comments.

13. *Fisheries Act* (Canada) Section 28 and Section 30: use of explosives prohibited, and prohibition on destroying fish except by fishing. [F, S]

Objective: No Objective stated.

Actual Outcome: These sections are used as the basis of fish protection standards during explosive use for geo-technical surveys and underwater excavation.

Comments: No Comments.

14. *Wildlife Act* Section 6.1: Harm to threatened or endangered species. [P, S]

Objective: A person commits an offence if the person kills an animal (includes fishes) that is a threatened or endangered species as defined under regulation (Section 5).

Actual Outcome: No Outcome stated.

Comments: (a) Included as a consequential amendment in the *Fish Protection Act*;
(b) fish must contribute to a fishery to be protected under the *Canada Fisheries Act*.
The *Wildlife Act* expands the parameters to include rarer species.

15. Guidelines for the Use of Explosives in Canadian Fisheries Waters. [F, D]

Objective: Recommendations on how fish kills may be minimized when using explosives under water.

Actual Outcome: Successful in reducing the scale of fish kills associated with explosive use through restraints on timing, size of charge, firing intervals, etc.

Comments: No Comments.

End of Chapter 5 "Tables."

(Ed. Note: *In the original manuscript the material in this Section was presented in tables with columns and rows. Tabular format necessitated fine print and the use of legal size pages, not well suited to the range of publication options being considered for this document. For this reason, and for greater legibility, the editor reformatted the material without changing its content. CPN.*)

6. RELATIONSHIPS BETWEEN PROVINCIAL LEGISLATION and the FEDERAL *FISHERIES ACT* and HABITAT MANAGEMENT POLICY

6.1 General

- Sections 35(1) and (2) of the *Fisheries Act* are the key statutory provisions in any comparison between federal and provincial fish habitat protection regimes. These sections give effect to the federal power to protect fish habitat and to approve harmful alteration, disruption or destruction (HADD) of habitat under certain conditions, i.e. the application of the *No Net Loss Principle* as set out in DFO policy, usually meaning the creation of compensatory habitat. Only DFO can authorize HADD and this power is unlikely to be delegated to the provinces in the near future. DFO will thus continue to make final decisions on the conditions of approval for proposed works and activities that have a direct impact on fish habitat.
- However, the definition of what should or should not be considered as HADD is still imprecise, and this makes it difficult to clearly circumscribe MELP's role in project review and approval in cases where there is a possibility of HADD. If any future worksharing agreement between DFO and MELP is to be effective, it must address this issue and, accordingly, a prerequisite will be a DFO guideline document that defines HADD in some detail and that would allow MELP staff to make unilateral decisions on projects which, while they might affect fish habitat to some degree, would not cause HADD within the definition in the guidebook. This would obviate the concern of provincial staff regarding the possibility of their "counselling an offence" if they were to approve certain projects without input from DFO.
- Several provincial statutes (primarily the *Forest Practices Code Act*, *Water Act* and *Fish Protection Act*) complement the provisions of §35 by: i) regulating activities which are not directly amenable to control under the *Fisheries Act* (e.g. relatively wide riparian reserve zones under the *Forest Practices Code*); ii) applying to the habitat of a wider range of fish resources, not just those supporting a fishery (e.g. threatened and endangered species); iii) requiring permits before certain activities may be undertaken (e.g. changes in and about a stream); iv) making some activities automatic offences rather than having to prove habitat damage in each case (e.g. deposit of logging slash); and v) outright prohibitions on some activities that would cause major impacts on fish habitat (e.g. no new dams on the Fraser River). Much of this progressive environmental legislation has been introduced within the last few years; however, the recent emphasis of the provincial government on economic development has prevented the full potential benefits from being achieved. For example, most sections of the *Fish Protection Act* are not yet in force, and the application of the *Forest Practices Code* is constrained by preset provincial limits (interpreted by most district managers as applying at the local level with no allowances for variation between coast and interior, for instance) on the allowable impact on timber harvest levels.
- The *Waste Management Act* complements the provisions of Section 36 of the *Fisheries Act* regarding pollution control well with the latter setting national standards for effluents and the former requiring a site-specific permit before a waste may be

discharged. The provincial permitting process is used to deliver the federal effluent requirements with, in some cases, the permit levels being more stringent than the federal ones. The provincial statute makes it easier to take into account the characteristics of specific discharges and locations and is more readily revised as new information becomes available. Although there are some federal/provincial differences of opinion on issues such as the need for secondary treatment at all municipal sewage plants, in general the two regulatory systems work well together.

- Close co-operation has developed over the past 25 years between DFO and MELP operational staff in most areas of the province, with DFO continuing to concentrate on salmon-bearing watersheds and MELP on resident freshwater species habitat. Although there are some formal agreements between DFO and MELP on habitat protection, they are very general and co-operation at the operational level depends on a variety of informal arrangements. These include an exchange of letters setting out individual agency roles, and regular meetings to review referrals and divide up the work load. In general these arrangements have worked well but there are continuing issues which need resolution in order that the system can work more effectively. These include the differences in the mandates of the two agencies wherein MELP staff are required to take a broader perspective to include their responsibilities for fish, wildlife and biodiversity; the lack of a clear provincial policy for fish habitat to parallel DFO's *No Net Loss Principle*; the lack of clarity surrounding the concept of HADD; and fluctuations (mostly reductions) in staffing levels.
- The situation is particularly problematic in Eastern BC where DFO had no involvement up until a few years ago and even today has no staff located in the area. MELP staff are attempting to follow the spirit of the informal working agreement which sets out the roles of the two agencies in referral and major project review but the issues listed at the end of the previous paragraph, combined with the extreme difficulty of communicating on a regular and thorough basis between staff located several hundred miles apart, have resulted in a breakdown of the agreement.
- Approximately half of the current combined federal and provincial expenditures on fish habitat are being directed to habitat restoration activities. A continuing strong and effective habitat protection regime will be required if the benefits of the restored habitat are not to be lost to future industrial and urban development pressures.
- Recent reductions in baseline resource levels in both DFO and MELP have required innovative responses such as the development of memoranda of understanding with municipalities for the screening of referrals, with only those not amenable to standard operational constraints being sent to the fisheries agencies for review; and the dropping of some categories of referral altogether in favour of standard environmental protection conditions. No major problems have arisen to date and this approach should be expanded as stewardship procedures continue to be implemented on a wider scale.

