Chapter 5 • Management of the Fraser River sockeye salmon fishery

Introduction

In this chapter of the Report, I describe the management of the Fraser River sockeye salmon fishery.[1] In many respects, the management of the sockeye fishery is extremely complex. Fraser River sockeye salmon are "harvested" (caught) in a number of fisheries as they migrate from their offshore ocean habitat in the North Pacific, through the Johnstone and Juan de Fuca straits, into the Strait of Georgia and up the Fraser River to the spawning grounds in the Fraser River watershed. The salmon travel through waters subject to the Pacific Salmon Treaty, an international treaty between Canada and the United States, as well as waters managed exclusively by the Department of Fisheries and Oceans (DFO). Because the co-management aspect of this fishery is unique, I will describe the management of the fishery under the Pacific Salmon Treaty by both DFO and the Fraser River Panel – which is part of the Pacific Salmon Commission. As the sockeye pass through these waters, they encounter test fisheries; commercial seine, troll, and gillnet fisheries; recreational fisheries; Aboriginal food, social, and ceremonial (FSC) fisheries; and Aboriginal economic opportunity fisheries. I will describe each of these fisheries in turn and how DFO manages them, together with a description of the current allocation policies applied to these fisheries.

In order to manage the fishery, and as required by the Pacific Salmon Treaty, DFO must set forecasts and obtain information about the fish as they migrate (e.g., estimates of when the fish will return, the number of fish returning, and the number of fish required to reach the spawning grounds). Scientific modelling is necessary for these forecasts, and although it can be challenging for the layperson to understand, I have endeavoured to explain the practices comprehensively.

In 2005, DFO introduced its Wild Salmon Policy, which DFO's senior management considers its guiding document for the management of salmon fisheries, including the Fraser River sockeye fishery. I have devoted Chapter 10 of Volume 1 to the Wild Salmon Policy and its implementation, and I touch on it where relevant in this chapter.

Several fishery management processes are particularly relevant to the Wild Salmon Policy: the Fraser River Sockeye Spawning Initiative (FRSSI), the Integrated Harvest Planning Committee (IHPC), and the Integrated Fisheries Management Plan (IFMP). These processes and their current operation are all reviewed in detail later in this chapter, and I address their relevance to the implementation of the Wild Salmon Policy in Chapter 10.

I have set out my recommendations regarding changes to DFO's management policies, practices, and procedures in Volume 3 of this Report.

Management by run-timing group

Four groups of Fraser River sockeye have been identified, based on the historical timing of their migration to their spawning grounds. The groups are referred to as run-timing groups (also called stock groups or management groups) and are identified as the Early Stuart, Early Summer, Summer, and Late run-timing groups.[2] The run-timing groups are used in the management of the various Fraser River sockeye fisheries.

The four run-timing groups of Fraser River sockeye are further broken down or delineated by stock. The International Pacific Salmon Fisheries Commission, the predecessor to the Pacific Salmon Commission, identified 271 separate Fraser River sockeye spawning populations, based on the timing of their migration and the location of their spawning grounds.* Many of these 271 spawning populations have been aggregated (grouped) into 19 identified (named) stocks; the remaining spawning populations are listed as "miscellaneous" stocks, as set out in Table 1.5.1.

The Fraser River sockeye fishery is a mixed-stock fishery, meaning that a run-timing group will be made up of several different stocks and that run-timing groups overlap in space and time with each other, all of which can affect the management of

Table 1.5.1 Modelled stocks, miscellaneous stocks, and management groups

Management Group	Modelled Stocks	Miscellaneous Stocks
Early Stuart	Early Stuart	
Early Summer	Bowron Fennel Gates Nadina Pitt Raft Scotch Seymour	Early Shuswap, South Thompson North Thompson tributaries North Thompson River Nahatlach River & Lake Chilliwack Lake, Dolly Varden Creek
Summer	Chilko Late Stuart Quesnel Stellako	
Late	Cultus Harrison Late Shuswap Portage Weaver Birkenhead	Misc. non-Shuswap (Harrison Lake)

Source: Reproduced from Exhibit 400, p. 8.

* The Pacific Salmon Commission itself refers to eight stock identification groups for Fraser River sockeye, which are different from the four run-timing groups and the 19 identified stocks. See the explanation in PPR 5, Harvest Management, at paragraph 40 and, below, in the discussion of the Pacific Salmon Commission's pre-season planning.

each run-timing group and the fishery. The sockeye stocks are distinct from the sockeye Conservation Units (CUs) under DFO's Wild Salmon Policy.[3]

In managing the marine mixed-stock fishery, DFO tries to protect the weak stocks, which are typically stocks identified as weak in production. During his testimony on the Wild Salmon Policy, Dr. Brian Riddell, former head, Salmon and Freshwater Ecosystems, Science, DFO Pacific Region, and now chief executive officer of the Pacific Salmon Foundation, clarified that not all small sockeye stocks are "weak stocks," explaining that some small populations have been "fished down below what their full capacity is, and because they're at the lower end of their production range, they're quite productive. They have a high rate of production, so they are sustaining that current harvest rate."[4] During the hearings, DFO managers referred to "weak stock management," which I understood to mean managing the Fraser River sockeye fishery in a way that attempts to conserve these weak stocks.

In the Wild Salmon Policy, sockeye (like other Pacific salmon) are grouped by Conservation Unit, which is defined as a "group of wild salmon sufficiently isolated from other groups that, if extirpated, is very unlikely to re-colonize naturally within an acceptable timeframe."[5] Fraser River sockeye CUs are not exactly the same as the sockeye stocks that historically have been used for management purposes. A stock may include more than one CU, and one CU may include more than one stock. Among the spawning populations, 251 are lake-rearing sockeye and make up about 31 CUs, while the remaining 20 are river-type sockeye and make up about seven CUs.[6] For further explanation of Conservation Units, see Chapter, 10, Wild Salmon Policy.

Overview of the management of the Fraser River sockeye fishery

Within designated waters, Canada shares management of the commercial Fraser River sockeye salmon fishery with the United States through the Pacific Salmon Treaty.[7] This international treaty, the successor to the *Convention for the Protection, Preservation and Extension of the Sockeye Salmon Fisheries of the Fraser River System*[8] (1937 Convention) ratified in 1937, was signed by both countries in 1985 and subsequently amended. The Pacific Salmon Treaty creates the Pacific Salmon Commission, which is directly involved in the management of the fishery.

Canada and the United States share the management of the Fraser River sockeye salmon general commercial fishery in the geographic area designated under the Pacific Salmon Treaty and known as the Panel Area waters. Both DFO and the Fraser River Panel of the Pacific Salmon Commission are involved in harvest management. DFO is responsible for the management of Canadian commercial fisheries in non–Panel Area waters in a manner consistent with the terms of the Pacific Salmon Treaty and for the management of all Aboriginal (FSC and economic opportunity) and recreational sockeye fisheries in both Panel Area and non–Panel Area waters. DFO conducts research and monitoring of Fraser River sockeye stocks and shares the information with the staff of the Fraser River Panel and the Pacific Salmon Commission.[9]

For both DFO and the Fraser River Panel, the management of the fishing of Fraser River sockeye follows an annual cycle of pre-season planning, in-season management, and post-season review.[10] In the pre-season stage, DFO prepares models forecasting the abundance of the returning stocks, as well as forecasts of the timing and movement (diversion rate) of the four run-timing groups on their return to the Fraser River, and gives this information to the Fraser River Panel. Under the Pacific Salmon Treaty, DFO is responsible for providing spawning escapement targets to the Fraser River Panel. These targets are generated through DFO's Fraser River Sockeye Spawning Initiative (discussed below). During this period (and in the post-season stage), DFO meets with interested parties (commercial and recreational fishers, representatives of First Nations, and environmental non-government organizations) through its Integrated Harvest Planning Committee and in bilateral discussions with First Nations. DFO defines its management objectives and sets objectives for allocation of the Canadian total allowable catch (TAC) among the different fisheries.[11]

Based on the forecasts provided to it by DFO, the Fraser River Panel prepares the pre-season fishing plan. DFO also prepares a fishing plan for salmon, the Integrated Fisheries Management Plan, which is approved by the minister of fisheries and oceans and distributed to the Pacific Salmon Commission for its use. Once the fishing season is

under way, the control of the commercial fishery in Panel Area waters shifts from DFO to the Fraser River Panel. The Pacific Salmon Commission's staff conducts in-season assessments of the fishery, using hydroacoustic monitoring and test fishing.

Once the season has finished, DFO generates post-season escapement estimates (the number of fish that "escape" the fishery and reach their spawning grounds) using a wide range of survey methods and analyses. DFO assesses the difference between estimates (explained in detail below) and a tally of the final run size. DFO reports to, and consults with, the IHPC and stakeholders, and the Fraser River Panel reports to the Pacific Salmon Commission.

The Pacific Salmon Commission and the Fraser River Panel

The 1937 Convention established the International Pacific Salmon Fisheries Commission (IPSFC). It had six members – three from each country – and employed permanent professional and technical staff. The 1937 Convention provided that the IPSFC would conduct scientific investigations for two life cycles of the sockeye (eight years) before it promulgated or enforced any regulations regarding the fishery.[12] Mike Lapointe, chief biologist of the Pacific Salmon Commission since 2002, testified that, at the time the IPSFC was formed, "the fishery had virtually collapsed." The IPSFC was given the mandate "to figure out what was going on," and it did so through natural history studies, tagging of fish, enumeration on the spawning grounds, investigations into all aspects of salmon life history, and looking for possible obstructions to migration in the Fraser River watershed.[13]

In 1946, the IPSFC began to regulate the fishery within the designated geographic area – the "Convention Waters."[14] It managed the commercial fishery within the Convention Waters, allocating the total allowable catch equally between Canada and the United States.[15] The IPSFC was responsible for establishing regulations to manage the fishery, although the 1937 Convention provided that the IPSFC would set up an advisory committee "composed of five persons from each country [later expanded to six] who shall be representatives of the various branches of the industry ... which ... shall be invited to all non-executive meetings of the [IPSFC] and shall be given full opportunity to examine and to be heard on all proposed orders, regulations or recommendations."[16] Although the IPSFC set the regulations, it was not empowered under the 1937 Convention to enforce them – that remained the responsibility of the individual countries.

On March 18, 1985, Canada and the United States signed the Pacific Salmon Treaty.[17] It provides for the management by both countries of all salmon originating in the waters of one country which are subject to interception by the other, affect the management of the other country's salmon, or affect biologically the stocks of the other country.[18]

Annex IV to the Pacific Salmon Treaty contains a group of short-term management plans directed at six specific sets of fisheries. This annex has been amended by the parties four times since the Pacific Salmon Treaty was ratified. Chapter 4 of Annex IV governs the management of Fraser River sockeye (and pink salmon). As amended in 2005, the provisions of chapter 4 were to be in effect from 2005 through 2010, but, at the end of 2010, the chapter was amended to extend through 2012.[19] Chapter 4 sets out the total allowable catch (explained in more detail below) and how it is calculated for each country's fisheries.[20]

The Pacific Salmon Treaty stipulated that the IPSFC would be terminated on December 31, 1985.[21] In 1986, the Pacific Salmon Commission (PSC) was created, and it is funded equally by Canada and the United States.[22] The agreement of both countries is required for any recommendation or decision by the Pacific Salmon Commission.[23]

Organizational structure of the Pacific Salmon Commission

The Pacific Salmon Commission is a 16-person body with four commissioners and four alternates for each country. They include persons involved in commercial and recreational fisheries, as well as federal, state, provincial, and First Nations governments.[24] The minister of fisheries and oceans appoints the four Canadian commissioners and the four alternate commissioners. Reporting to and assisting the commissioners are five committees and four panels, with subcommittees supporting

each panel. As set out in Figure 1.5.1, there are also two separate quasi-committees, the Northern Restoration and Enhancement Fund and the Southern Restoration and Enhancement Fund, which allocate research funds (see dotted line).[25] In addition to the committees and panels, the Pacific Salmon Commission has permanent staff, with headquarters in Vancouver. The commission's committees are made up of members from both countries: they offer technical advice to the Pacific Salmon Commission and its panels and report directly to the Pacific Salmon Commission.

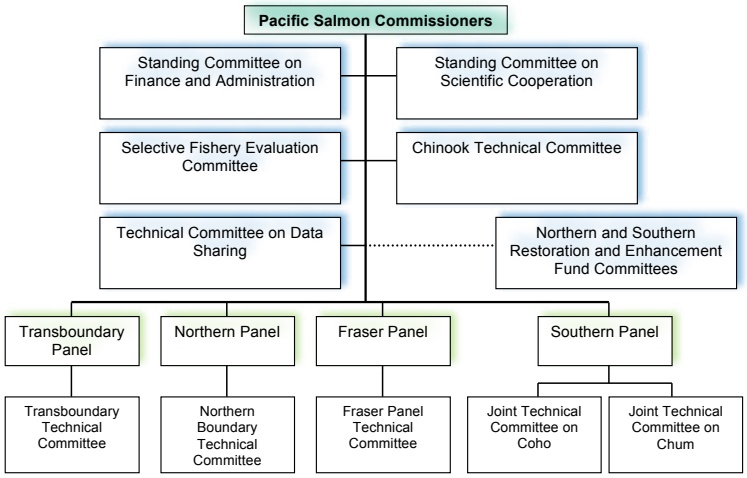


Figure 1.5.1 Pacific Salmon Commission organization chart

Source: Reproduced from Policy and Practice Report 4, Pacific Salmon Treaty, p. 16.

The Fraser River Panel

The Pacific Salmon Commission's panels provide technical and regulatory advice to the PSC and make recommendations on the management of the fisheries in their assigned geographic area.[26]

Under the Pacific Salmon Treaty, the Fraser River Panel is responsible for in-season management of the commercial harvest (except for commercial fisheries conducted by First Nations) in the designated geographic area – the Panel Area.[27] A map showing the Panel Area is set out in Figure 1.5.2.[28]

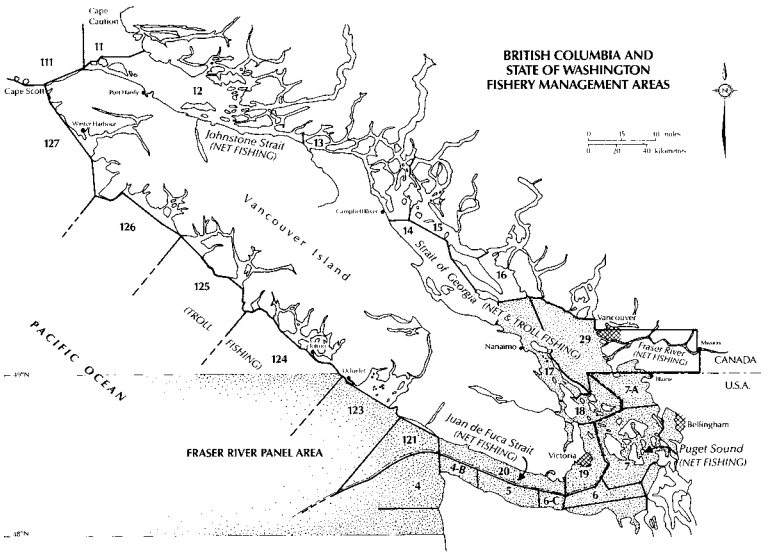


Figure 1.5.2 British Columbia and State of Washington fishery management areas

Source: Exhibit 74, p. 5.

As provided by Article II, paragraph 21, of the Pacific Salmon Treaty, the Fraser River Panel has six members and six alternate members from each country – individuals who come from government, various fishing sectors, First Nations, commercial harvest interests, and processors. Although the Canadian members are from different sectors, they represent Canada at the Fraser River Panel.[29] The chair of the panel and the vice-chair alternate each year between Canada and the United States, and they are each chair of their respective country's Fraser River Panel caucus.[30] DFO appoints the chair of the Canadian Caucus of the Fraser River Panel. The Canadian Caucus also has two observers from the Marine Conservation Caucus.[31]

The Fraser River Panel Technical Committee reports directly to the Fraser River Panel, providing it with the scientific data and analysis required for its management decisions.[32] The Technical Committee is made up of 10 representatives, five from each country. Of the five Canadian members of the Technical Committee, four are DFO employees, and one is a consultant with the Fraser River Aboriginal Fisheries Secretariat. The Pacific Salmon Commission's scientific staff provide the Technical Committee members with scientific information and analysis, which the committee then provides to the Fraser River Panel.[33] Pacific Salmon Commission staff also provide advice and direction to the Fraser River Panel.

Pacific Salmon Commission staff

Both Donald Kowal, executive secretary of the Pacific Salmon Commission since 1989, and Mr. Lapointe testified at the hearings. As chief biologist, Mr. Lapointe is responsible not only for managing the biology staff but also for working closely with the Fraser River Panel and its Technical Committee to ensure that the panel has the information it requires and that the members understand the technical basis for the information they receive so they can make decisions about fishery openings and closings. The chief biologist considers fishery recommendations from each country to determine if they are consistent with the objectives of the Pacific Salmon Treaty (e.g., TAC or available fish). If the chief biologist agrees with a country's fishery recommendations, the fishery can go ahead over the other country's objection; however, if both countries agree, they can overrule the chief biologist's approval.[34]

The Pacific Salmon Commission has 26 full-time staff and several summer staff who carry out fisheries-related monitoring activities and test fishing. It runs two technical programs related to the management of Fraser River sockeye: the Stock Monitoring Program (which assesses run size, daily abundance, and migration timing of returning stocks) and the Racial Analysis Program (which identifies the stock proportions of Fraser River sockeye in commercial, test, and First Nations catches).[35]

Overview of commercial harvest management under the Pacific Salmon Treaty

Article IV of the Pacific Salmon Treaty outlines the general conduct of fisheries. Under Article IV, each country is required annually to submit preliminary information for the upcoming year to the Pacific Salmon Commission (and to the other country), including the estimated run size, the interrelationship among stocks, the required spawning escapement, the estimated total allowable catch, "its intentions concerning the management of fisheries in its own waters," and, if appropriate, its domestic allocation objectives.[36] Each country establishes and enforces regulations to implement the fishery regimes and must notify the Pacific Salmon Commission and the other country of these regulations and any in-season modifications to them.[37] Article IV of the treaty also provides that each country must submit an annual report "on its fishing activities in the previous year" to the other country and to the Pacific Salmon Commission. Annual reports are reviewed by the appropriate Pacific Salmon Commission panels, and the Pacific Salmon Commission then reports back to the respective country.[38]

Article VI of the treaty modifies the provisions of Article IV with specific reference to Fraser River sockeye and pink salmon in the Fraser River Panel Area (which is set out in Annex II of the treaty, Fraser Panel Area). Once the countries have adopted the Pacific Salmon Commission fishery regime under Article IV (which is set out in Annex IV),[39] Article VI stipulates that it is the Fraser River Panel (and not the individual country) which proposes regulations to the Pacific Salmon Commission for the harvest of Fraser River sockeye and pink

salmon. Regulations are then recommended by the Pacific Salmon Commission to the parties for approval, and they become effective on approval by the country in whose waters the regulations are applicable.[40] Article VI also provides:

> 6. During the fishing season, the Fraser River Panel may make orders for the adjustment of fishing times and areas stipulated in the annual regulations in response to variations in anticipated conditions. The Parties shall review the orders for consistency with domestic legal obligations. The Parties shall give effect to such orders in accordance with their respective laws and procedures.
>
> 7. The Parties shall not regulate their fisheries in areas outside the area specified in Annex II in a manner that would prevent achievement of the objectives of the fishery regime for the salmon referred to in paragraph 1.

As noted earlier, Annex IV of the treaty contains the fishery regimes agreed to by the parties under Article IV, and chapter 4 of Annex IV specifically applies to Fraser River sockeye and pink salmon. In chapter 4, the total allowable catch for each country is defined and allocated; paragraph 4 of chapter 4 expressly places the onus on Canada to establish spawning escapement targets for the purpose of calculating the annual TAC. It also states: "For the purposes of pre-season planning, where possible, Canada shall provide forecasts of run size and spawning escapement requirements by stock management groupings to the Fraser River Panel no later than the annual meeting of the Commission."[41]

In his testimony, Mr. Lapointe explained TAC and how it is calculated under the provisions of chapter 4 of Annex IV:

> Paragraph 3 ... [tells] how it's calculated ... total allowable catch for international sharing purposes is calculated by taking the total return of Fraser River sockeye and subtracting a number of deductions, [which] ... include spawning escapement targets; the management adjustment ... the agreed aboriginal fisheries exemption; and any expected catches and panel-approved test fisheries. [TAC is] ... total run minus spawning escapement minus test fisheries … That is used to apply the percentage shares in paragraph 2 to determine the shares that each country would be entitled to.[42]

On approval of the pre-season plan and during the in-season period of Fraser River Panel regulatory control, all commercial sockeye fisheries in Panel Area waters are closed unless they are opened for fishing by in-season order of the Fraser River Panel.[43] The in-season decision-making process to be followed by the Fraser River Panel is expressly set out in paragraph 13 of chapter 4 of Annex IV and is discussed in greater detail below.

The Fraser River Panel's annual reports contain appendices setting out the regulations for each year's fishing season. These regulations are submitted at the end of June by the Pacific Salmon Commission to Canada and the United States.[44] Regulatory recommendations for Canadian waters are implemented under the federal *Fisheries Act* as part of the Canadian legislative regime for the licensing, openings and closings, and enforcement of the fisheries.

DFO Fraser River sockeye fisheries management structure

DFO is organized around a functional matrix model; fisheries management falls under the national Fisheries and Aquaculture Management (FAM) sector* and its equivalent regional branch (for an explanation of DFO's national sectors and regional branches, see Chapter 4, DFO overview). DFO Science staff working in the regional Science Branch offices, as well as those working in the area offices, are also involved in sockeye harvest management.[45] Within DFO's Pacific Region, several entities have been created which share responsibility for various aspects of the management of the commercial Fraser River sockeye harvest;[46] although the focus is on DFO, reference to the interaction between DFO and the Fraser River Panel is noted. DFO's Conservation and Protection staff are also involved in fisheries management through the department's compliance and enforcement programs.

* Renamed Ecosystems and Fisheries Management in the spring of 2010. For this Report, the sector will be referred to as FAM.

Salmon Team

The Salmon Team is made up of a small group of employees from the Pacific Region's FAM Branch.[47] The Salmon Team is responsible for drafting salmon IFMPs; it signs off on salmon fisheries notices and is involved in the salmon IHPC. It also develops and implements policy with respect to Pacific salmon, which includes DFO's Wild Salmon Policy. The members of the Salmon Team are its lead, the regional salmon coordinator (also called the regional salmon resource manager or the regional resource manager, Salmon), the regional recreational coordinator, and the salmon officer. The Salmon Team lead reports to the regional director of FAM, who reports to the regional director general of the Pacific Region.

Salmon Working Group

Although the Salmon Team is a discrete group within the Pacific Region's FAM Branch, the Salmon Working Group is a broader Pacific Region forum for the coordination of salmon planning and review activities and the integration of salmon management activities among the region's area offices.[48] It identifies policy needs and provides recommendations for improvements to salmon management programs, including the implementation and integration of agreements under the Pacific Salmon Treaty. It recommends research to the Centre for Science Advice, Pacific (CSAP) Salmon Sub-Committee (see below), as well as other research programs carried out by DFO or other agencies or universities, and, in turn, will review and implement the scientific advice it receives. Where the Salmon Team pulls together the information for the IFMP, the Salmon Working Group coordinates the development of the IFMP, including establishing related time frames and consultation processes.

The Salmon Working Group meets in November to review the season and begin pre-season planning; in March or April to finalize the IFMP; and in June to finalize plans for the upcoming season and discuss outstanding policy issues. The Salmon Working Group has a number of subcommittees, including the Stock Assessment Coordination Committee (see below).

Fraser River Sockeye and Pink Salmon Integrated Management Team

DFO's Fraser River Sockeye and Pink Salmon Integrated Management Team[49] (often referred to as FRIMT) is the administrative group that manages Fraser River sockeye and pink salmon for Canada. It works closely with the Fraser River Panel and provides overall direction to the three DFO area offices that manage Fraser River sockeye (South Coast, Lower Fraser, and BC Interior). The team's specific responsibilities include providing direction on the implementation of regional, national, and Pacific Salmon Treaty policies (e.g., licensing, regulations, stock assessment, and catch monitoring), coordinating the implementation and integration of management strategies (area-based, regional, and under the Pacific Salmon Treaty), implementing scientific advice, and coordinating the development of management plans in the IFMP.

Before Fraser River Panel meetings, the team coordinates with all DFO programs that provide input into the management of Fraser River sockeye. The linkage from the Integrated Management Team to DFO's Salmon Team is through the Salmon Team's salmon officer.

Membership of the team is completely internal to DFO. The core members include the Fraser River Panel's Canadian chair and alternate chair; area chiefs of Resource Management and Conservation and Protection; area directors for the South Coast, Lower Fraser, and BC Interior; the lead of the Salmon Team; the regional salmon officer; other FAM Resource Management staff as needed; and DFO's Fraser River Panel Technical Committee members. Other staff members are invited to attend as required, and may include people from FAM at national headquarters, the regional salmon resource manager, the regional salmon recreational fisheries coordinator, a representative from the Oceans, Habitat and Enhancement Branch (OHEB),* and the area chiefs of Stock Assessment.

* As of April 2011, it was renamed the Ecosystem Management Branch, but for the purposes of this Report it will be called the Oceans, Habitat and Enhancement Branch (OHEB).

Within DFO, the team is responsible for Fraser River sockeye and pink fisheries management in Panel Area and non–Panel Area waters. This task includes responsibility for commercial, recreational, FSC, First Nations economic opportunity, and treaty fisheries. The Integrated Management Team meets in November to develop a post-season report and to begin planning for the coming year; it also meets in March or April to work on pre-season fishing plans. In season, the team meets by conference call as required, generally before and after the Fraser River Panel and its Technical Committee meetings.

The Canadian chair of the Fraser River Panel is also the Integrated Management Team chair. This individual reports to the regional director of FAM and the area directors of the South Coast, Lower Fraser, and BC Interior. The Fraser River Panel's Technical Committee Canadian co-chair reports to the Canadian chair of the Fraser River Panel / Integrated Management Team on the work of the Technical Committee. The Fraser River Panel Canadian Caucus (or National Section) and the DFO Integrated Management Team meet periodically as well.

DFO's structure for management of Aboriginal fisheries

According to DFO, 146 *Indian Act* bands receive licences and allocations to harvest Fraser River sockeye salmon.[50] As described above, DFO's Integrated Management Team is responsible for the management of the Aboriginal FSC and economic opportunity fisheries – the Fraser River Panel does not manage them (although they may occur in Panel Area waters). In 1993, the federal government promulgated the *Aboriginal Communal Fishing Licences Regulations* under the *Fisheries Act* (discussed in more detail below), and at the same time, DFO developed and implemented its Aboriginal Fisheries Strategy. Under this strategy, DFO negotiates with and enters into agreements with First Nations regarding their fisheries – a role separate and apart from the management engaged in by the Integrated Management Team. DFO's approach to Aboriginal fisheries is explained in greater detail in the Aboriginal fishing policies and programs section below.

Stock Assessment Coordination Committee

The Stock Assessment Coordination Committee is the group responsible for the regional coordination of priorities for DFO's stock assessment work throughout the region, including the Fraser River.[51] It is given a budget target and generates a program profile to fit it. The committee is made up of area chiefs for Stock Assessment from all DFO areas, core Science members (e.g., the head, Salmon Assessment, and the division head, Salmon and Freshwater Ecosystems), representatives from OHEB and the Salmonid Enhancement Program, representatives from FAM, and DFO's Pacific Salmon Treaty coordinator. Area chiefs of Resource Management are sometimes involved with the Stock Assessment Committee. The division head of Salmon and Freshwater Ecosystems has the ultimate authority for advising the Regional Management Committee on behalf of the Stock Assessment Committee.

Centre for Science Advice, Pacific, Salmon Sub-Committee

In the Pacific Region, the Centre for Science Advice, Pacific is the organization within DFO responsible for the review and evaluation of scientific information on the status of living aquatic resources, their ecosystems, and the biological aspects of stock management (see Chapter 4, DFO overview). The CSAP Salmon Sub-Committee is the primary body providing pre-season scientific advice for the development of management plans for Pacific salmon. CSAP operates through a peer-review process; its membership is largely DFO scientists, with participants from other DFO sectors, academia, First Nations, stakeholders, other government or private institutions, and the public. Requests to CSAP for science advice from within DFO are passed on to the Regional Management Executive Committee to determine whether there are overlaps in projects. This committee decides how resources should be provided to meet science advice requirements (according to the priorities it has determined) and approves CSAP requests. The Regional Management Executive Committee is made up of senior management from Science, FAM, and OHEB.

Findings

The management structure of the Department of Fisheries and Oceans (DFO) for the Fraser River sockeye fishery is complex. However, I heard no evidence critical of this aspect of DFO's organizational structure. Later in this chapter I discuss the concerns about DFO's management in relation to the Integrated Harvest Planning Committee and the Integrated Fisheries Management Plan.

The regulation of the fisheries: licensing

Access to the fisheries

In order to fish for Fraser River sockeye, a person is required to hold a licence or be designated under an Aboriginal communal fishing licence.[52] As noted in Chapter 3, Legal framework, the *Fisheries Act* affords the minister the authority to license the fishing of Fraser River sockeye.[53] The minister may charge fees for licences and, in certain circumstances, may suspend or cancel licences.[54]

The *Fisheries Act* also allows the Governor in Council to make regulations "respecting the issue, suspension and cancellation of licences and leases" and "respecting the terms and conditions under which a licence and lease may be issued."[55] The *Fishery (General) Regulations*[56] govern the operation of the fisheries and apply to all fisheries (with certain exceptions for licences issued under the *Aboriginal Communal Fishing Licences Regulations*).[57] These regulations contain provisions regarding the establishment and variation of fishery closures, fishing quotas, fish size and weight limits, licences and registration, identification of fishing vessels and fishing gear, and fishery observers.

The *Pacific Fishery Management Area Regulations, 2007,*[58] describe the surf line and divide the Canadian fisheries waters of the Pacific Ocean into management areas and sub-areas, which in turn are referenced when describing fishery openings and closures, as set out in Figure 1.5.3.

The *Aboriginal Communal Fishing Licences Regulations*[59] authorize the minister to issue a communal licence to an Aboriginal organization, a term that includes "an Indian band, an Indian band council, a tribal council, and an organization that represents a territorially based aboriginal community."[60] These regulations apply to fisheries in the areas enumerated in Schedule 2 to the *Pacific Fishery Management Area Regulations, 2007,* and to salmon fisheries in British Columbia; however, they do not apply to fishing in national parks.[61]

Figure 1.5.3 Management areas – Pacific Region

Note: For definitions of the areas, see the *Pacific Fishery Management Area Regulations, 2007*.
Source: Policy and Practice Report 6, Commercial Sector Licensing, Appendix B.

The *Pacific Fishery Regulations, 1993,*[62] apply to commercial fisheries (with Part VI governing the salmon fishery). The *British Columbia Sport Fishing Regulations, 1996,*[63] apply to sport fishing in Canadian fisheries waters of the Pacific Ocean and British Columbia, setting close times, fishing quotas, and size limits for all sport fisheries in the province.

Both the federal and the provincial governments are involved in licensing anglers. The split between the two is based on tidal and non-tidal waters. Canada issues tidal licences, and the province issues non-tidal licences. The line between tidal and non-tidal waters for the Fraser River is drawn at the downstream side of the CPR bridge at Mission.

The British Columbia *Fisheries Act*[64] mandates that an individual must not fish or attempt to fish "unless the person holds a valid licence issued for that purpose and has paid the fee prescribed." The provincial *Wildlife Act*[65] states a similar requirement (to hold a valid licence) in order to fish in non-tidal waters. Although the provincial regulations apply primarily to freshwater species (rather than salmon), when freshwaters are closed to fishing or have gear restrictions imposed under the regulations, those restrictions also apply to fishing for salmon in non-tidal waters.

Licensing of the commercial fishery

The commercial salmon fishery in British Columbia is a limited-entry fishery, which means that no new licences are created.[66] The only way to acquire a commercial licence is to purchase one from a current licence holder, but there is a limited market for commercial licences. In recent years, the biggest "buyer" has been the federal government through licence buy-back programs.[67]

There are currently two categories of commercial salmon licences: Category A and Category N.[68] These licences are issued to vessels.[69] Category A licences, the main category, are distributed across gillnet, seine, and troll vessels. Category N licences are issued only to the Northern Native Fishing Corporation.* Before the mid-1990s, each vessel participating in the fishery had a single licence, which entitled the licence holder to fish anywhere in the province.[70] This system was referred to as a "coast-wide fishery."

