2004

Report of the

Commissioner of the Environment and Sustainable Development

to the House of Commons

Chapter 5

Fisheries and Oceans Canada—Salmon Stocks, Habitat, and Aquaculture

Office of the Auditor General of Canada

The 2004 Report of the Commissioner of the Environment and Sustainable Development comprises six chapters, and The Commissioner's Perspective—2004. The main table of contents is found at the end of this publication.

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Ce document est également disponible en français.

Cat. No. FA1-2/2004-5E
ISBN 0-662-37990-X

Chapter

5

Fisheries and Oceans Canada

Salmon Stocks, Habitat, and Aquaculture

The audit work reported in this chapter was conducted in accordance with the legislative mandate, policies, and practices of the Office of the Auditor General of Canada. These policies and practices embrace the standards recommended by the Canadian Institute of Chartered Accountants.

Fisheries and Oceans Canada

Salmon Stocks, Habitat, and Aquaculture

Foreword

To Canadians, salmon represents strong and deep ties to our heritage. Salmon has sustained families and communities for generations and has contributed significantly to the economies of British Columbia and the Maritime provinces. Salmon is also a key part of the recreational sports fishing industry on both coasts. Canada is the fourth largest farmed salmon producer in the world; salmon aquaculture provides substantial economic benefits for coastal and rural communities.

In recent years, however, salmon stocks on both the east and the west coasts have been under intense pressure, and Atlantic salmon commercial fisheries in the Maritime provinces have been closed for many years to safeguard the resource. There has been considerable discussion of the effects of salmon aquaculture on wild salmon and the marine environment, including opposition to net-pen salmon farming operations from environmental groups and negative media coverage.

The Auditors General of Canada, British Columbia, and New Brunswick are tabling separate reports to their respective legislatures on salmon-related issues. Between 1997 and 2000, the Auditor General of Canada conducted three audits that focussed on Pacific salmon, and this year it completed a follow-up of these audits in collaboration with the two provincial audit offices. The Auditor General of British Columbia examined the provincial government's role in sustaining wild salmon, and the Auditor General of New Brunswick looked at salmon aquaculture in that province.

Fisheries and Oceans Canada is responsible for ensuring that salmon and their habitat are protected, and it is the lead federal agency for aquaculture development. The provincial governments in British Columbia and New Brunswick have strongly supported the development of aquaculture in their provinces. In British Columbia, various provincial departments are responsible for managing lands and natural resources in ways that sustain wild salmon.

Our three audits were performed concurrently; our offices participated jointly in certain audit-related processes and shared information on a regular basis. As a result, we were able to accomplish more with less duplication of effort and achieve a broader view and understanding of the issues.

Wild salmon and their habitat

The purpose of policy is to provide a broad framework for a shared vision to guide decisions and activities. Canada's policy on salmon and salmon aquaculture should set clear objectives for managing both wild and farmed salmon and the interactions between them. At the federal level, Fisheries and Oceans Canada has been struggling since 2000 to finalize a wild salmon policy designed to conserve the genetic diversity of wild salmon and protect their habitat. Stakeholders have called for the policy to be finalized to clarify how conservation should be implemented and how fisheries should be managed. At the provincial level, British Columbia does not have a clear vision and an overarching strategy for wild salmon sustainability.

Two of our three audits noted gaps in policy implementation. Fisheries and Oceans Canada, for example, has never reported on the status of fish habitat conservation in Canada or assessed the effectiveness of its Habitat Policy. These continue to be significant challenges for the Department. Similarly, reporting by provincial ministries and agencies in British Columbia on performance relating to sustaining wild salmon is weak.

Salmon aquaculture

All three audits identified gaps in co-ordination between the federal and provincial governments. Despite numerous committees, agreements, and protocols between the two provinces and the federal government, problems still exist. For example, there are concerns about how long it takes to secure approvals for aquaculture sites, a key aspect of regulating salmon aquaculture.

The three audits also found significant gaps in the scientific knowledge about the potential effects of salmon aquaculture. Fisheries and Oceans Canada's Aquaculture Policy Framework expresses a strong commitment to developing a sustainable aquaculture industry in Canada. But when assessing applications for aquaculture sites, the Department needs to apply more credible, science-based criteria to ensure that approved sites are properly located. It has had difficulty assessing the cumulative effects of salmon aquaculture on wild salmon stocks. And it has to determine how to control the deposit of deleterious substances by salmon aquaculture operations. Wild salmon and habitat remain susceptible to the effects of salmon aquaculture.

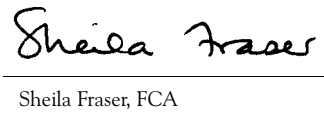
In New Brunswick, auditors found that stakeholders have yet to share a common vision of sustainable aquaculture. Therefore the Province lacks a comprehensive strategy for aquaculture development and the management of significant risks. In addition, there are deficiencies in both the monitoring of aquaculture activities and the enforcement of compliance. For example, the provincial government does not adequately monitor aquaculture producers' compliance with the terms of their leases and aquaculture licences. Unlike British Columbia, New Brunswick does not monitor escapes from salmon cages, nor does it require that escapes be reported.

The Salmon Aquaculture Policy Framework of the Province of British Columbia calls for relocating a number of sites that are poorly located and implementing new siting criteria, but key issues remain undecided. British Columbia's guidelines, and siting decisions made in New Brunswick, are based on scientific information that is less than complete.

Need for prompt, concerted action

Concerns about salmon and salmon aquaculture are not new, and neither are attempts to improve the state of the resource and its habitat. But progress has been slow. In the meantime, some salmon populations are in trouble, habitat loss continues to occur, and it is not known what long-term effects salmon aquaculture is likely to have on the natural resource or the environment.

Prompt, concerted action is required if the salmon fisheries and salmon aquaculture are to be sustainable. It is also imperative that more than a single level of government be involved in the solution. The collaboration of a variety of agencies within each government and between governments is essential. We urge our respective governments to take immediate action on these important issues.



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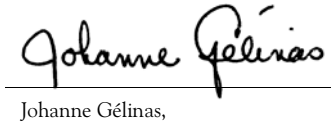
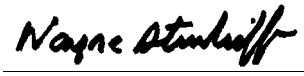


Johanne Gélinas,
Commissioner of the Environment and Sustainable Development



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The chapter "Fisheries and Oceans Canada—Salmon Stocks, Habitat, and Aquaculture" is available on the Office of the Auditor General of Canada Web site (www.oag-bvg.gc.ca). For copies, contact

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The report "Salmon Forever: An Assessment of the Provincial Role in Sustaining Wild Salmon" is available on the Office of the Auditor General of British Columbia Web site (www.bcauditor.com). For copies, contact

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Main Points

5.1 Overall, we are not satisfied with the progress made by Fisheries and Oceans Canada in responding to the recommendations we made in the three previous audits in 1997, 1999, and 2000. While many stocks are abundant, some Atlantic and Pacific salmon stocks are in trouble. We continued to identify significant gaps in managing risks.

- The Department has not finalized the Wild Salmon Policy, which would set out clear objectives and guiding principles. The policy would also bring together biological, economic, and social factors—for fisheries and resource management, habitat protection, and salmon enhancement.
- There are shortcomings in information on salmon stocks and habitat and scientific knowledge on the potential environmental effects of salmon aquaculture in aquatic ecosystems.
- There are weaknesses in regulatory approvals, enforcement, and monitoring of salmon aquaculture operations. This includes approving aquaculture site applications, assessing cumulative effects, and monitoring salmon aquaculture operations to prevent harmful destruction of habitat.
- There has been inadequate co-ordination between federal and provincial governments in managing fish habitat, undertaking research, approving aquaculture site applications, and sharing information.

Background and other observations

5.2 Atlantic and Pacific salmon are a vital part of life on the east and west coasts of Canada. They generate a wide range of economic, social, and cultural benefits for Canadians. Maintaining biologically-diverse and abundant salmon stocks is important in preserving this unique part of Canada's heritage.

5.3 Management of the salmon resource and its fisheries is very complex. This complexity is due to several factors: the biology and behaviour of salmon; the large number of stocks; the competing demands and diverse interests of environmental organizations, First Nations, the commercial fisheries industry, the recreational communities, and other stakeholders; ongoing First Nations treaty negotiations; changing climatic and ocean conditions; and changes to wild salmon habitat. In addition, the recently enacted *Species at Risk Act* introduces new protection requirements.