Summary: i) Several provincial statutes, now with explicit mention of fish habitat protection objectives, complement the provisions of §35 of the *Fisheries Act* by regulating activities that have the potential to harm fish habitat. But there is no provincial equivalent to DFO's *No Net Loss Principle* and thus no provincial mechanism for the creation of compensatory habitat in cases where habitat loss cannot be avoided. ii) Before

substantial progress can be made on a work-sharing agreement between DFO and MELP, there is a critical need for a DFO guideline document that defines HADD in some detail and that would allow MELP staff to make unilateral decisions. Once those guidelines are available MELP will need to prepare its own document that will provide guidance to staff on how to implement the federal guidelines in the context of the broader MELP mandate for wildlife and fish that do not support a fishery. iii) The *Waste Management Act* complements the provisions of §36 of the *Fisheries Act* well. In general the two pollution control regulatory systems work well together.

6.2 Forest Practices Code

- Applies to the habitat of threatened, endangered and regionally important species as well as the habitat of fish supporting a fishery. Thus its scope is broader than the *Fisheries Act*.
- Has resulted in a major improvement in protection for riparian areas of many fish streams. Although these areas have been accepted by the courts as falling under the definition of fish habitat for the purposes of the *Fisheries Act*, the direct application of §35(2) is rare; former practice was to rely on the co-operation of industry with jointly developed guidelines. Only with the advent of the FPC has the delineation and preservation of standardized riparian zones become mandatory operational practice.
- There is still some disparity between the widths of the riparian zones set out in the FPC and those recommended by DFO as necessary for full protection of fish habitat (*Establishing Fisheries Management and Reserve Zones in Settlement Areas of British Columbia, DFO Manuscript Report #2351, 1997*). An efficacy monitoring program of current FPC provisions will be required to resolve this issue.
- In the riparian management zones, as opposed to the reserve zones, there is less compliance with the best management practices as specified in the Riparian Management Area Guidebook, even though these were allowed for when the impact on the timber supply was calculated before the Code was finalized. This is particularly an issue in the case of small fish bearing streams (S4's), many of which are being logged to the banks.
- Similarly, FPC regulations regarding felling into streams, cross-stream yarding, road drainage, bridge and culvert construction, etc. have improved operational practices and are more easily applied than the general provisions of the *Fisheries Act*. Provision for fish passage in small streams has undergone a particularly noticeable improvement.
- The provisions that provide for the Designated Environmental Official to specify timing windows and measures that must be followed at stream crossings are proving to be a very valuable tool for fish habitat protection. DFO is collaborating with MELP on the development of these procedures. It would be beneficial for the protection of fish habitat if similar powers were included in other parts of the FPC.
- The discretionary powers of the Ministry of Forests district managers to amend riparian and other environmental protection requirements is a continuing source of concern. To date this has not proven to be a major problem but it is an area which requires vigilance on the part of the fisheries agencies.

- The discretionary powers of the district managers also has the potential to lead to inconsistent practices being applied. An example is a policy requirement in some districts for reserve zones on S4 streams; in other districts there are none.
- Another area of concern is the recent proliferation of non-standard forestry pilots such as innovative forestry practices, enhanced forestry, and performance-based harvesting. These all result in additional workload for a dwindling number of MELP staff.
- Watershed assessments should have provided an effective mechanism for resolving rate of cut issues in sensitive watersheds. However, it appears that this is not happening in all cases as the process is too easily stalled or manipulated to produce the answers desired by licensees and too few modifications to harvesting plans have resulted from these exercises to date. Unless fisheries agencies can obtain credible expert input to counterbalance industry experts, substantial benefit cannot be expected to accrue to fish habitat.
- It appears likely that the provisions described above will be most of what can be expected for fish habitat protection purposes under the code. Additional opportunities ranging from landscape level planning down to the identification of specific sensitive areas are likely to be limited in the main to biodiversity and wildlife considerations, although there will, no doubt, be incidental fish habitat benefits. Even these, however, may be some time in coming as the provincial government appears to have adopted a "go slow" approach to the development and designation of higher level plans that will provide mandatory direction to district managers.
- Also, since the Jobs and Timber Accord was signed between the provincial government and industry, there has been a marked change in the underlying administrative philosophy that the Ministry of Forests applies to the FPC. When the Code was developed it was considered as establishing minimum provincial standards for environmental protection with the option for higher standards in individual cases. Now the Code is being treated as the maximum and companies are being told to do only whatever is absolutely necessary. Also higher levels of risk are being accepted and often the burden of proof is being placed on government agencies rather than companies: i.e. formerly, the onus was on a company to demonstrate that its proposed operations would be harmless; now it falls to government to prove potential harm if changes are requested. To date this change in philosophy has affected wildlife protection provisions rather than fish habitat, except for issues such as the reduction in the level of detail now demanded in forest development plans rendering them practically useless as a referral tool. As this trend to more emphasis on economic development seems likely to continue, the situation should be closely monitored by the fisheries agencies in order that the improvements gained to date are not lost through future amendments to the code. DFO should investigate ways to offer more vigorous support to MELP to prevent such a scenario.
- The recently passed Part 10.1 of the *Act* (Pilot Projects to Improve the Regulatory Framework for Forest Practices) will permit the dis-application of the Code to 10% of the allowable annual cut if a company can assure the Lieutenant Governor in Council that its proposal for non-code harvesting operations will provide equivalent protection for forest resources. Unfortunately equivalency cannot be demonstrated until after the harvesting operations have taken place (perhaps many years after in the case of

- important parameters such as large organic debris recruitment associated with any modifications to the riparian reserve zones). Monitoring will be required (this raises the question of resources to carry it out), but if the results are negative, it may be too late to correct the situation. DFO should pay particular attention to these pilots with a view to rigorous application of the *Fisheries Act* provisions.
- Also, forest practices were exempted from the provisions of the *BC Environmental Assessment Act* on the understanding that the Forest Practices Code would ensure adequate environmental protection. As the Code undergoes more and more amendments, this assumption may require re-evaluation.

Summary: i) The Forest Practices Code complements the *Fisheries Act* well. The major areas of improvement since the advent of the code, i.e. the protection of riparian zones, prohibitions on cross-stream yarding and deposition of slash, and improved fish passage provisions, are areas that are not directly amenable to the application of the *Fisheries Act* where a connection has to be made in each case to potential fish habitat damage. Except for encroachment into streams in the case of major road crossings, full application of the Code (including the best management practices described in the Riparian Management Area Guidebook) would prevent harmful alteration, disruption or destruction of habitat, thus eliminating any requirement for *Authorizations* under §35 of the *Fisheries Act*. ii) The Code could be significantly strengthened from a fish habitat protection perspective if there were more sections that allow the DEO to specify measures for certain activities (cf. Forest Road Regulation regarding crossings of fish streams). iii) A major concern is, however, the amount of discretion afforded to the district managers and the concomitant issue regarding the fettering of their decisions. This has the potential to lead to inconsistent application of the Code depending on the personality and environmental attitude of individual managers, as does the recent amendment allowing disapplication of the Code to 10% of the AAC in favour of performance-based harvesting.