Area-based commercial licensing and the Mifflin Plan

In March 1996, Canada introduced the Pacific Salmon Revitalization Strategy, known as the Mifflin Plan after the Honourable Fred Mifflin, the minister of fisheries and oceans (see Chapter 4, DFO overview). The Mifflin Plan included a federally funded voluntary licence retirement, or buy-back program, aimed at reducing the fleet and introduced single-gear licensing and area-based licensing.[71] Lisa Mijacika, DFO's former acting chief of the Pacific Fishery Licensing Unit and its acting manager of business and client services (the Pacific Region unit responsible for commercial licensing), stated that one of the objectives of the Mifflin Plan was to align the makeup of the fleet with available harvest opportunities and the decline in the stocks.[72]

For commercial licensing purposes, British Columbia is split into two regions – the North Coast and the South Coast – which are further broken down into areas.† In each area, commercial fishing occurs only by way of a specific gear type and within set geographic bounds. Only the South Coast commercial fleet receives a fishing allocation of Fraser River sockeye. The area names and gear types, by region, are listed in Table 1.5.2.

Table 1.5.2 Commercial fishing areas and gear types

North Coast Region		**South Coast Region**	
Area A	Seine	Area B	Seine
Area C	Gillnet	Area D	Gillnet
Area F	Troll	Area E	Gillnet
		Area G	Troll
		Area H	Troll

Source: Policy and Practice Report 6, Commercial Sector Licensing, para. 32.

* The Northern Native Fishing Corporation (NNFC) was established in 1982 when BC Packers Ltd. sold 243 vessels and 252 licences to the NNFC. The minister created this special category of N licences, which the NNFC could sell to individual First Nations fishers. PPR 6, Commercial Salmon Fishing, para. 24 and n. 39; see also Lisa Mijacika, Transcript, March 15, 2011, p. 72.

† At the time the Mifflin Plan was implemented, licence holders had to designate the area (and gear type) in which they wanted to fish. Chris Ashton, Transcript, February 22, 2011, p. 54; Lisa Mijacika, Transcript, March 15, 2011, p. 46.

A commercial licence holder is entitled to a limited opportunity, when that particular fishery is "open," to fish for the designated species in accordance with whatever conditions are attached to the licence. The licence conditions set out parameters related to the operation of the vessel and other requirements associated with the fishery, such as the harvest limits and maintaining a harvest log.[73] Schedule VI of the *Pacific Fishery Regulations, 1993,* sets out the "salmon close times" for all areas and sub-areas, all species of salmon, and all gear types: for all of them, they are January 1 through December 31.[74] The salmon fishery is therefore always closed unless there is a variation allowing an opening.[75]

Description of areas and gear types

Jeff Grout, regional resource manager, Salmon Team, DFO,* reviewed the current size of the fleet and set out the methods employed by the different gear types.[76] His description of each licence area and gear type follows the relevant map(s), with a discussion of the "mortality rates" for each gear type. The mortality rate refers to the inadvertent catching during the sockeye fishery of other species of salmon, which may then be released alive, depending on the type of fishing gear used (see the section on selective fishing below).[77]

Mr. Grout testified that, in Area B, a seine fishery, for example, there are 168 licences in all (see Figure 1.5.4). The seine net is a large net that circles a school of fish and is then pursed at the bottom; the fish are dipped out of the seine net using a brailer (a long-handled net). He said that the release mortality rate for non-target species is approximately 25 percent in the seine fishery.

Seiner, Prince Rupert, BC, 2010

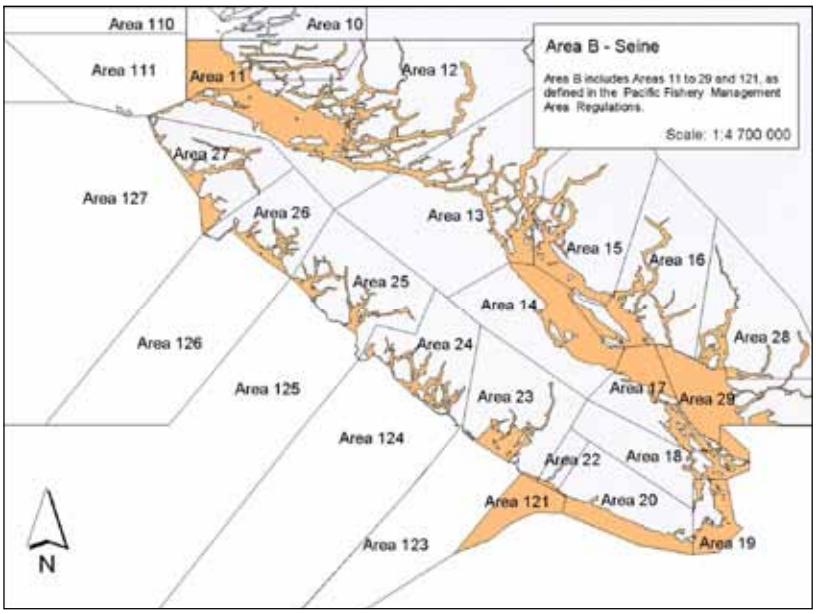


Figure 1.5.4 Area B – Seine

Source: Policy and Practice Report 6, Commercial Sector Licensing, Appendix B.

* Also referred to as regional salmon coordinator or as regional salmon resource manager.

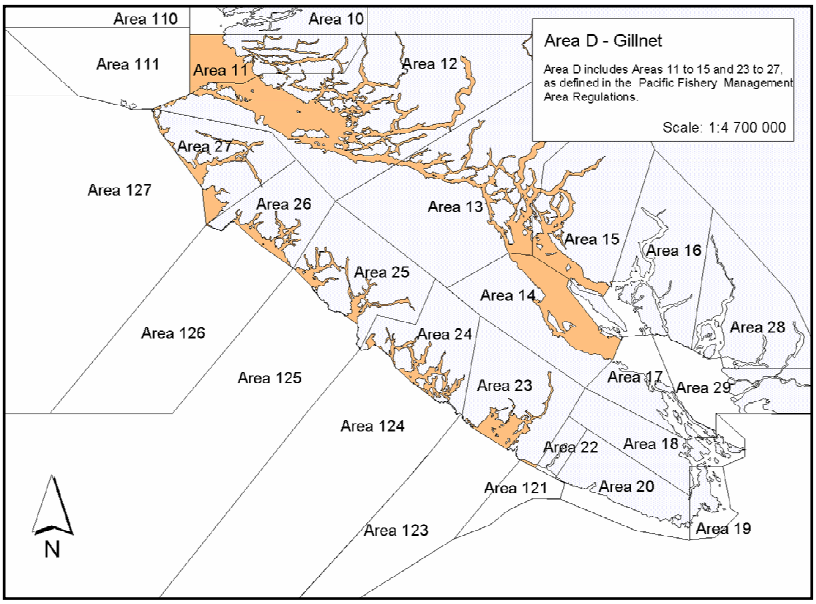


Figure 1.5.5 Area D – Gillnet

Source: Policy and Practice Report 6, Commercial Sector Licensing, Appendix B.

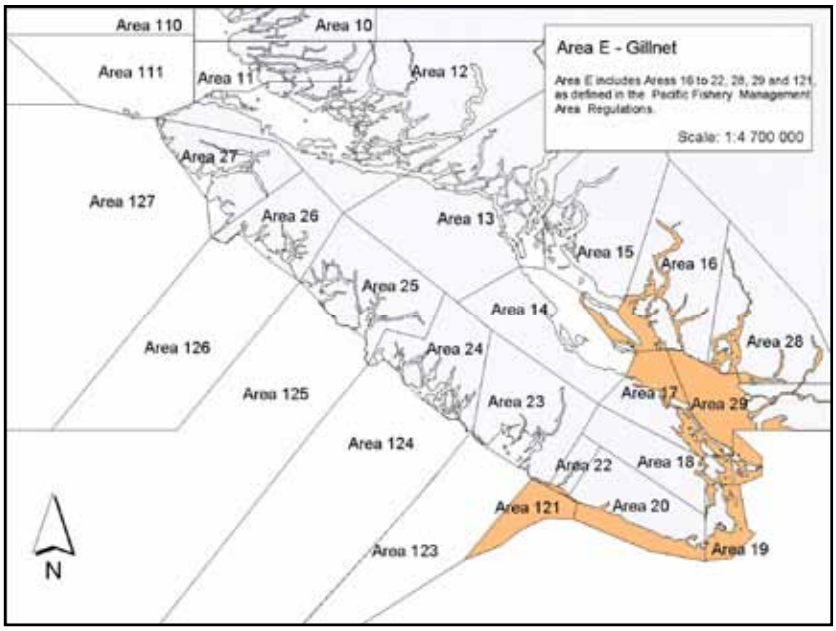


Figure 1.5.6 Area E – Gillnet

Source: Policy and Practice Report 6, Commercial Sector Licensing, Appendix B.

Mr. Grout testified that there are 355 licences in Area D and 393 licences in Area E, all of which use gillnets – rectangular nets hanging in the water that catch fish by enmeshing their gills in the net (see figures 1.5.5 and 1.5.6). Mr. Grout testified that DFO typically applies a release mortality rate of 60 percent to the gillnet fishery.

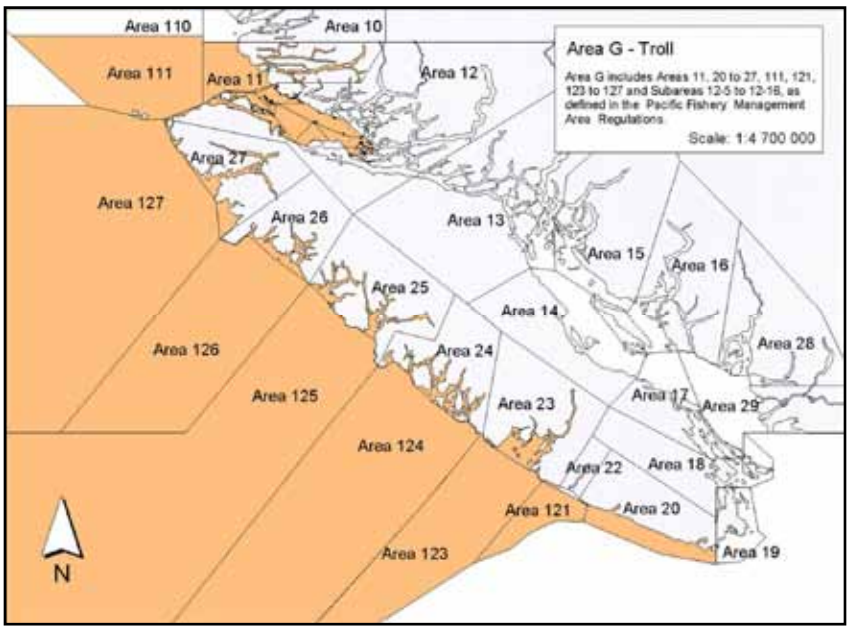


Figure 1.5.7 Area G – Troll

Source: Policy and Practice Report 6, Commercial Sector Licensing, Appendix B.

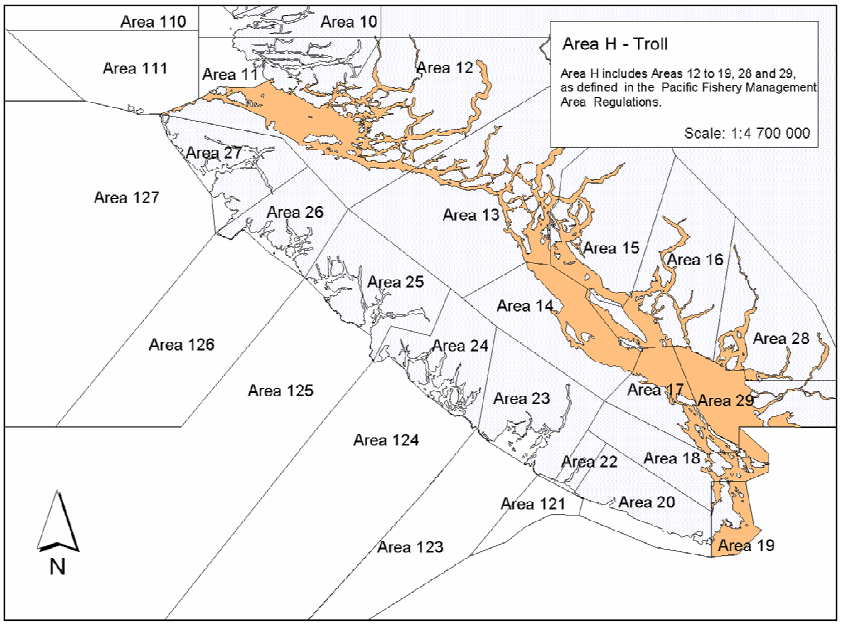


Figure 1.5.8 Area H – Troll

Source: Policy and Practice Report 6, Commercial Sector Licensing, Appendix B.

Mr. Grout testified that there are 165 licences in the Area G troll fleet and 89 licences in the Area H troll fleet (see figures 1.5.7 and 1.5.8). In the troll fishery, poles with lines with numerous hooks and lures are lowered into the water, and the fish are individually hooked. The release mortality rate using troll gear is 15 percent for coho and chinook and 10 percent for sockeye.

Commercial licence fees

The current fees for commercial licences were set in 1998;[78] the fees have remained constant since then, although the prices for salmon have dropped and the fishery has declined. Ms. Mijacika testified that DFO began to review licensing in 2007, "to align [it] more with the current market and economic conditions and resource conditions of the fisheries."[79] She acknowledged, however, that there are challenges to implementing changes to the fee structure:

> [A] comprehensive package has been presented to the Minister to consider some options on how to restructure the fees to make them more balanced across all the different fisheries. What would have to happen, though, is there would have to be approval for that and then corresponding regulation changes would have to be made to implement those proposals and extensive consultations would be required with those that are affected, and under the *User Fee Act* there's also separate regulatory requirement that the Department would have to meet to ensure that we've adequately consulted and looked at the impact of making those fee changes.
> …
> [The process] hasn't taken place in a formal way other than through our existing advisory boards. A number of fisheries have asked for the status of this particular initiative and why it's not moving, because of their concerns about fees not being aligned with what their current revenues are. It is … an inequity in our current structure, and so there's been a lot of pressure on us, but still, there hasn't been a decision made by the Minister that we can move forward on.[80]

Ms. Mijacika also testified that DFO does not have the authority to waive fees and would require that authority through the Treasury Board:

> We also don't have the authority to remit or refund existing fees that we've collected because it results in a revenue shortfall which we are then required to absorb, so we also don't have a budget or a specific program set aside for that purpose. So a specific request would have to be made to [the] Treasury Board to do that. That's one reason.
>
> Another reason is there's this interest … in a number of fisheries where they're seeing declines in their revenue … or in their markets or their access to markets. So applying a fairness principle, we would have to look at how this would be applied to a number of different fisheries to make them more in balance with what's happening in the current circumstances of the fishery.[81]

Ms. Mijacika told me that the Treasury Board withholds or holds back a certain portion of DFO funds until DFO deposits the same amount into the Consolidated Revenue Fund through collection of licence fees, at which time the Treasury Board will release funds to DFO to spend on programs. However, according to Ms. Mijacika, DFO has been falling short of its target for several years and, accordingly, is not receiving its full allotment to spend on programs.[82]

Licensing of Aboriginal fisheries

As described above, the minister may issue communal fishing licences to Aboriginal organizations under the *Aboriginal Communal Fishing Licences Regulations*, which provides a licensing mechanism for fishing for both food, social, and ceremonial reasons and as an economic opportunity under DFO's Aboriginal Fisheries Strategy.[83] In these licences, the minister may designate the persons who may fish and the vessels that may be used.[84] If the minister does not designate the persons or the vessels that may fish under the authority of the licence, the Aboriginal organization receiving the communal licence may do so.[85]

Ms. Mijacika described the nature of the communal commercial licence and how it differs from a commercial salmon licence. She described it as "party-based," in that the licence is not issued to a particular vessel but, rather, in relation to a contribution agreement with the First Nation whereby the First Nation must designate a vessel that meets the length restrictions set out in the licence.[86] She said that, although some fees may be involved (related to a business plan or arrangements made under the Pacific Integrated Commercial Fisheries Initiative [PICFI] program), no annual licence fees are attached to a communal licence.[87]

Aboriginal communal fishing licences may contain conditions and restrictions where necessary "for the proper management and control of fisheries and the conservation and protection of fish."[88] In particular, the minister may, in a licence, specify conditions respecting any of the matters set out in paragraphs 22(1)(*b*) to (*z.1*) of the *Fishery (General) Regulations* and any conditions respecting any of the following, without restriction:

- species and quantities of fish taken or transported
- designation requirements
- identification of fishing vessels and gear
- locations and times of landing fish
- methods for landing fish and quantification of fish
- reporting of fishing activities
- locations and times of inspections of fishing vessels
- maximum number of designated persons or vessels
- type, size, and quantity of fishing gear
- marking of fish for scientific or administrative purposes
- disposition of fish caught[89]

Policies guiding DFO's issuance of communal licences

DFO issued its Policy for the Management of Aboriginal Fishing in 1993 to guide the implementation of its Aboriginal Fisheries Strategy and to reflect the Supreme Court of Canada's decision in *R. v. Sparrow*.[90] The Policy for the Management of Aboriginal Fishing provides that, "to ensure conservation," all communal licences shall, as a minimum, contain the following provisions or terms and conditions:

- An allocation to the Aboriginal fishery for each species or stock to be fished for which other fisheries have "limited access" or are "quota-limited."
- Provision for the designation of individuals by the Aboriginal Fishing Authority to fish under the agreement or licence.
- A form of identification to be carried by all designated individuals as evidence of their authority to fish.
- Provision for monitoring, by the Aboriginal Fishing Authority in co-operation with DFO, of the catch by designated individuals sufficient to ensure that the aggregate harvest does not exceed the allocation.
- A maximum limit on the number of individuals who may be designated to fish and on the type and amount of gear to be used by those individuals.[91]

In May 1998, DFO developed a Pacific Region *Communal Licence Handbook* to "describe and standardize the licensing process" and to "allow communal licences to be drafted, reviewed and issued efficiently and effectively."[92] Building on the Policy for the Management of Aboriginal Fishing, the handbook states that "DFO attempts to attain mutually agreeable arrangements that facilitate effective fishery activities. It is understood that these arrangements are reflected in the communal licences."[93] However, where an agreement cannot be made, it is DFO's policy to issue a communal licence to provide access for FSC purposes.[94] The *Communal Licence Handbook* describes the types of communal licences (or templates) that DFO has developed to fit particular circumstances. These licences include the following:

- *Single Species*: This template is used to license fishing of a single species, typically salmon. It is used to license all fisheries on the Fraser River.
- *Multi-Species*: This template uses separate schedules to license fishing for a number of different species – for example, salmon, herring, and shellfish. Typically it is used in the North Coast and South Coast divisions.
- *Supplemental*: This licence is required when food fishing occurs outside of the area described in the communal licence. It is approved when it is not possible to achieve the required harvest under the existing communal licence.
- *Dry rack*: This licence is used exclusively for First Nations that are fishing in the Fraser Canyon.
- *Ceremonial*: This licence may be issued when fishing is restricted or prohibited due to management reasons when local stocks cannot support an open fishery but may not be threatened by limited effort. It is intended

to allow fishing for ceremonial purposes only. Ceremonial licences are used almost exclusively in the Lower Fraser River.

- *Interim*: This type of licence is generally issued to Aboriginal organizations pending completion of negotiations. After issuing the interim licence, any changes to that communal licence necessitated by subsequent negotiations would be addressed by way of amendments to the licence.[95]

Communal licences can be issued from either the division offices or from the field offices of DFO.[96] The Aboriginal Fisheries Branch (now the Aboriginal Policy and Governance Branch) must consult with FAM and the Conservation and Protection branches before producing a licence, and legal counsel may review the licence if it contains unique conditions or raises other legal issues.[97] Communal licences must be signed by a fishery officer.[98]

In February 2001, DFO developed "Guidelines Respecting the Issuance of Licences under the *Aboriginal Communal Fishing Licences Regulations*" (the ACFLR Guidelines).[99] According to the ACFLR Guidelines, their purpose is to "confirm the approach that DFO has taken since the ACFLR were enacted in June 1993."[100] The ACFLR Guidelines apply wherever the minister issues communal licences under the regulation.

The ACFLR Guidelines reiterate that the issuance of a communal licence under the regulations is not recognition that a particular Aboriginal group has an Aboriginal or treaty right to fish but, rather, is a tool that assists in the management of the fisheries and the conservation of fisheries resources to promote stability in fisheries.[101] Where an agreement is reached, the licences issued will reflect the fisheries access and licence conditions described in the agreement. Where an agreement is not reached, the minister will review the consultations held and take into account the preferences and concerns expressed by the Aboriginal organization, conservation requirements, and other matters. Communal licences issued would then contain conditions that the minister believes would meet the requirements of *Sparrow* and subsequent court decisions and that are required for the proper management and control of fisheries and the conservation and protection of fish.[102]

Drift net fishing, Fraser River, Cheam, BC, 2010

It is DFO's policy that, within communal licences, fishing for FSC purposes should take place within the "areas that were used historically by the aboriginal group."[103] DFO has internal guidelines, "DFO's Guidelines for Responding to Requests by Aboriginal Organizations to Fish for Food, Social and Ceremonial (FSC) Purposes in Areas Not Previously Authorized Under Communal Licences Issued by DFO to the Aboriginal Organization for FSC Purposes," which state that, where an Aboriginal individual wishes to fish for FSC purposes in a historical area of another Aboriginal group, that person may do so under that Aboriginal group's communal licence pending consent of that group.[104] Barry Rosenberger, area director, BC Interior, DFO, testified that this policy is one of long standing with the DFO: it is an attempt to reflect the fact that First Nations, through the land-claim treaty process, assert rights and titles to certain areas and that, in the past, they have expressed significant concerns that DFO has infringed on their rights in their territories by providing licences that allow Aboriginal individuals to fish for FSC purposes wherever they choose.[105]

Licensing of the recreational fishery

A recreational fisher must hold a licence issued by the federal government to fish for salmon in British Columbia's tidal waters.[106] A recreational fishing licence permits fishing for salmon, but not the

retention of any salmon (to keep salmon, there is a further requirement, discussed below). DFO does not require a licence holder to have any special training to obtain a recreational fishing licence;[107] however, Devona Adams, regional recreational fishery coordinator, DFO, and Jeremy Maynard, former chair of the Sport Fishing Advisory Board, agreed that some education and/or training for recreational fishers before they obtained a licence would be helpful.[108]

To retain salmon, anglers must also have a salmon conservation stamp affixed to their licences, whether tidal (federal) or non-tidal (provincial). Conservation stamps for tidal-water anglers are authorized under the *British Columbia Sport Fishing Regulations, 1996*.[109] For provincially issued non-tidal angling licences, there is an equivalent program: the provincial salmon conservation stamp. To keep a salmon of any legal size or species from non-tidal waters, an angler must have a Non-Tidal Salmon Conservation Surcharge Stamp (it is not required for anglers who will release all salmon caught). There must also be an opening for that species at the time it is caught.

In the commercial fishery, the conditions attaching to a particular licence type may be numerous; by contrast, recreational licences do not attach as many conditions – there are only four conditions. DFO communicates applicable restrictions and regulations to recreational fishers mainly by the published *Sport Fishing Guides*, which are then supplemented by Fishery Notices. Two *Sport Fishing Guides* relevant to salmon are produced every other year by DFO: the *Tidal Waters Sport Fishing Guide*[110] and the *British Columbia Freshwater Salmon Supplement*.[111]

Recreational licence fees

All recreational fishing licences require the payment of fees, as does the acquisition of conservation stamps (both for tidal and non-tidal licences). The fees are set out in a table under the *Sport Fishing Regulations*,[112] and the table is also reproduced in the *Tidal Waters Sport Fishing Guide*.[113] The recreational licence fees were last raised in the mid-1990s.[114] Recreational fishing representatives told me that the recreational fishing sector would like to see an increase in recreational licence fees, on the condition that the increased fees be earmarked for DFO to spend on programs to benefit recreational fishing.[115] Ms. Adams said that no specific fee review is under way and that, given the provisions of the federal *User Fees Act*,[116] it is difficult to increase licence fees. In addition, DFO is not guaranteed to receive money back from the Treasury Board for specific programs (the fees received by DFO for licence purchases would go into general government revenue).[117]

Findings

The current fees for commercial licences have remained unchanged since 1998, although the prices for salmon have dropped and the fishery has declined. The evidence indicates that the Department of Fisheries and Oceans (DFO) would like to respond to fishers' desire to adjust commercial licence fees to reflect the market reality.

All recreational fishing licences require the payment of fees, which were last raised in the mid-1990s. Recreational fishing representatives told me that the recreational fishing sector supports an increase in its fees, provided that the increased fees are earmarked for programs to benefit recreational fishing.

The minister issues communal fishing licences to Aboriginal organizations, and they provide a licensing mechanism for food, social, and ceremonial fishing and for economic opportunity fishing. DFO does not charge licence fees for these communal licences for either type of fishery.

Under section 8 of the *Fisheries Act*, the Governor in Council may prescribe the fees that are to be charged for fishery or fishing licences. It is my understanding that licence fees collected under this authority go into the federal government's Consolidated Revenue Fund, to be spent for government purposes generally. If a government department seeks to collect licence fees and use that revenue for specific purposes (e.g., fisheries-related activities), it must proceed under the *User Fees Act*, which sets onerous requirements for public consultation, review by a standing committee, and approval by the House of Commons.

Although I do not make a recommendation regarding licensing, there are, in my view, several inequities in the current licensing regime. Commercial and recreational licence fees have not been adjusted for at least 15 years. Communal

licences for economic opportunity fishing are issued without fee, although the economic opportunity fishery is a specialized component of the commercial fishery. If monies raised through licence fees could be earmarked for fisheries-related activities, that would be desirable, but several witnesses told me that the onerous requirements of the *User Fees Act* may make that goal unrealistic. In any event, DFO should consider a licensing regime in which all of these sectors of the fishery (commercial, recreational, and economic opportunity) pay their fair share.

DFO advisory processes: fisheries management

Introduction

DFO is responsible, together with the Fraser River Panel, for planning and managing the sockeye fishery. In carrying out this task, DFO meets with many different groups representing those who participate in, or with an interest in, the fisheries.[118] Accordingly, a consideration of DFO's advisory processes is relevant to considering its management of the fishery. Consultation with different sectors also takes place through the Fraser River Panel; however, the focus of this section is on DFO's advisory processes.

Each year, DFO engages in a series of meetings, the scheduling of which roughly follows the fishing season. DFO meets with or is a member of the following groups: the Integrated Harvest Planning Committee (IHPC), the Commercial Salmon Advisory Board (CSAB), the Sport Fishing Advisory Board (SFAB), and the Marine Conservation Caucus.[119]

I briefly discuss DFO's Forum on Conservation and Planning, which involves consultation with First Nations, in this section. However, because it is discussed in greater detail in the Aboriginal fishing policies and programs section below, I expressly do not discuss DFO's efforts to build a co-management relationship with First Nations here.

DFO has also established an Allocation Implementation Committee to consult with the recreational and commercial sectors on issues related to allocation of their combined total allowable catch for salmon (see below). In addition to these groups, this section provides an overview of the Integrated Salmon Dialogue Forum (ISDF), which is not a DFO process but a forum in which DFO actively participates.

Finally, I have included a discussion about the evidence I heard regarding "meeting fatigue" – the extent to which DFO's employees devote time to meetings along with those individuals who are involved in its advisory processes as representatives of various sectors.

Tier 1, Tier 2, and Tier 3 processes

When discussing the meetings in which they are involved, representatives from both DFO and the First Nations (or Aboriginal organizations) refer to Tier 1, Tier 2, and Tier 3 processes. Tier 1 refers to processes between and among Aboriginal groups.[120] Tier 2 meetings are processes between Aboriginal groups and the federal or provincial governments (for example, meetings to discuss Aboriginal Fisheries Strategy agreements).[121] Tier 3 refers to processes that engage Aboriginal groups, government, and others involved in the fisheries.[122] DFO's IHPC is an example of a Tier 3 process.

The guiding principles (or terms of reference)

The terms of reference for the IHPC, the CSAB, and the SFAB state that the bodies will adhere to the following guiding principles, all of which are worded similarly and resemble those set out in the Wild Salmon Policy as "Key Attributes of an Effective Planning Process" under Strategy 4:[123]

> *Transparent:* There should be transparency throughout the process based on open lines of communication and the provision of timely, accurate, accessible, clear and objective information. This information should be available to all participants in the process on an equal basis. Organizers should provide access to agendas and information needed as a starting point for informed discussion well in advance of meetings. In addition, this information will be posted to a public website to ensure accountability to all Canadians.

Accountable: Participants who are representatives of a constituency are expected to bring to the discussions the general views, knowledge and experience of those they represent, and bring back an awareness and understanding to their constituencies about deliberations of the consultation activity and reasons for decisions taken. All participants share accountability for the success of the process. The Department is accountable to participants for explaining how their advice / input was used and why and how decisions are taken.

Inclusive Representation [*Balanced Representation* on CSAB]: Representation on advisory bodies should relate to the mandate and function of the committee. Participation in advisory processes should be fairly balanced and reflect a broad range of interests in fisheries and oceans issues in the Pacific Region, to the extent possible, so that a diversity of perspectives is involved.[124]

The terms of reference of these bodies also refer to "effective" and "efficient" guiding principles (joined together into one principle in the CSAB's terms of reference), although they are worded slightly differently.

For the IHPC, the terms of reference state:

Effective: All participants should be satisfied that the process can achieve the goals of the mandate. This does not mean that participants will always agree with the final advice, outcome or recommendation. Processes must be cost-effective, and set and respect realistic timeframes.

Efficient: The size of the advisory committee must be kept to a number that facilitates consensus-based discussion. Wherever possible, links to other departmental consultative processes will be made to realize efficiencies in consultation.[125]

For the CSAB, the terms of reference state:

Effective & Efficient: All participants should be satisfied that the process can achieve the goals of the mandate. This does not mean that participants will always agree with the final advice, outcome or recommendation. Processes must be cost-effective, and set and respect realistic timeframes.[126]

For the SFAB, the terms of reference state:

Effective: All participants should be satisfied that the process can achieve the goals of the mandate. This does not mean that participants will always agree with the final advice. Processes must set and respect realistic timeframes recognizing the volunteer nature of the SFAB.

DFO, taking into consideration its financial capacity and current policies, will provide funding consistent with the effective and efficient discharge of the SFAB and its approved subcommittees in fulfilling their mandate, roles and responsibilities.

Efficient: The size of the advisory committee will reflect a balance between the diversity of fisheries and oceans issues in the Pacific Region, and participant numbers that will facilitate productive discussion. Should committee, or subcommittee size become an issue, the above noted principle of "Inclusion" will be the overriding priority. Wherever possible, links to other departmental consultative processes will be made to realize efficiencies in consultation.[127]

The salmon Integrated Harvest Planning Committee

DFO established the IHPC in 2004, partly as a response to recommendations set out in the *Independent Review of Improved Decision Making in the Pacific Salmon Fishery: Final Recommendations*, 2001, by the Institute for Dispute Resolution at the University of Victoria.[128] The IHPC "is intended to provide an opportunity for the different interests to come together and work on coordination of fishing plans and identify potential conflicts in areas where they need to work together across their fisheries to try and work things out."[129] The IHPC is an advisory process, not a decision-making process, which was reiterated in the final written submissions of the First Nations Coalition.[130] In its final written

submissions, Canada described the IHPC as "the key advisory process used by DFO for integrated planning of the Pacific salmon fishery."[131]

The salmon IHPC has two regional subcommittees, one for the South Coast and one for the North Coast. Each regional subcommittee is made up of the following: six representatives from the South Coast CSAB or four representatives from the North Coast CSAB (from the southern or northern regional committee), three representatives from the SFAB (again, from the northern or southern regional committee), two representatives from the Marine Conservation Caucus (from the regional caucus), four First Nations representatives, and an ex officio representative from the province.[132] The IHPC is chaired by an independent facilitator hired by DFO.[133]

The terms of reference of the IHPC dated May 2005 expressly state that its purpose is "to promote a more streamlined, representative, cross-sectoral advisory process related to salmon harvest planning, management and post season review."[134] Its mandate is as follows:

> The IHPC is the primary contact for the Department for cross-sectoral communication and advice and [for] mak[ing] recommendations to the Department on operational decisions related to salmon harvesting in the Pacific Region. The goal of the IHPC will be to ensure fishing plans are coordinated and integrated, identify potential conflicts, and if there are disputes, make recommendations for solutions if possible.[135]

The IHPC's roles and responsibilities are set out in the terms of reference:

Pre-season:

- Provide recommendations that ensure fishing plans are coordinated and integrated, identify potential conflicts, and recommend a means of resolving disputes;
- Receive from and provide advice to DFO on pre-season forecasts and stock assessments;
- Review enforcement plans, identify problems and provide recommendations on the management or enforcement of the fishery, and make recommendations for improvement;
- Provide input on stock assessment programs, as required for management purposes;
- Provide advice on changes to escapement strategies or policies;
- Advise on IFMPs (i.e. decision guidelines, fishing plans);
- Advise on measures and mechanisms for timely and accurate catch / effort information; and
- Advise on selective fishing practices.