5.4 Fisheries and Oceans Canada has the responsibility and legislative authority under the *Fisheries Act* to ensure that salmon and their habitat are

protected. The Department is also the lead federal agency for the development of aquaculture. In British Columbia, the federal and provincial governments share responsibility for conserving and protecting wild salmon and their habitat. The federal and provincial governments also share responsibility for regulating salmon aquaculture in British Columbia and New Brunswick.

5.5 In previous years, we conducted three audits on the management of Pacific salmon. In 1997, we reported that Pacific salmon stocks and habitat were under stress. In 1999, we found that Pacific salmon fisheries were in trouble. The long-term sustainability of the fisheries was at risk because of overfishing, habitat loss, and other factors. In 2000, we reported that Fisheries and Oceans Canada was not fully meeting its legislative obligations to protect wild Pacific salmon stocks and their habitat from the effects of salmon aquaculture operations.

5.6 In 2003, we revisited the Department to assess its progress in conserving and protecting salmon stocks and their habitat, ensuring sustainable use of salmon fisheries resources, and regulating salmon aquaculture in British Columbia. We also looked at salmon aquaculture in New Brunswick as well as the current situation with Atlantic salmon stocks in the Maritime provinces.

5.7 In response to the financial pressures it faces, the Department completed a Departmental Assessment and Alignment Project to assess all its policies, programs, and activities during our audit. As well, it has been working to assess all its expenditures, to identify ways to work more efficiently, and to modernize management and financial planning processes. These activities are expected to result in a more risk-based approach to managing areas such as stock assessment, habitat, and aquaculture. We did not audit these activities.

The Department has responded. Fisheries and Oceans Canada's responses to our recommendations are included in this chapter. The Department has accepted all our recommendations and has provided individual responses. The responses include statements of actions already under way or planned to address the recommendations.

Introduction

Significance of Atlantic and Pacific salmon and salmon aquaculture in Canada

Did you know?

The seven species of North American Pacific Salmon are:

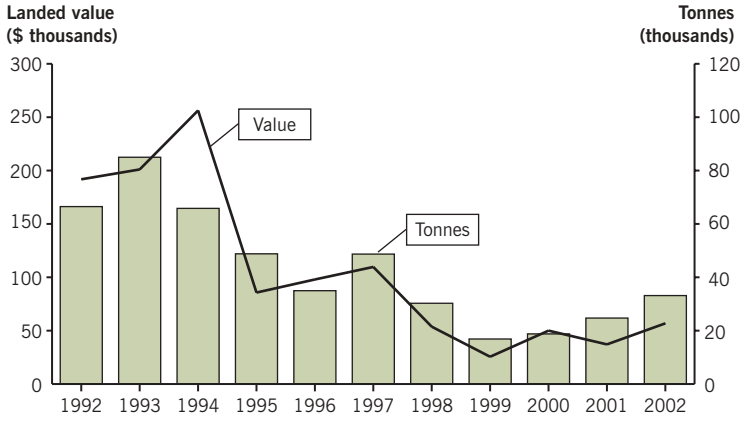
- **pink** (most abundant)
- **coho***
- **chum**
- **sockeye**
- **chinook***
- **cutthroat**
- **steelhead**

*also raised in aquaculture

5.8 Atlantic and Pacific salmon are important for Canadians. The various species of Pacific salmon have been a vital part of life on the Pacific coast of Canada, and they continue to generate a wide range of economic, social, and cultural benefits. Both Atlantic and Pacific salmon are a primary food source for First Nations people. Conserving salmon stocks and their habitat is an important step in preserving this unique part of Canada's heritage.

5.9 Pacific salmon are harvested by First Nations, commercial fishermen, and recreational anglers. Due to a variety of factors including conservation measures and declining market prices, the commercial catch of wild Pacific salmon has decreased substantially from 1992 to 2002 (Exhibit 5.1).

Exhibit 5.1 Commercial landings of wild Pacific salmon 1992–2002



Source: Fisheries and Oceans Canada

A First Nation fisher waits for a catch with his spear.

Source: Fisheries and Oceans Canada

5.10 There has been a significant decline in the number of wild Atlantic salmon that return to spawn in the rivers in the Maritime provinces. All commercial fisheries for wild Atlantic salmon in New Brunswick have remained closed since 1985.

A commercial fishing vessel

Source: Fisheries and Oceans Canada

5.11 Canada is the world's fourth largest salmon aquaculture producer, behind Norway, Chile, and the United Kingdom. Canada's production comes mainly from British Columbia and New Brunswick. In 2002, these two provinces produced approximately 128.8 thousand tonnes of farmed salmon, compared with approximately 29.8 thousand tonnes in 1992. There are approximately 121 salmon aquaculture sites in British Columbia and approximately 96 sites in New Brunswick. In 2002, the industry estimated that it had generated over 7,000 direct and indirect jobs in these two provinces. In British Columbia, salmon aquaculture production is dominated by farmed Atlantic salmon (approximately 85 percent); farmed Pacific salmon

(chinook and coho) are also produced. In New Brunswick, only farmed Atlantic salmon are raised, predominantly in the Bay of Fundy. Most Canadian production is exported.

What we said in previous reports

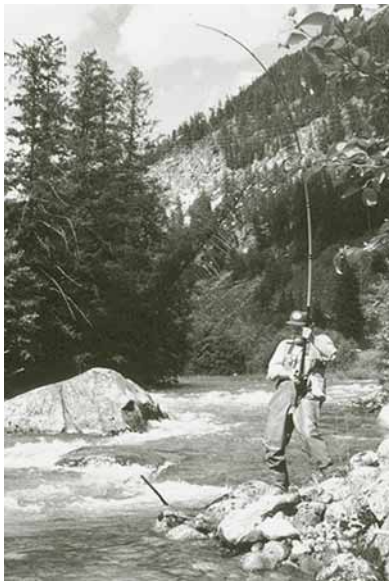
5.12 In the past seven years, we conducted three audits on the management of Pacific salmon. In 1997, we reported that Pacific salmon stocks and habitat were under stress. Canada's ability to sustain Pacific salmon at the existing level and diversity was questionable, given the various factors influencing salmon survival, many of which were beyond its control. While Fisheries and Oceans Canada helped build up major salmon stocks, other stocks were declining. Habitat loss may have contributed to these declines, but no overall status report from the Department was available to assess the impact of habitat loss on salmon.

Stock—populations of a salmon species that are grouped for management purposes.

5.13 In 1999, we reported that the Pacific salmon fisheries were in trouble. The long-term sustainability of the fisheries was at risk because of overfishing, habitat loss, and other factors. The result was a fisheries management crisis that had cast a cloud of uncertainty over the future of the salmon fisheries.

5.14 In 2000, we reported that the Department was not fully meeting its legislative obligations to protect wild Pacific salmon stocks and habitat from the effects of salmon aquaculture operations. We also reported that salmon aquaculture has the potential to create additional stress on wild salmon stocks over time, particularly if the industry expands.

Responsibility for conserving and protecting wild salmon and their habitat and regulating salmon aquaculture is shared



Anglers are part of a large group of recreational fishers.

Source: Fisheries and Oceans Canada

5.15 Fisheries and Oceans Canada has the responsibility and legislative authority under the *Fisheries Act* to ensure that fish and their habitat are protected. It is also the lead federal agency for aquaculture development. In 2000, the Department established the Office of Sustainable Aquaculture to increase policy and program coherence to federal aquaculture initiatives. In 2001, the Department released its second sustainable development strategy for the period 2001–03.

5.16 In British Columbia, the decision-making processes for land and water use generally fall within the mandate of the province. Since 1997, the federal government and the province have entered into agreements to deal with issues concerning Pacific salmon fisheries and to improve the co-ordination of activities to protect their habitat.

5.17 The federal government and the provinces share responsibility for regulating aquaculture operations. Under the 1988 British Columbia and 1989 New Brunswick Memoranda of Understanding on Aquaculture Development, the provinces have the primary responsibility to manage and develop the aquaculture industry in consultation with Fisheries and Oceans Canada. The Department has regulatory responsibility in some areas, including conducting environmental assessments and ensuring that all sites meet the requirements of the *Fisheries Act*. Until 28 March 2004, it also had

responsibility for the *Navigable Waters Protection Act*, which has since been transferred to Transport Canada. As stated in its 1995 Federal Aquaculture Development Strategy, the Department must ensure that its activities to develop aquaculture are consistent with sustainable development.