6.3 Private Managed Forest Lands

- The majority of private forest lands are located on Vancouver Island (70%) and in the Kootenays (25%). Total area is 920,000 ha.
- Applicable legislation for fish habitat protection is the *Fisheries Act* which applies to all fisheries waters in Canada whether running through public land or private, and the recently passed *Forest Land Reserve Amendment Act* and proposed regulation. The Forest Practices Code does not apply.
- No formal referral mechanisms to fisheries agencies for harvesting plans are in place for private forest land and DFO staff have become involved only at the request of the landowner (usually a major company) or when major problems have arisen (e.g. San Juan watershed). MELP staff have not been involved to any extent in the protection of fish habitat on private forest land.
- The proposed Private Land Forest Practices Regulation will introduce specific restrictions on harvesting practices for the first time and could, in theory, bring about an improvement in fish habitat protection. However, several major constraints will

keep the standard of practice on private land well below those on public land: for example the riparian protection in the proposed regulation is much inferior to that in the Forest Practices Code; there are no requirements to maintain fish passage at road crossings; and the administering agency (Forest Land Commission) will have a very limited capability for inspection, monitoring and enforcement.

- Due to the permissive nature of the private forested land legislation, there is a possibility that a landowner could destroy fish habitat while complying with the regulation. DFO's ability to prosecute under §35(2) of the *Fisheries Act* could thus be impaired through an "officially induced error" defence. This is of major concern to DFO and a monitoring program will be introduced for private forest lands on Vancouver Island to determine the effects of the new legislation.

Summary: i) The Private Land Forest Practices Regulation will add a measure of control that is currently lacking over forest harvesting on private lands, but it will be significantly less than under the Forest Practices Code. As DFO and MELP have not traditionally had a major presence on private forest land, this may result in some added protection for fish habitat. ii) However, it will not result in no net loss nor preclude the requirement for *Fisheries Act* §35(2) *Authorizations* for certain instream operations permitted under the regulation. Unless DFO learns about such proposed activities beforehand and imposes restrictions, the regulation may lead to a loss of habitat and associated problems in successfully prosecuting incidents of habitat damage.

6.4 *Fish Protection Act*

- Sensitive streams: the initial list of 15 candidate streams being put forward for approval includes only those that have an immediate need for additional protection and whose designation would have minimal impact on other resource users, i.e. difficult inter-resource allocation decisions are being postponed, possibly at the expense of the fish. Although this section has the potential to be of major benefit to fish in streams currently facing water shortages, the slow pace at which it is being implemented means that those benefits are being postponed, possibly until it is too late.
- Fish habitat considerations in water licensing decisions: this is potentially a major improvement over the flow provisions of the *Fisheries Act* which deal with flows below obstructions only. It goes part of the way to meeting a long-standing concern with the *Water Act*, i.e. that fish have not been historically recognised as beneficial users of water. However, the decision on whether or not to consider potential fish habitat impacts on most streams will remain the responsibility of the non-fisheries manager. Even on those streams specified by regulation as requiring consideration, the final decision on whether to restrict further water withdrawals will be up to the water manager. Thus it will be essential that the regulation currently under development to provide criteria upon which water managers will base their decisions, should be clear as to when and how fish flows must be taken into account. If the regulation leaves too much discretion to the water manager, much of the potential benefit will be lost.

- Provincial directives on streamside protection: these have the potential to improve on the application of the *Fisheries Act* to preserve riparian zones in urban areas. *Fisheries Act* provisions are indirect and rely on measures which are difficult to enforce, such as restrictive covenants and voluntary stewardship initiatives. However, the provision in the *Fish Protection Act* to allow local governments to decide if their bylaws and permits are equivalent to the provincial directive is of concern: development-oriented councils are not likely to make unbiased decisions in favour of fish habitat preservation. Given the natural resistance of many local governments to what they see as downloading of responsibilities from senior governments, one of the keys to the successful implementation of the directives is likely to be the continuing provision of technical support and expertise, via such programs as the highly regarded Urban Salmon Habitat Program, from provincial agencies and DFO to local governments.

Summary: i) The sensitive stream provision has the potential to be of major benefit to fish in streams currently facing water shortages, but the slow pace at which it is being implemented means that those benefits are being postponed, possibly until it is too late. ii) The formal power to include fish habitat considerations in water licensing decisions is potentially a major improvement over the flow provisions of the *Fisheries Act*. However, the discretion afforded water managers to decide on biological issues could be problematic and it is thus critical that the regulation currently under development be as clear as possible with regard to when and how fish flows must be taken into account. iii) Provincial directives on streamside protection have the potential to improve on the application of the *Fisheries Act* to preserve riparian zones in urban areas. However, the provision to allow local governments to decide if their bylaws and permits are equivalent to the provincial directive is of concern. Close monitoring of the actions of local government councils will be necessary as this initiative proceeds, and continuing provision of technical support and expertise from provincial agencies and DFO to local governments will probably be necessary to ensure successful implementation.

6.5 Water Act

- The *Water Act* was written as a tool for allocating and regulating water withdrawals from streams, rivers and lakes with no recognition of fish as beneficial users of water. This has created the potential for conflict between the provincial allocators of water and the federal protectors of fish and fish habitat. The referral system, however, allows fisheries agencies to comment on water licence applications and those comments are often taken into account by water managers in the licences issued.
- The changes introduced through the *Fish Protection Act*, however, will give water managers the power to consider fish and fish habitat when making their decisions (see comments under 6.4 above) and to issue licences for stream flow protection purposes.
- Also the consequential amendments to the *Water Act* dealing with water management areas and water management plans have the long-range potential to improve conditions for fish in streams under stress from lack of adequate flows. The *Fisheries Act* is not capable of dealing with such circumstances and is of little use in providing for

additional fish flows in streams already suffering shortages, or in preventing the further withdrawal of water. The implementation of the new *Water Act* sections, however, is slow and no actual benefits for fish have yet been achieved. Even if procedures are introduced soon concerning the development of water management plans, the planning and inter-resource negotiations will take some time; thus benefits for fish are not likely to be realized until some years in the future.