Post-season:

- Review post-season stock status to determine if conservation goals were met;
- Advise on problems encountered regarding management, enforcement and consultation;
- Advise on management, enforcement or other actions that will improve the fishery;
- Review anomalies not covered in the fishing plan;
- Review expected stock status for the coming year; and
- Review the stock assessment program.[136]

The IHPC typically meets six times each year; of these meetings, three will be the IHPC as a full committee in November, March, and May; the other meetings will be of the southern and northern committees meeting separately (December–January) for post-season review.[137]

The May 2005 terms of reference stated that the IHPC would be reviewed and evaluated by DFO and IHPC participants no later than 2006. In March 2007, Pam Cooley, a consultant hired by DFO, produced an evaluation of the IHPC, based on interviews or surveys of four DFO employees and representatives from the various sectors.[138] In her summary of the IHPC evaluation, Ms. Cooley wrote:

> Concerns remain about representation: how people are chosen to be on the IHPC from their sectors and interest; consistency in the representation from meeting to meeting; and the decision-making authority of the representative. Representation processes require continued refinement and more consistency for the IHPC but not to gain legitimacy as

> the mechanism for sectors to solve harvest-planning conflicts. All sectors struggle with the refinement of true representation but that does not stop a constructive process.
>
> All have a great amount of respect for the First Nations' own challenges regarding true representation at a table like the IHPC. More legitimate representation from all sectors and interests could lead to a more viable problem solution process; however, waiting for this would be unrealistic.
>
> Data issues are also a main concern: the timeliness of data for analysis, quality of the data and producing it so that people can use it and make decisions. There is also a question of openness to new methods of obtaining data from other sources and science. The main disputed issue heard through the evaluation is with DFO and how decisions are being made, particularly "in-season."
>
> ... While there are numerous processes and structures relating to salmon, most agree that the IHPC is different and can be enhanced in the future with a more consistent and relevant approach to harvest planning. The DFO would not have to defend its positions if there was more stakeholder participation in the IFMP and decision-making processes. There would be more collaborative analysis and ownership if the IHPC were truly being consulted.[139]

Echoing Ms. Cooley's reference to DFO's decision-making processes, Jefferey Young, a representative of the Marine Conservation Caucus (briefly described below), expressed concern that DFO has not reached a point through the IHPC process where its decision making (and that of the minister with respect to the IFMP) is transparent.[140]

Ms. Cooley's 2007 evaluation referred to the guiding principles set out in the IHPC's terms of reference and made the following suggestion about improving inclusive representation at the IHPC: "Continue to invite and find ways for as much [First Nations] participation as possible in IHPC and sub groups. It may mean, at times[,] that the DFO approach [First Nations] after an IHPC decision."[141] During the hearings, witnesses testified that First Nations representation on the IHPC is inadequate:

> I think that First Nations are not adequately represented at the IHPC ... There is no representation from the middle Fraser, the other tribes in the area, or the lower Fraser ... [or from] the south coast marine First Nations.[142]

> I think First Nations are under-represented ... generally, given the scope of impact of ... DFO's decisions that may or may not be ... discussed at the IHPC, First Nations are significantly affected by those and representation of First Nations is, I think, less than ideal.[143]

Through the IHPC, DFO attempts to bring all parties to the table.[144] However, Susan Farlinger, regional director general, Pacific Region, acknowledged that there is still work to do on increasing the participation of First Nations Coalition (FNC) in the IHPC (integrated process).[145] In its final written submissions, the First Nations Coalition noted the lack of adequate participation by First Nations in the IHPC and described the reasons behind it:

> The IHPC suffers from the lack of a coordinated process to ensure First Nations representation. Although Mr. Matthew attends for the Secwepemc Fisheries Commission, Mr. Shepert attends from the Upper Fraser, Don Hall attends for the Nuu-chah-nulth, and Murray Ned has recently begun attending the South Coast IHPC meetings as an observer from the Lower Fraser, such attendees do so in a technical capacity and do not carry mandates to negotiate the content of the IFMP with other sectors. Most of the witnesses who testified in regards to the IHPC noted that First Nations were under-represented at the IHPC, and they were sympathetic to First Nations' calls for a coordinated, Tier 1 approach to assist the IHPC table. The difficulty in not having mandated First Nations represented at Tier 3 processes, such as the IHPC, is that First Nations attendees are then not in a position to meaningfully contribute to the discussions or help make difficult decisions.
>
> A primary reason First Nations are not currently attending the IHPC is that they will not negotiate the protection and exercise their s. 35 Aboriginal rights, particularly their priority s. 35 FSC rights, with stakeholders ...

> Although DFO insists that the IHPC is not the location to discuss Aboriginal rights, the fisheries management decisions in the IFMP have potential impacts on the exercise of Aboriginal and treaty rights, and therefore require consultation and, where appropriate, accommodation. The FNC submits that given the nature of the decisions made in the IFMP [IHPC], and the fact that the IFMP guides the decision making process that occurs in-season at the FRP [Fraser River Panel], it is critical that First Nations have an opportunity, on a Tier 2 level, to discuss these issues with DFO …
> DFO has recognized the difficulty for First Nations to come to these processes when they are still trying to have their rights affirmed. Mr. Rosenberger testified that DFO would like to see a process developed, through the Roadmap Initiative, that would allow First Nations representatives to feed into representative processes like the IHPC, or the FRP, or other management processes. The FNC submits that the challenges of securing meaningful First Nations representation at the IHPC underscores the importance of developing and properly resourcing Tier 1 and Tier 2 processes[.][146]

Brian Assu, councillor of the We Wai Kai Nation and member of the Fraser River Panel, Mr. Young, and Peter Sakich, commercial fisher and member of the Commercial Salmon Advisory Board, agreed that the role of the IHPC is an advisory one.[147] The IHPC does not make decisions for DFO but provides a forum (to some degree) for the resolution of conflict among the sectors. Wayne Saito, a consultant to the province and former DFO employee, said:

> [The IHPC] is intended or designed to provide advice to [DFO] regarding the efficacy of fishing plans in the pre-season and to comment on the achievement of objectives in [the] post-season sense … one of the primary focuses is to identify areas of competing and conflicting interest and to engage in discussions … to the extent possible, to resolve them.[148]

Dr. Gerry Kristianson, chair of the Sport Fishing Advisory Board, told me: "The IHPC is the place where we can meet with the other harvest sectors and the conservation group to work through the places where those [fishing] plans intercede [*sic*] or conflict. So it's to get at that aspect of things that is particularly valuable and important to us."[149]

The IHPC, however, operates on consensus – something that is difficult to achieve, given the diversity of interests among the various representatives. In the two instances where consensus on an issue has been reached at the IHPC, DFO has not implemented the recommendation.[150] Chris Ashton, a commercial fisher, described his frustration with this situation:

> I just wanted to bring up one point that the IHPC, working on consensus, I asked some colleagues how many instances you could ever remember that we actually had a motion put forward and reached consensus and, collectively, we only came up with two …
>
> … [T]here was a motion put forward and the entire IHPC passed that motion by consensus that they agreed that [the CSAB] should have funding.
>
> The other one was for the [commercial] licence holiday …
>
> … There [were] letters sent to the Minister and there was a motion passed by the IHPC and presumably a letter went from the IHPC to the Minister explaining the hardship that [the] requirement to pay the licence fee [when the fishery was entirely closed] was causing quite a few people.
>
> … [We] find [it] a little disconcerting that we're asking for a licence holiday and we find out DFO, who we're asking for the holiday, probably has no intention of trying to back our request because they're trying to meet a target set by Treasury Board.[151]

Criticism was also expressed that the participants at the IHPC (as well as other consultative processes) do not have the technical expertise required to understand such things as the Fraser River Sockeye Spawning Initiative – DFO's escapement target model – and DFO's forecasting modelling because they do not have adequate funding:[152]

> What we're seeing in this age … since the advent of computers, is an absolute exponential

> growth in computer modelling and abstract activity that becomes at times absolutely overwhelming. And it's certainly ... a challenge for people who do not get paid and don't have the resources to go through that.[153]

However, Dr. Kristianson (who is also a commissioner on the Pacific Salmon Commission) commented that it was preferable that DFO retain the technical expertise to avoid the creation of "duelling technical bodies."[154] He also felt strongly that DFO should be adequately funded to continue to provide the necessary technical expertise:

> [M]y vision of the technical support is that a well-funded Department with highly qualified staff does the primary technical work. It subjects its technical findings and science to a peer review process called in the past PSARC [Pacific Scientific Advice Review Committee] and now CSAP ... And the other interests can have technical people or others at those PSARC meetings ... that gives us the ability to understand and question what the Department's doing, and out of that comes the advice which flows from Science to Management in the Department of Fisheries and Oceans. I think it's a good model. I think it's not adequately supported at present for reasons that are not the fault of Pacific Region, but I would not like to see, at least in our case, resources diverted from that to try and provide what would become inevitably duelling scientific hired guns.[155]

Several witnesses, including Paul Ryall, former lead of DFO's Salmon Team and former chair of the Fraser River Panel, testified that the IHPC did not function as a "policy forum" or a place in which DFO policy could be debated. He agreed that neither role belonged to the IHPC.[156]

The Commercial Salmon Advisory Board

The terms of reference of the CSAB[157] were finalized in February 2006.[158] The CSAB is independent from DFO, although DFO staff participate in its meetings, and express roles and responsibilities for DFO are set out in the CSAB terms of reference. The mandate of the CSAB is to serve as the consultative body on issues that affect commercial salmon fisheries. It includes providing advice on policy matters related to the commercial fishery; developing commercial salmon harvest plans that consolidate and coordinate the interests of the various areas and gear types; and providing recommendations to resolve conflicting issues within the commercial sector allocation, harvesting priorities, and responses to *Species at Risk Act* concerns.[159]

The CSAB is made up of one main board and two geographic subcommittees, north and south. The CSAB's terms of reference provide for salmon area harvest committees, which represent each of the eight commercial gear types and whose members are elected by every licence holder in the commercial fleet.[160] The committees each elect two representatives who are responsible for representing the interests of the specific area and gear type to the CSAB.[161] The membership of the CSAB also includes two representatives of each of the United Fishermen and Allied Workers' Union (UFAWU) and the processing industry; in addition, a representative of the province sits on the board ex officio.[162] The Native Brotherhood of British Columbia was initially represented on the CSAB, but it withdrew in 2006.[163] Kathy Scarfo, a commercial fisher who is the president of the West Coast Trollers' Area G Association, was critical of the membership of the CSAB and told me that, in her opinion, the inclusion of the processing industry was not appropriate for an organization representing fishers.[164]

The CSAB's terms of reference set out the roles and responsibilities for DFO, the Area Harvest Committees, the CSAB secretariat, and the CSAB itself. They include:

- DFO will provide fisheries management and technical expertise, as agreed to by both parties, to support CSAB meetings.
- The CSAB secretariat is responsible for development of the meeting agenda and notification of CSAB members. The DFO will be invited to add to the agenda.[165]

The CSAB's express roles and responsibilities include, among others, that it

- Nominate representatives from the membership of the CSAB to sit on the DFO Integrated Harvest Planning Committee.

…

- Develop decision guidelines for in-season management action in the commercial sector.
- Develop a coordinated management plan.

…

- Provide advice on principles and guidelines for the commercial harvesting component for any new or emerging stock assessment programs.

…

- Provide in-season advice and recommendations on fishing related issues to the Department as appropriate.
- Provide advice on other commercial sector issues as required.

…

- Meet with Sport Fish[ing] Advisory Board (SFAB) and First Nations representatives or other interested parties as appropriate to resolve issues between the sectors.
- Develop or acquire scientific expertise necessary to adequately represent the commercial sector in dealing with issues like endangered species, reduced harvest rates on particular stock, departmental spawning ground initiatives, etc[.]

…

- Support the development of a funding mechanism[.][166]

The CSAB's terms of reference for the area harvest committees (AHCs) set out further roles and responsibilities for both the DFO and the committees, including the following:

DFO:

- Fishery managers will meet with AHC's [*sic*] as needed to review information discuss fishing options and implement fisheries.
- Develop collaborative arrangements with the AHC's [*sic*] …

AHC:

- Develops specific harvesting plans including fishery time frame, starting dates, and boundaries for individual fisheries relative to the area and gear type for consolidation and coordination by the CSAB.

…

- Identify problems encountered regarding the management or enforcement of the fishery.
- Meet with the SFAB, First Nations representatives, or other interested parties as appropriate to resolve issues affecting the respective sectors or area gear types.
- Provide in-season advice on fishing related matters to DFO as appropriate to the area and gear type.[167]

The CSAB's decisions or advice are to be developed through consensus, whereas the decisions of the area harvest committees are made by simple majority.[168] When consensus cannot be reached, the CSAB chair summarizes the differing views and "advise[s] the Department accordingly."[169] Mr. Grout testified that, from DFO's perspective, the CSAB is "effective for getting feedback on issues," but DFO recognizes that it is challenging for the CSAB, because of its makeup, to reach consensus "on some of the more controversial issues."[170] Participation in the CSAB is also governed by a "Committee Charter" that defines the expectations members may have for how they work together: CSAB members have a responsibility to participate in consultations in good faith and to engage in "effective, balanced and civil communication[s]."[171]

DFO managers and its salmon officer participate in the meetings of the CSAB, including having set the CSAB's terms of reference.[172] Although the CSAB's consultation meetings with DFO "vary from year to year," they typically hold a post-season review meeting in January to review the southern BC fisheries (which include Fraser River sockeye), and another meeting in April to review the commercial salmon harvest sharing arrangements and negotiate the allocations of fish for the different gear types under the proposed fishery plan for the coming season.[173]

DFO does not fund the CSAB, and some commercial fishing witnesses felt strongly that the lack of funding negatively affects participation in the CSAB.[174] Ryan McEachern, a commercial gillnet fisher and a representative on area harvest committees and the CSAB, recommended:

> [I]f there's one recommendation around the advisory process that I would hope would come out of this Commission [it] would be that the participants from the various commercial fleets should be adequately compensated for their time and their expenses ... putting that load on the commercial fishermen at the same time that the economic viability of the fleet is on the decline has been very hard to bear.
> ...
> [B]ecause the advisory processes are not funded, you have a large group of people that attend all of the meetings and [at] every meeting [there] are people that are getting paid in some fashion, particularly when it comes to company representatives.
> ...
> You could either change the make-up of the Commercial Salmon Advisory Board so you limit it to fishermen only, and the union and the companies would need to make their advice to the Department in a separate forum, or you could pay the independent fishermen themselves for attending these meetings so that they would be able to participate at the same level that the union or the company would.[175]

In relation to DFO's consultation with the commercial sector, Ms. Scarfo observed:

> I don't think the CSAB is going to make any difference to Fraser River sockeye survival; there are major problems with the consultation processes that DFO engages with ... I think that somebody told me the other day that[,] on the west coast alone[,] fisheries managers attend 160 different management consultation processes. Most of them I would say are meaningless. Most of them are presentations of PowerPoints that I could just as easily sit at home, without incurring costs, to look at. You very rarely get time to ask any meaningful questions, because usually the room is too big or the person who actually made the presentation isn't there to answer the questions. So it's kind of meaningless consultation; it's window dressing.[176]

Mr. Grout offered the following explanation about the competing interests in DFO's participation in the consultative processes, in the context of those with the commercial sector:

> I think there's a fine balance there because if you aren't engaged in these processes and you don't have discussions in an open and transparent way, you risk losing some of the accountability that the processes were intended to bring into play. So they were trying to keep these processes effective and efficient and we continue to discuss with these committees ways that we can improve what we're doing but I think there's a balance there.
>
> If you go too far one way and there's no consultation at all, I think that takes you back a number of years to times when people were complaining about the lack of transparency in the decision making, lack of input on some of the decisions that were made. The department's moving much more in the direction of harvesters and others having an increased role in how we manage the resource.[177]

The Sport Fishing Advisory Board

The SFAB is a volunteer body whose members represent both recreational anglers from across the province and people whose economic interests are related to sport fishing.[178] DFO can have a role in determining the representation on the SFAB; Mr. Grout stated that DFO is "looking to see that the representation is balanced ... the department has been involved in setting up the terms of reference" for the SFAB.[179] Since 1964, the SFAB has been the primary process for DFO's consultation involving the recreational fishing sector.[180] Its mandate is to provide formal advice and make recommendations to DFO on matters relating to tidal recreational fisheries and non-tidal anadromous fisheries.[181]

Like the CSAB, the SFAB has a main board (Main SFAB) and two geographic subcommittees, the North Coast and South Coast regional committees. The SFAB is made up of local sport fishing advisory committees, covering much of the province, which are represented in the two regional committees (which, in turn, are represented in the Main SFAB). In addition to this hierarchical and regional organization (from local to regional to the main board),

the SFAB has specific working groups for particular species or issues, including a "sockeye, pink and chum working group." The main board includes the chairs and elected representatives from the North Coast and South Coast regional committees, as well as appointed organization representatives (including the B.C. Wildlife Federation, the B.C. Federation of Drift Fishers, the Sport Fishing Institute, and the Pacific Salmon Commission), and ex officio government representatives.

The SFAB's terms of reference contain a membership policy that requires "the majority of the SFAB to be Primary Level User Group Members," meaning "persons who do not receive a significant amount of their annual income directly or indirectly from the recreational fishery."[182] The SFAB provides advice to the federal and provincial governments and assists in disseminating information to the angling community and the general public. It also recommends recreational fishing representatives to sit on or participate in, among others, the Pacific Salmon Commission and the IHPC.[183]

DFO meets with the Main SFAB in January for post-season review and pre-season planning. DFO also meets with the SFAB's South Coast regional committee in late March or early April to go over the draft of the Integrated Fisheries Management Plan (IFMP) and meets again with the Main SFAB in late April to review the IFMP.[184] DFO provides funding for travel and accommodation expenses for SFAB representatives participating in meetings with DFO.[185]

The Marine Conservation Caucus

The Marine Conservation Caucus is an umbrella group that was formed in 2003 and that represents nine or 10 environmental non-governmental organizations, including the David Suzuki Foundation, Watershed Watch Salmon Society, Raincoast Conservation Foundation, and the Canadian Parks and Wilderness Society.[186] It participates in DFO's IHPC and acts as an observer at the Fraser River Panel's Canadian Caucus.[187] According to Mr. Young, one of the representatives of the Marine Conservation Caucus at both the IHPC and the Canadian Caucus, the Marine Conservation Caucus hopes to ensure "that conservation is held up as the priority mandate for DFO."[188] He acknowledged that the caucus does not represent all environmental interests, but that its participation in the IHPC provides a useful means for environmental groups to provide input to DFO on Fraser River sockeye issues.[189]

Forum on Conservation and Harvest Planning for Fraser Salmon

In 2008, as a result of forecasted poor returns, DFO hosted a series of workshops with Aboriginal groups on harvest planning, with the goal of discussing how small returns of Fraser River salmon could be shared among them.[190] DFO recognized that poor returns for Fraser River salmon would limit harvest opportunities and could potentially have an impact on the ability of Aboriginal groups to harvest salmon for FSC purposes.[191] The meetings have continued for the past four years and are now called the Forum on Conservation and Harvest Planning for Fraser Salmon, coordinated by the Fraser River and Approach Working Group (which consists of representatives of both First Nations and DFO and which operates with administrative assistance of the Fraser River Aboriginal Fisheries Secretariat).[192] The forum meets about four times a year[193] to review technical information and discuss management issues and approaches to Fraser River salmon.[194] DFO does not view the forum as a decision-making body,[195] but these meetings have led to an agreement among First Nations on how to deal with low Early Stuart returns.[196]

Although the forum provided a venue for discussions regarding FSC fisheries, Aboriginal participants indicated a desire to develop a more permanent co-management structure or process between Aboriginal groups and DFO regarding Fraser River salmon.[197] In response, a new process called the Fraser River Salmon Roadmap was developed in 2009 to bring together DFO and Aboriginal groups from the Fraser River watershed, Vancouver Island, and the marine approach areas.[198] The roadmap process is discussed in more detail in the Aboriginal fishing policies and programs section later in this chapter.

In its final written submissions, Canada indicated that DFO intends for the roadmap process to have linkages with other advisory processes, such as the IHPC.[199]

Recreational–Commercial Salmon Allocation Implementation Committee

DFO held the inaugural meeting of the Allocation Implementation Committee on November 10, 2004. Its purpose is to deal with allocation issues that make an impact on both recreational and commercial fishers (the Aboriginal sector is not represented on this committee, although individuals who are Aboriginal may be involved as commercial fishers).[200] The committee was active for three years (until 2007) and was reactivated in late 2009 or early 2010 to address further allocation issues, including those stemming from the 5 percent cap DFO's Salmon Allocation Policy put on the recreational portion of the combined recreational-commercial total allowable catch for sockeye.[201]

The terms of reference of the Allocation Implementation Committee set out in its mandate:

> [To] be a forum to discuss issues related to the implementation of the *Allocation Policy for Pacific Salmon.*
>
> To provide advice to the Minister regarding specific allocation issues that have a direct impact on both the recreational and commercial sectors.[202]

Like the IHPC, the CSAB, and the SFAB, the Allocation Implementation Committee is guided by principles of transparency, accountability, inclusive representation, effectiveness, and efficiency.[203] Its membership is 11 representatives from the CSAB, 11 representatives from the SFAB, and four representatives from DFO.[204] The Province of British Columbia may participate in an ex officio capacity. The committee is responsible for identifying issues "not clarified in the Allocation Policy," developing consensus recommendations for consideration by fishery managers, and providing advice to DFO on specific issues related to inter-sectoral allocation.[205]

Integrated Salmon Dialogue Forum

The ISDF was created in 2006 as a result of the recommendation stemming from the 2001 report, *Independent Review of Improved Decision Making in the Pacific Salmon Fishery*,[206] and was to run from 2007 through the spring of 2011. The ISDF described itself as a "BC-wide process that brought diverse participants together to work as partners in a conversation to share information, incubate new ideas and approaches, and start to address some of the big issues impeding progress toward a fully integrated and sustainable salmon fishery."[207]

The participants in the ISDF were volunteers.[208] They were drawn from First Nations, DFO, the province, commercial and recreational fishers, and conservationists,[209] but they were not mandated to speak on behalf of these groups. As a result, any consensus reached at the ISDF was non-binding.[210] I heard evidence from participants that the ISDF did not fulfill the role of a policy advisory body, nor was it an appropriate policy forum.[211]

The ISDF did not have terms of reference per se, but a consensus framework developed by its participants set out the following description of its goals:

> What is the Forum?
>
> a. The Integrated Salmon [Dialogue] Forum provides a collaborative and inclusive opportunity for all interests to work towards a fully integrated sustainable fishery in ways that respects [*sic*] the Wild Salmon Policy and serves both people and salmon.
> b. Participants have agreed to make best efforts to work through their respective processes, agencies and organizations to give effect to any consensus reached in the forum, and to address any differences that emerge.
>
> What are the goals of the Forum?
>
> a. Developing shared principles that can have broad application across an integrated and sustainable salmon fishery, and relevant processes.
> b. Enabling broadly based interest connected with the salmon fishery to identify and address underlying issues.
> c. Developing innovative possibilities to assist the diverse interests associated with the fishery to reach common ground and generate enduring solutions.

d. Building collaborative relationships, networks and partnerships through which different sectors will have an opportunity to express and advance concerns and interests, and explore how they might best create mutual value.
e. Stimulate and inform discussions within existing processes in ways that support and enhance the management of an integrated fishery.
f. Carry out the work of the Forum at two levels: a "high beam" – e.g. regional, policy, long term[,] and a "low beam" [–] specific, ground level, operational.[212]

The ISDF was characterized as "a safe place to talk"[213] or "a forum of dialogue where folks can get together ... and discuss very prickly issues in and around the Fraser River."[214] Through the ISDF's Monitoring and Compliance Working Group, the Monitoring and Compliance Panel was formed. Its report, *Charting Our Course*, is discussed in the section of this chapter on fisheries monitoring and catch reporting.

In its final written submissions, the Province of British Columbia encouraged DFO's ongoing and future support of the ISDF and its Monitoring and Compliance Panel, asserting that these initiatives provide the opportunity to involve all those who have an interest in the fishery and who can improve relationships and build trust.[215] The First Nations Coalition, however, urged more involvement in Tier 1 and Tier 2 processes rather than the Tier 3 process of the ISDF.[216]

The extent of DFO'S meetings

During the hearings, I heard from many different witnesses about the amount of time required to attend meetings by both DFO staff and representatives of the different sectors. Mr. Saito, a former DFO employee who now works primarily with the province and was actively involved in the ISDF, was particularly concerned about the level of "meeting fatigue" experienced by participants:

> My only observation and concern is that many of the individuals that participate in the myriad of consultation fora and meetings are the same people, and there is this issue of fatigue, perhaps, in that ... an awful lot [is being] asked of individuals to participate day after day, week after week in very similar forums, and I think it's asking an awful lot of individuals. And I know that [for] some people ... the demands have been more than they could provide, and ... you're starting to see some drop out in some of these processes. I'm very fortunate, quite frankly, in observing the high level of integrity and competency within the individuals that do participate, but one only has to take a look at a three-page list of the number of meetings that are going to take place over a year, relating to just salmon, and realize that the same people are at those same meetings, that you've got to ask yourself how long can this take place.[217]

Dr. Kristianson supported Mr. Saito's concerns, although he spoke positively about DFO's efforts at consultation through meetings:

> [T]he Department of Fisheries and Oceans deserves a gold star for being probably the most consultative department of government in this entire country. I'm not aware of any department of government, federal or provincial, that spends as much time trying to understand the needs of its constituents.
> ...
> Now, can things be improved? Of course. I mean, I think we're all troubled by the issue Wayne has raised, the demands on individuals.
> ...
> The other side of this is – to keep in mind that we're just talking about salmon here, and in particular, Fraser River salmon. There are a whole series of other processes, advisory consultant processes going on in DFO related to other species. So one can't look at one part of the puzzle without thinking of the other.[218]

Mr. Rosenberger, area director of BC Interior (based in Kamloops), testified that, during the fishing season, he meets once or twice a week with local First Nations fisheries harvest committees regarding FSC openings, meets weekly with recreational fishing groups regarding recreational

fishery openings, and has weekly conference calls with commercial fishers where the Area Harvest Committee representatives can discuss commercial openings.[219] Marcel Shepert of the Upper Fraser Fisheries Conservation Alliance told me that he attends between 20 and 30 meetings a year between DFO and Aboriginal organizations,[220] and Ernie Crey, fisheries advisor with the Stó:lō Tribal Council, said that he attends between 30 and 40 meetings a year with DFO.[221] Mr. Grout testified that he meets with every First Nations planning committee for each economic opportunity fishery.[222]

Witnesses told me that it was inefficient to have the same information repeated at different meetings where several of the same participants are present. Pat Matthew, fisheries management coordinator for the Secwepemc Fisheries Commission, told me that there are "too many processes out there" and that repetitive technical pre-season and post-season information is presented by DFO.[223] It is also expensive to host and participate in meetings. Mr. Rosenberger told me that a "significant portion" of DFO time and resources is spent on engaging with First Nations at different levels,[224] and Ross Wilson of the Heiltsuk First Nation stated that he did not have enough funds to attend most of the meetings that take place.[225] Grand Chief Saul Terry of the St'at'imc Nation said that money spent at "enormous huge meetings" with sometimes questionable results could be better used on stream cleaning or local projects overseen by First Nations.[226]

Mr. Young told me that he thought the efficiency of these processes could be improved and that this point alone could alleviate meeting fatigue. He said it is difficult for the Marine Conservation Caucus to participate fully in all the processes.[227] Mr. Crey said that, although he was happy to attend meetings and talk with DFO, "there has to be a purpose for all the talk and the commitment of resources."[228] Mr. Shepert stated that, after attending meetings with DFO for the past 15 years, "the dialogue has definitely run its course," and it was now time for action.[229]

Findings

Although I do not make a recommendation, I am satisfied that the Integrated Harvest Planning Committee (IHPC) process serves a useful purpose. However, I heard concerns about

- the need for increased First Nations' representation in the IHPC process; and
- the need for the Department of Fisheries and Oceans (DFO) to explain when its final Integrated Fisheries Management Plan differs from the recommendations made by First Nations and stakeholders during the IHPC processes.

I encourage DFO to address both these issues.

In addition to the above, I heard evidence that satisfies me of the value of DFO's advisory processes with the Commercial Salmon Advisory Board and the Sport Fishing Advisory Board, and I encourage DFO to continue to support these activities. I understand that DFO provides funding for travel and accommodation for sport fishing representatives attending meetings with DFO but does not provide comparable funding for independent commercial fishers. I encourage DFO to apply a consistent policy in relation to both advisory groups.

It is clear to me that all these advisory meetings create "meeting fatigue" for those involved, including DFO employees. While some of these meetings are a necessary and important component of DFO's management of the fishery, I encourage DFO to find ways to reduce the number of meetings and to streamline its advisory processes in order to alleviate meeting fatigue and conserve DFO resources.

I discuss these findings and any related recommendations in Volume 3 of this Report.

Allocation

In the management of the fishery, "allocation" describes the number of fish that a sector (commercial, recreational, or Aboriginal fisheries), gear type, or licence holder is allowed to catch.[230] According to Ms. Farlinger, "[A] key pillar of any successful management regime is deciding and writing down who gets what."[231] Allocation of salmon is usually expressed as percentages of the total allowable catch (TAC), while in the FSC fishery it is either an absolute number or a percentage of TAC (see the explanation of total allowable catch in the section below).[232]

The process of allocating TAC among sectors is called "inter-sectoral allocation"; allocation among gear types within the commercial sector is called "intra-sectoral allocation."[233] DFO uses its 1999 Allocation Policy for Pacific Salmon (Salmon Allocation Policy)[234] to determine both inter-sectoral and intra-sectoral allocation.

Mr. Grout stated that "allocation refers to how the resource is shared between conservation objectives [and harvested] by various participants."[235] Allocation affords DFO a tool to manage the fisheries and offer fairness in the fisheries to the various fleets and sectors; however, as I describe below, allocation is a contentious issue.

I received public submissions regarding DFO's allocation policies and practices in the salmon fishery, including the following suggestion:

> In its investigation of DFO's management of the commercial fishery, the commission should consider several specific questions pertaining to the Sockeye Allocation Policy, the use of sockeye equivalents, and stakeholder consultation processes. The commission should recommend that commercial fishermen be paid not to fish in years of low abundance, which would provide relief while maintaining the infrastructure to harvest strong returns.[236]

DFO authority over allocation

DFO's authority over allocation arises from its ability to set and vary limits or quotas on the amount of fish caught under the *Fisheries Act* and its regulations (described in Chapter 3, Legal framework). Section 43(1)(*c*) of the Act allows the Governor in Council to make regulations respecting the "catching, loading, landing, handling, transporting, possession and disposal of fish." The *Fishery (General) Regulations* allow the minister to specify conditions on a fishing licence respecting "the species of fish and quantities thereof that are permitted to be taken or transported."[237] This regulation also provides that,

> where a close time, fishing quota or limit on the size or weight of fish is fixed in respect of an area under any of the Regulations listed in subsection 3(4) [which includes both the *British Columbia Sport Fishing Regulations, 1996*, and the *Pacific Fishery Regulations, 1993*], the Regional Director-General [or a fishery officer] may, by order, vary that close time, fishing quota or limit in respect of that area or any portion of that area.[238]

In the Pacific Region, the Salmon Team is responsible for implementing the Salmon Allocation Policy. The Salmon Working Group also coordinates the implementation of regional and national strategies relating to allocation.[239]

Pre-1999 allocation process and reviews

Before the mid-1980s, DFO had no formal procedures for allocating salmon, either inter- or intra-sectorally; in general, DFO managed openings to provide fishing opportunities to the seine and gillnet fleets for sockeye, pink, and chum salmon, while the troll fishery focused on chinook and coho salmon.[240] In the late 1980s and early 1990s, DFO worked with the Commercial Fishing Industry Council, an independent body contracted by DFO, to provide a yearly catch allocation formula to determine intra-sectoral allocation.[241]

In December 1995, the Pacific Policy Roundtable issued a *Report to the Minister of Fisheries and Oceans on the Renewal of the Commercial Pacific Salmon Fishery*, in which it recommended the appointment of an advisor to the minister on inter-sectoral allocation to set rules associated with initial catch shares and adjustments over time. As a result, Minister Fred Mifflin contracted Dr. Art May to conduct an assessment of inter-sectoral allocation of salmon in British Columbia.

The May Report, 1996

After consulting with the fishing sectors, Dr. May concluded[242] that there was "no possibility of building consensus among all interested parties on principles or policy frameworks to guide the conservation and utilization of Canada's Pacific salmon fisheries."[243] He set out a number of policy considerations for the minister to consider in

the development of an allocation framework: that allocations for Aboriginal fish should have priority; that initial shares for the commercial and recreational sector need to be based on the most recent historical period (he suggested 1991–94); and that the recreational fishery have priority for chinook and coho fisheries. The May Report did not address intra-sectoral allocation, nor did it reflect a consensus on inter-sectoral allocation. DFO continued exploring these issues in subsequent work by Samuel Toy and Stephen Kelleher.