5.18 In fact, there are many federal departments and agencies involved either directly or indirectly in aquaculture. For example, responsibility for administering section 36 of the *Fisheries Act* dealing with the deposit of a deleterious substance has been delegated to Environment Canada under a 1985 memorandum of understanding. However, the minister of Fisheries and Oceans is accountable to Parliament for all sections of the *Fisheries Act*.

Deleterious substance—any substance that would degrade or alter the quality of the water.

Focus of the audit

5.19 Our follow-up focussed on the action taken by Fisheries and Oceans Canada on the key observations and recommendations in chapters 28, 20, and 30 respectively of our 1997, 1999, and 2000 reports. The objective was to determine the progress made by the Department in conserving and protecting salmon stocks and habitat, ensuring the sustainable use of the salmon fisheries resource, and regulating salmon aquaculture in British Columbia. We also looked at salmon aquaculture in New Brunswick as well as the current situation with Atlantic salmon stocks in the Maritime provinces. For more information on our audit, see **About the Audit** at the end of the chapter.

5.20 At the time of our follow-up, the Department was facing significant financial pressures. It has completed a Departmental Assessment and Alignment Project to assess all its policies, programs, and activities. It will consider options required to renew its policies and programs, strengthen management practices, and stay within existing budget levels.

Observations and Recommendations

Managing and protecting salmon resources

Spawning salmon need clean water and a clean gravel bed, so that their eggs can safely grow to the alevin stage, which occurs once the eggs have hatched.

Source: Fisheries and Oceans Canada

Wild Salmon Policy not finalized

5.21 In 1997, we recommended that the Department clarify the extent to which it intends to apply practices in sustainability and genetic diversity to the management of individual Pacific salmon stocks and their habitats. We also recommended that the Department develop more explicit operational objectives and targets for salmon stocks in its fishery management plans. In 1999, we recommended that the Department apply the precautionary approach to the management of salmon fisheries by establishing catch levels and conservation units (groupings of one or more populations).

5.22 Each of the wild Pacific salmon species is comprised of a number of separate genetic groups, each adapted to different spawning and rearing conditions. Maintaining the biodiversity and abundance of salmon stocks is important to preserving this resource.

5.23 In 2000, we reported that the Department had released the draft Wild Salmon Policy for consultation and was aiming to finalize the policy in spring

2001. The policy would provide a framework for defining conservation objectives for wild salmon. The policy would also include direction for fisheries and resource management, habitat protection, and salmon enhancement. However, the policy was not yet completed at the writing of this Report in mid–2004.

5.24 The Department now expects to finalize the Wild Salmon Policy in December 2004. It explained that additional time was necessary for extensive internal review of specific issues such as

- determining the level of genetic diversity necessary to conserve salmon,
- dealing with the implications of the new *Species at Risk Act*,
- developing an open and transparent process to consider social and economic factors in addition to biological factors, and
- completing consultations with stakeholders.

5.25 This policy is long overdue. Stakeholders have called for the policy to be finalized to clarify how conservation should be implemented and how fisheries should be managed. Decision making in the Department is hampered by uncertainty over how to measure genetic diversity and how to balance biological, social, and economic factors.

5.26 For example, the Department undertook a post-season review of the 2002 Fraser River sockeye fishery. The review identified that there were no clear objectives for the conservation of wild salmon. There was no consensus over conservation units, goals for escapement (number of fish returning to their rivers of origin to spawn), and acceptable risks for managing the fishery. We also noted that the Department's 2003 Integrated Fishery Management Plan did not include a framework to manage risks that is based on science or a detailed risk analysis of management options. Nor did the plan include socio-economic benefits or long-term goals for escapement.

5.27 At the time of this follow-up, the Department was still working on developing principles and operational guidelines on resource management, habitat management, and salmon enhancement, as well as establishing conservation units.

5.28 **Recommendation.** Fisheries and Oceans Canada should finalize the Wild Salmon Policy to define conservation objectives and provide direction for the management of fisheries, protection of habitat, and salmon enhancement.

Department's response. Fisheries and Oceans Canada is nearing completion of a draft of the Wild Salmon Policy. Following regional and national review and approval, the policy will go to consultation and final departmental approval. The policy will then be released as soon as possible.

A number of salmon populations are in trouble

5.29 Although there are indications of good returns of certain Pacific salmon stocks to waters in some geographical areas of British Columbia in 2003, a number of Pacific and Atlantic salmon populations remain a

conservation concern. There are concerns that the biodiversity of salmon is at risk. Meanwhile, there is a lack of comprehensive information, which prevents a complete assessment of the status of Pacific salmon stocks.

5.30 Some wild Pacific salmon stocks are in trouble. For example, the Committee on the Status of Endangered Wildlife in Canada designated the interior Thompson River coho as endangered in May 2002. In October 2002, the Committee designated the Cultus Lake and Sakinaw Lake sockeye as endangered in an emergency assessment and in May 2003 confirmed their status.

5.31 On the east coast of Canada, we have seen a long, steady decline of Atlantic salmon stocks over a 20 to 25 year period. Acid rain, habitat loss, at-sea mortalities, and overfishing have contributed to this decline. The persistent failure of wild salmon stocks to achieve the Department's conservation targets in many areas of the Maritimes resulted in the closure of Atlantic salmon commercial fisheries about 20 years ago. In particular, the inner Bay of Fundy populations are in a critical state (the estimated number of wild adult Atlantic salmon in the 33 rivers of the inner Bay of Fundy in 2003 was less than 200); in 2001, they were all designated as endangered. They are now listed in the *Species at Risk Act*. The Department has completed a recovery strategy for these populations, but their recovery is not anticipated before 2015.

Did you know?

Number of rivers with reported Atlantic salmon in the Maritime provinces: **more than 150**

Prompt action is required to protect weak wild salmon populations

5.32 In 1999, we recommended that the Department build adequate safeguards into fishery management plans to protect stocks at risk and ensure these plans include formal recovery plans for stocks at risk. Since our 1999 audit, the Department has undertaken a number of measures to conserve weak stocks, mostly through limiting fishing opportunities or by reducing the catch rate.

5.33 On 5 June 2003, most of the provisions in the *Species at Risk Act* came into force. The legislation requires the Department to develop and implement recovery strategies as well as action and management plans, and to identify critical habitat necessary for the survival and recovery of an aquatic species listed in the Act. As of 1 June 2004, it is an offence to kill, harass, harm, or capture a listed species.

5.34 Environment Canada is the lead department for the *Species at Risk Act*. When the federal government receives an assessment of the status of a wildlife species from the Committee on the Status of Endangered Wildlife in Canada, the minister of the Environment must include a report in the *Species at Risk Act* Public Registry within 90 days. This report, called a response statement, describes how the minister intends to respond to the assessment and also provides time lines for action. Within nine months of receiving the assessment, the Governor in Council may accept the assessment and add the species to the List of Wildlife Species at Risk in the Act, reject it, or send it back to the Committee for clarification or more information.

5.35 While the Committee designated the Cultus Lake and Sakinaw Lake sockeye as endangered in October 2002 and confirmed their status in May 2003, the minister of the Environment officially received the assessments and included them in the Public Registry only in January 2004. The minister released the response statements for these stocks in April 2004. On 21 April 2004, the Governor in Council issued an order acknowledging receipt of the assessments; a decision about whether or not to list the species in the Act is expected within nine months of that date.

5.36 Meanwhile, these stocks are at very depressed levels. For example, the average number of Sakinaw sockeye returning to spawn from 1997 to 2002 was about 80. As a result, the population is at a high risk of extinction and is also vulnerable to poachers, predators, habitat loss, low water levels, and, even to a limited extent, fishing. Lack of prompt action may push these stocks even closer to extinction.

5.37 While three Pacific salmon populations have been designated as endangered, it is expected that other salmon populations will also be similarly designated. The Department must take action in a timely manner to avoid the need for the designation or listing of more salmon populations as endangered. It is important that fisheries management plans include formal plans and measures to protect weak salmon populations. It is also important that the Department's Wild Salmon Policy operate in a manner that is compatible with the *Species at Risk Act*.