- Section 22(3) of the *Fisheries Act* allows DFO to require specified flow releases below obstructions and this results in the potential for major conflict with the provincial power to allocate water for hydro purposes. When most of the hydro dams in BC were built, the federal power was not exercised due to a reluctance on the part of the federal government to challenge provincial resource allocation decisions and the lack of involvement of DFO in the Peace and Columbia River drainages. Recently, however, the federal government has indicated that it is ready to use its powers to require specified flows.
- This in part led to the adoption by the provincial government of the Water Use Planning Process which gives the Comptroller of Water Rights the power, among other things, to require a plan in response to a perceived water use conflict. This recently introduced process is proving to be of major benefit to fish by providing for fish flow releases from hydro facilities and, by involving all concerned parties in a co-operative process, is a more efficient means of achieving that end than the use of *Fisheries Act* § 22(3).
- The provisions in the *Water Act* to regulate physical "changes in and about a stream" complement the provisions of §35 of the *Fisheries Act*. The referral system has been used to ensure that approvals granted under the *Water Act* are compatible with the requirement to protect fish habitat.

Summary: i) The *Fisheries Act* is of little use in providing for additional fish flows in streams already suffering shortages, or in preventing the further withdrawal of water. ii) The recent changes introduced through the *Fish Protection Act* will help to address this issue and represent major improvements to the *Water Act* which was written as a tool for allocating and regulating water withdrawals from streams, rivers and lakes with no recognition for fish as beneficial users of water. iii) The implementation of the new sections is slow, however, and no actual benefits for fish are likely to be realized for some time, even if effective regulations are passed in the near future. iv) The co-operative Water Use Planning Process is proving to be of major benefit to fish by providing for fish flow releases from hydro facilities and is a more efficient means of achieving that end than the use of *Fisheries Act* Section 22(3). v) The provisions in the *Water Act* to regulate physical "changes in and about a stream" complement the provisions of §35 of the *Fisheries Act* and the fisheries agencies have worked closely together to ensure stream stability and fish habitat protection.

6.6 *Municipal Act*

- There is no direct relationship between the *Municipal Act* and the *Fisheries Act* but, through the Official Community Plan and Development Permit Area mechanisms, it can be a useful tool in providing general protection to environmentally sensitive areas such as streams and riparian areas.
- Over the past several years, in an attempt to eliminate referrals from local governments for approvals of a myriad of small development applications, and to improve the protection of fish habitat in urban areas, DFO and MELP have placed significant emphasis on the development and implementation of innovative approaches such as the production of the Stewardship Series guidelines and the Urban Salmon Habitat Program. If no net loss is to be achieved in the urban setting, these highly successful initiatives must be continued and expanded until local governments: (a) officially have the mandate and power to protect fish habitat; (b) have the resources and expertise to classify environmentally sensitive areas, carry out impact assessments on development applications and define required restrictions; and (c) have the political will to do so.

Summary: i) Official Community Plan and Development Permit Area mechanisms can be useful tools in providing general protection to environmentally sensitive urban areas, including support for *Fisheries Act* provisions. ii) However, federal and provincial assistance under such initiatives as the USHP will need to be continued if significant fish habitat protection benefits are to be obtained from the current environmental provisions in the *Municipal Act*.

6.7 *Environmental Assessment Act*

- The harmonized provincial-federal assessment process addresses the potential fish habitat impacts of reviewable projects in the context of DFO's mandate under the *Fisheries Act* and habitat management policy. DFO will ensure that no net loss of fish habitat productive capacity will occur and this is not a position that is negotiable through the assessment process. If DFO cannot meet its objectives through the joint process, it will negotiate separately with a proponent.
- The provincial process, however, can address a broader range of fish species than is protected under the *Fisheries Act*, i.e. threatened, endangered or regionally important species, not only those supporting a fishery.

Summary: The assessment process can offer some marginal benefits for fish habitat protection over those of the *Fisheries Act*, primarily for fish that do not support a fishery.

6.8 *Waste Management Act*

- Highly integrated with Section 36 of the *Fisheries Act*. The latter is used to establish national effluent standards and the *Waste Management Act* effluent discharge permit system is used as the delivery vehicle, although provincial standards may be, and often are, more stringent.
- Unlike the *Fisheries Act*, the *Waste Management Act* calls for a site-specific permit before an effluent may be discharged from any industrial/municipal facility. This makes it easier in theory to enforce as the allowable levels are incorporated into the permit and it is an offence to exceed those levels. However a recent court decision has placed the onus on the Crown to show harm before a violation can be proven under the *Waste Management Act*. Under the *Fisheries Act*, unless a specific regulation has been developed, the prosecution has to establish in court that the deposit was deleterious.
- There are some discrepancies between the two regulatory regimes in that the province may not necessarily stipulate a non-toxic discharge or even the measurement of toxicity; and the province uses the concept of an initial dilution zone wherein water quality objectives do not apply. The *Fisheries Act* general provisions or regulation limits apply to the actual deposit, not the receiving water after mixing has taken place.
- There are federal concerns regarding the new municipal sewage regulation with respect to the exemption from providing secondary treatment at existing plants, the toxicity provisions and the use of reclaimed water for stream augmentation; and the proposed aquaculture regulation. These could lead to officially induced error difficulties regarding potential prosecutions under the *Fisheries Act*.
- Other regulations are fully supported by federal agencies such as the antisapstain, contaminated sites, and spill reporting regulations.

Summary: i) The federal and provincial effluent control regimes are highly integrated and in general work well together, with the federal regime establishing national standards and the provincial delivering those standards (or higher standards) through the site specific permitting process. ii) There are some discrepancies between the two regulatory regimes, however, with regard to toxicity and the concept of initial dilution zones. These discrepancies should be resolved between agencies before they become a major issue in some future court case.

6.9 Agriculture

- In principle, several statutes apply to the protection of fish habitat (including water quality) on agricultural land: federal *Fisheries Act* and provincial *Water Act*, *Fish Protection Act*, *Waste Management Act*, *Forest Practices Code of BC Act* and *Pesticide Control Act*. Much of the agricultural activity is carried out on private land and, although most of the legislation applies (except for the FPC) to that land category, monitoring and enforcement have accordingly always been problematic.
- The legislation listed above applies to pollution control (*Waste Management Act*), water withdrawals (*Water Act*, *Fish Protection Act*), pesticide application (*Pesticide*

- Control Act), intake screening (*Fisheries Act*) and protection of instream habitat (*Fisheries Act, Water Act*) on agricultural land. However, except for the FPC application to range management practices, there is no explicit legislation covering the protection of riparian areas on agricultural land; provincial directives on streamside protection under the *Fish Protection Act* do not apply to agriculture.
- There have been long-standing conflicts between fisheries agencies and agricultural operators regarding the preservation of fish habitat on their lands. In an attempt to address this issue a multi-agency committee (Partnership Committee on Agriculture and the Environment) has been established to develop guidelines for such items as ditch maintenance and riparian preservation. The statutory basis for these guidelines will be the federal *Fisheries Act* as there is no applicable provincial legislation. The committee's efforts are directed to the Fraser Valley and Vancouver Island (the Interior has yet to be addressed) and are still at an early stage; it remains to be seen whether significant progress can be made in this contentious area of private property rights versus public resource values.
- Impacts from range operations tend to be more dispersed than from the more intensive agricultural practices and are, therefore, not such a problem for fish habitat. Even so, the FPC does represent a significant improvement by directly addressing riparian protection and cattle watering issues on Crown land.