The Toy Report, 1998: inter-sectoral allocation

In October 1997, the minister appointed Samuel Toy,[244] a retired justice of the BC Court of Appeal, to carry out and oversee consultations on inter-sectoral salmon allocations, focus his review on issues identified in Dr. May's report, and work with stakeholders to come to a consensus on as many issues as possible.[245] Mr. Toy took advice on how to consult with the various sectors from a group of 10 advisors representing the Aboriginal, commercial, and recreational sectors; however, the Aboriginal sector withdrew from the process, citing pending settlement of land claims and the need for fair compensation for historic infringements on Aboriginal fishing rights.[246] Mr. Toy proceeded to consult with the commercial and recreational sectors, and eventually secured the agreement of these sectors on a statement of 10 principles concerning allocation.

Mr. Toy made two official recommendations to the minister. The first was to adopt, with some qualification, the statement of principles developed by the representatives from the commercial and recreational sectors. The second was to create a new initiative in which regionally elected management boards would advise on allocation issues under the wing of an independent allocation tribunal.

The Kelleher Report, 1998: intra-sectoral commercial allocation

Contemporaneously with the Toy process, the minister contracted with lawyer and arbitrator Stephen Kelleher to consult with commercial fishers and make recommendations on intra-sectoral allocation. Mr. Kelleher undertook two sets of consultations with commercial fishers: one in 1997 and the other in 1998. His April 1998 report summarizes the results of both these consultations.[247] Based on his 1997 consultations, Mr. Kelleher made seven recommendations to the minister:

1. Allocation should include all five species, sockeye, chum, pink, coho and chinook salmon.
2. Sockeye equivalents should be the unit of measurement in allocation.
3. Where possible, an allocation plan should reflect traditional fishing patterns.
4. Allocation must be considered on a four year basis.
5. The allocation plan should target coast-wide shares of 34 per cent gillnet, 42 per cent seine, and 24 per cent troll.
6. Allocation planning should strive for equality between southern areas, but cannot guarantee equality between northern and southern areas.
7. The allocation plan should provide for Fraser River Sockeye catch-up / make-up amounts of 477,477 Sockeye to be given the troll fleet, and 143,754 to be given the seine fleet. This payback arises from terms of the 1990–94 Long Term Allocation Plan.[248]

After the 1998 consultations, Mr. Kelleher made an additional 23 recommendations about how allocation within the commercial sector should proceed among gear types. The recommendations covered, among other things, deficit surplus accounting (monitored by DFO year to year by sockeye equivalent) with a formal allocation accounting once every four years, bycatch (unintentional catch) in the northern fisheries, allocation changes over time, specific troll-fleet issues, and selective fishing practices.[249]

DFO's Salmon Allocation Policy

In December 1998, in response to the work performed by Dr. May, Mr. Toy, and Mr. Kelleher, DFO released a report entitled *An Allocation Framework for Pacific Salmon 1999–2005*. DFO held three workshops in March and April 1999 to gather feedback on the Allocation Framework, and it also

received 225 pages of written submissions.[250] Based on these consultations, DFO revised its Allocation Framework in October 1999 and renamed it An Allocation Policy for Pacific Salmon (Salmon Allocation Policy).[251] According to DFO, it is "intended to guide salmon allocation decisions by the department's managers and provide stakeholders with more certainty and predictability in the approaches that will be used."[252]

The Salmon Allocation Policy contains a Salmon Allocation Framework, which sets out seven principles for the allocation of salmon, described by Mr. Grout as "the key drivers for the way we [DFO] manage the fisheries."[253] The principles, with some of the surrounding language, are as follows:

> *Conservation* – Conservation of Pacific salmon stocks is the primary objective and will take precedence in managing the resource – conservation will not be compromised to achieve salmon allocation targets.
>
> *First Nations* – After conservation needs are met, First Nations' food, social and ceremonial requirements and treaty obligations to First Nations have first priority in salmon allocation.
>
> *Common Property Resource* – Salmon is a common property resource that is managed by the federal government on behalf of all Canadians, both present and future.
>
> *Recreational Allocation* – After conservation needs are met, and priority access for First Nations as set out in Principle 2 is addressed, recreational anglers will be provided:
> - priority to directed fisheries on chinook and coho salmon; and
> - predictable and stable fishing opportunities for sockeye, pink and chum salmon.
>
> *Commercial Allocation* – After conservation needs are met, and priority access for First Nations as set out in Principle 2 is addressed:
> - the commercial sector will be allocated at least 95 per cent of combined commercial and recreational harvest of sockeye, pink and chum salmon; and
> - the commercial harvest of chinook and coho will occur when abundance permits.
>
> *Selective Fishing* – To encourage selective fishing:
> - a portion of the total available commercial catch will be set aside for existing commercial licence holders to test alternative, more selective harvesting gear and technology; and,
> - over time, commercial allocations will favour those that can demonstrate their ability to fish selectively.
>
> *Gear Allocations* – Target allocations for the commercial sector will be:
> - established on a coast-wide basis by gear, with the catch of all species expressed on a sockeye equivalent basis; and,
> - subject to adjustments over time to account for conservation needs, including selective fishing, and possible changes resulting from the Voluntary Salmon Licence Retirement Program.[254]

Building on the recommendations from Dr. May, Mr. Toy, and Mr. Kelleher, the Salmon Allocation Policy contains a provision that "an impartial board with coast-wide responsibilities will be established to advise and assist the Minister in implementing this salmon allocation policy."[255] According to the policy, the allocation board was to be established in the calendar year 2000. It has never, however, been established.

Inter-sectoral allocation

The Salmon Allocation Policy deals with both recreational and commercial fishing and with inter-sectoral allocation among First Nations fishing for FSC purposes by allocating FSC purposes priority over other uses of the salmon resource. Between commercial and recreational fishers, the Salmon Allocation Policy recognizes the following:

> Recreational and commercial salmon fisheries operate very differently. The recreational fishery accounts form a relatively small portion of the total annual harvest of salmon. It is primarily concerned with the quality of the angling experience and with the opportunity to fish throughout the year. In contrast, the commercial fishery,

> which takes place mainly from July to November, accounts for the vast majority of the total salmon harvest and is primarily concerned with the quantity and value of the catch.[256]

Principle 4 grants recreational harvesters priority access to chinook and coho salmon, and it also limits the recreational harvest of sockeye, pink, and chum salmon "to a maximum average of 5% of the combined recreational and commercial harvest of each species over the period 1999 to 2005."[257] The Salmon Allocation Policy also contains provisions regarding the catch limits in the recreational fishery for sockeye, noting that "typical limits" for sockeye (combined with pink and chum salmon) will be established as follows:

- Tidal Waters: a daily limit of four salmon with a possession limit of eight salmon;
- Non-Tidal Waters (adults): a daily limit of two adult salmon and a possession limit of four adult salmon;
- Non-Tidal Waters (jacks): a daily limit of four salmon and a possession limit of eight salmon.[258]

I heard evidence that, because the recreational catch averages less than 5 percent, the Salmon Allocation Policy's allocation of a maximum of 5 percent of the combined harvest to recreational fishers is still used in most years,[259] but that the policy might not work if the recreational catch were to increase.[260] However, a decrease in the commercial harvest automatically lowers the cap for recreational fishing. In years of low abundance, recreational fishers may reach the cap earlier, even if taking fewer fish than in previous years. As a result, there is tension between the commercial and the recreational sectors regarding the Salmon Allocation Policy Principle 4 priority of chinook and coho salmon to recreational fishers.[261]

Allocation to Aboriginal fisheries

DFO manages allocations in the Aboriginal fishery by providing a given Aboriginal organization access to a certain number of fish, whether presented as an absolute number or calculated as a percentage of the TAC. According to Kaarina McGivney, former regional director, Treaty and Aboriginal Policy and Governance Directorate, having allocations is important because they facilitate fisheries management. She said that having an agreed amount of access provides some stability and understanding for fisheries management.[262]

DFO states that Aboriginal fishing allocations are reached by negotiation with Aboriginal organizations.[263] In these negotiations, DFO staff are provided with "mandates" setting out the maximum number of fish and funding that may be agreed to at a given negotiation.[264] Since 2007, the mandates associated with the FSC fisheries of individual British Columbia Aboriginal groups have been determined by the regional director general.[265] Before that, they were set in Ottawa.[266] Mandates associated with the economic opportunity fisheries continue to require approval from the minister.[267] According to Barry Huber, Aboriginal affairs advisor, BC Interior, DFO, mandates are reviewed annually and can be adjusted if necessary.[268]

Mr. Huber also told me that mandates are not disclosed to Aboriginal groups, as doing so would detract from the negotiations under way. He said that each negotiator needs flexibility,[269] and laying all the "chips on the table" at the start is not a good way to negotiate because it "forces you to be positional right off the bat."[270] At the end of the negotiations, the agreement reached may include fewer FSC fish or less funding than is stipulated in the mandate, though most are at the top of mandate levels.[271]

The Aboriginal Fisheries Framework contains an articulation of the overall percentage of the available salmon harvest that is to be allocated to First Nations.[272] The actual percentage was not disclosed to the Commission. When I ordered that this percentage allocation be disclosed, I was provided a certificate from the clerk of the privy council certifying that the information and related documentation was a cabinet confidence.

Despite not knowing the percentage of salmon allocated to First Nations in the Aboriginal Fisheries Framework, I did hear evidence on how this percentage is used. According to Ms. McGivney, the percentage allocation covers both FSC fishing and Aboriginal communal fishing for economic purposes.[273] The percentage is to be achieved on average, over a number of years, recognizing that, in years of low salmon returns,

the Aboriginal FSC fishery may form a higher percentage of the catch.[274]

According to DFO's Aboriginal Fisheries Framework, on a year-to-year average,[275] Aboriginal FSC and economic opportunity fisheries are allocated approximately 30 percent of the total salmon harvested in British Columbia.[276] In contrast, the First Nations Panel on Fisheries recommended in its 2004 report, *Our Place at the Table: First Nations in the B.C. Fishery*, that the government immediately transfer a minimum of 50 percent of all fisheries to First Nations, with the potential that the total may reach 100 percent in some fisheries.[277]

Commercial communal Aboriginal allocation

In addition to FSC fishing access, Aboriginal Fisheries Strategy agreements between DFO and individual Aboriginal groups may provide for communal commercial fishing opportunities. From 1992 until 2003, DFO provided communal commercial Fraser River sockeye fishing access to certain Lower Fraser Aboriginal groups through DFO's Pilot Sales Program.[278] Since 2004, DFO has provided communal commercial fisheries access through "economic opportunity fisheries."[279] (DFO's Pilot Sales Program and economic opportunity fisheries are described in more detail in the Aboriginal fishing policies and programs section later in this chapter.)

In 2010–11, a total of 379 communal commercial licences were issued for salmon.[280] The number of fish allocated to an Aboriginal group for communal commercial fishing is determined by negotiation between DFO and the group. In preparing for these negotiations, DFO gives its staff "mandates" for communal commercial allocations.[281] The Allocation Strategy within the Aboriginal Fisheries Framework states that the allocation of communal commercial access must balance the department's objective of supporting the economic development objectives of First Nations communities and the interests of all fishery participants.[282] In addition, communal commercial Fraser River sockeye allocations have been provided to support in-river fisheries, as described below in the section on terminal fisheries.

Commercial intra-sectoral allocation[283]

Principle 7 of the Salmon Allocation Policy (allocations by gear) adopted the initial coast-wide allocation targets for different commercial gear types (expressed as percentages of TAC)* recommended in the Kelleher Report: 34 percent gillnet, 42 percent seine, and 24 percent troll.[284] These numbers were adjusted in early 2000, after the second licence buy-back program, to 38 percent gillnet, 40 percent seine, and 22 percent troll.[285] These coast-wide target allocations are translated, on an annual basis, into licence area target allocations.[286] These annual target allocations are expressed in sockeye equivalents, based on the previous year's average price by species.[287]

DFO divides the entire coast into 21 production areas (e.g., "South Coast Sockeye – Area 23" is a production area), identifies the major stock of harvest, and projects the number of fish that will be harvested in each production area.[288] It looks at the market value of the fish, based on the previous year, and turns each fish into a "sockeye equivalent" (e.g., one chinook might be worth five sockeye, whereas one pink might be worth only a fraction of one sockeye). In this way, DFO can determine the value of the projected harvest, based on sockeye equivalents, for each production area. Mr. Grout described the process:

> What we do to determine sockeye equivalents is it's relying on a landed value of the harvest from the previous season. So for the 2009 planning we're looking at the sockeye equivalents from the 2008 season. It relies on the landed value of the catch, and the landed price per kilogram or pound, and the average weights of those species. And … then it's converted into sockeye equivalents, looking at the relative value of each species compared to sockeye on a coast-wide basis.[289]

The sockeye equivalent for a particular fish species is calculated as follows:

- Sockeye equivalent = (price / fish) ÷ (price / sockeye)

* TAC in this context means the Canadian commercial TAC specific to Fraser River sockeye.

- Price / fish = landed value by species ÷ total catch by species[290]

Each year in April, DFO meets with the CSAB to consult on how the coast-wide target allocations will be translated into licence area target allocations.[291] The annual consultation on allocation starts with a model table prepared by DFO which reflects the previous year's shares, the projected harvest, and the value of the catch in sockeye equivalents for each production area. The model is updated during the course of the meetings; different scenarios can be run as necessary to explore different allocation options. At the end of the meeting, DFO seeks an agreement on the percentage shares of each licence area for each production area.[292] This summary then becomes Appendix 4 of the IFMP for salmon.[293] It is the formal allocation plan for the year, broken down by species / production area and licence area / gear type.

The commercial fishers who testified were critical of the allocation process because it is not always possible to achieve the target percentage split of the TAC among the sectors – a criticism that was acknowledged by Mr. Grout.[294] Mr. McEachern told me that he thinks "the system is broken."[295] He identified the problem as a coast-wide allocation strategy imposed on area licensing which, because licence holders are restricted to fishing in a particular area, prohibits trades across licence groups:[296]

> [W]e have a coast-wide allocation division of an economic pie that requires us to be able to move fish around, but we are geographically restricted by our individual licences [so] that if there is an imbalance, as it was explained, you can't access that fish. So we end up every year going through a process of trying to resolve differences in share of catches that aren't possible to achieve because of the structure of the area licensing in coast-wide allocation.[297]

Ms. Scarfo criticized the allocation process on the basis that the process lacks guiding principles: there are conflicting priorities, she said, and "a complete lack of direction from government."[298] Dennis Brown, a former commissioner of the Pacific Salmon Commission and author of the book *Salmon Wars*, described it as "highly problematic in the industry at this time."[299]

Other commercial allocation considerations

The Salmon Allocation Policy also states that target allocations are not guaranteed, and no compensation is provided in the event that an allocation is not achieved.[300] More specifically, "'catch up / make up' adjustments to future target allocations will not be considered in the event that a fleet does not achieve its target allocation."[301] That is a departure from previous allocation methods. "Catch up / make up" is a method of accounting for fish among commercial groups whereby, if one group had to "give up" fish one year, efforts would be made to pay it back in terms of allocation in a subsequent year.

DFO did not accept Mr. Kelleher's recommendations on deficit-surplus accounting; instead, the Salmon Allocation Policy expressly states that "catch up / make up provisions would seriously complicate salmon fishery management and potentially conflict with conservation goals and selective fishing priorities."[302] Although I heard from one commercial fishing witness that it was preferable to return to a catch up / make up approach, Mr. Grout, speaking on behalf of DFO, was of the opinion that it would be extremely complicated to revert to this approach.[303]

Selective fishing in the commercial fishery under the Salmon Allocation Policy

As one of its seven principles, the Salmon Allocation Policy expressly sets out in Principle 6 to encourage selective fishing:

> For a two-year period (1999–2000), up to 5% of the total available commercial catch will be available to commercial licence holders who wish to experiment with alternative fishing gear and technology such as salmon traps, fish wheels and tooth tangle nets. The results of these fishing trials will be reviewed and evaluated. At the end of the two-year period, the adequacy of the allocation for experimental trials will be assessed and revised if necessary.

> Initial longer-term allocations to alternative gear and technology will also be considered at that time.[304]

Selective fishing is "the ability to avoid non-target fish, invertebrates, seabirds, and marine mammals or, if encountered, to release them alive and unharmed"[305] (selective fishing is discussed further in the selective fishing section below). Under the Salmon Allocation Policy, selective fishing experiments were to have priority over existing commercial fisheries and, "[o]ver the longer term, target allocations for seine, gillnet and troll gear will … reflect the relative ability of each gear type to harvest selectively through modification of existing gear and fishing operations."[306]

The target allocations under the Salmon Allocation Policy have not been adjusted away from the "Kelleher formula" to reflect the relative selectivity of different gear types. Instead, fleets using less-selective methods may be unable to access their allocation if, for example, their fishery is closed because of a high risk to stocks of concern.

Status of allocation

The Salmon Allocation Policy remains the operating policy document for guiding salmon allocation.[307] Recently, DFO revived the Allocation Implementation Committee, as discussed above, to address some issues of modernizing the Salmon Allocation Policy.* For example, this group may deal with the problem of how to address recreational fishers going beyond the 5 percent cap for sockeye in years of poor returns when the commercial harvest is low.[308] In addition, DFO has received some funds from Pacific Salmon Treaty negotiations (approximately $1 million) for modernization of the Salmon Allocation Framework.[309]

While I made no recommendation regarding the existing allocations between the commercial and recreational sectors, later in this chapter, I discuss the Aboriginal Fisheries Framework and its potential to significantly influence the future allocation of the Fraser River sockeye fishery. The findings I make and related recommendations are discussed in Volume 3.

Management of the recreational fishery

Ms. Adams described salmon fishing in the recreational fisheries as the "critical backbone of the recreational fishing community in both marine and in freshwater."[310] She told me that British Columbia's marine recreational fishery is the largest in the country – both in angler days and in the "economic analysis related to that."[311] People spoke positively about the recreational fishery in this province.

DFO controls the recreational fishing of Fraser River sockeye; there is no direct involvement by the Fraser River Panel. The annual IFMP, which is discussed below, governs the recreational fishery and contains DFO's recreational fishing plan for the year.[312] DFO states there that recreational fishing opportunities are regulated by the *British Columbia Sport Fishing Regulations, 1996,* and that the regulations are summarized in the *Tidal Waters Sport Fishing Guide* and the *Freshwater Salmon Supplement*.[313] The recreational fishery for sockeye will be opened once DFO has established that conservation and FSC needs have been met.[314]

Two DFO employees responsible for the recreational fishery, Deborah Sneddon, acting program coordinator, Lower Fraser Area Resource Management, and Joe Tadey, biologist and program head, Recreational Fisheries Program, told me that the most common tools DFO uses to manage the recreational sockeye fishery are its authority to set openings and closings of the recreational fishery, to establish daily limits and possession limits, and to determine whether a given recreational fishery will be a retention or non-retention fishery.[315]

* On December 23, 2011, DFO issued a press release, "Federal Fisheries Minister Announces Licence Retirement Program for B.C.'s West Coast Chinook Salmon Fishery" (on website), in which it states: "The $30-million mitigation strategy also includes an initiative to modernize the Department's commercial salmon allocation framework and funds to support economic development on the West Coast of Vancouver Island." However, I had no evidence before me regarding DFO's plans to modernize its Salmon Allocation Policy.

Ms. Sneddon said that, in recent years in making its management decisions, DFO has considered the impact of recreational fishing in a particular area.[316] For instance, the South Coast tidal water recreational sockeye fishery is considered a low-impact fishery because fishers are not concentrated in a small area to the point where their impact on particular stocks or species may be significant; however, the in-river recreational sockeye fishery in the area from Mission to Hope is considered a medium- to high-impact fishery because tens of thousands of fish may be harvested in this area by recreational fishers.[317]

DFO has set out its approach to managing these recreational fisheries, including when there will be a sockeye retention fishery, in the *Decision Guidelines for the Recreational Fraser River Sockeye Fishery*:

> **South Coast Marine Waters, Fraser River downstream of Mission and Fraser River above Hope**
> These fisheries are viewed as low impact fisheries, therefore, allow sockeye retention in the tidal water recreational sockeye fishery, including the waters off the mouth of the Fraser once local First Nations FSC fisheries are taking place.
>
> - The sockeye retention of fishery in marine waters by the recreational fishery would be permitted unless:
>   - it is expected that FN FSC needs will not be met; or
>   - conservation objectives (i.e. exploitation rate limits for Sakinaw, Cultus and Interior Fraser River coho) and sockeye escapement targets established in the IFMP will not be met.
>
> **Fraser River Non-tidal Waters** (Mission Bridge to Hope Bridge)
> This fishery is viewed as a medium to high impact fishery, therefore allow sockeye retention in the Fraser River from Mission to Hope:
> - once in-river FN FSC open times are regularized (i.e. 72 hour set nets); and
> - a harvestable surplus for recreational / commercial fisheries is expected.
>
> Close the in-river recreational sockeye fisheries when:
>
> - a change in formation leads to the expectation that FN FSC needs will not be met; or
> - conservation objectives (i.e. exploitation rate limits for Sakinaw, Cultus and Interior Fraser River coho) and sockeye escapement targets established in the IFMP will not be met.[318]

DFO has committed to providing 48 hours' notice of a closure to the recreational sockeye fishery, wherever possible, and to avoiding implementing any closure on a weekend or statutory holiday.[319]

The Vision for Recreational Fisheries in British Columbia[320]

As a result of the 2005 Pacific Fisheries Reform process and documents, the recreational fishing sector advised DFO that there was no discussion or plan for recreational fishing.[321] That prompted DFO to work with the SFAB and the Province of British Columbia through the years 2007–9 to create a framework for the recreational fishery.[322] In January 2010, the minister approved the report, *A Vision for Recreational Fisheries in British Columbia, 2009–2013 (Vision)*.[323]

Ms. Adams stated that the *Vision* is "based on a national operational policy for recreational fisheries in Canada."[324] It is not an allocation policy, but "a plan to ensure progress toward a collective vision for the recreational fishery … It is meant to serve as a framework for developing goals, initiatives and actions to support achievement of a collective vision for the recreational fishery in B.C."[325] The *Vision* contains nine principles and seven strategic goals, including the principle that "[t]he needs of the recreational fishery, such as for stable and predictable fishing opportunities, will be explicitly considered and clearly reflected in integrated fishery management plans."[326] It includes the following strategic goals:

> Strategic Goal #1: Achieve healthy and productive marine and freshwater ecosystems that support recreational fisheries[.]

> Strategic Goal #2: Realize the full social and economic potential of the recreational fishery.
> ...
> Strategic Goal #4: Ensure that the management of the recreational fishery is based on the best available information while taking into account local and traditional knowledge.
>
> Strategic Goal #5: Provide sustainable fishing opportunities which consider the needs of and foster the potential of the recreational fishery.[327]

Ms. Adams told me that, in conjunction with the *Vision* document, DFO developed an action group (working with the recreational fishing community and with Province of British Columbia staff) to identify the most important issues facing the recreational fishery, focusing on communication, education, access and allocation, and improvement of information and catch accounting.[328]

Pre-season planning: introduction

As I mention earlier in this chapter on the management of the Fraser River sockeye salmon fishery, during the pre-season planning stage, DFO scientists prepare models forecasting the abundance of the returning stocks as well as the timing and movement of the four returning run-timing groups. DFO scientists also generate spawning escapement targets through the Fraser River Sockeye Spawning Initiative. In this section I review these models, how they are generated, and how they are used.

In the pre-season stage, both DFO and the Fraser River Panel prepare pre-season fishing plans. For DFO, it is the IFMP. In an effort to illustrate the complexity of the pre-season planning and the different entities and processes involved, Commission staff prepared the diagram set out in Figure 1.5.9.

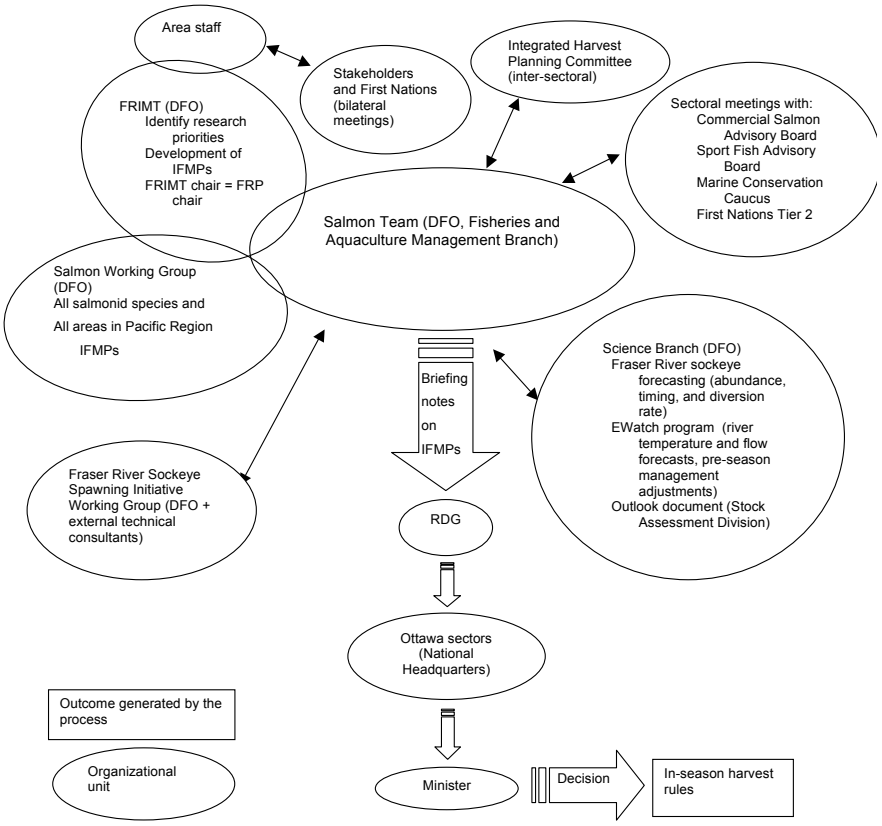


Figure 1.5.9 Pre-season planning

Note: FRIMT: Fraser River Sockeye and Pink Salmon Integrated Management Team (DFO); FRP: Fraser River Panel; IFMPs Integrated Fisheries Management Plans; RDG: regional director general.
Source: Commission staff.

As part of its annual pre-season planning, DFO produces the Salmon Stock Outlook, a document that is "intended to provide an objective and consistent context within which to initiate fisheries planning … it provides a preliminary indication of salmon production and associated fishing opportunities by geographic area and species (or a stock group)."[329] As Mr. Grout, regional resource manager, Salmon, DFO, testified before me:

> The intention of the document is to provide a broad scan of the status category on a scale of 1 to 4 for a number of salmon stocks in the region … [T]here [are] four status categories, from status 1 being a stock of concern … The criteria are somewhat subjective, but they're meant to give you an indication of stocks that are less than 25 percent of their target where [it has been] identified or has been declining rapidly, up to a category 4 population which is considered abundant and is forecast to be well above target.[330]

The Salmon Stock Outlook is typically updated from December through February as new information becomes available and is made public through DFO's advisory processes with the IHPC, the CSAB, and the SFAB, and other groups (as discussed above). The Salmon Stock Outlook is a prelude to forecasts.[331]

The Pacific Salmon Treaty requires DFO to provide the Fraser River Panel with pre-season forecasts of run size, run timing, and diversion rates. It also stipulates that DFO is responsible for establishing annual spawning escapement targets for Fraser River sockeye.[332]

Harvest decision guidelines for Fraser River sockeye are set out in each year's IFMP for South Coast salmon. DFO pre-season planning is complete when DFO releases the final IFMP around the end of June.

Forecasting

DFO produces pre-season forecasts of the run size, the timing of the runs, and the "diversion rate" of the returning sockeye.[333] This section provides an overview of DFO's annual forecasting process and the methodology used to prepare the forecasts.

Once DFO's forecasts are received, the Pacific Salmon Treaty stipulates that the Fraser River Panel will determine the probability level of the forecast that will be used in planning the fisheries. Typically it is the median value of 50 percent probability, unless there is agreement otherwise.[334]

Mr. Rosenberger, who is co-chair of the Fraser River Panel, described the importance of the forecasts: "It's key for us in pre-season planning and also in our in-season works in understanding the linkages of timing, distribution, stocks of concern … [I]t gives us that relative magnitude and understanding about which stocks we think we can harvest."[335]

In Technical Report 7, Fisheries Management, the authors made the following recommendation regarding pre-season forecasting: "The analytical resources currently allocated to preparing pre-season forecasts should be re-allocated to defining a clear set of escapement goals and in-season management models that will assist managers in fisheries planning and the achievement of these goals."[336] However, during the hearings on this report, Karl English, its primary author, agreed that pre-season forecasts are useful in managing Fraser River sockeye, as they provide information to assist in setting initial fishing plans.[337]

Forecasting: run size

Mr. Lapointe said that DFO generally provides the Fraser River Panel with its initial run size forecasts at the panel's meeting in February and with its final pre-season run size forecasts in April.[338] DFO's Science Branch is responsible for preparing the forecasts.

Both DFO and the Pacific Salmon Commission acknowledge that the forecasts are not intended to provide certainty but are important for supplying context and the range of scenarios used in the contingency planning for the fishery.[339] Mr. Lapointe told me, "The model predicts a distribution. It doesn't predict a number."[340] Mr. Rosenberger admitted that, because DFO has had difficulty communicating the nature of the pre-season forecast, it is making efforts to let it be known that the forecasts

reflect a "probability distribution" – a range of possible outcomes.[341]

DFO staff prepare the forecasts using different models which present a range of outcomes. The Salmon Sub-Committee of DFO's Centre for Science Advice, Pacific, a peer-review process that involves DFO scientists as well as members of the public, reviews the forecasts (see Chapter 4, DFO overview).[342] Once accepted by CSAP, the authors present their conclusions and recommendations for the forecasts in the annual Canadian Science Advisory Secretariat (CSAS) Science Advisory Reports, which summarize each season's run forecast.[343] The Science Advisory Report is presented to DFO management and becomes DFO's official record of science advice. The methodology for the run size forecast is developed through the CSAP process.[344]

DFO provides the forecasts to the Fraser River Panel and the Pacific Salmon Commission (as well as to First Nations and fisheries stakeholders), who use the forecasting information for pre-season planning purposes and for developing potential fishing plans.[345] The forecasts offer DFO and the Fraser River Panel a starting point for their planning discussions and allow them to work out disputes and issues that may arise if certain scenarios were to occur – to assess various "what if" scenarios.[346] The forecasts provide detailed information on the range of returns expected for salmon, as well as specified probability levels to indicate the uncertainty of the potential returns.[347] The forecasting models are not intended to accurately predict a certain return for any stock but to provide "an idea of the range of returns that are possible for the population and the probabilities of those returns occurring."[348]

Mr. Grout said that "the information is used at the Fraser River Panel for pre-season planning purposes and for developing potential fishing plans for the various groups if, in fact, a specified return level were to occur during the upcoming season."[349] He explained that the panel also uses the pre-season forecasts early in the fishing season, before reliable in-season estimates are available, to determine if the fish are returning as expected. That is done by comparing the very early season returns to the forecast and determining whether there is much of a discrepancy.[350]

DFO develops the run size forecast using a series of models for each of the 19 identified stocks, as well as some of the miscellaneous stocks. According to DFO scientist Sue Grant, program head, Sockeye and Pink Analytical Program (which falls under DFO Science's Stock Assessment Section), DFO conducts its pre-season run size forecasts for these stocks because they account for 95 to 98 percent of the total abundance in the Fraser River watershed. Ms. Grant told me that DFO has data on "stock" (female spawner abundance and spawner success) and "recruitment" (catch plus escapement) for the 19 forecasted stocks. She said that, for the "miscellaneous" stocks forecasted, DFO has only escapement data.[351]

The run size forecasting models are computer generated and typically fall into one of two categories: biological models and "naive" (statistically based) models. The models use historical escapement and productivity data collected from past returns to predict what might happen if runs follow traditional patterns.