The role of hatcheries in the enhancement of salmon is still being questioned

5.38 The Salmonid Enhancement Program is a key program in the Department's Pacific Region with expenditures of approximately $25 million in 2003–04, including about $17 million for hatcheries. The Department delivers this program in collaboration with some 10,000 volunteers and stream keepers. The program provides for habitat restoration, education, public information, First Nations involvement, and research related to enhancement.

A juvenile salmon, which was bred in a hatchery, at the fry stage

Source: Fisheries and Oceans Canada

5.39 Within the Pacific program, salmon hatcheries are a major activity; these projects release approximately 600 million juvenile salmon into the streams each year. They are released into the wild primarily to support sport and commercial fisheries. The Department estimates that hatchery-bred salmon account for about 20 percent of the total salmon catch in British Columbia.

5.40 In 1986, we raised concerns about salmon hatcheries. We recommended that Fisheries and Oceans Canada assess and report the actual costs and benefits of key components of the Salmonid Enhancement Program. Since 1977, salmon enhancement has been used to rebuild stocks to maintain and contribute to fishing opportunities. A 1994 departmental assessment found that enhancement must be reconciled with the conservation of wild salmon; in particular, wild stocks must be protected from the potentially negative effects of stocks raised in hatcheries. Since 1994,

there has been no comprehensive evaluation of the effectiveness of salmon hatcheries.

5.41 Hatchery-bred salmon are different from wild salmon. According to the Department, hatchery-bred salmon can have negative effects on wild salmon. For example, salmon enhancement may, over time, erode the biological diversity of the wild salmon stocks. In fisheries with relatively large numbers of hatchery-bred salmon, there is a serious risk of over-harvesting wild salmon, as fishers cannot distinguish between the more abundant hatchery-bred salmon and the less plentiful wild salmon when fishing.

Hatchery-bred salmon—various species of Pacific salmon are raised in hatcheries. Eggs are taken from female salmon, fertilized with milt from males, and incubated under controlled conditions. Juveniles are reared in containers; they are released as fry to migrate to the ocean.

5.42 In view of the significant expenditures incurred in salmon hatcheries and their negative effects on wild salmon, we believe there is a need to evaluate the role of salmon hatchery production and its consequences on managing and conserving wild Pacific salmon. We understand that salmon enhancement, including the role of hatcheries is a key component of the Wild Salmon Policy—which has not yet been finalized.

Did you know?

Number of hatcheries in British Columbia that produce salmon: **over 120**

Main species of Pacific salmon produced in hatcheries: **coho, chinook, chum**

5.43 The salmon enhancement program on the East coast was eliminated several years ago, closing most hatcheries. However, the Department continues to fund the operation of the Mactaquac hatchery in New Brunswick as a biodiversity facility to maintain a gene pool for endangered salmon stocks. The Department also operates two hatcheries in Nova Scotia for the same purpose. It feels that the maintenance of inner Bay of Fundy salmon in these facilities will be key to recovery plans.

Allocation and consultation issues remain in salmon fisheries

5.44 In addition to the lack of a finalized Wild Salmon Policy, allocation and consultation problems remain in Pacific salmon fisheries. The issue of allocating the amount of salmon that First Nations, commercial, and recreational fishers can take has been the subject of debate for a number of years. User groups have stated that decisions about allocating the amount of salmon to be caught should be more predictable. In our 1999 Report, we recommended that the Department act on its proposal to establish an independent allocation board as soon as possible.

A hatchery worker transfers salmon fry from one container to another.

Source: Fisheries and Oceans Canada

5.45 In 1999, the Department issued an allocation policy, which called for establishing an impartial board to deal with salmon allocation issues in an open and transparent manner. However, the Department did not establish an independent allocation board. As indicated earlier, the Department stated that it is undergoing a comprehensive review of its programs, services, and expenditures. The proposed board, if needed, will be considered in the context of this review.

5.46 In 1999, we recommended that the Department evaluate its consultation process, with input from stakeholders, to identify where improvements are needed before it finalizes its policy for improved decision making. Subsequently, the post-season review of the 2002 Fraser River sockeye fishery identified concerns about the transparency, participation, and timeliness of consultations on pre-season management plans and in-season decision making.

5.47 Since March 2004, the Department has approved a national Consultation Framework and Toolbox (the Toolbox provides a description of the consultation process, tools and templates, and references and resources), and adopted a policy to govern advisory bodies. In the Pacific Region, the Department has also established an integrated salmon advisory process. However, the Pacific Region has only begun to implement these initiatives. It has not yet incorporated First Nations consultations into this new approach.

Information on Pacific salmon stocks and habitat

Significant deficiencies continue to exist with respect to information on Pacific salmon stocks and habitat

5.48 In previous reports, we found that the Department's information on Pacific salmon stocks and habitat was incomplete. The limited information precluded a complete assessment of the status of salmon stocks. We also reported that further improvements in the databases on catch, escapement, and habitat are needed. In this audit, we continued to identity shortcomings in these areas.

5.49 We found that stock assessments have improved in quality, but they are still limited to assessing larger populations and a few populations that are weak. There are areas of the Pacific coast where information is non-existent. There are also no formal assessments for the majority of Fraser River sockeye stocks. We observed that a number of salmon stocks had not been assessed in the last three years, and the status of several of those was believed to be poor or below average. It is not realistic to assess all stocks each year, but we believe that the Department needs to ensure that it has up-to-date assessments on stocks that are below departmental targets and declining.

5.50 There are questions about the availability and quality of departmental data. For example, the post-season review of the 2002 Fraser River sockeye fishery showed that users were critical of the data available to manage the Fraser River sockeye fishery. There were concerns whether in-season estimates of abundance, migration timing and route, stock composition, and catch reporting were timely, adequate, or accurate.

5.51 Progress in improving the monitoring and catch reporting in the commercial salmon fishery has been modest. In February 2002, the Department released a Pacific Region Fishery Monitoring and Reporting Framework, which calls for developing an action plan and setting standards to improve the accuracy and timeliness of catch reporting. At the time of our follow-up, the Department was seeking input from stakeholders to develop an improved system to monitor the fishery.

5.52 There is limited information available on the status of the conditions of salmon habitat. We found very few habitat status reports that had been reviewed and published by the Department's Pacific Scientific Advice Review Committee. It provides scientific information and advice to the Department and other bodies on the status of stocks and habitat and the potential biological consequences of actions to manage the fisheries.

5.53 A recent departmental review of habitat information management found that the Department and the Province of British Columbia have made

progress in improving how the information on salmon stocks and habitat is collected and managed. However, the review concluded that there are still problems in managing habitat information. For example, there continues to be no simple access for departmental managers and users to current and complete data, and a lack of key technical data for many watersheds, including limited information about small streams.

5.54 **Recommendation.** Fisheries and Oceans Canada should collect and analyze information to provide up-to-date assessments on habitat conditions and Pacific salmon stocks that are below departmental targets and declining.

Department's response. Fisheries and Oceans Canada collects habitat information in partnership with community groups, the Province of British Columbia, and industry sectors. These assessments are accessible in a variety of ways, including watershed atlases and on-line digital mapping. The assessments will continue and expand as new partnerships are developed.

Recently developed planning tools, in conjunction with the Pacific Scientific Advice Review Committee, provide a basis for the prioritization of salmon stock assessment activities, with focus on key fisheries and weaker stocks that may be at risk.

Managing and protecting salmon habitat

Departmental reviews raise questions as to whether an overall net gain of habitat is being achieved

5.55 The overall objective of the Department's Policy for the Management of Fish Habitat (Habitat Policy) is to achieve an overall net gain or increase in the amount of habitat available to salmon. In 1997, we reported that habitat loss was a major problem. The Department had neither prepared an overview report on the status of fish habitat conservation in Canada, nor had it conducted a review of the effectiveness of its Habitat Policy to conserve and protect habitat since its adoption in 1986.

Did you know?

Sockeye salmon cannot be successfully moved from one lake to another when their habitat is destroyed.

5.56 In 1997, we also recommended that the Department devote more time and effort to monitor compliance (with the terms and conditions of development projects approved by the Department) and follow-up in order to assess the effects of its decisions about managing fish habitat and its performance towards the achievement of "no net loss" of habitat. In response, Fisheries and Oceans Canada undertook a number of reviews and scientific evaluations, which identified concerns about whether the guiding principle of no net loss of habitat on a project level was being achieved.