Summary: i) In principle, several statutes apply to the protection of fish habitat on private agricultural land but monitoring and enforcement are problematic. ii) Provincial statutes apply to water withdrawals, pollution control, pesticide application and changes in and around streams; the *Fisheries Act* applies to physical damage to instream habitat and intake screening. However, neither statutory regime directly protects riparian areas on private agricultural land. A prime opportunity was lost to increase protection of riparian areas when agricultural land was exempted from the streamside directive provisions of the *Fish Protection Act*. iii) The FPC does represent a significant improvement for range management on Crown land by directly addressing riparian protection and cattle watering issues. iv) The multi-agency committee currently developing guidelines for ditch maintenance and riparian preservation has a critical role to play in improving fish habitat protection on private agricultural land; unless an effective, co-operative regime is developed, protection efforts will revert to the past experience of site specific conflict between farming practices and the application of the *Fisheries Act*.

6.10 Mining

- Placer mining remains an anomaly with regard to the protection of riparian areas. In theory the riparian reserve zones specified in the Forest Practices Code apply but a temporary exemption is in place to permit placer operations to continue with the previously established 10 m zones only. Thus placer mining and forestry operations can exist on the same stream with radically different levels of disruption of riparian areas. This issue should be resolved before the pace of mining activity picks up again when the price of gold recovers.

- The major fish habitat concern associated with hard rock mining exploration access is stream crossings. The main federal regulatory instrument is §35 of the *Fisheries Act* which is now well complemented by the provisions of the Forest Practices Code and the *Mines Act* Health, Safety and Reclamation Code. These provincial statutes contain prohibitions against the deposit of debris, streambank destabilization, etc. although the Health, Safety and Reclamation Code contains more qualifiers such as "to the extent practicable" and "to the extent possible" than the Forest Practices Code.
- Mining exploration activity has been at a relatively low level in recent years and thus the potential problems of interpretation associated with the wording in the Health, Safety and Reclamation Code have not been fully tested. This is an area that should be monitored when mining exploration activity increases.
- Mine development is covered by the harmonized federal/provincial environmental assessment review process with *Fisheries Act* §35 provisions, supplemented by the No Net Loss Policy, being the very effective means of protecting fish habitat from the physical impacts of mining and the use of lakes as tailings ponds. If, however, the fish involved do not support a fishery, the *Fisheries Act* does not apply and protection of habitat falls back on much weaker provincial legislation.
- The treatment and disposal of effluents from mining operations is primarily regulated by the provincial *Waste Management Act* which is much more current with regard to treatment technology than the regulations under §36 of the *Fisheries Act*.

Summary: i) Protection of riparian areas from placer mining activity should be more readily accomplished under the Forest Practices Code than under the *Fisheries Act*. However, the riparian reserve zones specified in the Forest Practices Code are not yet being applied. ii) The provisions of the Forest Practices Code and the Health, Safety and Reclamation Code of the *Mines Act* with regard to mining access complement the *Fisheries Act* well but the qualifiers in the wording of the *Mines Act* code need to be tested. iii) Provincial legislation is weak compared to the *Fisheries Act* for the protection of fish habitat from the direct impacts of mine development. iv) The effluent disposal provisions of the *Waste Management Act* are more current and stringent than the equivalent federal standards.

6.11 Oil and Gas

- Oil and gas exploration and development are, at least in theory, covered by the provisions of the *Fisheries Act*, the Forest Practices Code and the Oil and Gas Handbook with respect to the protection of riparian areas and fish habitat during road construction, stream crossings, etc. The combination of these standards should result in adequate protection for fish habitat.
- However, the rapid pace of development of the industry in northeastern BC, the requirement for immediate response to permit applications, and the meagre staffing levels of both DFO and provincial environmental protection agencies in the area, have resulted in most development applications being given only cursory review in the office and almost no monitoring in the field.

- The Oil and Gas Commission has removed regulatory personnel from individual agencies and has thus isolated them from managerial support for their individual mandates. The development-oriented mandate of the Commission has resulted in a decrease in the level of environmental protection in northeastern BC.
- Only major projects which are regulated by the National Energy Board or are covered by the environmental assessment process receive adequate review. In those cases major stream crossings are subject to strict controls to achieve no net loss of productive capacity. In other cases it is almost certain that loss of fish habitat is occurring, although the extent of the loss is unknown due to a lack of monitoring/enforcement capability.

Summary: i) The Forest Practices Code and the Oil and Gas Handbook should have added substantially to the provisions of the *Fisheries Act* to protect fish habitat from oil and gas exploration and pipeline construction. However, lack of both federal and provincial staff in northeastern BC, particularly for monitoring and enforcement, and the emphasis on economic development, have resulted in development occurring with limited environmental input. ii) As a result, it is very likely that there is a loss of fish habitat occurring.

6.12 Summaries from Sections 6.1 to 6.11

General: i) Several provincial statutes, now with explicit mention of fish habitat protection objectives, complement the provisions of §35 of the *Fisheries Act* by regulating activities that have the potential to harm fish habitat. *But* there is no provincial equivalent to DFO's *No Net Loss Principle* and thus no provincial mechanism for the creation of compensatory habitat in cases where habitat loss cannot be avoided. ii) Before substantial progress can be made on a work-sharing agreement between DFO and MELP, there is a critical need for a DFO guideline document that defines HADD in some detail and that would allow MELP staff to make unilateral decisions. Once those guidelines are available MELP will need to prepare its own document that will provide guidance to staff on how to implement the federal guidelines in the context of the broader MELP mandate for wildlife and fish that do not support a fishery. iii) The *Waste Management Act* complements the provisions of Section 36 of the *Fisheries Act* well. In general the two pollution control regulatory systems work well together.

Forest Practices Code: i) The Forest Practices Code complements the *Fisheries Act* well. The major areas of improvement since the advent of the code, i.e. the protection of riparian zones, prohibitions on cross-stream yarding and deposition of slash, and improved fish passage provisions, are areas that are not directly amenable to the application of the *Fisheries Act* where a connection has to be made in each case to potential fish habitat damage. Except for encroachment into streams in the case of major road crossings, full application of the Code (including the best management practices described in the Riparian Management Area Guidebook) would prevent harmful alteration, disruption or destruction of habitat, thus eliminating any requirement for

Authorizations under §35 of the *Fisheries Act*. ii) The Code could be significantly strengthened from a fish habitat protection perspective if there were more sections that allow the DEO to specify measures for certain activities (cf. Forest Road Regulation regarding crossings of fish streams). iii) A major concern is, however, the amount of discretion afforded to the district managers and the concomitant issue regarding the fettering of their decisions. This has the potential to lead to inconsistent application of the Code depending on the personality and environmental attitude of individual managers, as does the recent amendment allowing disapplication of the Code to 10% of the AAC in favour of performance-based harvesting.