Biological models rely on historical information about stock recruitment. For the historically identified sockeye stock, that phrase means the estimated total number of adult sockeye returning to the spawning grounds from the marine environment and originating from a spawning event that occurred three, four, or five years before their return. Ms. Grant described biological models, including the information that is considered to be a variable (something that will affect the estimates), as follows:

> [T]hese models incorporate … the stock and recruitment time series. [They] establish a relationship between the spawner abundance and the recruits, the resultant recruits … the core data that would go into these models … [is] paired stock and recruitment data. So that's escapement data, so it's paired, and that's fundamental to the models.
> …
> Escapement is being used as a predictor variable in the models.
> …
> And then the other piece of data that we use for the 19 forecasted … stocks in terms of biological models is also environmental variables. So specifically for biological models we can also incorporate environmental variables into the models. And these include things like sea surface temperature, Fraser discharge, et cetera.[352]

Mr. Rosenberger and Ms. Grant noted, however, that even though DFO has tried to see if environmental variables might be used in the forecasting process, it has not "had a lot of success so far on that."[353]

The assumption that future production will be similar to levels experienced in the past is implicit in the use of abundance information and historical stock-recruitment relationships to estimate future abundance.[354]

The other forecasting models are referred to as naive models and are based purely on statistical information. As described by Ms. Grant:

> [H]istorically we've called them naive models, because these models don't establish any relationship between the spawning abundance and the resultant recruits, but instead are forecasting abundance based on summarizing the time series data that we have.
>
> [O]ne example of a naive model would be a time series average model, what we call a TSA ... The TSA model ... would just average the returns over the historical time series, and use that average to predict what we would see next year. So next year's return would simply be the average of the historical time series.[355]

In Ms. Grant's opinion, the stock recruitment data available to DFO for running the models to forecast the run size of Fraser River sockeye is "globally accepted as being amongst the best stock recruitment time series for salmonids ... throughout the world." However, Ms. Grant acknowledged that run size forecasting would be improved if DFO had more research on "the survival part of the whole stock recruitment relationship, understanding what are the mechanisms driving survival for Fraser sockeye." In her view, this information "would include research in the freshwater environment and the marine environment."[356]

The run size forecast models necessarily include uncertainties, given the nature of the data available to DFO. Ms. Grant agreed that information about the young sockeye – "smolt data" – would be extremely useful in forecasting and would eliminate some uncertainty:

> [I]f we forecast with smolt data, we are eliminating all the uncertainty and survival in the freshwater environment.
>
> [I]f we're just forecasting with adult spawners that return to the spawning ground, we're forecasting the future based on all of the uncertainty we have with freshwater survival, as well as marine. When we have smolt data, we're eliminating that uncertainty. We ... have a better starting point because we're further ahead in the life history.[357]

DFO has smolt data on the Chilko stock, which it relies on as an indicator stock. DFO also has data on the Cultus Lake stock for some years.[358] Using Chilko as an indicator stock means that it can "partition total survival into freshwater ... and marine ... [DFO can] look at what fresh-water survival was like, and marine survival, and see where that occurred."[359] Ms. Grant agreed that "in a perfect world it would be better to have more indicator stock data to give [DFO] a better handle on more than one stock in regards to being able to figure out if there's a survival breakdown, [and] where [it] is ... occurring, in the freshwater or the marine environment."[360]

Ms. Grant also acknowledged the uncertainties associated with the DFO run size forecasting models, highlighting the problem with estimating a given stock's escapement (particularly where there are no resources to use a counting fence):

> [A] lot of the escapement enumeration programs don't employ fences because they can't ... [T]hey use a range of methods to enumerate on the spawning grounds, from mark-recapture studies or visual surveys from helicopter flights ... and there's going to be uncertainty in the core data we're using from that perspective.[361]

Uncertainty is also apparent in other aspects of forecasting. Ms. Grant described three further areas of uncertainty: recruitment data (which she described as "catch plus escapement"), variability in inter-annual survival, and variability in the model form itself. She testified:

> You'll have the escapement uncertainty, as well as uncertainty in the catch estimates, because catch is assigned to the different stocks through assessing catch and doing some analysis on the animals being caught in the fisheries, and assigning them based on a

> sample to the different stocks ... So that's just classic observation error in the models.
>
> The other kind of error ... or uncertainty in the models is associated with uncertainty and variability in inter-annual survival. So we use different models to explain recruitment. So brood year escapement, environmental variables, but there's always going to be a certain component of that inter-annual variation and survival that we cannot explain. And, that is also a component of uncertainty in the models, the variation in recruitment over time.
>
> And the model forms themselves are part of the uncertainty, given ... you're exploring a lot of different forms of models that are capturing stock recruitment dynamics in different ways, so there's uncertainty in the model form that you're using, as well. So I would say those would be the key uncertainty elements to the forecasts.[362]

To clarify how DFO determines the run size forecast models it will choose, Ms. Grant reviewed the document, "Pre-Season Run Size Forecasts for Fraser River Sockeye for 2006."[363] The document sets out the methodology used by DFO's forecasters in determining which forecasting models they will follow:

1) choose candidate forecast models depending on data availability;
2) perform a retrospective analysis for each stock by sequentially forecasting abundance for years with observations of abundance;
3) evaluate model performance by comparing the retrospective forecasts with the abundance observations based standard performance criteria;
4) [i]dentify the "best" forecast model from step 3 and present forecasts as posterior distributions of returns in 2006.[364]

Ms. Grant described the first step as a process of selecting "the suite of models for each stock that could be explored, limited by the data that's available" (as described earlier).[365] The second step in choosing the particular forecasting model requires a ranking of all the possible models for a particular stock, based on a retrospective analysis (looking back at how the stock has performed historically). Ms. Grant described this process:

> The models that have the smallest difference between the forecasts and the true returns ... perform better in retrospective analysis. So we look at the performance of the models and compare how each one is doing through time compared to the true return time series. And we create a ranking for all the candidate models for a particular stock, and then we're ranking them, based on this retrospective analysis, from 1 to total number of models that exists.[366]

From this ranking, DFO selects its "best" forecast model, which is the top-ranked model of its forecasts. As Ms. Grant noted, "[T]here is not one model which performs optimally across all stocks, and even across one stock through time. So generally if you look at a forecast table, there will be a range of different models being used to generate forecasts for different stocks."[367] A considerable degree of uncertainty continues to be associated with the forecasts, though those models that take into account the recent declines in Fraser River sockeye productivity tend to perform better than those that are looking at the entire historical time series.[368]

Change in 2010 run size forecasting

As I discuss above, the models operate within the parameters of past performance over time. In other words, it is assumed that what has happened in the past will reflect what will happen in the future. In 2009 this assumption was demonstrated to be problematic in that the forecast was far higher than the actual returns. This shortfall led DFO to reconsider the appropriate data sets to be used in the forecast models.

In 2010, DFO changed its run size forecasting models because of the observed decline in the productivity of Fraser River sockeye. Ms. Grant and Mr. Rosenberger explained that DFO had noted persistent declines in sockeye productivity and, in 2009, saw the lowest returns on record.[369] That decline led DFO to include in its forecasts "alternative assumptions about ... the survival of Fraser sockeye ... in light of declines in productivity."[370] Mr. Lapointe described this decision as a "paradigm shift."[371] Mr. Rosenberger explained the changes to the 2010 forecasting models:

> We'd been … looking at trying to expand the range of models and options to be used in forecasting. And so in [2010], there were models that … truncated the data-set so they used a portion of it … four-year models, eight-year models and [Kalman] filter models were added as options [to] … those that could be used for making the predictions.[372]

The first table in the 2010 forecast document described the results of the models forecasting the 2010 Fraser River sockeye return using a data set restricted to data from more recent years. The results are set out in Table 1.5.3. The second table described the 2010 forecast results using the long-term average productivity (that is, using the entire data set), which was how the 2009 forecast and all previous forecasts were generated. Table 1.5.4 contains the results. The third table described the results forecasting the 2010 returns using the productivity seen in the 2005 brood year (which spawned the 2009 returns). Table 1.5.5 contains the resulting forecast.

Table 1.5.3 "Recent Productivity" 2010 forecast table by stock and timing group (condensed from Grant et al. 2010, Table 2)

Run Timing Group	Mean Run Size		Probability that Return will be at/or Below Specified Run Size[a]				
Stocks	**all cycles[b]**	**2010 cycle[c]**	**10%**	**25%**	**50%**	**75%**	**90%**
Early Stuart	304,000	113,000	17,000	26,000	41,000	66,000	101,000
Early Summer	--	--	174,000	374,000	783,000	1,601,000	3,047,000
(total excluding miscellaneous)	***(504,000)***	***(797,000)***	***(129,000)***	***(269,000)***	***(581,000)***	***(1,251,000)***	***(2,543,000)***
Bowron	21,000	20,000	400	700	1,300	2,500	4,600
Fennell	29,000	26,000	9,000	16,000	31,000	56,000	90,000
Gates	59,000	17,000	2,000	4,000	9,000	17,000	33,000
Nadina	79,000	22,000	9,000	16,000	30,000	60,000	107,000
Pitt	60,000	55,000	7,000	12,000	26,000	53,000	96,000
Raft	33,000	16,000	7,000	13,000	24,000	42,000	71,000
Scotch	73,000	248,000	40,000	106,000	265,000	640,000	1,450,000
Seymour	150,000	393,000	55,000	101,000	195,000	380,000	691,000
Misc[d]	--	--	13,000	58,000	134,000	242,000	302,000
Misc[e]	--	--	7,000	10,000	14,000	22,000	42,000
Misc[f]	--	--	24,000	35,000	48,000	76,000	144,000
Misc[g]	--	--	1,000	1,000	4,000	6,000	10,000
Misc[h]	--	--	0	1,000	2,000	4,000	6,000
Summer	**5,332,000**	**5,059,000**	**1,045,000**	**1,605,000**	**2,612,000**	**4,343,000**	**6,894,000**
Chilko	1,740,000	1,900,000	864,000	1,273,000	1,958,000	3,011,000	4,435,000
Late Stuart	750,000	396,000	8,000	21,000	60,000	169,000	429,000
Quesnel	2,350,000	2,200,000	111,000	215,000	438,000	909,000	1,727,000
Stellako	492,000	563,000	62,000	96,000	156,000	254,000	393,000
Late	**3,193,000**	**9,126,000**	**3,331,000**	**5,023,000**	**8,003,000**	**12,305,000**	**19,695,000**
(total excluding miscellaneous)	***(3,193,000)***	***(9,126,000)***	***(3,264,000)***	***(4,951,000)***	***(7,871,000)***	***(12,035,000)***	***(19,352,000)***
Cultus	17,000	18,000	5,000	6,000	9,000	14,000	19,000
Harrison	58,000	NA	53,000	97,000	195,000	429,000	1,167,000
Late Shuswap	2,210,000	7,640,000	3,101,000	4,652,000	7,252,000	10,791,000	16,702,000
Portage	55,000	90,000	8,000	18,000	42,000	99,000	221,000
Weaver	406,000	690,000	71,000	126,000	264,000	472,000	799,000
Birkenhead	447,000	688,000	26,000	52,000	109,000	230,000	444,000
Misc. non-Shuswap[i]			67,000	72,000	132,000	270,000	343,000
TOTAL	--	--	**4,567,000**	**7,028,000**	**11,439,000**	**18,315,000**	**29,827,000**
(TOTAL excluding miscellaneous)	***(9,333,000)***	***(15,095,000)***	***(4,455,000)***	***(6,851,000)***	***(11,105,000)***	***(17,695,000)***	***(28,890,000)***

a. probability that return will be at/or below specified projection. b. sockeye: 1980-2006 (excluding miscellaneous stocks). c. sockeye: 1980–2008 (excluding miscellaneous stocks). d. unforecasted misc. Early Summer Stocks (Early Shuswap stocks: S.Thompson); return timing most similar to Scotch / Seymour. e. unforecasted misc. Early Summer stocks (N. Thompson tributaries; return timing most similar to Fennell/Bowron/Nadina). f. North Thompson River. g. Nahatlach River & Lake. h. Chilliwack Lake and Dolly Varden Creek. i. unforecasted miscellaneous Late Run stocks (Harrison)

Note: This forecast incorporates new models that take into account recent productivities, rather than the entire historical data set. Model performance of old and new models were evaluated only for more recent brood years (1997–2004).

Source: Reproduced from Exhibit 341, p. 8.

The 2010 run size forecast also contained a change in the presentation of the different probabilities that convey forecast uncertainty: forecast probabilities are now described as the probability of returning at or below the specified forecast. In this arrangement, the lowest probability levels (10 percent and 25 percent) are now associated with the lowest forecast. In other words, as Figure 1.5.10 indicates, the "old" 75 percent forecast is equivalent to the "new" 25 percent forecast. DFO considers this new format to be appropriate from a conservation perspective.[373]

Table 1.5.4 The "Long-Term Average Productivity" 2010 forecast table by stock and timing group

Probability of Return at/or Below Specified Run Size

Run Timing Group	10%	25%	50%	75%	90%
Early Stuart	55,000	85,000	135,000	213,000	315,000
Early Summer	387,000	723,000	1,518,000	3,544,000	7,993,000
Summer	1,434,000	2,304,000	3,972,000	6,981,000	11,875,000
Late	3,484,000	5,239,000	8,364,000	12,803,000	20,741,000
TOTAL	5,360,000	8,351,000	13,989,000	23,541,000	40,924,000

Note: These forecasts were produced using the methodology of previous years, including for 2009. Specifically, model forecasts use the first-ranked model based on retrospective analysis using the entire retrospective time series to calculate performance measures.
Source: Reproduced from Exhibit 341, p. 9.

Table 1.5.5 The "Productivity Equivalent to the 2005 Brood Year" 2010 forecast table by stock and timing group

Probability of Return at/or Below Specified Run Size

Run Timing Group	10%	25%	50%	75%	90%
Early Stuart	12,000	19,000	29,000	46,000	70,000
Early Summer	68,700	141,400	314,000	698,000	1,430,000
Summer	94,000	159,000	290,000	548,000	1,029,000
Late	645,000	1,243,000	2,842,000	6,586,000	14,068,000
TOTAL	819,700	1,562,400	3,475,000	7,878,000	16,597,000

Note: For a number of stocks, particularly Summer-run stocks that were predicted to return at high abundances, productivity for the 2005 brood year was among the lowest on record. These forecasts were produced by using preliminary productivity data (R/EFS or R/smolt) associated with the 2005 brood year (which resulted in the 2009 poor returns). At the time of this paper, 2009 returns data were preliminary and not available by each of the 19 forecasted stocks.
Source: Reproduced from Exhibit 341, p. 9.

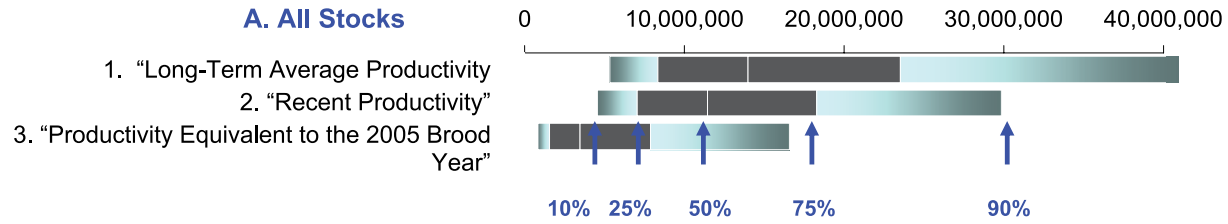


Figure 1.5.10 Pre-season run size forecast for 2010

Source: Exhibit 341, p. 6.

Although DFO's 2010 forecasts were criticized as being inaccurate, given the size of the return, Ms. Grant defended them, noting that they "were on the map in terms of long-term average productivity."[374]

Forecasting: run timing

DFO also forecasts the timing of the return of the runs and produces pre-season run-timing forecasts for the Fraser River Panel. The run-timing forecast is a "prediction of the median (i.e. 50%) return timing date," meaning the most probable calendar date when half of the run of a particular stock is expected to have passed by a specific geographic location on the return migration.[375] Unlike the run size forecasts that are prepared for 19 identified Fraser River sockeye stocks, DFO produces pre-season run-timing forecasts for only two stocks – the Early Stuart and the Chilko stocks. Michael Folkes, salmon stock assessment biologist, Salmon Assessment Section, Salmon and Freshwater Ecosystems Division, Science Branch, Pacific Region, explained the rationale behind this limited timing forecast:

> As the Early Stuart stock is the earliest of all four returning stock groups[,] its timing is monitored as the first indicator for overall Fraser sockeye return timing. There is a good historical record of Early Stuart run timing, which allows for more robust statistical relationship between timing and oceanographic indicators. The Chilko stock, part of the summer timing aggregate, has historically been numerically strong during each year of the four year sockeye generation[,] thus allowing for more data inclusion to the timing forecast model. This led to it being the stock of choice for timing evaluation.[376]

The run-timing forecasts are produced using a statistical methodology known as linear regression, which mathematically relates an independent variable (cause) to a dependent variable (effect). Currently, DFO uses two independent variables (ocean currents and sea surface temperature) to predict the dependent variable of median return timing date. The statistical "fitting" between cause and effect relies on historical data and is updated with each ensuing year.[377]

The uncertainty in the run-timing forecasts is referred to as a "prediction interval." In addition to the forecast date, the DFO forecast memoranda will include "the historical time series median date, derived from the series of post-season dates … which allows for some comparison of how far off the historical average the forecasted date may be."[378]

Forecasting: diversion rates

Fraser River sockeye travel south along the coast of British Columbia as they migrate (or return) to their spawning grounds in the Fraser River watershed. Historically, the majority of returning sockeye migrated through Juan de Fuca Strait (south of Vancouver Island). The diversion rate (sometimes referred to as the "northern diversion") refers to the percentage of migrating Fraser River sockeye that returns from the North Pacific Ocean through Johnstone Strait, thereby "diverting" from the traditional return route through Juan de Fuca Strait.[379]

DFO's forecast for the diversion rate is not stock specific but a total estimate, accounting for all Fraser River sockeye returns.[380] DFO submits two forecasts of Fraser River sockeye diversion rates to the Fraser River Panel: the first in early June and the second in early July. Any in-season updates to the diversion rate estimate are prepared by the panel's Technical Committee (as opposed to DFO).[381]

Mr. Folkes described the basis for the diversion rate forecast:

> [I]t is likely that returning adult Fraser sockeye are responding to an environmental cue in the marine system, specifically temperature … diversion rates relate to late spring sea surface temperature (SST) recorded at Kains Island lighthouse (NW Vancouver Island). While SST at this location is not likely the cue for Fraser sockeye, it may be a proxy for the true environmental cue. For example, SST at Kains Island may be reflective of temperatures that Fraser sockeye respond to while migrating through critical locations of the North Pacific.[382]

DFO bases its forecast diversion rate on the relationship between the average May and June sea surface temperature measured at Kains Island lighthouse in the given year and the estimated post-season diversion rates from 1977 to the previous year (e.g., for the 2010 year, it would be the estimated

post-season diversion rates for 1977–2009). Once a relationship between cause (SST) and effect (diversion rate) is estimated (by fitting the regression line), the fit is used to predict the upcoming diversion, given known ocean temperatures.[383] Mr. Folkes attested that, beginning in 2009, the DFO diversion rate forecast memoranda include estimates of uncertainty around the forecast, "derived from published deterministic methods associated with the statistical model," and are stated with a probability level – for example, "diversion forecast of 32%, with 50% probability the range is within 27%–42% and 95% probability the range is within 16%–59%."[384]

Findings

I am satisfied that DFO's pre-season forecasting serves a useful purpose in the management of the fishery, as it provides information which assists the Department of Fisheries and Oceans (DFO) and the Fraser River Panel to set fishing plans. DFO has made efforts to improve both the methodology of the pre-season forecasts and its communication of these forecasts to those involved and/or interested in the fishery.

Pre-season escapement target planning: Fraser River Sockeye Spawning Initiative

Introduction

Under the Pacific Salmon Treaty, DFO is responsible for establishing the annual spawning escapement targets for Fraser River sockeye and for providing these spawning escapement requirements by stock group to the Fraser River Panel.[385] The data used in setting escapement targets (the stock and stock groupings) are the same as are used in forecasting, although the forecasting model is entirely distinct from the escapement target model. The Fraser River Panel uses the escapement targets to inform its pre-season harvest planning model and fishing plans, which I discuss later in this chapter. DFO and the Fraser River Panel also use the escapement targets to determine the total allowable catch (TAC) and, ultimately, fishery openings in-season.

DFO determines its escapement targets using a simulation model and stock and recruitment data; the model is known as the Fraser River Sockeye Spawning Initiative (FRSSI, pronounced "frizzy").[386] Al Cass, a DFO scientist and one of the creators of the FRSSI model, said that FRSSI affords a way to develop a rules-based system for determining harvest rates based on the estimated abundance of returning sockeye.[387] He explained that, in setting escapement targets, DFO is balancing conservation and management of the fishery.[388]

Cyclic dominance

Some of the 19 Fraser River sockeye stocks demonstrate cycles with a predictable peak in abundance every four years; when this pattern is very pronounced it is called "cyclic dominance."[389] Dr. Jim Woodey, former chief biologist of the Pacific Salmon Commission, identified the following stocks demonstrating cyclic dominance: Quesnel, Adams, Lower Shuswap, Seymour, Scotch Creek, and Stuart.[390] Cyclic dominance involves one large return year (the dominant line year), a subdominant line year (the year following the dominant year), and then two years where the abundance is considerably lower (varying from less than 1 percent of the dominant year abundance to a few percent of the dominant year abundance).[391] Cyclic dominance is well accepted, although the cause or trigger for it is still unknown. Dr. Woodey and Dr. Carl Walters, a fisheries professor at the University of British Columbia, agreed that cyclic dominance is most likely a biological phenomenon.[392] Cyclic dominance is an important factor for setting escapement targets for some stocks.[393]

Stock / recruitment modelling

FRSSI uses stock / recruitment modelling to represent population dynamics in the simulation model.[394] Since the early 1970s, the statistical relationship between the number of spawners and the number of resulting recruits has been used as a basis for the escapement target forecasting models,[395] even in light of the variability and uncertainty in the stocks.[396]

Fraser sockeye stocks are simulated into the future based on the historical relationship

> between spawning escapement (i.e. number of adults in the brood year) and recruitment (i.e. number of 4 and 5 year old adults produced from that brood year).
> …
> Statistical methods have been developed to explain the relationship between spawners and recruits. For sockeye, these models typically calculate the expected number of age 4 and age 5 recruits resulting from each brood year, and combine these age classes into a projection of run size. SR [stock / recruitment] models usually predict increasing production of recruits as the number of spawners increases, eventually levelling off or declining as high spawner abundances exceed the capacity of the environment to sustain the offspring.[397]

The most widely applied model to quantify the population dynamics of Pacific salmon (including Fraser River sockeye) is the Ricker Model, generated by DFO scientist William Ricker at the Pacific Biological Station in 1954. The Ricker Model is based on historical stock and recruitment data and assumes that, when there are few spawners in a given brood year, there is no negative interaction due to overcrowding (population density) and, at a certain level, there will be a maximum production of recruits per spawner (known as maximum sustainable yield, or MSY).* In the Ricker Model, as spawning abundance increases past the MSY point, the resulting number of recruits per spawner (productivity) decreases. The Larkin Model (or delayed density dependence model) was developed in 1971 and is essentially a modified version of the Ricker Model. It includes cross-cycle interactions, so considers the spawning abundance of the brood year as well as the spawning abundance one to three years earlier in the given stock.[398]

> The latest version of the FRSSI model includes the use of the Larkin or delayed density dependent versions. Some researchers have suggested that the recent decline in productivity of Fraser sockeye is due to a management regime that attempts to increase the spawning abundance across all cycle lines. In addition, delayed density dependence suggests higher exploitation rates than do the standard Ricker models. The FRSSI model has the capacity to explore implications of these alternative hypotheses.[399]

One criticism levelled against the use of stock / recruitment models to forecast and set escapement targets is the assumption that the relationship between spawners and recruits (productivity) is stable. Ken Wilson, a consulting fisheries biologist and a member of the Canadian Caucus of the Fraser River Panel and of the Marine Conservation Caucus, said:

> My concern is a simple one. If you have 50 years of data and you're going to use those data to understand how a system behaves, you're making an assumption about how stable the relationships between the various factors that affect the population will be over that time period. 50 years of data may seem like a long time, but … [i]s it representative of the 50 years going forward that the model's attempting to help us understand? And that's where the problem occurs in my opinion. Yes, I think that those data, to some degree, are an adequate representation of the past performance of these stocks. Whether the past performance of these stocks will enlighten us very much about the future performance of these stocks is really at the heart of the matter.[400]

Pre-1985 escapement target setting

Before 1985 (when the Pacific Salmon Treaty was signed), the International Pacific Salmon Fisheries Commission, the precursor to the Pacific Salmon Commission, generated escapement targets together with its forecasting document.[401] In preparing the escapement targets for Fraser River sockeye, it looked at stock-recruitment curves, trying to determine the maximum sustainable yield for the dominant stocks and then applying

* In setting escapement targets, the models will refer to the "maximum sustainable yield" (MSY), which, according to the witnesses, is the difference between the necessary escapement level in the return year and the return itself (as opposed to the point of escapement, which produces the largest run); it is also referred to as the "maximum average yield." See Jim Woodey and Carl Walters, Transcript, February 9, 2011, p. 16.

the same MSY to run-timing group / co-migrating smaller stocks. The targets were generated by cycle line. It was a fixed escapement policy: regardless of the return for a particular stock, the escapement goal would remain the same.[402] During this period, the IPSFC attempted to set escapement targets that rebuilt the sockeye stocks in a measured way, reflecting a gradual increase in the escapement over time instead of doubling escapement in any one population from one cycle to the next.[403] However, this approach changed in 1985 when DFO took over setting escapement targets.

Rebuilding strategy or plan, 1987

With the enactment of the Pacific Salmon Treaty, DFO assumed responsibility for setting escapement targets for Fraser River sockeye. In 1987, it instituted a rebuilding strategy or plan[404] – an attempt to rebuild escapement in order to increase the returns and the yield over a three- to four-generation period (for 12 to 16 years, from 1987 to 2002, approximately).[405] The rebuilding strategy had certain interim goals (given the uncertainty of the cycle lines), such as reducing the harvest rate from 75 percent or higher to a maximum of 60–65 percent, in order to increase escapement in the hope of rebuilding stocks.[406]

> A basic premise of the rebuilding plan was to increase escapements each year, beyond brood year levels, to maintain an increasing rebuilding trajectory towards interim escapement targets ... To meet rebuilding targets during years of low survival, a higher fraction of the run is allocated to escapement rather than catch.[407]

Mr. Brown, a former commissioner of the Pacific Salmon Commission and the author of the book *Salmon Wars*,[408] was extremely critical of DFO's rebuilding plan. "[T]he stocks did the opposite to what the party line from DFO was saying," he testified. "They didn't rebound and improve, they declined calamitously."[409]

By the 1990s, DFO was not seeing the expected increases in the salmon stocks and had noticed that some stocks were starting to decline. Accordingly, the department initiated a review of its rebuilding strategy in 2002, which eventually led to FRSSI:

> DFO initiated a review of the rebuilding strategy prior to the 2003 fishing season to address the growing concern about its appropriateness during a time of reduced productivity and dwindling abundance. The mandate of the review process was to incorporate new information, integrate emerging policies such as the Wild Salmon Policy (WSP), and establish a formal framework for setting escapement targets. In addition, there were new and emerging technologies and methodologies for analyzing the historical data and projecting consequences of different strategies. The Fraser River Sockeye Spawning Initiative (FRSSI) was the result.[410]

FRSSI: development and implementation

In 2002, DFO initiated the change in escapement planning to FRSSI, and four years later, it was implemented. FRSSI is both a computer model and a consultative process.

In terms of the model component, in 2004, DFO scientists Mr. Cass and Mr. Folkes, together with Gottfried Pestal (who was then at Simon Fraser University), produced a CSAS research document in which they developed "a quantitative modeling tool for assessing harvest rules for Fraser River sockeye salmon given conservation needs and other management objectives."[411] In the proposed model, the authors acknowledged its similarity to the previous escapement planning principles:

- Target exploitation rates (and hence catch and escapement) vary with estimated run size.
- Constraints on harvest rules may include a minimum run size with zero harvest, a maximum exploitation rate for aggregates to protect small co-migrating stocks with lower productivity, and possibly an escapement ceiling for individual stocks.[412]

However, the proposed FRSSI model was modified "to address the challenges and concerns identified while implementing the rebuilding plan":

- Develop escapement plans based on optimal (target) exploitation rates rather than fixing target escapement derived from highly uncertain estimates of optimal escapement.
- Don't prescribe a strictly increasing rebuilding trajectory (i.e. remove the constraint of not going below brood year escapement) but rather, balance the trade-off between catch and escapement in an objectives-based approach that considers the preference of stakeholders.[413]

Mr. Cass said that, subsequent to the publication of the research document, DFO held a series of six workshops with stakeholders in order "to identify the range of preferences that would become the objectives" and to assist DFO to determine the appropriate model, given the uncertainty in the stocks.[414] In 2006, DFO also hosted and published the proceedings of a workshop on cyclic dominance.[415] Mr. Cass said that the cyclic dominance workshop resulted in "major changes" to the FRSSI model set out in the 2004 paper (which had yet to be implemented) – namely, that the modelling had to account for cyclic dominance and that a fixed exploitation rate was necessary in some circumstances. He explained:

> [T]he fundamental change was an acceptance that probably the best way to model the dynamics of Fraser sockeye was to include this so-called Larkin model which essentially is a Ricker model, but with some added terms to account for the importance of previous spawning escapements on determining the survival of a brood year in the sense that there was a [delayed] density impact ... depending on the size of the spawn, numbers of spawners, and on the degree of interaction between the spawners. So essentially it was a way to account for the cycles in terms of how these particular year classes interacted to result in differences in mortality associated and driving cycles.
>
> [T]he other ... fundamental change was ... that the more appropriate way to manage according to a rule was to have a fixed exploitation rate applied across a large run size range with some contingency for ramping down on that harvest rate at low run size abundances.[416]

As stated in the FRSSI 2009 Model Overview:

> Escapement strategies in the FRSSI model are defined as a Total Allowable Mortality Rule (TAM rule) that specifies the total allowable mortality rate at different run sizes. The escapement strategies are designed around three fundamental considerations:
>
> - No fishing at very low run size, except for test fishing. The No-Fishing point is intended to keep component Conservation Units out of the red zone ... with a specified risk tolerance.
> - Fixed escapement at low run sizes to protect the stocks and reduce process-related challenges at this critical stage (e.g. uncertain run size).
> - Fixed total allowable mortality rate at larger run sizes to ensure robustness against uncertainty in population dynamics (e.g. capacity estimate) and in-season information.
>
> This approach is equivalent to specifying a target escapement that changes with run size. For example, if the total allowable mortality for a run size of 1 million is 60%, then the corresponding target escapement is 400,000 and the available exploitation rate is 60% minus a management adjustment which accounts for the difference between fish counted at Mission and fish counted on the spawning grounds.[417]

DFO implemented FRSSI in 2006, and an example of the interaction between the total allowable mortality (TAM) and the considerations discussed above is set out in Figure 1.5.11.

Mr. Grout explained the graphs set out in Figure 1.5.11 as follows:

> [T]he top figure here, which is the total allowable mortality[,] gives you a sense of the shape of the harvest rule, which you're going to see in the subsequent figure [see Figure 1.5.12].There's two key reference points that describe the shape of the curve. One is the no-fishing point, which is at about 0.4 million in this curve, and

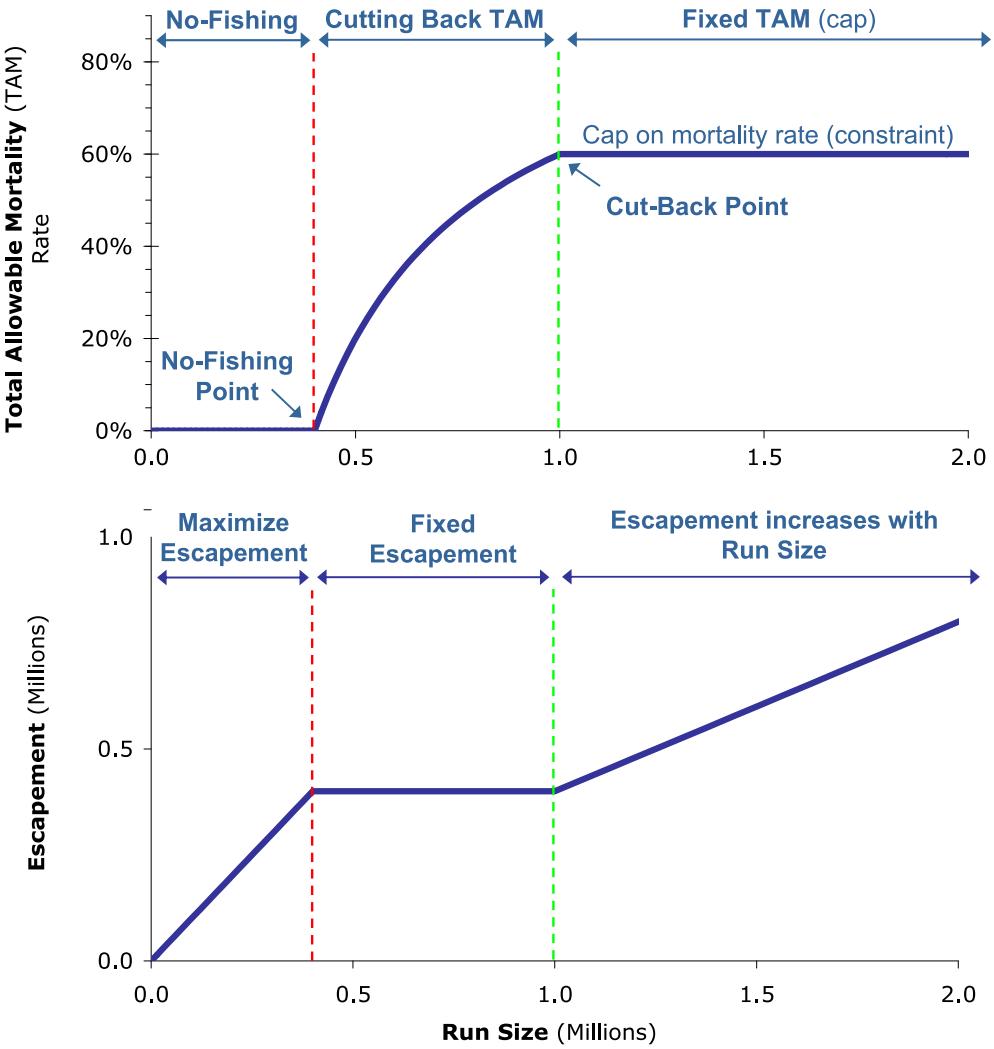


Figure 1.5.11 Illustration of TAM rule and corresponding escapement strategy

Source: Reproduced from Exhibit 322, p. 9.

to that point, we're trying to maximize escapement. There might be some minimal harvest for food, social and ceremonial harvests, potentially ceremonial fisheries and test fisheries, but up until about 0.4 million, we're trying to maximize the escapement, which is what you see in the lower figure. So the top figure shows you the total mortality you can apply to the run. The lower figure shows you the escapement that's going to result from that.