Clear-cutting of logs creates erosion, which may affect salmon spawning beds.

Source: Fisheries and Oceans Canada

5.57 For example, in 2000, the Department reviewed the measures to restore fish habitat implemented by coastal log-handling facilities in British Columbia from 1994 to 1999. It looked at a total of 35 files and found that no net loss of habitat was achieved at only a few locations investigated. In a few cases, the review noted that it was not possible to determine whether no net loss of habitat at specific sites had been achieved, as no monitoring was done at the facilities after work had been completed. In addition, the reports on environmental assessment and monitoring, which the Department had examined, were of inconsistent quality and use, as there were no standard reporting requirements or format.

Coastal log-handling activities can damage salmon habitat.

Source: Fisheries and Oceans Canada

5.58 If the Department considers that a proposed development project will result in a harmful destruction of habitat, it will only issue an authorization if compensatory habitat can be constructed by the proponent to offset the residual effects from the project. A recent departmental review of 52 authorizations and associated habitat compensation projects across Canada (including 36 in the Pacific Region) identified that many projects resulted in net losses in habitat. Most projects had either larger destruction to habitat or smaller compensation than had been authorized.

5.59 There are indications that habitat loss is continuing. As the Habitat Policy has been in effect for many years and does not seem to be working, we suggest that the Department re-examine the objectives of the policy and make it work.

Limited information to Parliament on the Department's performance in meeting the objectives of the Habitat Policy

5.60 Section 42.1 of the *Fisheries Act* requires the minister of Fisheries and Oceans to prepare and table a report, as soon as possible after the end of each fiscal year, on administering and enforcing the provisions of the Act relating to fish habitat protection and pollution prevention. We would expect the Department to submit this report in a timely manner and to provide information on achieving the objectives and goals of the Habitat Policy.

5.61 The tardiness in providing this report to Parliament has been a long-standing problem. The last report for the fiscal year ended 31 March 2002 was tabled only in February 2004. While the report describes numerous activities related to protecting habitat and enforcing the provisions of the Act, there is limited information on the extent to which the Department is achieving the objectives and goals of the Habitat Policy.

Need for a risk-based and streamlined approach

5.62 In 1997, we reported that the project referral system was the primary tool used to conserve habitat. Under the system, individuals, companies, and agencies refer projects involving land, river, and marine development projects to both the Department and the Province of British Columbia for review. This is to determine whether changes to fish habitat are likely to occur. We recommended that the Department work with the province to improve efficiencies in the referral system, subject to an appropriate accountability framework being put in place to satisfy the Department's mandate to protect fish habitat.

5.63 The Department advised us that British Columbia has withdrawn from the referral process for protecting fish habitat; the province now uses a results-based approach. The Department is concerned that the results-based approach, as set out by the province, is likely to have a significant effect on its own work. For example, the provincial government has introduced a regime for results-based forest and range practices, focussing on outcomes rather than paper review processes. The changes to the provincial forest legislation will require the Department to examine its own involvement in the review process for forest development, including acceptable streamside protection

A proposed development project has barriers at the riverbanks to prevent erosion of soil, which could be carried downstream to salmon spawning areas.

Source: Fisheries and Oceans Canada

standards and guidelines to limit logging activities beside small and feeder streams.

5.64 At the time of our audit, the Department did not have a national risk management framework to manage habitat. In the Pacific Region, the review process assumed all habitat projects are equally important or that all projects have equal impacts, rather than focussing on projects and areas that pose the greatest risk to fish habitat. We believe that the Department needs to work with the Province of British Columbia using a risk-based approach that would both complement the provincial approach and satisfy the Department's mandate for habitat management and protection.

5.65 The Department is now revamping its approach to managing fish habitat. It has recently introduced an action plan aimed at improved management of program risks, improved program coherence, increased efficiency in program delivery, and strengthened partnerships with others. A key element of the plan is developing a risk management framework for the habitat management program. This framework will involve realigning its regulatory review efforts towards those projects and areas with the greatest risk to fish habitat. Projects will be identified as low, medium or high risk to fish habitat, and the Department will develop streamlining tools with its partners.

5.66 **Recommendation.** Fisheries and Oceans Canada should co-ordinate efforts with the Province of British Columbia, using a risk-based approach that would both complement the provincial approach and satisfy its own mandate to manage and protect fish habitat.

Community volunteer assists in restoring salmon habitat.

Source: Fisheries and Oceans Canada

Department's response. As part of an overarching environmental modernization process, Fisheries and Oceans Canada is implementing a science-based risk management framework that focusses on the highest risks to fish habitat. Consultations are ongoing with provinces, territories, industry sectors, and environmental groups. In British Columbia, a working group has been exploring ways to achieve one-window service delivery for proponents. In addition, a Canada–British Columbia Committee on Regulatory Reform is conducting several pilot projects that will lead to the renewal of the Canada–British Columbia Agreement on Fish Habitat Management, signed in 2000. Fisheries and Oceans Canada has also collaborated with British Columbia in the development of its new Riparian Areas Regulation, which will come into force in 2005. It meets the requirements of the *Fisheries Act* and is intended to provide a more streamlined, results-based approach for developers in determining setback requirements.

Limited progress in improving community-based fish habitat planning

5.67 In 1997, we reported that more community involvement in planning is needed. We recommended that the Department increase its level of participation in initiatives for regional and community-based planning. Since 2001, a new process called Watershed-based Fish Sustainability Planning has been in place to help governments, First Nations, and non-government

groups to contribute to conserving and recovering fish stocks and their habitat in British Columbia.

5.68 This approach that focusses on watersheds, offers the opportunity for more efficient and strategic delivery of federal-provincial responsibilities and stronger partnerships with stakeholder groups. However, a review in 2003 sponsored by the Department and the Province of British Columbia found that the new planning process has, to date, lacked the necessary direction, structure, and resources to generate effective results. In particular, it lacks a common framework for federal-provincial co-operation and community partnerships in the planning process. Key factors affecting the planning process include lack of long-term federal and provincial government commitments, inadequate departmental staff commitments, and confusion over the roles of community groups and government in the plans. A more structured approach is needed to reduce uncertainty and to more effectively plan for conserving fish in watersheds. At the time of our follow-up, the Department was considering an implementation strategy and work plan as recommended by the review.

Salmon aquaculture

The Department has put in place an aquaculture policy framework

5.69 The Department recognizes that salmon aquaculture offers large potential economic benefits for Canada, particularly for coastal and rural communities. However, salmon aquaculture poses risks to wild salmon stocks and the marine environment. These risks need to be managed because Canadians can benefit from sustainable aquaculture development.

5.70 In 2000, the Department implemented an Aquaculture Action Plan aimed at increased public confidence in the sustainability of aquaculture and to support competitiveness in international markets. This plan includes several components:

- an enabling policy environment that includes developing an aquaculture policy framework;
- the Program for Sustainable Aquaculture;
- an enabling regulatory environment;
- programs to develop the industry;
- inter-jurisdictional co-operation; and
- communications with Canadians.

5.71 The aquaculture policy framework represents a significant step forward with regard to the Department's role as the lead federal agency for aquaculture development. Through this framework, the Department is committed to being both an enabler and a regulator of aquaculture development. Among other things, it attempts to ensure that laws and regulations relating to aquaculture are clear, efficient, effective, consistently applied, and relevant to the sector. It also invests in aquaculture science, research, and development. In addition, it is committed to work with provincial governments to provide predictable, equitable, and timely access to aquaculture sites.

Did you know?

Number of genetically modified salmon produced commercially in the aquaculture industry: **none**

5.72 As a first step to clarifying its regulatory requirements, the Department has developed several interim guides to assist its officials in assessing aquaculture projects. In addition, the Department has worked with provinces to establish joint committees to review applications for salmon aquaculture sites and other issues. Despite all these efforts, the Department continues to face significant challenges in balancing its regulatory role and its enabling role. We continued to identify significant gaps in managing risks, as explained in the following sections.