Private Managed Forest Lands: i) The Private Land Forest Practices Regulation will add a measure of control that is currently lacking over forest harvesting on private lands, but it will be significantly less than under the Forest Practices Code. As DFO and MELP have not traditionally had a major presence on private forest land, this may result in some added protection for fish habitat. ii) However, it will not result in no net loss nor preclude the requirement for *Fisheries Act* §35(2) *Authorizations* for certain instream operations permitted under the regulation. Unless DFO learns about such proposed activities beforehand and imposes restrictions, the regulation may lead to a loss of habitat and associated problems in successfully prosecuting incidents of habitat damage.

Fish Protection Act: i) The sensitive stream provision has the potential to be of major benefit to fish in streams currently facing water shortages, but the slow pace at which it is being implemented means that those benefits are being postponed, possibly until it is too late. ii) The formal power to include fish habitat considerations in water licensing decisions is potentially a major improvement over the flow provisions of the *Fisheries Act*. However, the discretion afforded water managers to decide on biological issues could be problematic and it is thus critical that the regulation currently under development be as clear as possible with regard to when and how fish flows must be taken into account. iii) Provincial directives on streamside protection have the potential to improve on the application of the *Fisheries Act* to preserve riparian zones in urban areas. However, the provision to allow local governments to decide if their bylaws and permits are equivalent to the provincial directive is of concern. Close monitoring of the actions of local government councils will be necessary as this initiative proceeds, and continuing provision of technical support and expertise from provincial agencies and DFO to local governments will probably be necessary to ensure successful implementation.

Water Act: i) The *Fisheries Act* is of little use in providing for additional fish flows in streams already suffering shortages, or in preventing the further withdrawal of water. ii) The recent changes introduced through the *Fish Protection Act* will help to address this issue and represent major improvements to the *Water Act* which was written as a tool for allocating and regulating water withdrawals from streams, rivers and lakes with no recognition for fish as beneficial users of water. iii) The implementation of the new sections is slow, however, and no actual benefits for fish are likely to be realized for some time, even if regulations are passed in the near future. iv) The co-operative Water Use

Planning Process is proving to be of major benefit to fish by providing for fish flow releases from hydro facilities and is a more efficient means of achieving that end than the use of *Fisheries Act* Section 22(3). v) The provisions in the *Water Act* to regulate physical "changes in and about a stream" complement the provisions of §35 of the *Fisheries Act* and the fisheries agencies have worked closely together to ensure stream stability and fish habitat protection.

Municipal Act: i) Official Community Plan and Development Permit Area mechanisms can be useful tools in providing general protection to environmentally sensitive urban areas, including support for *Fisheries Act* provisions. ii) However, federal and provincial assistance under such initiatives as the USHP will need to be continued if significant fish habitat protection benefits are to be obtained from the current environmental provisions in the *Municipal Act*.

Environmental Assessment Act: i) The assessment process can offer some marginal benefits for fish habitat protection over those of the *Fisheries Act*, primarily for fish that do not support a fishery.

Waste Management Act: i) The federal and provincial effluent control regimes are highly integrated and in general work well together, with the federal regime establishing national standards and the provincial delivering those standards (or higher standards) through the site specific permitting process. ii) There are some discrepancies between the two regulatory regimes, however, with regard to toxicity and the concept of initial dilution zones. These discrepancies should be resolved between agencies before they become a major issue in some future court case.

Agriculture: i) In principle, several statutes apply to the protection of fish habitat on private agricultural land but monitoring and enforcement are problematic. ii) Provincial statutes apply to water withdrawals, pollution control, pesticide application and changes in and around streams; the *Fisheries Act* applies to physical damage to instream habitat and intake screening. However, neither statutory regime directly protects riparian areas on private agricultural land. A prime opportunity was lost to increase protection of riparian areas when agricultural land was exempted from the streamside directive provisions of the *Fish Protection Act*. iii) The FPC does represent a significant improvement for range management on Crown land by directly addressing riparian protection and cattle watering issues. iv) The multi-agency committee currently developing guidelines for ditch maintenance and riparian preservation has a critical role to play in improving fish habitat protection on private agricultural land; unless an effective, co-operative regime is developed, protection efforts will revert to the past experience of site specific conflict between farming practices and the application of the *Fisheries Act*.

Mining: i) Protection of riparian areas from placer mining activity should be more readily accomplished under the Forest Practices Code than under the *Fisheries Act*.

However, the riparian reserve zones specified in the Forest Practices Code are not yet being applied. ii) The provisions of the Forest Practices Code and the Health, Safety and Reclamation Code of the *Mines Act* with regard to mining access complement the *Fisheries Act* well but the qualifiers in the wording of the *Mines Act* code need to be tested. iii) Provincial legislation is weak compared to the *Fisheries Act* for the protection of fish habitat from the direct impacts of mine development. iv) The effluent disposal provisions of the *Waste Management Act* are more current and stringent than the equivalent federal standards.

Oil and Gas: i) The Forest Practices Code and the Oil and Gas Handbook should have added substantially to the provisions of the *Fisheries Act* to protect fish habitat from oil and gas exploration and pipeline construction. However, lack of both federal and provincial staff in northeastern BC, particularly for monitoring and enforcement, and the emphasis on economic development, have resulted in development occurring with limited environmental input. ii) As a result, it is very likely that there is a loss of fish habitat occurring.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

7.1.1 Physical habitat

- i. Several provincial statutes complement the physical habitat protection provisions of §35 of the *Fisheries Act* well. Although the DFO authorization system for harmful alteration, disruption or destruction of fish habitat is effective in maintaining instream habitat, it is not directly applicable to the regulation of upslope activities or the protection of wide riparian zones. However, provincial statutes such as the *Forest Practices Code of BC Act* and the Health, Safety and Reclamation Code under the *Mines Act* can regulate activities that have the potential to cause indirect harm to fish habitat by destroying riparian vegetation or disturbing unstable terrain. Also, unlike the *Fisheries Act* where habitat damage must occur before an offence is committed, it is an offence to carry out certain activities without a permit under many provincial statutes, regardless of whether damage to habitat occurs or not.
- ii. In practice, however, many of the potential benefits for fish habitat contained in provincial statutes are circumscribed by policies and provisions which place the emphasis on economic development rather than environmental protection. Examples are the restrictions on the application of various sections of the Forest Practices Code to keep impacts on harvesting levels within specified limits, and the very short timeframes allowed for the review of natural gas permit applications.
- iii. Some major gains for fish habitat protection have been achieved through recent provincial legislation, most notably the riparian management provisions of the Forest Practices Code.