For the next sort of middle stanza between the no-fishing point and the cutback point, we enter in a period from 0.4 million to 1 million where we're applying a fixed escapement. So over this run size return, we're allowing 400,000 spawners to go back to return to spawn, and so you see the total allowable mortality increasing over that point. And then the final stanza of abundance, we have above one million, we've capped the total allowable mortality at 60 percent, and it splits the benefits, essentially 60/40 between catch and escapement. So that's the context of the harvest rules.[418]

Mr. Cass said that, to establish a fixed exploitation rate, DFO determined it was necessary to set a ceiling on TAM – the total number of fish that are caught in the fisheries or that die en route to the spawning grounds.[419] Because the fisheries are managed by the run-timing groups, any run-timing group may contain a mix of weaker and stronger

Conservation Units. Therefore, DFO recognized a need for precaution in setting the maximum mortality rate. DFO set the TAM ceiling at 60 percent, which Mr. Cass acknowledged to be a policy choice by DFO:

> Once we agreed that the control rule would be a fixed exploitation rate across a range of run sizes, then the question is what would you set the total allowable mortality rule at? And so it's at that stage where we, throughout the workshop environment, came to a value of 60 percent and it's important, I think to note that that's not based on an outcome from modelling the population dynamics for the stocks that we included in the model. It was designed to reduce the probability of doing harm, if you like, to stocks that had a lower productivity that weren't reflected in the model, so it was a way to guard against populations, reduce the harvest rate from what might be the optimal to guard against over fishing small stocks in mixed stock fisheries. It was also designed to mitigate, if you like, or reduce the impact of uncertainty in in-season management, so uncertainty in run sizes that higher exploitation rates could have the undesirable impact of removing too many fish if the run size was estimated to be lower than it actually was. And it also guarded against what's been called sort of implementational error. You can't precisely implement a fishery with an exact harvest rate, so there's some uncertainty about what exactly the harvest rate you can achieve, given your target.
>
> And so those three things resulted in a policy choice, if you like, to have a 60 percent cap, which is what is currently in the plan.[420]

The FRSSI model simulates a group of stocks, applies different escapement strategies to each run-timing group over 48 years into the future, and tracks the performance of these escapement strategies against certain defined performance measures.[421] In 2008, DFO published a summary of the development of FRSSI to that date.[422] In describing the simulation model developed through the FRSSI process, Mr. Cass acknowledged that both technical and policy choices are made in determining escapement strategies and harvest management:

> Technical considerations include the dynamics of Fraser sockeye stocks, and how the stocks are expected to respond to different escapement strategies. Policy choices focus on trade-offs between different management objectives, such as:
>
> - Policy Choice 1: Trade-off between harvest benefits versus providing protection to individual stocks.
> - Policy Choice 2: Trade-off between short-term and long-term benefits.
> - Policy Choice 3: Trade-off between stability in catch and maximizing opportunity.[423]

FRSSI in practice

For DFO management, the FRSSI model allows DFO to evaluate the effect of different escapement strategies for any of the modelled stocks against certain management objectives or performance measures. There are three general classes of performance measures or performance indicators: yield, variability, and conservation.[424] The key performance measures are the probability of a population not meeting an escapement benchmark (avoiding low spawning abundance);* the probability of the realizable harvest being less than 1 million fish (described as a socio-economic indicator);[425] and the probability of a four-year average of spawners being lower than a particular benchmark for abundance.[426]

In setting the escapement targets under FRSSI, options for escapement strategies for each

* A note about benchmarks in the FRSSI context: "Benchmarks are specific levels of a performance measure that are meaningful to a broader audience ... While FRSSI was being developed, implementation of the Wild Salmon Policy was also underway. Definition of benchmarks is an important aspect of the Wild Salmon Policy. Those WSP benchmarks for Fraser Sockeye are not available yet" (Exhibit 400, pp. 18–19); "Benchmarks used in the FRSSI process are called 'interim benchmarks' to distinguish them from the CU benchmarks contemplated by the Wild Salmon Policy. The intention is that the FRSSI benchmarks will be reviewed for consistency once the Wild Salmon Policy benchmarks have been established" (PPR 5, p. 39; see also Al Cass, Transcript, February 7, 2011, p. 26; Jeff Grout, Transcript, January 17, 2011, p. 35; and the discussion of benchmarks in Chapter 10, Wild Salmon Policy).

run-timing group based on performance measures are selected (typically four options) and presented to stakeholders and First Nations in the first draft of the IFMP for consideration and debate during the IHPC process; they are also distributed outside the IHPC process during sector and First Nations meetings.[427] The suggested escapement targets are set out in a memo prepared by DFO's "technical working group."[428] For each run-timing group (Early Stuart, Early Summer, Summer, and Late-run), two graphs are provided – the top showing "performance indicators"[429] and the bottom showing "escapement strategies" with four separate options. Figure 1.5.12 illustrates the Early Stuart run.

Figure 1.5.12 Sample simulation results and options for the Early Stuart run

Source: Reproduced from Exhibit 322, p. 15.

Mr. Grout explained the two graphs as follows:

> [I]f you just focus on the lower figure for now, which is the total allowable mortality rate versus the run size, it's not showing the escapement in this figure. It's showing you the amount of mortality you can apply and it's got four different curves listed there from option 1 to option 4. And option 1 is a curve where you would start fishing sooner and you'd place a higher importance on avoiding low catch, for example. Option 4 would be you'd wait longer to fish. You can see the no-fishing reference point is shifted over to over 150,000, and then you would gradually build harvest. So you'd be much more interested in avoiding low spawners in that case.
>
> In terms of the performance indicators, at the top, the axis on the top figure is the run size which the total allowable mortality is reduced. So it's … essentially the cutback point. So you can read off there what the performance of the different options would be. So Option 1, for example, has a cutback point that's quite low here.
>
> [G]oing back to the lower figure, the vertical dotted lines and the solid vertical bars show you the probability range on the forecast, with the solid bar being the midpoint of the forecast. The lower dotted line, the p75 [%] probability and then the … p90 [%] on the other side.
>
> What you can then do is look at the figure above at the run size at which the total allowable mortality is reduced. So each of figures – options 1, 2, 3 and 4 has a different level and it shows you the probability of avoiding low catch, or probability of catch less than the low catch benchmark.[430]

Mr. Cass explained that FRSSI allows DFO to model stock-specific escapement strategies, rather than as an aggregate, so that the overlapping runs are accounted for (at least for the 19 stocks with data).[431]

The 2008 and 2009 escapement memos state that one of the stocks in the Late-run group exhibited strong cyclic dominance and contributed most of the abundance (Late Shuswap). Run sizes for this group swing from 2 million in dominant years to 500,000 in off-cycle years. In off-cycle years, the expected return is well below the "no fishing point" generated by the FRSSI model. Because of that, in off-cycle years such as 2009, DFO used a "fixed floor" exploitation rate of 20 percent instead of a FRSSI-generated harvest rule.[432] The run size was so low that it would not justify generating a harvest rule that increased the exploitation rate as the run size increased. Mr. Grout said that the 20 percent exploitation rate was developed to allow some access to the more abundant Summer-run group, which overlaps with the Late-run group, and to be consistent with the 20 percent harvest rate for Cultus Lake.[433] For 2010, which was a dominant year for the Late Shuswap, pre-season planning identified a 20 percent exploitation rate for the Late-run group, although this rate was increased in-season.

According to Mr. Cass, the FRSSI model itself does not allocate harvest – it determines TAM rules, and DFO managers then allocate harvest (or mortality) among the commercial, recreational, and Aboriginal fisheries, as well as accounting for mortality through natural causes.[434]

Changes to the FRSSI model

In 2010, Mr. Cass, Mr. Pestal, and Ann-Marie Huang, a DFO scientist, reviewed the methodology of the FRSSI model and published their response in a CSAP working paper.[435] The stated objective of their paper was to review methods to evaluate the performance of alternative escapement strategies for Fraser River sockeye populations and to explore the sensitivity of different escapement strategies to key sources of uncertainty.[436] The authors acknowledged that the FRSSI model focuses on long-term strategies (it assumes that "one strategy is going to be adopted and applied for 48 years, which is not likely in practice") and doesn't address "all of the operational complexities of in-season management."[437] The authors also recognized the challenge of incorporating DFO's Wild Salmon Policy with the FRSSI model:

> The modelling framework developed for the [FRSSI] is consistent with the biological principles outlined in the WSP. For example, the stocks included in the simulation model closely match up with lake-based conser-

> vation units ... and escapement strategies are evaluated based on the performance of individual stocks, not management groups. Unfortunately, there are only 19 stocks with sufficient escapement and return data to allow incorporation into the simulation model. This presents an ongoing challenge for the operational aspects of the Wild Salmon Policy, and a coast-wide approach is under development for incorporating CUs with insufficient data into the planning and implementation of fisheries ... In addition, there is a paper in progress that is scheduled to be reviewed in the fall of 2010 [Exhibit 1915] on Fraser sockeye benchmarks. Once these are available, we will reassess the performance of the stocks against the formal WSP benchmarks.[438]

In the 2010 FRSSI paper, the authors set out the following priority areas for ongoing work in preparation for workshops with stakeholders scheduled for 2010–11:

- Review the freshwater ecology of each stock to identify plausible hypotheses for the structure of best fit models (i.e. why are some lag-terms significant?)
- Explore risk management approach to uncertainty in SR [stock / recruitment] models and assess the risk of being wrong in assumptions about delayed-density effects (e.g. what if we manage a Ricker-type stock based on Larkin model assumptions).
- Explore implications of alternative SR models (i.e. number of lag terms) for setting benchmarks under the *Wild Salmon Policy*.
- Investigate differences between this model and the previous version.
- Explore alternative approaches for random variation in forward simulations.
- Enhance the communication of the model scenarios and implications (e.g. Larkin fits), and facilitate real-time use during workshop deliberations.
- Finalizing the dataset(s) for Fraser sockeye. There are several on-going processes dealing with this, including: a) Cultus dataset from the Cultus Conservation Team, b) data checking for the non-Cultus populations by the Pacific Salmon Commission Staff, and c) checking historic escapement estimates for proper use of zeroes versus NAs by Fraser Stock Assessment staff.[439]

Mr. Ryall testified that DFO intended to review the TAM rules, among other things, in 2011 after four years of FRSSI implementation (2007–10).[440] However, at the time of the evidentiary hearings, DFO had not undertaken the actions identified above as priority areas.[441]

FRSSI criticisms

In general, witnesses agreed that escapement targets are useful and necessary and that the FRSSI model and process is essentially a good start and an improvement to DFO's 1987 rebuilding strategy. However, Rob Morley, vice-president of the Canadian Fishing Company, Mr. Cass, and Mr. Wilson noted that DFO faces difficulty in explaining FRSSI to stakeholders because of the highly technical nature of the model and how results are generated.[442]

Mr. Morley and Mr. Wilson also criticized the FRSSI model because, although it models 90–95 percent of the stocks, it cannot model those stocks for which it does not have information. The blanket 60 percent total allowable mortality ceiling could be detrimental to these stocks.[443]

Mr. Morley, Mr. Cass, and Mr. Wilson also said that, because the Fraser River sockeye salmon fishery is a mixed-stock fishery, that factor may create problems in setting TAM across the fishery at a 60 percent ceiling (the 60 percent ceiling is a maximum, and TAM is not always that high; for some witnesses, the 60 percent ceiling is too low, while for others, too high).[444] Related to the TAM ceiling is the issue of large spawner abundances, sometimes called "over-escapement": criticism was levelled that the FRSSI model sets escapement targets that allow too many fish on the spawning grounds, thereby risking a decline in the population (see the section on over-escapement below).

Another criticism levelled at DFO and the use of the FRSSI model is that DFO does not consider economic trade-offs that are required to be made

in setting total allowable mortality / escapement.[445] Mr. Morley urged that, when presenting the four optional escapement targets in a given year for a given run, DFO should conduct an economic evaluation of the harvest rates before choosing a model. That evaluation would include:

> What are the values to incomes to First Nations fishers in Johnstone Strait, to gillnetters in the lower river, to First Nations economic opportunity fisheries in the river[,] to First Nations' very important FSC fisheries all the way up the river?
>
> That evaluation is not done in the context of analyzing these escapement goals. And once we set these rules, currently, they have been extremely inflexible in-season.[446]

However, DFO witness Mr. Ryall defended the FRSSI model, arguing that FRSSI harvest rules do factor in social and economic considerations, although not perfectly, and that conservation considerations are also factored in through the use of performance measures.[447] Other criticism of the FRSSI model and process focused on the lack of consideration of the effect of habitat on productivity and the resulting escapement targets.[448]

Related issue: impact of large escapements, or "over-escapement"

Issues were raised in the Inquiry concerning the impact on stocks from over-escapement. The phenomenon has been defined as allowing escapement surplus to those fish needed to produce the maximum average yield (the maximization of the average harvest on a particular line in cyclic dominant stocks).[449] Mr. Wilson described it as "under-fishing" – not harvesting all the fish that have been identified as surplus to the escapement goal.[450] Over-escapement has also been defined as large escapements that, through delayed density-dependent effects,* cause a significant decrease in productivity in future recruits.[451] Over-escapement is also discussed in Volume 2, chapters 2, Public submissions, 4, Decline-related evidence, and 5, Findings, of this Report.

The witnesses who were critical of over-escapement asserted that allowing large escapements results in delayed density-dependent effects in cyclically dominant stocks. Dr. Walters expressed the concern that over-escapement may ultimately create a strong dominant pattern synchronized across all or many cyclic stocks and creating one enormous dominant year, followed by three very small years, thereby seriously compromising the stability of the fishery.[452] All witnesses who testified on this issue agreed that, judging by the weight of evidence, there is a low risk of stock collapse, if any risk at all, arising from large escapements.[453]

Large escapements may have beneficial ecosystem effects, such as streamside and aquatic vegetation. In addition, they may provide benefits to other species (e.g., bears or birds), providing nutrients to the lake and the surrounding system (ecosystem services).[454] However, there is need for further scientific research on the benefits to the ecosystem of large escapements of sockeye.[455]

Findings

The Pacific Salmon Treaty stipulates that the Department of Fisheries and Oceans (DFO) must set escapement targets, and I am satisfied from the evidence that the Fraser River Sockeye Spawning Initiative (FRSSI) process and the model developed for that purpose are serving a valuable function. I am also satisfied that FRSSI is an improvement over DFO's earlier rebuilding strategy.

I encourage DFO to follow through with its stated intention to review the FRSSI model and address the criticisms of it, including whether total allowable mortality (TAM) as a function of run size should have a maximum 60 percent cap. Although I note that FRSSI is a very technical process, it is in DFO's interests to be more explicit about both the values it is considering in setting escapement targets under FRSSI and the way DFO weighs these values. I also urge DFO to be explicit in how

* Delayed density dependence is a mechanism and description of an assumed biological link between generations, whereas over-escapement is a term for the number of spawners relative to some reference point. Randall Peterman, Transcript, April 21, 2011, pp. 69–70.

it considers habitat and large escapement issues (where applicable) in its escapement planning.

I note that FRSSI is not an implementation of the Wild Salmon Policy. However, the criticisms of FRSSI and the trade-offs associated with setting escapement targets should be a component of the work DFO performs under Strategy 4 of the WSP, as discussed in Chapter 10, Wild Salmon Policy.

I discuss these findings and any related recommendations in Volume 3 of this Report.

Integrated Fisheries Management Plan

As part of its pre-season planning, DFO produces an Integrated Fisheries Management Plan for salmon, which encompasses all of the fisheries.[456] The Pacific Region IFMP Salmon Southern B.C. addresses the management of Fraser River sockeye.[457]

DFO's preparation of the IFMP runs parallel to the Fraser River Panel's preparation of the fishing plans for the commercial sockeye fishery in Panel Area waters.

Introduction of the IFMP

Before it introduced the IFMP in 1999, DFO published yearly fishery management plans that provided the commercial fishing sector with the rules of a particular fishery. These annual plans were divided by fishing gear into two types: net fishing plans (seine and gillnetters) and troll fishing plans. The fishery management plans set out the pre-season forecasts, estimated TAC, and anticipated fishing opportunities for each DFO fishing area.

DFO formally introduced the IFMP in 1999 as part of its national co-management initiative, set out in its three-volume document *Framework and Guidelines for Implementing the Co-Management Approach* (Vol. 1: Context, Concept and Principles; Vol. 2: Integrated Fisheries Management Plans; and Vol. 3: Guidelines for Joint Project Agreements).[458] These documents set out a standard framework for fisheries co-management involving two steps: the IFMP document, followed by a legally binding, voluntary Joint Project Agreement, which spells out the roles and responsibilities of DFO and resource users with respect to specific co-management projects.

According to DFO, "the IFMP is both a process and a document. Its primary goal is to provide a planning framework for the conservation and sustainable use of fisheries resources and the process by which a given fishery will be managed for a period of time."[459] The IFMP document "describes the management of Pacific salmon fisheries in southern B.C. and the factors that influence decision-making … [It] incorporates the results of consultations and input from the [IHPC], First Nations, recreational and commercial advisors and the Marine Conservation Caucus."[460]

The IFMP as a process

As a process, the IFMP is intended to integrate the expertise and activities of various DFO program activities in fisheries management planning (e.g., Fisheries Management; Science; Conservation and Protection; Aboriginal Policy and Governance; Oceans, Habitat and Enhancement; Policy and Economics; and Aquaculture). The IFMP process is also intended to provide an opportunity for First Nations and stakeholders to provide their views on the management of the fishery, and, as stated in the IFMP, the IHPC is "recognized to be the primary source of stakeholder input into" the salmon IFMP, although input to the IFMP is also received through other avenues.[461] DFO's senior management repeatedly told me that the IFMP process is consultative.[462]

DFO Pacific Region's Fisheries and Aquaculture Management Branch manages the IFMP process, which is cyclic, and adheres to the following rough schedule:

- The IFMP development process is triggered by the annual post-season review of the fishery. This review helps to determine the effectiveness of the previous year's management measures and to identify areas for improvement.
- Immediately on completion of the post-season review, the chair of the salmon IFMP process invites relevant DFO sectors to designate a representative to an IFMP Development Committee. The position of chair rotates among different resource management area

chiefs of the South Coast, Lower Fraser, and BC Interior areas.
- The IFMP Development Committee discusses the results of the post-season review, assigns sectoral tasks required for the development of the IFMP, and sets a timeline for the collection and consolidation of information. The chair tracks progress and consolidates the information into a draft document.
- The chair invites the directors of the different sectors represented on the Development Committee to meet and discuss the draft IFMP. DFO incorporates their feedback in a revised draft IFMP, including the internal agreement in principle on the main elements, issues, and objectives.
- DFO consults with external groups once it has produced a revised version of the IFMP. Where DFO has determined that there is a legal duty to consult with Aboriginal groups, DFO's resource management staff are supposed to ensure that the existing process for consultations or any new process designed for this purpose meets the requirements outlined in the *Interim Guidelines for Federal Officials to Fulfill the Legal Duty to Consult, February 2008*.[463]
- The chair presents the draft IFMP at the March and May IHPC meetings, and DFO encourages IHPC participants to discuss the content of the document, provide additional information, and suggest needed changes. A structured agenda and appropriate facilitation techniques are used to guide the meeting, and a record of the discussions and decisions is kept. In co-operation with participants, DFO incorporates feedback in a revised draft IFMP.
- The chair invites the directors of the different sectors represented on the Development Committee to meet and discuss the post-consultation draft IFMP. The draft is presented by the chair. DFO incorporates this feedback in a revised draft IFMP, and this document becomes the final draft IFMP.
- The final draft IFMP and the associated briefing note are delivered to the minister for approval. To allow time for review of the IFMP, and for the preparation of licence conditions before the start of fishing activities, the IFMP is supposed to be submitted for approval as far in advance of the opening of the fishery as possible.*
- DFO releases the final IFMP to the public on the DFO national and regional websites; DFO states that, if possible, it should be released a minimum of one month before the opening of the fishery.[464]

While the chair of the salmon IFMP process is responsible for making sure that the IFMP is completed every year, the regional resource manager for salmon is tasked with coordinating the staff in all branches across the South Coast, Lower Fraser, and BC Interior areas who contribute to the salmon IFMP.

Some First Nations are of the opinion that DFO does not adequately engage with them in the IFMP process.[465] According to Mr. Shepert, chair of the Upper Fraser Fisheries Conservation Alliance and member of the Fraser River Panel, the present system[466] of sending recommendations to DFO is unsatisfactory:

> [W]e get what was accepted and what wasn't and usually some sort of a rationale, although we don't understand who made the decision or why the decision was made ... there's definite room for improvement ... starting with the technical agenda, working through those technical agendas at the watershed, and then the sub-regions from there would greatly improve understanding of how decisions are made.[467]

Mr. Rosenberger disagreed, testifying that DFO had made a number of changes in the development of the IFMP (and at the IHPC) regarding First Nations representation and communication.[468]

In its final written submissions, the First Nations Coalition submitted that DFO should engage more with First Nations, at a Tier 2 level, regarding the IFMP:

> [T]he fisheries management decisions in the IFMP have potential impacts on the exercise of Aboriginal and treaty rights, and therefore require consultation and, where appropriate,

* The IFMP is usually approved in late June or early July, after the fishing season has commenced. Jeff Grout, Transcript, January 17, 2011, p. 6; Barry Rosenberger, Transcript, January 17, 2011, p. 68; see also Exhibit 327, which is date stamped by the minister's office June 25, 2009.

> accommodation. The FNC submits that given the nature of the decisions made in the IFMP, and the fact that the IFMP guides the decision making process that occurs in-season at the FRP, it is critical that First Nations have an opportunity, on a Tier [2] level, to discuss these issues with DFO.[469]

Mr. Young of the Marine Conservation Caucus criticized the lack of transparency in DFO's decision-making process, saying that recommendations are made through the IHPC but that DFO neither incorporates them into the IFMP nor explains why the recommendation is not accepted.[470] Mr. Grout acknowledged that, after the May IHPC meeting reviewing the draft IFMP, although DFO may receive further comments on the IFMP from IHPC participants, it is a challenge to incorporate them into the IFMP for the minister's approval.[471]

The IFMP as a document

DFO developed the current format of the salmon IFMP over two years from 2000 to 2002. It follows a standard template. The 2010–11 salmon IFMP includes the following information:

- management changes for 2010–11;
- introduction;
- general context (which contains, among other sections, 3.2 the policy framework for the management of Pacific salmon fisheries, 3.3 conservation statement, 3.6 First Nations and Canada's fisheries framework, 3.7 scientific support, and 3.8 Pacific Salmon Treaty);
- fishery management objectives (including the sections 4.1 stocks of concern, 4.2 First Nations, 4.3 recreational and commercial, 4.4 international, 4.5 domestic allocation, 4.6 compliance management, and 4.7 enhancement objectives);
- decision guidelines and specific management measures (section 5.5 sets out Fraser River sockeye decision guidelines);
- the Southern BC / Fraser River First Nations fishing plan (FSC fisheries only);
- the Southern BC / Fraser River Recreational Fishing plan;
- the Southern BC / Fraser River Commercial Fishing plan; and
- the post-season review of the 2009 fishery.[472]

IFMP: ministerial discretion to approve

Ultimately, the minister approves the IFMP. As preparation for the approval, the minister is given a briefing note with recommendations prepared by DFO Pacific Region's Salmon Team.[473] This briefing note is vetted first by the regional director of Fisheries and Agriculture Management, and then by the regional director general of the Pacific Region. It is further vetted in Ottawa by the assistant deputy minister of FAM and the director of Fisheries Resource Management Pacific / Central and Arctic at national headquarters.[474] The IFMP may be altered at any time by the minister under the discretionary powers conferred by the *Fisheries Act*.

Mr. Grout told me that the salmon IFMP is approved at the ministerial level, whereas some IFMPs for other fisheries are not.[475] The briefing note provided to the minister for approval of the 2009–10 IFMP and the minister's approval of the briefing note were tendered as exhibits.[476] On the copy of the minister's approval of the briefing note, the words "need to ensure we maximize opportunities for commercial fisheries" were handwritten beside the minister's signature, and the note was date stamped June 25, 2009.[477] However, Mr. Rosenberger testified that the minister's comment on the final IFMP did not have any impact on the in-season management of the fishery that year.[478]

IFMP renewal

IFMP renewal was initiated in 2007–8 to make the IFMP process consistent with the Sustainable Fisheries Framework (discussed in Chapter 4, DFO overview).[479] DFO produced the Fisheries Sustainability Checklist,[480] which Ms. Farlinger, regional director general, Pacific Region, explained "sets out how have we [DFO] used the precautionary approach, how have we addressed ecosystem issues, how have we addressed basic stock assessment issues."[481]

In April 2008, DFO released a draft (first revision) of a policy document, "A Framework for Socio-Economic Analysis to Inform Integrated Fisheries Management Planning and Fish Harvest Decisions,"[482] which presents guidelines and principles for conducting a socio-economic analysis to inform the IFMP process and the annual harvest decisions.[483] The compilation of this framework was done in concert with the development of a new template and guidelines for all IFMPs (not just the salmon IFMP).[484] According to this document, IFMPs should include an economic profile and assessment of the current economic health / viability of the fishery. An economic analysis of management objectives and measures will be done when the minister and/or senior managers request resource management staff to look at particular options.[485] However, there was no evidence that DFO had acted on this document, and there were no changes to the IFMP.[486]

DFO issued a new IFMP template in 2010,[487] and DFO's intention is to have a standardized format for IFMPs for all species. The new IFMP templates are a national initiative, and DFO intends eventually to make IFMPs into multi-year plans that, in the words of Ms. Farlinger, will be "more consistent [with each other so] that we [DFO] can explain that sustainability checklist and how well or not we are doing against that to parliament and Canadians."[488]

Findings

I commend the Department of Fisheries and Oceans (DFO) for its efforts to improve communication about the Integrated Fisheries Management Plan (IFMP) to those it affects and for its efforts to modernize the IFMP. I am hopeful that DFO can implement its stated goal of including an economic profile and assessment of the current economic health and viability of the fishery in the IFMP and in making the IFMP a multi-year document.

I am satisfied that the process around the IFMP is sound. However, First Nations and stakeholders who participate in the Integrated Harvest Planning Committee (IHPC) are frustrated when the recommendations they make during that process, recommendations that are incorporated into the draft IFMP, do not wind up in the final version of the IFMP that is approved by the minister, and they are given no reason for these changes. The minister has the discretion to make such changes, but those who have invested so much time and energy in the IHPC process deserve to understand the reasoning behind the changes.

I discuss these findings and any related recommendations in Volume 3 of this Report.

Fraser River Panel pre-season management

The Terms of Reference of this Inquiry do not expressly require me to consider the management of the commercial harvest of Fraser River sockeye salmon by the Pacific Salmon Commission (and its Fraser River Panel) under the terms of the Pacific Salmon Treaty. However, given the historical and extensive involvement of the Pacific Salmon Commission with the DFO in the management of the Fraser River sockeye fishery, it is important to understand how the two entities work together and divide the responsibilities.

The Fraser River Panel

Under the Pacific Salmon Treaty, the Fraser River Panel manages the commercial harvest of Fraser River sockeye (and pink) salmon in the Fraser Panel Area; it is responsible for developing pre-season fishing plans, in-season decision rules, and in-season harvest regulations of Fraser River sockeye in its waters.[489] Although the Fraser River Panel does not regulate commercial fisheries in waters outside the Panel Area, DFO will generally ask the Fraser River Panel for comments with respect to these fisheries. However, there is no equivalent process for the Fraser River Panel to comment on DFO's proposed Aboriginal food, social, and ceremonial (FSC) fisheries, though DFO will provide information to the Fraser River Panel and the Pacific Salmon Commission on all its fisheries (including Aboriginal fisheries).[490]

Fraser River Panel pre-season planning and the Harvest Planning Model

Mr. Lapointe said that the Fraser River Panel begins its pre-season planning in February of each year and, before the start of the fishing season, generates a pre-season management plan for Fraser River Panel Area fisheries. In the pre-season period, the Fraser River Panel holds three meetings: at its first meeting of the year (typically in February), DFO provides the Fraser River Panel with its pre-season forecasts; the panel meets again in April and in June, during which refinement of the pre-season forecasts and additional information is provided by DFO for the panel's pre-season planning. Mr. Lapointe described this planning as a process to create "a number of scenarios for how a fishing season might take place given the available harvest." This process will produce an agreed pre-season fishing plan,* "which is basically a template for how the season might work out if the runs come back as expected."[491]

The Fraser River Panel generates its pre-season plans through the use of a computer model – the Harvest Planning Model. The panel's pre-season Harvest Planning Model relies on information from Canada and the United States to generate the pre-season fishing plans, including both countries' international catch allocation goals. Accordingly, DFO provides the Fraser River Panel with the following information: its escapement plan (the TAM rules and escapement targets obtained through the FRSSI model); its pre-season forecasts of run size, diversion rate, and timing; and its domestic catch allocation goals, which, for Canada, includes FSC, recreational, and commercial (broken out by licence area / gear type) objectives.[492] Canada will also provide its conservation objectives and identify management concerns for non–Fraser River sockeye stocks and other species, which must be taken into account in setting the fishery plan.

The Fraser River Panel / Pacific Salmon Commission created a document for this Inquiry explaining the panel's use of pre-season forecasts and pre-season planning in its management of the Fraser River sockeye fisheries. It is set out in Figure 1.5.13.

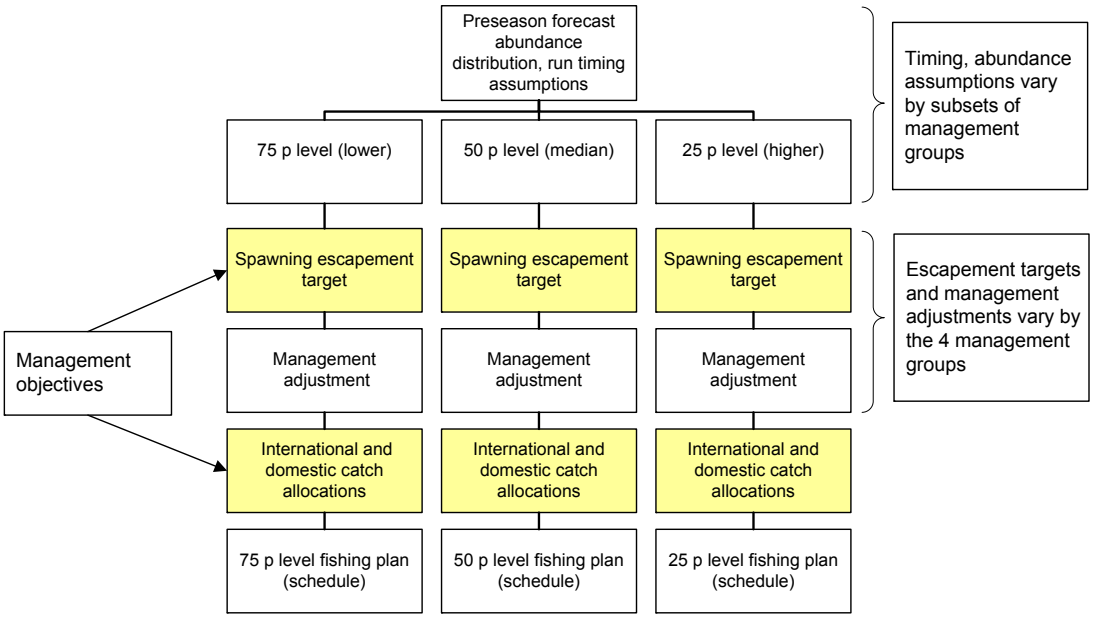


Figure 1.5.13 How pre-season forecasts are used in Fraser River sockeye management

Source: Reproduced from Exhibit 331, p. 1.