Possible effects of aquaculture on ecosystems

Significant gaps continue to exist in scientific knowledge about the potential effects of salmon aquaculture

5.73 In 2000, we reported that the 1997 Salmon Aquaculture Review in British Columbia identified a wide range of research that needs to be done on salmon aquaculture and its effects on the environment in general and on wild salmon in particular. We found that the Department was not giving adequate attention to prioritizing research requirements. We recommended that the Department identify areas of needed research to understand the potential effects of an expanded salmon aquaculture industry and assign priorities to ensure the most effective use of the limited resources before new site proposals are reviewed.

A salmon aquaculture site

Source: Fisheries and Oceans Canada

5.74 Improved scientific research and better understanding of environmental effects of aquaculture are important parts of the Department's sustainable development strategy. Sound scientific information and its evaluation must be the basis for applying the precautionary approach to decision making. Under the Program for Sustainable Aquaculture, the Department has obtained an amount of $12.5 million over five years for environmental and biological science to improve the federal government's capacity to assess and reduce the potential effects of aquaculture on aquatic ecosystems. An additional amount of $20 million from the program is to be used over five years for the Aquaculture Collaborative Research and Development Program. Under this program, the Department partners with industry to fund research and development projects to enhance innovation and productivity of this industry sector.

A salmon aquaculture site

Source: Fisheries and Oceans Canada

5.75 Our current audit found that, while some research has been undertaken or is ongoing, significant gaps still exist with respect to the needed research on the potential effects of salmon aquaculture in aquatic ecosystems and on wild salmon stocks. The Department, through its state of knowledge initiative, identified significant gaps in knowledge about far-field environmental effects of finfish aquaculture and the use of chemicals on finfish aquaculture in Canada. We also observed that sufficient knowledge of the risks and potential effects of salmon aquaculture on wild salmon does not exist in several areas such as diseases, sea lice, and escapes of farmed salmon from aquaculture sites.

5.76 **Diseases.** Infectious hematopoietic necrosis is a serious disease in British Columbia. The first confirmed report of this disease in salmon aquaculture sites in the province was in 1992. Between August 2001 and May 2002, the virus infected some 19 salmon aquaculture sites.

5.77 Infectious salmon anaemia first occurred in New Brunswick aquaculture sites in 1996. In 1998, more than one million farmed salmon had to be slaughtered in an effort to control one outbreak. The disease was later found on wild Atlantic salmon in the province. In 2001, 15 aquaculture sites tested positive for this disease in the Bay of Fundy. However, little is known about the virus, including its effect on wild stocks. The issue is sensitive because the Bay of Fundy sites are close to aquaculture sites in the state of Maine; many sites there were left fallow and cleaned in response to outbreaks of the disease.

5.78 **Sea lice.** Sea lice infestation is a major concern for the aquaculture industry in British Columbia. However, the potential effect of sea lice on wild salmon stocks and its relation to salmon aquaculture operations remain unanswered. In addition, the Department does not have a long-term research plan to address this issue. In response to public concerns expressed over the low number of pink salmon returning to spawn in 2002 in the Broughton Archipelago, where many aquaculture sites are located, the Department and the Province of British Columbia announced an action plan to address the sea lice issue in February 2003. Key departmental commitments included a freshwater monitoring program, a marine monitoring program, and a long-term research plan. Monitoring began in early March and ended in June 2003.

5.79 While pink salmon were returning in good numbers throughout British Columbia in 2003, the number of pink salmon returning to the rivers flowing into the Broughton Archipelago was again poor. According to the Department, findings from the 2003 monitoring programs are that the majority of sea lice found on wild stocks are a species rarely found on salmon aquaculture sites. Furthermore, the bulk of the sea lice found had minimal effect on the host. The Department recognizes that it is difficult and scientifically indefensible to draw conclusions about the effects of sea lice or the causal links between salmon aquaculture and sea lice on wild salmon after one season of study. In May 2004, the Department announced that the next phase of the research plan in the Broughton Archipelago would begin that month. This research is intended to address the main gaps identified from the analysis of the 2003 data, focussing on the later part of the out-migration of juvenile salmon to the ocean. International experience indicates that there are different views on the link between salmon aquaculture, sea lice infestations in wild salmon, and drops in wild salmon stock levels.

5.80 **Escapes.** The aquaculture industry wants to keep all of the farmed salmon it produces and is making improvements to minimize escapes, but they occur. In the Pacific Region, the Department's Atlantic Salmon Watch Program reported that adult and juvenile Atlantic salmon were found in rivers and streams, and adult Atlantic salmon were caught in marine waters. However, it is difficult to determine exactly how many fish actually escaped from aquaculture sites, where they went, and what happened to them after they had escaped. In particular, it is difficult to identify escaped farmed Pacific salmon from these sites because they cannot be easily distinguished from wild Pacific salmon. This represents a significant limitation to assessing the effect

of escapes of farmed salmon on wild salmon. There has been a decline in the number of escapes reported in the last two years; the Department attributes this to the introduction of provincial escape prevention regulations.

5.81 In New Brunswick, there is no reporting or monitoring of escapes of farmed salmon from aquaculture operations by the Department, although it is known that escaped farmed salmon have been found in some rivers. Unlike in British Columbia, there is also no requirement for salmon aquaculture operators to recover escaped farmed salmon in this province. The effect of the presence of farmed salmon escapees on wild salmon has not been adequately examined in Atlantic Canada.

Need to prioritize and co-ordinate scientific research

5.82 According to the Department, resource constraints have limited its ability to address knowledge gaps that would support decision making by its officials on key concerns regarding approvals of salmon aquaculture sites and environmental assessments. According to a recent internal report, Department officials raised concerns that the results of many scientific studies were presented only as information rather than as advice. They looked for more support from science in translating scientific information into advice and risk management/mitigation strategies that would address identified concerns. In our view, the Department needs to better align research projects to deal with priority issues when undertaking environmental and biological scientific research to provide the knowledge urgently required for decision making. We noted that the Science Branch in the Maritimes Region has worked closely with habitat management officials to provide them with scientific advice on a number of issues related to aquaculture.

5.83 We found a lack of national co-ordination on aquaculture research and development. Different jurisdictions, organizations, and programs conduct aquaculture research and development; their work may duplicate or compete with each other. It is essential that the Department work with other research-funding agencies to identify and prioritize these issues and to co-ordinate research activities.

5.84 **Recommendation.** Fisheries and Oceans Canada should set priorities and develop a long-term research plan to address knowledge gaps on the potential effects of salmon aquaculture in aquatic ecosystems and on wild salmon stocks.

Department's response. Fisheries and Oceans Canada has an active research program on both coasts evaluating environmental interactions of salmon aquaculture. The Department has undertaken a state of knowledge initiative to identify research gaps and priorities and is finalizing a state of knowledge work plan for scientific advice on the impacts of salmon aquaculture on fish habitat.

In the Pacific Region, Fisheries and Oceans Canada is working with British Columbia, industry, academics, and other stakeholders in developing a research plan to address gaps in project-environment interactions related to

salmon aquaculture. This research plan should be completed by 31 March 2005.

Regulating salmon aquaculture

Difficulty in assessing the cumulative, environmental effects of salmon aquaculture operations

5.85 In 2000, we reported that the Department was unable to assess the cumulative, environmental effects of salmon aquaculture operations as required by the *Canadian Environmental Assessment Act*. While the Department has issued guides to assist its officials in considering cumulative, environmental effects relating to aquaculture projects, we found that the Department still has difficulty in assessing these effects. The Department states that it is strengthening its assessments by developing a standardized approach to reviewing these effects.

5.86 Our audit work was conducted before the responsibility for the *Navigable Waters Protection Act* was transferred to Transport Canada in March 2004. Prior to that, when Fisheries and Oceans Canada received an application for a salmon aquaculture site, it had to ensure that the site would meet the requirements under the *Fisheries Act* and the *Navigable Waters Protection Act*. Unless the project was exempted because it did not interfere substantially with navigation, the Department was required to complete an environmental assessment under the *Canadian Environmental Assessment Act* before the *Navigable Waters Protection Act* approval could be issued. The *Canadian Environmental Assessment Act* only came into effect in 1995.

5.87 In several environmental screening reports of proposed projects in British Columbia, the Department acknowledged that it needs to conduct further research on the aquaculture industry as a whole to answer many outstanding questions. More information is also needed on the transfer of diseases and parasites between wild salmon and salmon raised in aquaculture operations and on the adaptability of escaped farmed salmon to the wild, including their potential effects on the wild stocks.