7.1.2 Instream flow

- i. The *Fish Protection Act*, and to a lesser extent the *Water Protection Act*, have significant potential to complement the minimum flow provisions of the *Fisheries Act*. The latter apply only to releases from obstructions whereas the much broader provisions of the provincial statutes apply to both water storage and water withdrawals from a stream. However, similar economic constraints appear to be operating in the development of regulations under the *Fish Protection Act* as in the case of the Forest Practices Code. This has the potential to drastically reduce their effectiveness.
- ii. The Water Use Planning Process is proving to be by far a more effective tool for achieving adequate flows below hydro dams than the provisions of Section 22 of the *Fisheries Act*.

7.1.3 Water Quality

- i. The *Waste Management Act* complements the provisions of §36 of the *Fisheries Act* well. In general the two pollution control regulatory systems work well together.

7.1.4 General

- i. The *Fisheries Act* applies only to fish species supporting a fishery whereas provincial statutes can also apply to the protection of the habitat of other fish such as rare, threatened, endangered and regionally important species.
- ii. There are no provincial statutory provisions that parallel the DFO requirement for the physical replacement of fish habitat which will be damaged by a proposed development; this is the essence of the *No Net Loss Principle*. Although there are many provincial statutory provisions that help to prevent damage, none require habitat compensation.
- iii. The practical application of both the federal and provincial statutory regimes depends to a large extent on decisions made by professionals and managers in the field. Unless clear directives are available, there is a potential for inconsistency between regions/areas. DFO has addressed this issue to some degree through the *Habitat Conservation and Protection Guidelines* and the *Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat*. More refinement of the latter document is required, however, if full consistency is to be achieved and a practical worksharing agreement developed between DFO and MELP on project review and authorization. On the provincial side the discretion given to MOF district managers under the Forest Practices Code is leading to inconsistencies between districts (cf. treatment of S4 streams), and a similar potential exists under the *Fish Protection Act* provisions wherein water managers may consider the impact on fish habitat when making water licence decisions. Unambiguous direction will be required in the regulation currently under development to ensure consistency across the province.
- iv. The lack of statutory protection for fish habitat on private land remains a major concern. Although the *Fisheries Act* applies to private land, its practical application is limited by the difficulty in using it to regulate offstream activity, lack of formal referral mechanisms for forest lands, private property rights concerns, and limited monitoring. The recent provincial attempts to fill the gap through the *Forest Land Reserve Amendment Act*, streamside directives under the *Fish Protection Act* and the Partnership Committee on Agriculture and the Environment are well-intentioned but, as they rely heavily on the co-operation of the industry groups concerned, may not result in significant increased protection. A prime opportunity was lost to increase protection of riparian areas when agricultural land was exempted from the streamside directive provisions of the *Fish Protection Act*.

- v. Lack of a significant DFO presence in eastern BC is limiting the application of the *No Net Loss Principle* to major projects only. Loss of fish habitat is probably occurring on a widespread basis, particularly in the face of rapid expansion of the oil and gas industry in the Northeast.

7.2 Recommendations

- i. Provincial governments have dual mandates for environmental protection and economic development, with the latter always taking precedence in the long run. The federal government should, therefore, be very wary of delegating the key statutory provision for the protection of fish habitat in Canada, i.e. § 35 of the *Fisheries Act*.
- ii. However, even without formal delegation there is the potential for much greater division of labour between DFO and MELP regarding § 35 *Approvals*, with provincial staff unilaterally issuing letters of advice for proposed instream works or activities that fall below a certain threshold of potential disruption. This will require an improved version of DFO's Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD) guideline document to define HADD in much more detail and thus allow MELP staff to make decisions on proposals which, while they would affect fish habitat to some degree, would not cause HADD within the definition in the guidebook. For more certainty, it may be advisable to include the definition in a regulation under the *Fisheries Act*.
- iii. Once those guidelines are available MELP will need to prepare its own document that will provide guidance to staff on how to implement the federal guidelines in the context of the broader MELP mandate for wildlife, biodiversity, and fish that do not support a fishery. For the latter, the provincial government should develop an overall policy which will provide definite direction to MELP staff as is provided to DFO staff through the *No Net Loss Principle*.
- iv. The minimal number of staff in both DFO and MELP currently dealing with fish habitat protection in eastern BC is of major concern. There is a significant disparity between the level of protection afforded fish habitat there as compared to the rest of the province. If DFO is to be a "fish" habitat protection agency, not just a "salmon" habitat protection agency, it must find ways of improving its operations in that part of the province.
- v. A major gap in fish habitat protection throughout the province, not just eastern BC, is the problem of regulating activities (forestry, agriculture, urban development) on private land. Particular emphasis should be placed on continuing stewardship initiatives and co-operative development of guidelines, reinforced whenever possible by strengthened legislation.

- vi. If significant gains are to be made in fish habitat protection under the *Fish Protection Act* it will be essential that the regulations currently under development for sensitive streams and water licensing should be clear as to when and how fish flows must be taken into account. The discretion afforded to non-fisheries managers should be kept to a minimum. Also the regulations should be broad in scope, and not just restricted to a few streams, if they are to correct serious long-standing problems for fish in water short areas such as the Interior.
- vii. In future amendments to the Forest Practices Code it would be desirable to increase the number of situations which allow the DEO to specify measures for fish habitat protection as is currently the case for stream crossings. DFO should work with MELP in the identification of such possibilities, the development of the required measures, and in persuading the provincial government to adopt them. The Headquarters staff of both agencies should ensure as high a level of consistency as is possible across the regions with regard to the measures currently being specified and any to be developed in the future.
- viii. On the other hand DFO should play a more prominent role in supporting MELP to ensure that future amendments to the Forest Practices Code introduced for economic reasons are not detrimental to fish habitat protection.
- ix. If significant fish habitat protection benefits are to be obtained from the current environmental provisions in the *Municipal Act* and the streamside directive of the *Fish Protection Act*, federal and provincial assistance under such initiatives as the USHP will need to be continued.
- x. There are some discrepancies between DOE and MELP's regulatory regimes for effluent control with regard to toxicity and the concept of initial dilution zones. These discrepancies should be resolved between agencies before they become a major issue in some future court case.
- xi. DFO is planning to use some of the new Habitat Auxiliary program resources to monitor how fish habitat is being treated on private forest lands. It would be desirable to expand the monitoring role (in co-operation with MELP wherever possible) to include: i) the impacts of oil and gas exploration in northeastern BC; ii) the inclusion in the *Mines Act* Health, Safety and Reclamation Code of qualifiers such as "to the extent possible" in provisions for mine exploration access roads as compared to parallel provisions without qualifiers in the Forest Practices Code; iii) the actions of local government councils with regard to their decisions concerning the equivalency of their bylaws and permits with the provincial directive on streamside protection; iv) the effects of the inconsistencies resulting from the discretionary powers of MOF district managers to decide, for instance, whether to specify best management practices in riparian areas; and v) the effectiveness of the guidelines being developed for agricultural practices by the Partnership Committee on Agriculture and the Environment.