* As stated above in the overview of harvest management, the Pacific Salmon Commission / Fraser River Panel uses eight stock groupings in its management of the Fraser River sockeye fishery, which are based on the four run-timing groups as follows: the Early Stuart run is one stock group; the Early Summer run is broken down into three sub-groups – Early Miscellaneous, Scotch / Seymour, and North Thompson; the Summer run is divided into two sub-groups – Late Stuart / Stellako and Chilko / Quesnel; and the Late run is also broken into two sub-groups – Harrison and Late Shuswap / Weaver. See also PPR 5, p. 24; Mike Lapointe, Transcript, November 8, 2010, p. 27.

As stated in DFO's Record of Management Objectives, the objective of the Fraser River Panel's pre-season planning model is "to identify potential fishing opportunities while attempting to meet conservation, international, and domestic objectives."[493] The computer model allows the panel to input specific fishery opening scenarios and observe the results. The resulting pre-season management plan identifies the approximate pattern of fishery openings required to achieve the Fraser River Panel objectives, given pre-season expectations, and serves as a reference point if the in-season data reflect the conditions with which the model was populated.[494]

A high degree of uncertainty is associated with the pre-season model because it uses uncertain predictive information about diversion rate, run size abundance (at different probability levels), return timing, and en route mortality. These pre-season fishing plans are "what if" scenarios based on the forecast information available pre-season. Mr. Lapointe described the uncertainty associated with the pre-season models:

> [T]he intent of this exercise is to give [fisheries managers] some scoping of the potential scenarios, particularly on the fisheries planning side ... to conduct a what-if exercise in the middle of July or something is almost impossible.
>
> So the degree to which we can do that kind of what-if probing in the calmness of April or June, is really important ... quite often we may be close on one of these scenarios ... that we did, and that really provides a valuable frame of reference when you're trying to make these fisheries decisions on the fly in the middle of summer while the information is changing every day.[495]

Mr. Lapointe provided an example of the output of the pre-season fishery planning model, which is presented in tables 1.5.6 and 1.5.7.

Before the fishing season begins, the Fraser River Panel approves two documents which are initialled by the Canadian and US chairs and contained in the *Record of Management Strategies: Principles and Constraints* (Principles and Constraints)[496] and the *Guidelines for Pre-season Fraser Sockeye Fishing Plans to Address Late Run Concerns* (Guidelines).[497] The Principles and Constraints provide a "very broad statement"[498] of the assumptions agreed to by Canada and the United States regarding the management of the fishery. They are based on the forecasted information and set out the TAC for each country (which I discuss below), as well as the regulations that will guide the fishery, including the anticipated date of the fishery openings if the forecasted abundance occurs. The 2009 document states:

> Regulations
>
> i) If the abundance of Early Summer-run sockeye salmon is tracking at approximately the 50% probability level (739,000 fish) and the abundance of Summer-run sockeye salmon is tracking at approximately the 50% probability level (8,677,000 fish) and the runs arrive at or near normal dates, low impact fisheries in Panel Waters would be expected to commence the week of July 19–25. If the return abundances of Early Summer-run and Summer-run sockeye vary from the 50% probability level forecast, this could change the start dates, and duration of fisheries.
> ii) Fisheries directed at Fraser River pink salmon will be managed in accordance with the Late-run sockeye guidelines.
> iii) The Parties' conservation concerns for other species and stocks will be taken into account throughout the 2009 management season.[499]

The Guidelines set out the bilateral agreement on how the Fraser River Panel will address the behaviour of Late-run sockeye (based on historical observation) and the high level of mortality in these Late-run stocks, including assumptions and elements of the fishing plan to set the exploitation rates. The 2009 Guidelines state:

> [T]he potential continuation of high in-river mortality [rates] experienced by several Late-run stocks in recent years continues to be a serious conservation concern and there is a special concern for critically depressed Cultus sockeye for which recovery efforts have been implemented by Canada to ensure this stock's long-term viability. A co-ordinated approach

Table 1.5.6 Model output reviewed with Fraser River Panel

Model run comparisons: June 16

Comments	DBE Early Summer Spawners to the Grounds (296,000)	DBE Summer Spawners to the Grounds (3,471,000)	DBE "Late-Lates" Spawners to the Grounds (458,000)	U.S. TAC	Canada TAC	U.S. Catch	Canada Catch	Total Catch	Early Summer Exploit Rate	Summer Exploit Rate	Cultus Exploit Rate	"Late-Lates" Exploit Rate	Potential Spawning Escapement "Late-Lates"
Harvest within constraints, 50% p 75% p EStu, 50% diversion, Bayes MA's June timings, Quotas	302,107	4,939,848	53,087	889,100	4,899,400	551,473	3,651,079	4,202,552	43.3%	43.1%	16.8%	20.4%	456,146
→ Harvest within constraints, 50% p 75% p EStu, 28% diversion, Bayes MA's June timings, Quota	300,637	5,077,690	49,636	889,100	4,899,400	624,523	3,427,966	4,052,489	43.4%	41.4%	16.6%	20.1%	457,614
Canada & US harvest full TAC, 50% p 75% p EStu, 28% diversion, Bayes MA's June timings, Quota	239,380	3,592,626	46,258	889,100	4,899,400	888,703	4,863,104	5,751,807	51.8%	58.6%	31.9%	35.3%	370,450
US Harvests full share, Canada adjust, 50% p 75% p EStu, 28% diversion, Bayes MA's June timings, Quota	283,992	4,846,339	48,775	889,100	4,899,400	886,329	3,427,205	4,313,534	45.7%	44.1%	17.9%	21.5%	449,674
Harvest within constraints, 75% p all stocks, 28% diversion, Bayes MA's June timings, Quota	196,002	2,905,183	27,888	472,700	2,792,400	310,988	1,946,987	2,257,975	38.8%	40.8%	17.1%	20.4%	257,112
	(195,000)	(1,966,000)	(258,000)	< - goal at 75 % p									

→ More detailed output for model run shown in second row – provided to each country's caucus (not typically discussed bilaterally)

Note: p is probability level.

Source: Reproduced from Exhibit 331, p. 8.

to management will be developed that reflects both Parties sharing the burden of conservation for Late-run sockeye.

Assumptions and Elements of the Plan

1. For fisheries planning purposes, we applied a precautionary approach and assumed that Late-run sockeye will continue their post-1995 early upstream migration behaviour. Given pre-season assumptions about marine timing and recent delay behaviour, the median upstream migration date for Late-run sockeye in 2009 is expected to occur during the 3rd week of August. Given this timing and based on the 50p forecast level of abundance (573,000 fish), the exploitation rate limit is 20%.[500]

Total allowable catch

The Pacific Salmon Treaty requires Canada to provide the Fraser River Panel with run size forecasts and escapement targets before each fishing season. Based on the forecast run sizes at different run size probability levels and corresponding spawning escapement targets, the Fraser River Panel will develop pre-season fishing plans and will then calculate the projected total allowable catch (TAC) for each country.[501] The panel will also calculate TAC allocations during its in-season management of the fishery.[502]

The international TAC formula for all Canadian and US Fraser River sockeye fisheries is set out in the treaty as follows:

TAC = return – sockeye harvested in test fisheries – total escapement target – MA – AFE[503]

Table 1.5.7 Detailed model output provided to the caucuses in Canada and the United States

PACIFIC SALMON COMMISSION 2009
SOCKEYE FISHERY MODEL

	50% p Level		Run:	
	Goal	%	Modeled	%
Predicted Total Run:	10,488,000	100.00%	10,488,000	100.00%
Commercial Catch:	5,358,500	51.09%	3,596,520	34.29%
Gross Escapement:	5,593,900	53.34%	7,374,367	70.31%
Test Fishing Catch:	64,700	0.62%	70,829	0.68%
Non Commercial (Marine)	291,435	2.78%	291,435	2.78%
U.S. Goal/Catch:	889,100	100.00%	624,523	100.00%
Treaty Indian Catch:	601,921	67.70%	417,750	66.89%
Non Indian Catch:	287,179	32.30%	206,773	33.11%
Canadian Commercial Catch:	3,720,400	100.00%	2,126,829	100.00%
Canadian Allocation/Catch:				
Area "B" Purse Seine	1,767,190	47.50%	1,008,232	47.41%
Area "D" Gillnet	799,886	21.50%	474,631	22.32%
Area "E" Gillnet	930,100	25.00%	516,158	24.27%
Area "G" Troll	0	0.00%	0	0.00%
Area "H" Troll	223,224	6.00%	127,808	6.01%
Area "F" Troll	0		0	
Canadian Other Catch				
Recreational	170,000	NA	194,634	NA
Fraser River Aboriginal	749,000	NA	845,168	NA
Marine AFS	260,000	NA	261,335	NA

Note: Harvest within constraints, 50% p 75% EStu, 28% diversion, Bayes MA's June timings, Quota.
Source: Reproduced from Exhibit 331, p. 9.

In the formula, MA means the management adjustment for each Fraser River sockeye run-timing group (management adjustments are discussed below), and AFE means the Aboriginal Fisheries Exemption (explained briefly below).[504]

United States total allowable catch

The following equation is used to calculate the United States TAC (USTAC):

USTAC = Treaty % ∗ (TAC)[505]

In this formula, "Treaty %" is a fixed percentage of TAC allocated to United States fisheries (now set at 16.5 percent for each cycle year).[506]

Aboriginal Fisheries Exemption

The Aboriginal Fisheries Exemption (AFE) is a fixed amount of sockeye set aside for Canadian Aboriginal fisheries, as defined in the Pacific Salmon Treaty. In paragraph 3(d) of Annex IV, chapter 4, the Fraser River AFE amount is set up to 400,000 sockeye salmon annually for Canadian in-river and marine Aboriginal fisheries, of which up to 20 percent can be applied to the Early Stuart run-timing group. The portion of the total AFE assigned to the different run-timing groups is initially set using the historical average distribution of the Aboriginal harvests for the past three cycle years.[507] The values set for each run-timing group may be adjusted where necessary to address conservation concerns or respond to major changes in run size for a specific run-timing group, or where the United States and Canada otherwise agree.[508] The AFE is a treaty-defined amount and does not limit Canada's allocation of its TAC to First Nations FSC fisheries.

Canadian total allowable catch

The Canadian TAC (CTAC) is what remains when the USTAC is removed from the international TAC. The Canadian commercial TAC is what remains when the First Nations FSC catch and recreational catch is subtracted from the CTAC.

Post-season total allowable catch

Before 2005, post-season TAC was calculated using post-season estimates of run size, spawning escapement, and test fishing. On February 17, 2005, the Fraser River Panel agreed on a revised Annex IV, chapter 4 of the treaty, which established a new method for calculating post-season TAC. The Fraser River Panel also decided to apply the new method for calculating post-season TAC retroactively for 2002 through 2004.

Since 2005, the calculation has used the estimates of run size, spawning escapement target, management adjustment, and test-fishing catch in effect when the Fraser River Panel relinquishes control of the last US Panel Area (usually late in September). The new method is therefore based on in-season data (estimated escapement) rather than post-season data (actual escapement) to calculate total sockeye available for sharing in each fishing season. This change affects the TAC and share calculations, and specifically the overages and underages relating to yearly TAC.

Although TAC is calculated as set out above, certain conservation and management constraints can limit harvesting opportunities. For that reason, TAC may not be reached in a given year.

Management adjustments

The Fraser River Panel determines the annual management adjustment to be added to the escapement goal. It is a way of estimating the number of fish that will be lost to en route mortality through high water temperature, high or low water flow, disease, predation, or illegal catches and of accounting for bias in the abundance estimates made at the hydroacoustic station at Mission, on the spawning grounds, and through catch monitoring.[509] The management adjustment is made both pre-season (at the Fraser River Panel's June pre-season meeting) and in-season.

Mr. Lapointe told me that there have always been some uncertainties in estimates, resulting in differences between estimates at Mission and those on the spawning grounds. However, a serious problem was identified in the early 1990s in that there were significant discrepancies between fish counted at Mission and fish counted at the spawning grounds.[510] In 1997, in response to previous public reviews of the Fraser River sockeye fishery, the management adjustment

model based on environmental conditions was developed (known as environmental management adjustments).[511] Environmental management adjustments have been adapted and refined for a number of years and are now known as "management adjustments."[512]

DFO's Environmental Watch Program (EWatch) observes the migration biology of sockeye and the freshwater environmental factors that influence migration success. Specifically, the EWatch Program monitors and researches environmental conditions in the Fraser River; researches migration biology; and provides science advice on the impact of different freshwater factors primarily through modelling.[513]

David Patterson, manager of the EWatch Program, testified about DFO's modelling of management adjustments and offered the following definition of management adjustments: "A management adjustment is ... the [forgone] catch that is added to ensure that we [DFO] actually meet the spawning escapement targets."[514]

Management adjustments are a means to ensure that, in-season, enough fish arrive at Mission so that there will be sufficient fish on the spawning grounds to meet the escapement targets set by Canada for each of the management groups. Management adjustment models may use environmental data (e.g., temperature of the water and flow) and biological data (e.g., run timing) to predict the expected difference between the abundance estimates at Mission and the spawning ground escapement estimates.[515]

The management goal is to make sure that the targeted number of spawners reaches the spawning grounds. DFO can estimate how many fish are expected to be caught in legal fisheries upstream of Mission, but simply adding the number of fish expected to be caught to the number of spawners desired does not give the number of fish which must pass Mission to meet escapement targets. Because of en route mortality and/or bias in estimation methods in Mission hydroacoustics, escapement enumeration and catch monitoring, or illegal fishing, it is necessary at times that additional fish pass Mission. For example, if 100,000 fish were required to meet an escapement target and the management adjustment model indicates that 50 percent of the fish that pass Mission will not reach the spawning grounds, 200,000 fish will be required to reach Mission to ensure the 100,000 escapement target on the spawning grounds.[516]

Temperature and high water flow are key drivers that influence spawning migration mortality, but a number of other natural factors also give rise to in-river mortalities (e.g., predation, disease, water quality, incidental harm from fishing, or a cumulative effect from all these factors), as well as the possibility of estimate errors (bias) noted previously.[517]

Temperature and flow monitoring on the Fraser River

Monitoring of water temperature decreased in the 1980s and 1990s when DFO took over from the former IPSFC (now the Pacific Salmon Commission), but it has now returned to the level that was in place in the 1960s.[518] It is important to maintain the full data set of environmental conditions in the Fraser River to ensure accurate modelling of management adjustments.[519] Currently, DFO monitors in-river temperature to support the EWatch program and the management adjustment work, but Mr. Patterson stated that Environment Canada, which has the mandate to monitor water quality (of which water temperature is one of the main attributes), could be doing more in this regard.[520]

Management adjustment models

Management adjustments are calculated for run-timing or management groups; for the first three management groups, it has been determined that the most significant factors are flow and temperature, but for the Late-run groups, the most important factor is the timing of their river entry.[521]

> There has to be an agreement on the pre-season management adjustments. At this meeting [in June], typically we [Fraser River Panel] would have a long-range forecast of environmental conditions, which would be provided to us by Canada's Environmental Watch Program. And we would use that input, which is typically two things ... river flow, and

> river temperature, as inputs to determine the management adjustments for the Early Stuart, Early Summer and Summer run sockeye. And then for Late Run sockeye, if we are using a management adjustment approach, it would be based on their anticipated upstream timing. So definitely management adjustments, pre-season-wise are finalized, but then of course in-season we adjust them as we see the river conditions change.[522]

DFO Science and EWatch Program staff have developed models to create the management adjustments, and DFO's EWatch provides the environmental forecast data to the Pacific Salmon Commission.[523] The commission runs the models pre-season and in-season, using pre-season forecasts or in-season run size estimates and current environmental data, to generate the management adjustment that must be accounted for before any fishery can be opened. After a model is chosen pre-season for a run-timing group, the Fraser River Panel could change the model in-season if the pre-season predictor variables do not provide the best fit or model performance to the in-season variables.[524]

Mr. Patterson said that studies are currently under way with EWatch and university collaborators to look at the potential impact of different gear types on en route loss. He also said that EWatch is looking at the impact of future climate change scenarios.[525]

Choice of model

A range of models, each of which has some bias, are used to generate management adjustments. Mr. Patterson agreed that, at present, it is not always clear why a particular model is chosen in-season.[526] He said that EWatch is developing a more transparent method wherein management goals / objectives can be identified, and the appropriate model to meet the management goal can be chosen based on the stated goals:[527]

> Clearly, multiple performance measures need to be considered in fisheries analyses … because of the competing management objectives typically faced by fisheries managers … When clear objectives are combined with appropriate affiliated performance measures, model selection through retrospective analysis can be used to provide scientific advice to managers to help increase the probability of achieving fisheries management objectives.[528]

Management adjustments and differences between estimates

Management adjustments are related to the differences between estimates (DBEs) which are discussed in the section on differences between estimates below. They represent the post-season calculation of the difference between Mission and spawning ground escapement, whereas the management adjustment is the in-season projection of these numbers.[529]

Findings

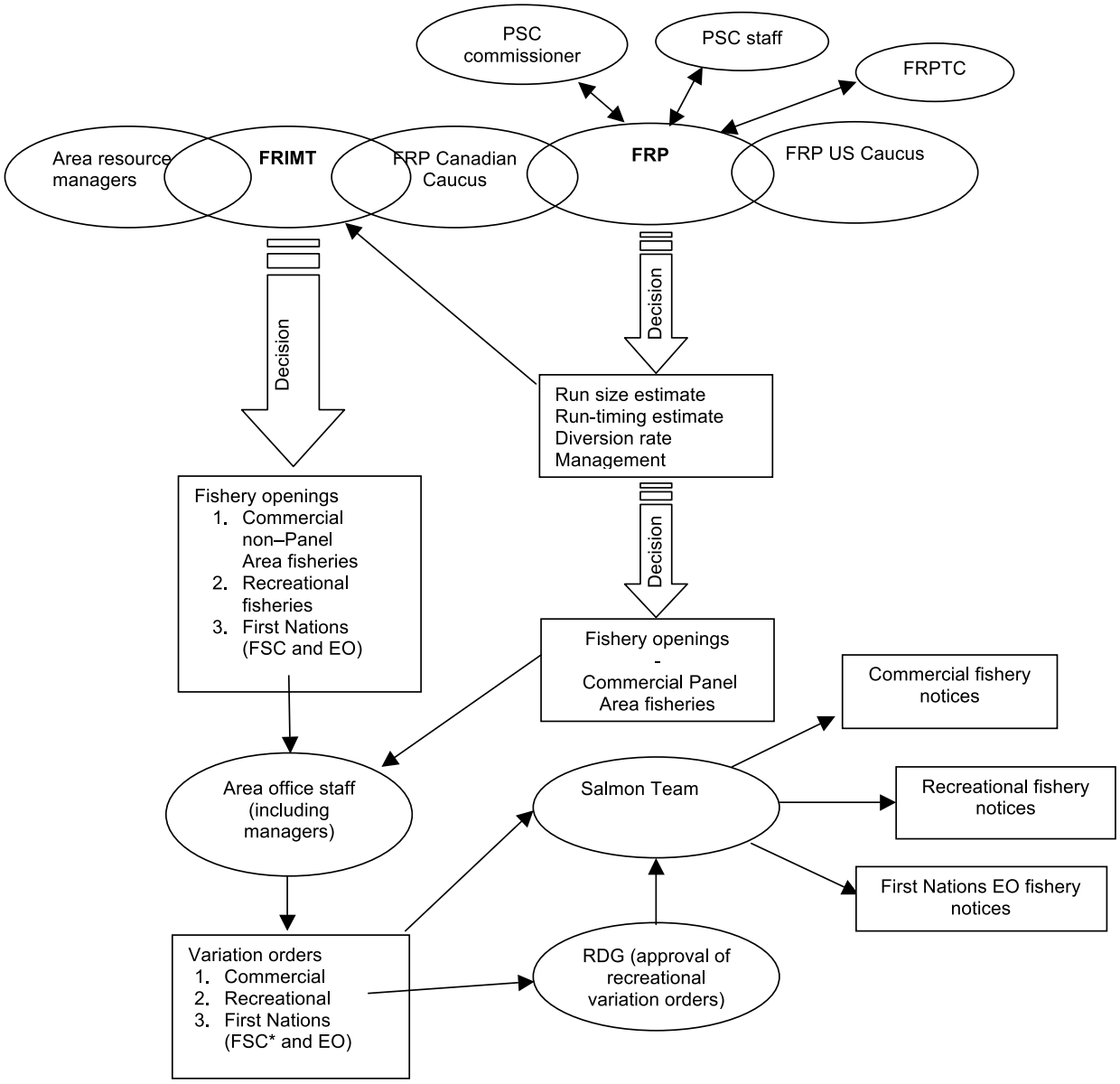
Based on the above discussion, I find that management adjustments are useful and important to meet conservation objectives of the Department of Fisheries and Oceans (DFO). As noted by the witnesses who testified on the subject, the data required to support the generation of management adjustments (e.g., in-river water temperature and flow) are important, and I urge DFO and Environment Canada to continue their ongoing work together in obtaining these data.

I discuss this finding and any related recommendations in Volume 3 of this Report.

In-season management

In this section of the Report, I describe the in-season management of the Fraser River sockeye fisheries, together with the scientific information that is used in-season to assist with the management of these fisheries (such as run size estimates, test fishing, the use of monitoring equipment at Mission and Qualark, and selective fishing).[530] I also discuss monitoring of the fisheries and catch reporting.

DFO and the Fraser River Panel of the Pacific Salmon Commission (PSC) both manage the fisheries in-season, depending on the nature of the fishery (e.g., whether it is commercial or recreational, or for First Nations food, social, and ceremonial [FSC] use) and its location (the Fraser River Panel does not manage the commercial fishery outside Panel Waters). The interaction between DFO and the Fraser River Panel is complicated, so Commission staff created Figure 1.5.14 to explain the in-season management.



EO: economic opportunity fisheries; FSC: food, social, and ceremonial fisheries; FRIMT: Fraser River Sockeye and Pink Salmon Integrated Management Team (DFO); FRP: Fraser River Panel (Canada and the United States; FRP Canadian Caucus – DFO and non-DFO); FRPTC: Fraser River Panel Technical Committee (Canada and the United States); PSC: Pacific Salmon Commission; RDG: regional director general.

Figure 1.5.14 In-season management of the fisheries

Note: *No fishery notices are generated for First Nations FSC fisheries.
Source: Commission staff.

Transfer of control from DFO to Pacific Salmon Commission

The Fraser River Panel is responsible for all in-season decision making for all of the Panel Area water commercial fisheries (other than First Nations economic opportunity fisheries). PSC staff also perform tasks associated with the fishery (as explained below). Under the Pacific Salmon Treaty, all sockeye (and pink salmon) fisheries under the Fraser River Panel's jurisdiction are closed unless opened for fishing by in-season order of the panel.[531] Before every fishing season, there is a formal process, through a series of regulatory control letters, for transfer of control from the United States and Canada to the Fraser River Panel of the Pacific Salmon Commission for in-season management of the commercial fishery.[532] This process provides the closed-unless-opened regulatory framework.[533]

The Fraser River Panel conducts in-season management of the commercial fishery in Panel Area waters, and DFO's Integrated Management Team (described earlier) manages the commercial fisheries outside the Panel Area waters, the recreational fisheries, and the Aboriginal fisheries (FSC and economic opportunity). Mr. Lapointe of the Pacific Salmon Commission described the working relationship between DFO and the Pacific Salmon Commission as excellent, collaborative, and co-operative.[534] There is an overlap of DFO personnel on the Fraser River Panel and DFO's Integrated Management Team (as discussed earlier, the same person is the chair of both).[535]

As part of the in-season management of the fishery, Pacific Salmon Commission staff run (in effect, monitor) all the assessment programs for run sizes, run timing, and diversion rates and make recommendations for run size and in-season management adjustments. PSC staff will also assess catch estimates, assign stock identification, and review fishing plans from both countries.[536]

The Fraser River Panel determines the run size, run timing, and in-season management adjustments, based on information provided by PSC staff, and sets the opening times (if any) for the commercial fisheries under its jurisdiction.[537] The run size and management adjustment decisions result in a calculation of the total allowable catch that DFO uses to decide fishery openings under its jurisdiction.[538]

In-season management by the Fraser River Panel

The first in-season meeting of the Fraser River Panel will typically be in the first week of July, and it is driven by the status of the Early Stuart sockeye run.[539] In-season, the panel generally meets twice a week, once through a conference call and once in person if possible, but will meet more frequently if necessary.[540] The Fraser River Panel in-person meetings are open to the public (subject to approval by the national caucus) and include members of the Fraser River Panel Technical Committee. For both the teleconference and the in-person meetings, a "listening line" is available to members of First Nations in the watershed as well as each country's national caucus. The Technical Committee meets before the Friday meeting.[541]

During the in-season meetings, the Fraser River Panel updates the test fishery results, reviews the stock identification from the Mission site and the catch estimates, and discusses river temperatures and flow. As in-season information warrants, Pacific Salmon Commission staff make formal recommendations for changes to run size abundance estimates and management adjustments for each of the four run-timing groups.[542] These recommendations take effect after adoption by the Fraser River Panel.[543]

Following adoption, each national section proposes the opening of particular commercial fisheries, and PSC staff evaluate whether these fisheries are consistent with available harvestable surplus. Mr. Lapointe described the process as follows:

> PSC staff provide an evaluation of the proposals against the criteria. Primarily, is the expected catch in a particular fisheries proposal smaller or larger than the available TAC? And if it is smaller than the available TAC, then PSC staff would judge those fisheries consistent with the information. And if we judge them consistent, then the panel would approve those regardless of whether or not one of the countries objected. If we judge them inconsistent, then the panel – the national section whose proposal it is that we have judged inconsistent has two options. They can

> resubmit their proposal, change it, modify it somehow to improve the chances that it would be consistent. Or alternatively, the two parties can actually adopt the fisheries proposal by bilateral agreement regardless of the judgment by PSC staff.[544]

If PSC staff judge a national section fishery proposal consistent, then the proposed fisheries can go ahead as stipulated in the Pacific Salmon Treaty.[545]

Under the Pacific Salmon Treaty, Panel Area waters extend beyond Mission, although the Fraser River Panel has not, to date, made decisions on commercial fisheries above that point. Mr. Rosenberger, who is current chair of both the Fraser River Panel and the DFO Integrated Management Team, told me that, if the Fraser River Panel were to take over decision making for all fisheries in Panel Area waters, that would slow its decision-making process. In addition, the US panel caucus might not have the knowledge necessary to make these decisions (in particular, to manage FSC or First Nations economic opportunity fisheries).[546] Mr. Lapointe agreed and told me that the Pacific Salmon Commission does not now have the expertise to be tasked with the management of fisheries in Panel Area and non–Panel Area waters; as he said, it is theoretically possible, but, pragmatically, it would be difficult because of the representation on the Fraser River Panel.[547]

As discussed above, DFO prepares its IFMP and, once the minister approves it, DFO provides it to the Fraser River Panel. Issues with the panel's in-season management will arise when there is need for a decision (or an alteration) that is not within the parameters of DFO's IFMP because the pre-season planning did not anticipate the in-season reality. Mr. Rosenberger testified that this situation occurred in 2010 and resulted in the Fraser River Panel asking DFO to prepare a briefing note to the minister to make changes to the IFMP.[548]

Mr. Assu, a councillor with the We Wai Kai Nation (Cape Mudge Band) and a member of the Fraser River Panel, urged flexibility around DFO's IFMP where the need arises for an in-season change to it:

> I don't believe that the IFMP can ever cover every circumstance that may arise from time to time, and that as far as the in-season management of the fisheries go, there has to be more flexibility in trying to make changes [to the IFMP] if need be ... [There is a need for] flexibility ... within [the] region here. That's where the decision I think has to be made as far as in-season, rather than having to get the ministerial authority to make changes to the IFMP within the season.[549]

Mr. Morley, who is a member of the Fraser River Panel, also discussed this issue:

> [T]he approach, currently, is that whatever rules are laid out in the IFMP process are signed off, as we see, by the Minister on the pre-season plan, and the process to get ministerial change to some of those details, I think, is a very involved, detailed process, going up through the bureaucratic chain ... and most of these circumstances take place in the middle of the summer, when many people are away and very difficult to get a hold of, so I think it's a very cumbersome process to have to go back for every minute detail in that plan to get a ministerial sign-off on a change.
> ...
> [However], I think that the rules that we have adopted in the IFMP are robust enough to [address] situations ... where we end up with fewer fish coming back ... I don't think that ... we have ever been prevented from taking action when there [were] serious conservation problems. I don't think it's at all been prejudicial to conservation, but it certainly has limited the ability for sustainable harvest to be taken by many of the users.[550]

Generally, the witnesses who testified about the Fraser River Panel's in-season management agreed that it was impractical for the Fraser River Panel to operate through a consultative process with representatives of sectors such as the Integrated Harvest Planning Committee (IHPC, discussed earlier), given the nature of the fishery and the decisions that are required on an ongoing basis.[551] Mr. Rosenberger did note, however, that, throughout the season, there is consultation and that information is exchanged between DFO and the sectors.[552]

I heard differing opinions from witnesses regarding the representation of Canada's Aboriginal peoples on the Fraser River Panel. DFO (through the regional director general, Pacific Region) selects the Canadian individuals who sit on the Fraser River Panel, and the panel members do not represent the interests of the sector with which they may be affiliated – such as commercial or recreational fishing interests.[553] Paul Sprout, former regional director general, Pacific Region, agreed that, during a February 2009 meeting of the Pacific Salmon Commission, he said that the representation of First Nations on the Fraser River Panel should be increased to equal up to 50 percent of the membership.[554]

Chief Russ Jones, an alternate commissioner with the Pacific Salmon Commission who is also a hereditary chief of the Haida Nation, a policy advisor to the Haida Fisheries Program, and a member of the First Nations Fisheries Council, told me that the Pacific Salmon Commission and the Fraser River Panel do not adequately accommodate First Nations and are not representative of Aboriginal interests.[555] Mr. Shepert, who is on the Fraser River Panel, and chair of the Upper Fraser Fisheries Conservation Alliance and a member of the Wet'suet'en First Nation, told me that increased First Nations participation at the Fraser River Panel would take the stress off people like himself and Grand Chief Ken Malloway, of the Stó:lō Tribal Council, who is also on the Fraser River Panel.[556]

> It's very difficult for us to purport to represent First Nations issues while I'm clearly very [biased] towards the Upper Fraser. There are people in the Mid Fraser who have [no] participation whatsoever, who have different, as I've said earlier, Upper, Middle, sort of Lower and then approach, slightly different viewpoints on these issues. And it's very difficult to be but one. So I think, as a nominal starting point, that a 50 percent representation by the First Nations on those panels would send a very clear signal.[557]

However, Mr. Rosenberger observed that an individual member of a First Nation may not be able to represent the interests of other First Nations. This particular limitation acts as an impediment to increasing First Nations representation on the Fraser River Panel:

> I think there [are] a few impediments. One is that the First Nations have still not collectively got themselves to the point where[,] when somebody comes, they are there representing either a geographic area or some interest – well, obviously they have an interest, but … we know that they're there mandated by some area … and that they're going back. So there [are] some issues around how First Nations people amongst themselves would want to have people appointed. And then the role that they would carry back.[558]

These issues of First Nations representation are discussed more fully in the section below on Aboriginal fishing policies and programs. However, I note that the Pacific Salmon Treaty stipulates the number of representatives who sit on the Fraser River Panel (six from each country, with six alternates).[559] I heard no evidence regarding the effect of changing the number of representatives on the Fraser River Panel.

Findings

The Pacific Salmon Treaty establishes the in-season management regime for commercial fisheries in the Fraser Panel Area. I make no recommendation with regard to how the Department of Fisheries and Oceans (DFO) and the Fraser River Panel have structured their in-season management of the fisheries.

I understand that those who draft the Integrated Fisheries Management Plan (IFMP) try to anticipate every conceivable eventuality, but sometimes issues arise during in-season management that are not provided for in the IFMP. It is sometimes too time consuming for DFO to obtain ministerial approval for a change to the in-season management process where action is not prescribed by the IFMP. I agree that DFO's managers in the Pacific Region need flexibility in urgent circumstances to make in-season management decisions to respond to circumstances not contemplated in the IFMP without first receiving ministerial approval. My findings on the IFMP are discussed above, and any related recommendations about the IFMP are set out in Volume 3.