5.88 In the sample of Fisheries and Oceans Canada aquaculture files that we looked at in New Brunswick, we found very little discussion about the cumulative, environmental effects in environmental screening reports.

Need for credible siting criteria to assess salmon aquaculture projects

5.89 In 2000, we reported the lack of a scientific basis for the criteria used to ensure that aquaculture sites are properly located. We also noted that the 1997 Salmon Aquaculture Review recommended that scientific studies be conducted in specific areas to provide information for developing more credible criteria. In our current audit, we found that the Department is still using the same criteria that existed at the time of the Salmon Aquaculture Review to assess salmon aquaculture projects in British Columbia.

5.90 The Department uses different criteria to assess salmon aquaculture projects in New Brunswick. For example, there are specific criteria for water depth and current. However, there are no guidelines about locating salmon aquaculture sites at a specific distance from rivers frequented by wild salmon

and areas of sensitive fish habitat, wildlife, or shellfish beds in New Brunswick. In several cases, the Department approved projects situated right on top of juvenile lobster habitat or close to areas used extensively by wildlife such as endangered harlequin ducks. It believed that significant, negative effects were not likely from these projects; there are ongoing research and monitoring requirements at these sites.

5.91 Canada is a member of the North Atlantic Salmon Conservation Organization and a signatory to the Convention for the Conservation of Salmon in the North Atlantic Ocean. The convention supports general measures to minimize impacts from aquaculture activities. Such steps include locating aquaculture sites at a distance from salmon rivers. However, the Department does not apply these measures when assessing site applications in New Brunswick. As a result, Canada is not fully living up to its commitments.

Delays in completing environmental assessments

5.92 In 2000, we reported that the Province of British Columbia had put in place a moratorium on the expansion of the salmon aquaculture industry since 1995. In September 2002, British Columbia lifted the moratorium. Since then, the Department and the Province have received numerous applications for new, and renewals of, Crown land tenures and aquaculture licences and relocations. Similarly in New Brunswick, there have been a number of applications for new sites subsequent to the release of the 2000 Bay of Fundy Marine Aquaculture Site Allocation Policy by the Province. In addition, many operators are increasing their production or expanding the boundaries of existing sites, which may require federal approval under the *Navigable Waters Protection Act*.

5.93 The process of reviewing aquaculture site applications at the Department has been criticized by both industry and the provinces as being slow and inefficient. There were no established service standards to assess aquaculture projects. In many cases, information requirements and expectations were not clear; this resulted in significant delays in the site-approval process, particularly in the Pacific Region. There were also overlapping areas and duplication between the work done by the provincial ministries and Fisheries and Oceans Canada. In some cases, the province had issued licences to the proponents long before environmental assessments were completed by Fisheries and Oceans Canada. The Department states that, in 2004, it has worked with the provinces to improve the review times of aquaculture site applications.

5.94 We identified problems in how Fisheries and Oceans Canada applied the *Navigable Waters Protection Act* to aquaculture sites. The Act requires federal approval to construct any work in navigable waters. This requirement does not apply if the site does not interfere substantially with navigation. In the case of an exemption, an environmental assessment is not triggered. Approximately 80 salmon aquaculture sites in New Brunswick had been given exemptions in the past; thus, many of them have never been subject to an environmental assessment. In addition, many exemptions included requirements to implement safety measures. However, the Department later

found that these requirements constituted a condition of approval that should not have been applied to these exempted sites. We also found several cases where operators had placed net pens in the water without having obtained prior approval from Fisheries and Oceans Canada as required by the *Navigable Waters Protection Act*. The Department noted that these sites were placed in the water illegally. The operators were required to obtain a retroactive approval from the Department and to mark the sites according to *Navigable Waters Protection Act* guidelines.

Better monitoring is required to prevent harmful destruction of habitat

5.95 In 2000, we reported the lack of monitoring of sensitive coastal habitat adjacent to aquaculture sites and no regular monitoring of wild salmon stocks adjacent to these sites in British Columbia. We recommended that the Department act immediately to strengthen its monitoring and enforcement capabilities for salmon aquaculture operations.

5.96 During our current audit, we observed that in some cases the Department had entered into an agreement to require the operator to monitor and reduce the potential effects of an approved site. Nevertheless, the Department requires significant resources and effort to monitor the situation adequately. In one case in New Brunswick, we observed that the Department and others periodically monitored the effects of a salmon aquaculture site on nearby lobster habitat. However, in two other cases in New Brunswick, we did not find any monitoring information from the operator in the files, although the Department had required the operator to provide annual monitoring reports.

5.97 Salmon aquaculture operators in New Brunswick are required to report diseases, monitor and test the condition of the sea floor under the net pens, and report the results to the Province. This includes information on pesticide and antibiotic applications and other operational information. The Province provides information on the operations to the Department, but the information is only in summary form. Without sufficient operational information for each site, it is difficult for the Department to determine the actual effects of salmon aquaculture operations on fish habitat.

5.98 We would expect regular monitoring of sensitive habitats adjacent to aquaculture sites to prevent the harmful destruction of the habitat and to allow the Department to take enforcement action where appropriate. However, in the case study described below, there was a situation in British Columbia where the Department identified that a harmful alteration, disruption, or destruction of habitat had occurred. It did not take any enforcement action but granted a ministerial authorization for the destruction of the habitat and approved a plan proposed by the operator to remediate the situation.

Lack of progress to deal with the deposit of deleterious substances

5.99 In 2000, we recommended that Fisheries and Oceans Canada take immediate action to determine how the "deposit of a deleterious substance" would be addressed. In response, the Department indicated that it would

Lack of monitoring to prevent a harmful alteration, disruption, or destruction of habitat from salmon aquaculture operations

In November 2000, British Columbia referred an application to renew the tenure of a salmon aquaculture site to Fisheries and Oceans Canada for review. The Department was required to conduct an environmental assessment of the site.

Earlier in the summer of 2000, provincial officials had identified environmental concerns with the salmon aquaculture site. An initial environmental screening completed by the Department in June 2001 concluded that the existing site was causing significant adverse environmental effects. There was a significant build-up of organic waste material on the ocean bottom beside the facility. The sediment was black, sludge-like, and had a strong sulphide smell; there was a layer of fish feed found on top of the sediment.

In January 2002, the Department notified the operator of the site that a harmful alteration, disruption, or destruction of habitat had occurred, in violation of section 35(1) of the *Fisheries Act*. However, it did not take any enforcement action. In October 2003, it granted a ministerial authorization for the destruction of habitat under section 35(2) of the Act and accepted a remediation plan proposed by the operator.

Source: Fisheries and Oceans Canada

consider, in collaboration with Environment Canada, the development of regulations under section 36 of the *Fisheries Act* to control the deposit of deleterious substances from aquaculture operations.

5.100 In 2004, Fisheries and Oceans Canada advised us that it believes that a section 36 regulation for salmon aquaculture operations is not warranted. The Department is of the view that industry efforts to develop codes of practice for waste management are the best means of achieving environmental protection from potential deleterious substances. Further, the two departments will continue to monitor and research the patterns of use and the toxicity of chemicals in aquaculture that would support future development of regulations or other management options as warranted.

5.101 **Recommendation.** Fisheries and Oceans Canada should, in collaboration with the provinces, assess and monitor salmon aquaculture operations to prevent harmful effects on wild stocks and habitat. It should, in consultation with Environment Canada, continue to determine how the deposit of deleterious substances from aquaculture operations will be controlled, monitored, and enforced.

Department's response. With British Columbia, Fisheries and Oceans Canada has developed a harmonized approach to manage effects on fish and fish habitat. These arrangements are being formalized through letters of understanding, which will be signed by March 2005.

On the East coast, Fisheries and Oceans Canada participates through a series of federal-provincial committees to avoid and mitigate aquaculture-related fish habitat impacts, for example, as outlined in environmental management plans.

Fisheries and Oceans Canada and Environment Canada are continuing to evaluate and improve management practices for deleterious substances related to aquaculture operations.