- xii. After-the-fact monitoring may not be useful in certain situations such as the potential detrimental effects of MOF's Pilot Projects to Improve the Regulatory Framework for Forest Practices which will permit the disapplication of the Code to 10% of the allowable annual cut. DFO should pay particular attention to this initiative on a proactive basis with a view to rigorous application of the *Fisheries Act*.
- xiii. Standardization of riparian protection areas should be pursued. Currently different standards apply to forestry on Crown land, forestry on private land, placer mining, agriculture and urban development, and none are completely compatible with the latest recommendations from DFO. Effectiveness monitoring of the various riparian protection regimes in place in BC would be useful in finalizing a province-wide standard.

APPENDIX I

List of Sources for Expenditure and Budget Data

Provincial

1. Ministry of Environment, Lands and Parks:

L. Bergman	250-387-3426	P. Khare	250-387-9987
G. Broadhead	250-387-1332	L. Kriwoken	250-387-9446
B. Cox	250-356-6831	A. Zackodnik	250-354-6372
D. Humphries	250-387-9401		

2. Ministry of Fisheries

K. Conlin	250-387-9582	A. Tautz	604-222-6763
P. Lewis	250-387-9553		

3. Environmental Assessment Office:

B. Cox	250-356-6831		
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4. Ministry of Forests:

5. Forest Practices Board:

M. Wyeth	250-387-7964		
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6. Land Use Coordination Office:

B. Cox	250-356-6831		
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7. Urban Salmon Habitat Program:

D. Buchwald	250-356-2353		
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8. Forest Renewal:

P. Lewis	250-387-9553		
A. Nicholson	250-953-4107		

(Science Council)

L. Reece	800-665-7222	P. Slaney	604-222-6761
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9. Fisheries Renewal:

A. McKay	604-660-0936		
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10. Habitat Conservation Trust Fund

L. Stanlake	250-387-1159	I. Stewart	250-356-5215
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11. CRII:

P. Lewis 250-387-9553

12. BC Hydro:

H. Smith 604-528-7811

13. Ministry of Transportation and Highways:

B. Archer 250-953-4929 M. Kent 250-387-7768

A. Buckingham 250-387-7766

14. Oil and Gas Commission:

A. Ackerman 250-787-3426

15. Water Use Planning Process:

K. Conlin 250-387-9582 S. Macfarlane 604-666-5529

16. Systems Operation Fund:

K. Conlin 250-387-9582 S. Macfarlane 604-666-5529

Federal

1. Department of Fisheries and Oceans:

A. Benke	604-666-3974	J. Rehal	604-666-3429
T. Harvey	250-756-7281	J. Pringle	250-363-6335
L. Jennings	867-393-6722	A. Rowland	604-666-7528
J. Jung	604-666-2948	M. Weston	250-363-8316
G. Logan	604-666-6810	E. Woo	604-666-2874
J. Macphee	250-627-3418	C. Yong	604-666-3282

2. Department of Environment:

A. Ho 604-664-9357

3. Canadian Environmental Assessment Agency:

J. Mathers 604-666-2431

4. Department of Public Works:

E. Domigen 780-497-3846 C. Kingman 604-666-3995

5. Department of National Defence:

A. Smith 250-363-4914 J. Watson 250-363-4914

6. National Energy Board:

G. Higginson 403-299-3672

APPENDIX II

List of Contacts for Review of Statutes

Provincial

1. Ministry of Environment, Lands and Parks:

A. Ackerman	250-787-3426	I. McDougall	250-751-3222
G. Alexander	250-387-9675	G. McKinnon	250-387-9592
P. Belliveau	250-371-6240	D. Morrison	250-751-3223
R. Cairns	250-387-6944	A. Peatt	250-490-8293
G. Carlson	604-582-5216	T. Pobran	250-387-9784
A. Chutter	250-378-8435	R. Ptolemy	250-356-7054
A. Cober	250-559-6247	D. Roberts	250-356-0874
B. Cox	250-356-6831	D. Russell	250-787-3487
B. Fuhr	250-847-7288	A. Soobotin	250-354-6354
C. Haddow	250-953-4627	R. Stewart	250-398-4549
D. King	250-565-6422	R. Thompson	250-365-5467
S. MacDonald	250-371-6238	L. Williams	250-356-6605

2. Oil and Gas Commission:

S. Fraser 250-261-5719

Federal

1. Department of Fisheries and Oceans:

K. Calla	604-666-1228	J. Lamb	250-756-7277
A. Cowan	250-559-4412	O. Langer	604-666-8171
G. Ennis	613-998-1048	S. Macfarlane	604-666-5529
J. Johansen	604-666-2057	B. MacDonald	250-756-7284
M. Farrell	604-666-4609	B. Reid	604-666-0514
G. Kosakoski	250-851-4959	S. Samis	604-666-0209

2. Canadian Environmental Assessment Agency:

J. Mathers	604-666-6961	P. Scott	604-666-2431
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APPENDIX III

List of Abbreviations

AOX	Adsorbable Organo-halides
BCEAA	<i>British Columbia Environmental Assessment Act</i>
CEAA	<i>Canadian Environmental Assessment Act</i>
CEPA	<i>Canadian Environmental Protection Act</i>
DEO	Designated Environmental Official
DFO	Department of Fisheries and Oceans
DOE	Department of Environment
DPA	Development Permit Area
FPC	Forest Practices Code
FRBC	Forestry Renewal BC
FsRBC	Fisheries Renewal BC
FSZ	Fisheries Sensitive Zone
HADD	Harmful alteration, disruption or destruction of fish habitat
LRMP	Land and Resource Management Plan
LRUP	Local Resource Use Plan
MELP	Ministry of Environment, Lands and Parks
MMLER	Metal Mine Liquid Effluent Regulation
MOF	Ministry of Forests
OCF	Official Community Plan
PAS	Protected Areas Strategy
PPER	Pulp and Paper Effluent Regulation
USHP	Urban Salmon Habitat Program
WAP	Watershed Assessment Procedure
WHA	Wildlife Habitat Area
WMA	Wildlife Management Area
WUP	Water Use Plan

End of Document