Need for an operational, national, aquatic-animal health program

5.102 Disease outbreaks and sea lice infestations in salmon aquaculture operations have indicated the need for a national, aquatic-animal health program—a partnership of federal-provincial-territorial governments and industry stakeholders. The establishment of such a program is regarded by the Department and industry as essential for both fish health in aquaculture and for the protection of wild stocks. It is also needed for trade purposes because many countries expect Canadian exports of aquatic animal products to meet international standards, particularly that of the International Aquatic Animal Health Code established by the World Organisation for Animal Health.

5.103 In 2001, the Department obtained Cabinet approval in principle to establish the National Aquatic Animal Health Program, but it has not received any federal funding. To date, the program is not yet operational.

Conclusion

5.104 Overall, we found the progress made by Fisheries and Oceans Canada in response to our observations and recommendations made in 1997, 1999, and 2000 to be slow. In particular, key steps to protect and manage Pacific salmon are yet to be completed.

5.105 Management of the salmon resource and related fisheries is very complex. Meanwhile, there are concerns that the biodiversity of salmon is at risk, and some salmon populations are in trouble. We found that the Department has made little progress in applying practices in sustainability and genetic diversity to conserve Pacific salmon. It has not yet finalized the Wild Salmon Policy to provide clear objectives and guiding principles and to bring together biological, economic, and social factors for fisheries and resource management; habitat protection; and salmon enhancement. The role of hatcheries in relation to wild salmon needs to be clarified. Consultation and allocation issues remain in Pacific salmon fisheries. Shortcomings continue to exist in information on salmon stocks and habitat.

5.106 The Department has only recently developed a risk management framework for the habitat management program. Departmental reviews raise questions as to whether an overall net gain in the productive capacity of habitat is being achieved; it needs to re-examine the objectives of its Habitat Policy and make it work. The Department also needs to work with the Province of British Columbia and use a risk-based approach that would both complement the provincial approach and satisfy its mandate to manage and protect habitat. We observed limited progress in improving fish habitat planning that is community-based.

5.107 We continued to identify gaps in managing risks to salmon aquaculture. There are significant knowledge gaps with respect to the potential effects of salmon aquaculture on wild stocks and the environment. The Department needs to better align research projects to deal with priority issues to serve the urgent needs required for decision making. We identified problems in how Fisheries and Oceans Canada applied the *Navigable Waters Protection Act* to salmon aquaculture sites, (in March 2004, the responsibility for this legislation was transferred to Transport Canada). Fisheries and Oceans Canada continues to have difficulty in assessing the cumulative environmental effects of salmon aquaculture operations. There is a need for credible criteria to assess salmon aquaculture projects. In addition, there is a lack of progress to deal with the deposit of deleterious substances from these operations. These weaknesses place the Department at risk in terms of inadequate protection of wild salmon and fish habitat. It needs to strengthen its monitoring and enforcement capabilities to ensure that salmon aquaculture is being regulated and developed in a sustainable manner.

5.108 Salmon are important to Canadians, generating a wide range of economic, social, and cultural benefits. Maintaining biologically-diverse and abundant salmon stocks is essential in preserving this unique part of Canada's heritage. Lack of prompt action may put weak salmon stocks and the long-term sustainability of fisheries at risk. Fisheries and Oceans Canada needs to establish a comprehensive plan of action, setting out the priorities, key steps, and time frames to address issues related to the conservation and protection of wild salmon, habitat, and salmon aquaculture.

Department's response. Since the late 1990s, Fisheries and Oceans Canada has made important changes in its approach to fisheries management. Although the Wild Salmon Policy has not been finalized, the Department has made significant progress on implementation of precautionary salmon management, which protects weak stocks. For example, the introduction of the coho recovery plan in 1998 brought exploitation rates on weaker coho stocks to record low levels. Greatly reduced exploitation rates were also introduced for salmon stocks of concern, in particular, weak sockeye stocks throughout the coast, as well as chinook stocks on large areas of the coast. In virtually all salmon fisheries in British Columbia, exploitation rates are dramatically lower than a decade ago. While there have been important conservation successes, the cost to industry has been high, and as a result, the Department has come under continued pressure to relax conservation measures. It should also be noted that integrated fisheries management plans clearly state conservation objectives for each species. The Wild Salmon Policy will provide a cohesive package of each of these conservation objectives.

About the Audit

Objectives

The objectives of this follow-up audit were to determine the progress made by Fisheries and Oceans Canada in conserving and protecting salmon stocks and habitat, ensuring the sustainable use of the salmon fisheries resource, and regulating salmon aquaculture.

Scope and approach

The follow-up focussed on the action taken by Fisheries and Oceans Canada on the key observations and recommendations in the three chapters on Pacific salmon reported in 1997, 1999, and 2000. We also looked at salmon aquaculture in New Brunswick as well as the Atlantic salmon stock situation in the Maritime provinces. In addition, we followed up on specific issues and recommendations related to salmon management raised in Chapter 10 of our 1986 Report, Fisheries and Oceans Canada—Pacific and Freshwater Fisheries.

Our follow-up focussed on programs and activities at Fisheries and Oceans Canada. It does not deal with shellfish or other finfish aquaculture. We also excluded from our examination the Pacific Fisheries Adjustment and Restructuring Program, which ended in March 2003. The scope of the audit did not include issues related to food safety or federal support programs delivered by other federal agencies. We did not examine activities at the provincial level that are reviewed by the offices of the auditors general of British Columbia and New Brunswick in their respective provinces. We worked in collaboration with the two provincial auditor general offices in conducting the audit work but did not look at their files.

During the audit, we met or had meetings or discussions with departmental staff at headquarters in Ottawa, in the regional offices in Vancouver, Halifax, and Moncton, as well as in area offices and research facilities. We also had discussions with selected stakeholders such as commercial and sport fishery associations, non-government environmental organizations, and associations in the salmon aquaculture industry. We reviewed Fisheries and Oceans Canada's files and documentation. A large amount of material was obtained through the review of external and internal reports and from government and other Web sites.

Some quantitative information in this chapter is based on data drawn from various federal and other sources. We are satisfied with the reasonableness of the data, given their use in our chapter. However, the data have not been audited unless otherwise indicated in the chapter.

Criteria

We expected that Fisheries and Oceans Canada would have made satisfactory progress in implementing our recommendations. We expected the Department would

- have adequate databases on fish habitat and stock assessment, which would be accessible to, and used by, decision makers;
- apply the *Fisheries Act* and specifically the Policy for the Management of Fish Habitat to achieve the stated goal of net gain, first, by applying the guiding principle of no net loss and, second, by enhancing habitat where feasible;
- have established a salmon policy that sets out clear conservation objectives including direction for resource management, habitat protection, enhancement, and aquaculture;
- have entered into partnerships wherever and whenever possible to improve its efforts to protect fish habitat and enhance fish production in areas outside its jurisdiction and to maximize benefits from resources at its disposal;
- have adopted an appropriate sustainable approach, including acquiring and applying the necessary scientific information and contemporary knowledge, to fulfill its mandate to conserve and protect wild salmon and, where necessary, restore its abundance and the diversity of stocks;

- have ensured that all sectors were co-ordinating their operations and communications in the development and implementation of management plans for the Aboriginal, commercial, and recreational fisheries, using resource conservation objectives to achieve sustainable development;
- have complied with the *Species at Risk Act*, including the preparation of a recovery strategy and action plan for salmon populations listed as endangered, threatened, or extirpated;
- have ensured that its roles and responsibilities in regulating salmon aquaculture in British Columbia and New Brunswick were consistent with its mandate for the conservation and protection of wild salmon and other species as defined in key legislation such as the *Fisheries Act* and the *Oceans Act*; and that where agreements are in place for other agencies to administer provisions of the *Fisheries Act*, accountability requirements for these provisions were clearly articulated;
- have adopted science-based siting criteria and assessed the cumulative environmental effects under the *Canadian Environmental Assessment Act* in its review of salmon aquaculture projects in a timely and efficient manner;
- have ensured that salmon aquaculture facilities comply with the *Navigable Waters Protection Act*;
- have conducted research and acquired scientific information on the impact of salmon aquaculture operations on the conservation and protection of wild salmon stocks and other species and their habitat, and made such information available to decision makers, stakeholders, and the general public; and
- have developed or participated in the development of regulations/standards pertaining to salmon aquaculture, which are consistent with legislation and departmental policies, and ensured that such regulations/standards were enforced directly or monitored regularly through accountability provisions in administration agreements with other agencies.

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