Fishery decisions

The Fraser River Panel is responsible for in-season decision rules and harvest regulation for the commercial Fraser River sockeye fishery in Panel Area waters.[560] DFO regulates Aboriginal and recreational fisheries in all BC waters, as well as commercial fisheries in non–Panel Area waters.[561] It is also responsible for in-season enforcement of Fraser River sockeye fishery openings and closings in both Panel and non–Panel Area waters.

Commercial and recreational fishery openings

The Fraser River Panel's Canadian Caucus and DFO's Fraser River Integrated Management Team put together commercial and recreational fishing plans for all Canadian commercial and recreational fisheries.[562] Mr. Rosenberger said that, for Panel Area waters, the Canadian chair of the Fraser River Panel, on behalf of DFO, has the decision-making authority regarding commercial fishery proposals and, in addition, presents these fishery proposals to the Fraser River Panel and Pacific Salmon Commission staff at the in-season Fraser River Panel meetings.[563] Mr. Lapointe explained how PSC staff evaluate the proposals: if the proposals are consistent with available harvestable surpluses, the proposed commercial fisheries can go ahead as stipulated in the treaty.[564]

Once DFO's Integrated Management Team and the Fraser River Panel's Canadian Caucus decide to open a recreational or commercial fishery (and, if the latter is a commercial fishery in Panel Area waters, once the panel approves the fishery), fishery managers in DFO area offices draft variation orders.* For recreational fisheries, the variation orders are sent to the Salmon Team at DFO's Pacific Region headquarters for review. The Salmon Team will draft the appropriate recreational fishery notices, and these, along with the variation orders, are then sent to the regional director general for approval. For commercial fisheries, the area resource managers generate the fishery notices as well as the variation orders, and the notices are approved by the area chief or area head of the office that produces them. Following this process, the fishery notices go to the Salmon Team for review and posting on DFO's website.

Aboriginal FSC and economic opportunity fisheries

Fishing plans for Aboriginal FSC and economic opportunity fisheries are the product of bilateral planning meetings that are held between each First Nation and DFO area resource managers.[565] DFO's Fraser River Integrated Management Team reviews and approves these FSC fishery plans, and the regional director general, Pacific Region, and the Fraser River Panel's Canadian Caucus are informed about these fishery openings.

Treaty FSC and commercial fisheries

For the Tsawwassen First Nation (Tsawwassen), the amount of fish available for "domestic purposes" is set out in the Tsawwassen First Nation Final Agreement (Tsawwassen Treaty).[566] Fishing for FSC or for commercial purposes by the Tsawwassen is by way of a communal licence – similar conditions as for FSC and economic opportunity fisheries for other, non-treaty First Nations.[567] The Tsawwassen develop annual fishing plans and bring them to the Joint Fisheries Committee, in which British Columbia, Tsawwassen members, and DFO participate.[568] The fishing plan agreed on by the Joint Fisheries Committee is provided to the minister in the form of recommendations regarding the conditions of the Tsawwassen communal licence.[569] This licence in turn must be approved by the minister. If, in issuing the communal licence, the minister varies significantly from the provisions recommended by the Joint Fisheries Committee, the minister must provide written reasons to the Tsawwassen and the Joint Fisheries Committee.[570] The Tsawwassen also have a harvest agreement (which is not part of the Tsawwassen Treaty, although it was negotiated and ratified concurrently with it), and all the Tsawwassen's communal commercial access is set out in this harvest agreement.[571]

* A variation order is a variation from the regulatory regime, which says the fishery is "closed until open." Barry Rosenberger, Transcript, January 21, 2011, pp. 9, 10, and 12.

Pacific Salmon Commission: run size estimates

An important component of the in-season management of the fisheries is the estimate of the annual run size.[572] The Pacific Salmon Commission's scientific staff generate the in-season run size estimates, which both the Fraser River Panel and DFO use to manage the fisheries. As with the pre-season forecasting, run size estimates are generated using scientific models that seem complicated to the lay reader.

Dr. Catherine Michielsens, a quantitative fisheries biologist with the Pacific Salmon Commission who reports to Mr. Lapointe, prepared an affidavit in which she described the way in which PSC staff prepare the run size estimates.[573] According to Mr. Lapointe, Dr. Michielsens is "leading a substantial overhaul in the uncertainty part" of the Pacific Salmon Commission's analyses of run sizes.[574]

The Pacific Salmon Commission produces in-season run size estimates for each of the four run-timing groups (Early Stuart, Early Summer, Summer, and Late), as well as for some of the subgroups, or individual stocks, depending on the availability of data for the stocks.[575] Although DFO's pre-season forecasting information (run size, diversion rate, and run timing) is used to assist in the preparation of the in-season estimates, Dr. Michielsens wrote that "pre-season run size probability levels have *no* influence on the in-season run size estimates" (emphasis in original).[576] In her affidavit, Dr. Michielsens described the process used to estimate the run size as follows:

> Run size estimates are predicted in-season using a Bayesian cumulative normal model. The cumulative normal model compares the reconstructed daily migration pattern to ideal run timing curves, assuming the run is normally distributed. By assuming the run follows this idealized pattern, the run size can be estimated once the 50% migration date (i.e. the date 50% of the run has migrated past the reference location, which corresponds to the peak of the normal distribution) has been identified, by doubling the abundance up to that date. Prior to observing the peak of the run, there is considerable uncertainty about the run size. Based on initial observations before the peak of the run, the estimates can indicate the run to be either earlier and smaller than forecast, or later and larger than forecast. The uncertainty about the actual size of the run is estimated using Bayesian methodology. The Bayesian version of the cumulative normal model relies on additional information (pre-season forecasts of run size and timing, expected duration of the run, average historical expansion line estimates and pre-season forecasts of diversion rate) to reduce the uncertainty and keep the run size estimates within realistic bounds. This prior information is incorporated within the Bayesian model through the use of prior probability distributions (priors). These priors indicate a range of values that are assumed plausible for the various model parameters and[,] depending on the shape of the prior probability distribution[,] indicate which parameter values are assumed more plausible than others. Theoretically the Bayesian version of the cumulative normal model should provide more stable estimates since it relies on both in-season data as well as historical data. Indeed, retrospective analyses confirm that incorporating prior knowledge is especially advantageous before the 50% migration is known.[577]

Dr. Michielsens acknowledged in her affidavit that the forecasting of run size involves uncertainty in the following areas, which the Pacific Salmon Commission accounts for by the Bayesian cumulative model:

- Run size uncertainty: … [accounted for] by describing the range of possible values that the run size can attain and the probability of each value within the range[;]
- Uncertainty about the 50% migration timing of the run[;]
- Uncertainty about the spread of the run[;]
- Uncertainty about the ["]catchability["] or expansion line which … provide[s]

an indication of the uncertainty in daily abundance estimates[; and]

- Observation / process uncertainty / error.[578]

These uncertainties apply before, during, and after the peak.[579] Dr. Michielsens also stated in her affidavit that, before observing the peak of the run, it is very difficult to estimate the run size; accordingly, in-season estimates of run size are influenced by the pre-season forecast.[580] Once the peak of the run is observed, the influence of the pre-season forecast on the run size estimate is "reduced substantially."[581] Mr. Lapointe, too, said that uncertainty in the run size is "diminished greatly" once the peak is observed.[582]

Test fishing

Test fishing is, in general terms, fishing for salmon to obtain scientific information – to "test" for different information, based on the fish that are caught. In the Pacific Salmon Commission's "Policy for Fraser River Panel Authorized Fraser Sockeye and Pink Salmon Test Fisheries," the stated purpose of the test-fishing program is to collect physical, biological, and "catch per unit effort" information, which is used to provide estimates of run size and other stock assessment data for key stock components of Fraser River sockeye runs.[583] Test-fishing results are used to determine progress toward escapement goals and allowable harvest levels and to identify potential directed fishing opportunities.[584]

The Pacific Salmon Commission and DFO use test fishing to obtain genetic information about the stock – through DNA testing, DFO scientists are able to determine the likely stock of origin of the individual fish in the mixture.[585] Commercial and Aboriginal fishers use test-fishing results to assist with planning for the season's fisheries (the commercial and FSC fisheries).[586] Paul Ryall, former lead, Salmon Team,DFO, and former Canadian chair of the Fraser River Panel, testified that test fishing is considered essential for the management of in-season marine fisheries. It is in gathering information to properly manage the fishery, he said: "Without this information we would be, I would not say totally blind, but we would be missing how we would conduct fisheries in-season and make decisions to manage those fisheries … without [test fisheries], we would be having a challenge to know what the actual returns are each year."[587]

The funding of test fisheries and test fishing

Early in the year, the Pacific Salmon Commission provides a test-fishing plan to Canada and the United States which includes the proposed budget required from each country to fund the test fisheries.[588] A series of spreadsheets prepared by Canada and reflecting the cost of the test-fishing programs for the years 2009–10, 2008–9, and 2007–8 was tendered in evidence.[589] Once the test-fishing plan is agreed to, Canada transfers funds to the Pacific Salmon Commission to operate the test fisheries, and PSC issues all the contracts for test fishing in Panel and non–Panel Area waters. In non–Panel Area waters, however, DFO staff direct the test fishers.[590]

DFO earmarked funds for test fisheries through its "*Larocque* relief funding" program, a five-year national program running from 2007 to 2011;* however, DFO has not committed to continuing this funding after 2011.[591] Claire Dansereau, deputy minister, told me that DFO is currently in the process of evaluating which elements, if any, of the *Larocque* relief funding program should be renewed.[592] She said that "most people" would agree that test fishing is

* Before 2006, both DFO and PSC ran test fisheries (the PSC test fisheries for Fraser River sockeye salmon were restricted to the Fraser Panel Area). DFO funded its test fisheries through the sale of the fish caught by the operator of the test-fishing boat. In 2006, however, the Federal Court of Appeal determined in *Larocque v. Canada (Minister of Fisheries and Oceans)*, 2006 FCA 237 [*Larocque*], a case involving the snow-crab fishery in the Gulf of St. Lawrence, that the minister of fisheries and oceans does not have the power to finance DFO's scientific research activities by selling fish, "a common property resource belonging to all the people of Canada," and, moreover, a resource managed by DFO (*Larocque* at para. 13).

important, but that she cannot presuppose the outcome of the evaluation.[593]

The United States continues to fund its portion of the test-fishing budget through the sale of fish caught by the owners of the test-fishing boats.* The Pacific Salmon Commission negotiates the contracts with the operators of the test-fishing boats, pays the fishers, and receives proceeds from any fish caught and sold in Panel Area waters.[594] In test fishing outside Panel Area waters, the operator of the test-fishing boat will deduct the amount received from the sale of any test fish from the amount owed by the Pacific Salmon Commission.[595]

Administration of test fisheries by Pacific Salmon Commission

Under the Pacific Salmon Treaty, the Pacific Salmon Commission administers the test fisheries of Fraser River sockeye (and pink salmon) in the Panel Area waters, which are primarily Canadian waters, as well as in waters outside the Panel Area (DFO technicians are still involved in the test fisheries outside the Panel Area waters in Areas 12 and 13, which were historically run by DFO).[596] Although the Pacific Salmon Commission now administers the test fisheries, test fishing has been conducted continuously in the same locations using the same test schedule and the same fishing methods and gear types for many years, in most cases since the days of the International Pacific Salmon Fisheries Commission. In some cases the same fishers have conducted the test fisheries for up to 30 years.[597]

The Pacific Salmon Commission has somewhat reduced the test fishing of Fraser River sockeye since 2006, primarily in reaction to the *Larocque* decision. Canada has asked the Pacific Salmon Commission to reduce test fishing because of the cost of the program to DFO.[598] The Pacific Salmon Commission has resisted reductions in test fisheries, because that would have a detrimental impact on its ability to assess the run size (it would create increased variability in the estimated run sizes).[599] Jim Cave, head of stock monitoring for the Pacific Salmon Commission, and Mr. Assu expressed concern about maintaining test fishing at a reasonable level to provide an appropriate living for test fishers so they can continue to operate in this role; the reliability of the data, they said, depends on the consistency of the test fishers themselves. In addition, because the test fishers must fish whether there are fish in the water throughout the whole season or not, if the remuneration is not adequate to support the boat, gear, and crew, the Pacific Salmon Commission will not be able to find people to do it.[600]

Ms. Farlinger, regional director general, Pacific Region, told me that the test fishery provides key information that informs management decisions and is very important to the day-to-day management of the fishery. She said that DFO's Pacific Region is involved in the evaluation of the *Larocque* funding relief program for test fishing and that, in the opinion of regional management, "in the absence of those test fisheries we would need to have strategies and alternatives in place to manage the fishery that will provide us with adequate information to manage it."[601]

Findings

I am satisfied that the test-fishing program is important to the Fraser River sockeye salmon

* I note that on June 29, 2012, Bill C-38, *An Act to implement certain provisions of the budget tabled in Parliament on March 29, 2012 and other measures*, received royal assent. Part 4, Division 18, of Bill C-38 amends the *Fisheries Act,* allowing the minister to allocate fish for financing purposes, as follows:

> 411. The *Fisheries Act* is amended by adding the following after section 9:
>
> FISH ALLOCATION FOR FINANCING PURPOSES
>
> 10 (1) For the proper management and control of fisheries and the conservation and protection of fish, the Minister may determine a quantity of fish or of fishing gear and equipment that may be allocated for the purpose of financing scientific and fisheries management activities that are described in a joint project agreement entered into with any person or body, or any federal or provincial minister, department or agency.
>
> (2) The Minister may specify, in a licence issued under this Act, a quantity of fish or of fishing gear and equipment allocated for the purpose of financing those activities.

fishery, providing valuable information about stock composition, run sizes, and run timing, all of which are crucial to making prudent harvesting and escapement decisions. It is, in my view, essential that DFO's contribution to the cost of the test–fishing program continue.

I discuss this finding and any related recommendations in Volume 3 of this Report.

Test fishing: application and methods

Mr. Cave is head of stock monitoring (the group at the Pacific Salmon Commission responsible for test–fishing and hydroacoustics programs, as well as run size estimates and fishery modelling). He testified that the Pacific Salmon Commission uses the information it obtains through test-fishing to project the run size of each of the management groups, as well as some of the individual stocks, as the fish move through time and space between the day the test–fishing data are collected and the day those same fish reach Mission. In other words, the size and shape of the run as it moves through the marine areas is determined through the use of test–fishing data in conjunction with the data obtained through the Mission site (discussed below).[602]

The bulk of the test fisheries occurs in the marine environment, according to Mr. Cave, and consist of gillnet fisheries and seine fisheries – in the gillnet test fisheries, all the fish caught are killed, but not in the seine test fisheries.[603] A large number of fish may be caught and counted in the test fisheries, but only a subset of fish are retained for further purposes. In the gillnet test fisheries, between 100 and 115 fish are retained for samples (for stock identification, length, and sex and age composition). In the seine test fisheries, 100–150 fish per day are retained for this purpose.[604] The Pacific Salmon Commission also operates additional test fisheries for the purposes of stock composition assessment (a gillnet fishery at Cottonwood located near Deas Island in the Fraser River and a variable mesh fishery at Whonnock, near the former Albion Ferry dock on the Fraser River) and for species composition in the vicinity of the Mission hydroacoustic site (a combined drift net and set net fishery).[605]

Mr. Cave said that the test fishing provides the Pacific Salmon Commission with catch per unit effort (CPUE) data,* which it uses to estimate the abundance of the run in the marine areas:

> Test fishing vessels in Johnstone Strait (Area 12) and Juan de Fuca Strait (Area 20) collect CPUE data during the migration of salmon to the Fraser River. These data provide an early indicator of relative day-to-day changes in abundance. Daily abundance past the test fishery assessment sites is estimated from CPUE data and estimates of historic catchability.[606]

He explained that, for the Pacific Salmon Commission's estimates of run sizes (discussed above), the "catch per effort times expansion line equals the estimated abundance." He described expansion lines as factors to calculate abundance and "catchability"† as the proportion of the population that is removed by a fishing operation.[607]

Changes in data used for test-fishery models

Mr. Cave told me that, until 1994, run size assessment was based primarily on commercial

* Catch per unit effort (CPUE) was described as a calculation of the average number of fish that are caught by the specified method – in the case of seines, based on the number of sets that have been made, and in the case of a gillnet, based on the average soak time multiplied by the length of the net expressed in thousand fathom minutes. Jim Cave, Transcript, January 31, 2011, p. 12.

† "Expansion lines are factors used to extrapolate the relative index of abundance in marine test fisheries (CPUE data) to absolute abundance. The inverse expansion line is called the 'catchability.' Historic annual expansion lines are generated based on historic CPUE data and historic run-size estimates for individual years. Expansion lines differ from year to year[,] and expansion line estimates used for in-season assessment need to take this uncertainty into account. To account for uncertainty in the expansion line, a prior probability distribution for the expansion line is derived using historic data within an hierarchical model structure. Using hierarchical models, we can estimate both the average expansion line and the variation in expansion lines across years. These models then predict the expansion line for a year for which no data has been observed based on the average across the years and the variation from year to year. The amount of uncertainty in the expansion line will affect the uncertainty in the in-season run-size estimates." Jim Cave, Transcript, January 31, 2011, pp. 20, 21; Exhibit 315, p. 4.

purse-seine data that, because the fishery took a large percentage of the run, provided good information for run size estimates.[608] However, given the decline in the commercial fishery, the data from the commercial purse-seine fishery are no longer reliable. Ever since productivity declines began and fisheries were not authorized as frequently as in the past, Mr. Cave said, the Pacific Salmon Commission has depended more on test fisheries to estimate run size.[609] He testified that, although "it's a trickier business to do run size estimation now," he is satisfied with the quality of data the Pacific Salmon Commission receives from the current test–fishing model and with the estimates generated from these data.[610]

Mr. Cave also testified that he would like to have better estimates of run timing and, if it were possible, to get this information through more seaward test fishing that would be beneficial. He recognized, however, that this wish may not be practical. He expressed a desire for "small bite fisheries" as test fisheries, which he described as "a small fishery that takes a small amount of fish, but … surgically in a very short and small clearly-defined area."[611]

First Nations involvement in test fishing

Mr. Assu told me that the First Nations Marine Society was formed originally to harvest FSC fish for southern Vancouver Island First Nations bands. These bands did not have the capacity to fish for their FSC allotment themselves. He said that there was a test–fishing component to the fishing conducted by the First Nations Marine Society and that it ran the test fishery for two or three years in certain areas (Areas 12, 13, and 20). He explained that the test fishing ended in 2006 because it was not cost effective for the First Nations fishers involved, particularly when the fishery was limited.[612]

Chief Kimberley Baird of the Tsawwassen testified that she thought First Nations should be involved in test fishing. In her view, it would be "a very positive measure to ensure that if there isn't any fish beyond the test fishery, that First Nations would have access to those fish that are caught in-season as a starting point."[613]

Hydroacoustic monitoring: Mission and Qualark

Mission hydroacoustic site, Mission, BC, 2010

Hydroacoustic monitoring at Mission

Under the Pacific Salmon Treaty, the Pacific Salmon Commission is responsible for operating (and funding) the hydroacoustic monitoring site at Mission.[614] There, PSC staff collect data through the use of hydroacoustic monitoring to reflect daily returning sockeye abundance at that point in the Fraser River. Coupled with the data obtained in the test fisheries, the data obtained through this monitoring are essential to determining in-season run size. Mr. Lapointe described this information as "the single most important part of the in-season

run-size estimation."[615] Dr. Michielsens explained how escapement is estimated at Mission:

> Daily abundance or "escapement" at Mission is estimated using a split-beam hydro-acoustic system on the south shore (i.e. "left bank") of the Fraser River, combined with a downward looking split-beam system mounted on a vessel that transects the river. Both of these systems operate 24-hrs a day. Daily estimates of fish abundance past Mission are produced by combining estimates from the shore-based and vessel-based split-beam systems. These daily abundance estimates are more accurate than the daily abundance estimates derived from the test fishing CPUE data.[616]

Mr. Lapointe said that the data collected at the Mission hydroacoustic site represent approximately 10–15 percent of the fish swimming up the Fraser River, whereas the fish caught in the test fisheries represent approximately 0.5–1 percent of the fish – accordingly, the Mission data are considered more accurate than test fishing data.[617] In odd-numbered years when the pink salmon are returning to spawn, he said, there is a large overlap of pinks with sockeye, and the Mission estimates are less reliable in those years.[618] The PSC staff use data obtained from the hydroacoustic system at Mission in-season to assess whether escapement objectives can be met and, also, whether there is sufficient abundance to allow for fisheries openings.[619]

The Pacific Salmon Commission reviews the hydroacoustic system at Mission and makes recommendations for improvements on an annual basis through both internal reviewers and external reviewers (the Hydro-Acoustic Working Group).[620] Although there have been years when there seemed to be problems with the hydroacoustic system, particularly in 2004 when there were notable discrepancies between the abundance estimates at Mission and resulting abundance upstream, no review has found that there are significant issues with the system at Mission.[621] Mr. Lapointe said that, with the reinstatement of the monitoring site at Qualark in 2007 (described below) and the ability to cross-check the information at both locations, data obtained at the Mission site are more reliable than they had been before 2007.[622]

Qualark acoustic site, Yale, BC, 2010

DFO Qualark DIDSON monitoring

DFO originally conducted hydroacoustic monitoring at Qualark from 1993 to 1998 as part of its science programs (under the Pacific Region Science Branch). Following their 1992 review, Pearse and Larkin recommended in their report that hydroacoustic monitoring be located at every major tributary, and the Qualark site was DFO's response.[623]

In 2007, DFO Science reinstituted hydroacoustic testing at the Qualark site using a DIDSON (dual-frequency identification sonar) system – a high-frequency, multi-beam sonar with a unique acoustic lens system designed to focus the beam to create high-resolution images.[624] Dr. Riddell said that the use of the DIDSON system, coupled with a narrow passage for the fish and a reduced number of pink salmon (the majority of pink salmon spawn before they reach Qualark), allows for more accurate abundance data than the system at Mission.[625] Mr. Lapointe described the use of Qualark data as

"a very good crosscheck" or confirmation of the Mission information.[626]

The Pacific Salmon Commission has begun to use DFO's data from Qualark to evaluate the Mission numbers. In 2010, adjustments to the Mission estimates were made in-season based on Qualark data (adjusting the numbers up), but it is not known if this practice will continue.[627] As well, the Pacific Salmon Commission uses this Qualark information post-season to understand the differences between estimates at Mission and on the spawning grounds.[628] In Mr. Lapointe's opinion, the hydroacoustic monitoring at Mission is most effective in conjunction with the hydroacoustic station at Qualark.[629]

Mr. Lapointe told me that the Pacific Salmon Commission is not prepared to abandon Mission in favour of Qualark for the following reasons: first, several stocks have spawning grounds before Qualark and cannot therefore be counted at Qualark; second, Qualark is several days farther upstream from Mission, which means that marine and Lower Fraser River fisheries would have to wait a further two or three days for reliable assessments of run size, which would delay fishery openings to the detriment of marine fisheries; and third, the long historical record of retained data is based on Mission data, and there is a desire to maintain the historical record.[630]

Another major issue is that there is no current funding agreement between DFO and the Pacific Salmon Commission for Qualark:

> As stated in the budget memo provided to the [Fraser River] Panel by PSC staff at the October post-season meeting[,] we have obtained an estimate of the approximate annual operating cost of Qualark of $300,000. This estimate includes approximately $50,000 for the test fishery[,] which presumably would be funded by Canada out of *Larocque* [relief] funds consistent with other test fisheries. This would leave $250,000 remaining to be funded. One option for future funding of the program is to continue funding from DFO. Based on preliminary discussions with DFO staff, it appears unlikely that sufficient funds can be found within DFO's current operational budget. I have been told from Science Branch that Qualark is viewed as an operational program and thus is not appropriate to be funded from the Science program. This would leave the funding burden in the Stock Assessment Division, which would bring tradeoffs with other Fraser sockeye programs into play.[631]

Mr. Lapointe testified that the Fraser River Panel directed him and his staff to draft a proposal to seek funding bilaterally, but there has been no commitment from DFO to continue to fund the Qualark site.[632]

During her testimony in the fall of 2011, Ms. Farlinger told me that DFO considers the Qualark hydroacoustic monitoring station an experimental program that is evolving:

> I'd just say that the Qualark program that was run by DFO, and in fact is run by DFO this year based on Salmon Commission funding, has been and continues to be an experimental program. By and large the views are that there are positive results from this program. We continue each and every year to review the evaluation of the escapement with the Mission program and with the Qualark program, and the long-term considerations have to take both those things into account.
>
> The extension of the program this year was fundamentally based on the concept that that evaluation continues to need to be done, which is the contribution of Mission and the contribution of Qualark, and so that's one of the reasons the program was extended by the Pacific Salmon Commission this year.
>
> …
>
> There are a variety of views on the contributions of the Mission counting facility and Qualark, but it continues to evolve. The Qualark facility continues to evolve, and we will, as we have every year for the last four or five years, continue to take the best information from both of those and make a solution for the following years in terms of how we assess the escapement of stocks.[633]

Findings

I am satisfied that the hydroacoustic monitoring programs at Mission and Qualark are important and

contribute valuable data to the management of the fishery. According to Mike Lapointe, chief biologist at the Pacific Salmon Commission, the Pacific Salmon Commission's facility in Mission is the single most important part of the in-season run size estimation, and the data from DFO's Qualark facility provide a good cross-check or confirmation of the Mission data. However, the Department of Fisheries and Oceans (DFO) has not made a commitment to future funding of its Qualark facility. In my view, DFO should continue to provide sufficient funding to enable both the Pacific Salmon Commission to continue to operate its Mission facility and DFO to run its program at Qualark.

I discuss this finding and any related recommendations in Volume 3 of this Report.

Selective fishing

Selective fishing is "a conservation-based management approach which allows for the harvest of surplus target species or stocks while aiming to minimize or avoid the harvest of species or stocks of conservation concern, or to release by-catch unharmed."[634] Selective fishing has a long history with Aboriginal peoples.[635]

According to Dr. Brent Hargreaves, a DFO research scientist who conducted selective fishing research in the 1990s and 2000s, selective fishing allows for the harvest of Fraser River sockeye stocks in abundance while protecting stocks of lower abundance. As such, it can be considered a way to mitigate the effects of declining stocks on fishers.[636] For example, selective fishing strategies can provide the opportunity to fish for sockeye in the face of conservation concerns for other salmon species, such as coho, or around specific Fraser River sockeye stocks, such as Cultus Lake (see Chapter 11, Cultus Lake, for a discussion of its case history).[637] The options for selective targeting of Fraser River sockeye in marine areas are limited and, according to Dr. Hargreaves:

> For [Fraser River] sockeye, most of the conservation units or virtually all of them are single stocks in single lakes. In a mixed stock fishery in the marine approach areas, it's very difficult to sort that out ... it's ... impossible basically for a fisherman to distinguish a Cultus Lake sockeye from a Harrison sockeye, or some other stock. So the basic sorting ability of selective fishing is not very helpful.[638]

I was told that management options do exist that allow for some selectivity as marine fisheries target Fraser River sockeye, such as changing gear type and modifying the timing and location of fisheries.[639] Dr. Hargreaves explained that the time and area components of harvest management are powerful and can be used "to some degree" to increase selectivity in marine areas.[640] In the future, he said, it may be possible to use selective fishing to protect certain stocks of the same species based on DNA analysis.[641] According to Dr. Hargreaves, selective fishing is one of the most critical things we can still do:

> I think if we don't focus again on selective fishing for both conservation and harvest opportunities, in the new environment, which includes MSC certification, the Wild Salmon Policy, and other constraints that have come on since 2002, there will be no fisheries.[642]

Ms. Farlinger agreed that selective fishing is a critical tool for salmon fisheries in the Pacific Region.[643]

Development of DFO's selective fishing program and policy

In the 1970s and early 1980s, worldwide concern grew about conservation and responsible fisheries practices. In 1995, the United Nations Food and Agriculture Organization issued its *Code of Conduct for Responsible Fisheries*.[644] The purpose of this code, as described by Dr. Hargreaves, was to "describe how to fish responsibly, to conserve stocks of concern and to minimize by-catch ... it sets out guidelines for how to develop responsible fisheries."[645] In 1998, Canada's commercial fishing industry developed its own *Canadian Code of Conduct for Responsible Fishing Operations* (Canadian Code),[646] which approximately 80 percent of Canadian commercial fishing organizations have endorsed.[647]

Principle 6 of the Canadian Code provides, "To the extent practical, fish harvesters will minimize unintended by-catch and reduce waste and adverse

impacts on the freshwater and marine ecosystems and habitats to ensure healthy stocks."[648] This principle was described as the one that is most directly related to selective fishing.[649] The Canadian Code also contains several guidelines, the following of which relate to selective fishing:

> Guideline #2.1
> Develop protocols (including, when practical and appropriate, the use of selective fishing gears and practices) regarding the catch of non-targeted resources which jeopardize the health of the stocks.
>
> Guideline #2.2
> Use only gear authorized for use in a particular fishery.
>
> Guideline #2.3
> Ensure fishing activities are not conducted in a fashion that would endanger fish stocks or the environment.
>
> Guideline #2.4
> Conduct, in consultation with relevant sectors, research to assess fishing gears, and promote and utilize new fishing gears and practices which are consistent with sustainable fishing practices.
>
> Guideline #2.5
> Assist, initiate, and participate in research and assessment initiatives aimed at resource and environmental protection.[650]

The Pacific Salmon Selective Fisheries Program, 1998–2002

Dr. Hargreaves said that, in 1998, selective fishing rose to the forefront of fisheries management in British Columbia as a result of the decline in the southern BC coho and northern Skeena coho and a serious concern for their conservation.[651] DFO established a Coho Response Team and, as part of its Pacific Fisheries Adjustment and Restructuring Program (PFAR), funded the Pacific Salmon Selective Fisheries Program (Selective Fisheries Program) – one that was originally to run for three years but was extended to four, from 1998 to 2002.[652]

The Selective Fisheries Program had three goals:

1. Develop and evaluate more selective fishing techniques in commercial, First Nations and recreational salmon fisheries.
2. Facilitate implementation of selective fishing practices in commercial, First Nations and recreational salmon fisheries.
3. Communicate to participants in these fisheries harvesting methods and technologies that will lead to more selective fishing.[653]

Gordon Curry, former coordinator of the DFO Selective Fisheries Project Authority and its training and education section, who was with the program during its four years, testified that the Selective Fisheries Program had five components: building support and strategies for selective fishing, using experimental pilot projects; a First Nations gear purchase program; research projects; education, training, and communication; and compliance.[654] During the course of the program, DFO funded a number of selective fishing experimental pilot projects and stated in its final report that the "most significant research investment" was directed at determining salmon mortality after release from fishing gear.[655]

DFO also made these points in this final report:

- Seiners were able to demonstrate a reduction in coho mortality from 25 to 5 percent by employing brailing (removing fish from the seine net with a long-handled smaller net) techniques and allowing coho to recuperate in on-board revival tanks. These techniques allowed access to sockeye and pink fisheries that would otherwise have remained closed because of concerns about coho salmon.
- Gillnetters were able to show that it is possible to reduce coho mortality from 70 to 5 percent by using shortened nets, short set times, smaller mesh size, improved revival tank designs, and careful handling of fish. Changing fishing area as well as fishing only during daylight hours also helped to avoid catching coho.

- Troll gear can selectively catch one species over another by changing plug size. Trollers can also avoid non-target species through time- and area-specific fishing patterns.
- A significant knowledge gap still remains with respect to post-release mortality rates, "but the department plans to continue to investigate solutions."
- In the recreational fishery, measures implemented included Special Management Zones, barbless hooks in all salmon fisheries, and non-retention of coho.
- The 2001–2 IFMP set out selective fishing measures for the commercial fleet, including brailing of seine sets; net mesh and depth restrictions and set-length restrictions for gillnetters; use of barbless hooks for trollers; fish sorting; and use of revival tanks.
- DFO undertook educational activities, including sponsoring at least one selective fishing workshop in each year of the program, commissioning a selective fisheries review and evaluation, and holding community workshops in 2000–1.[656]

In February 2005, DFO's Audit and Evaluation Directorate released an evaluation in which it concluded that the Selective Fisheries Program marked "a step in the shift of thinking about selective fishing." This evaluation determined that, among other things, the program succeeded by implementing selective technologies and gear standards into licence conditions and in maintaining fishing activity under the guidance of IFMPs that contained temporary gear measures and time allocations, all of which helped sustain the industry through a period of low abundance by offering an innovative management approach. The evaluation noted that stock identification research also advanced under the Selective Fisheries Program. However, partly because of a lack of accurate implementation measures and selective fishing compliance indicators needed to measure the program's progress, the evaluation found "no evidence to suggest the Selective Fisheries Program had an impact in creating a viable and sustainable fishing industry." The evaluation also stated that the Selective Fisheries Program fell short in the development of selective standards.[657]

Mr. Curry was critical of the 2005 evaluation of the program and told me that a number of the staff involved with the Selective Fisheries Program were of the opinion that the evaluators were not familiar with fisheries. "For instance," he said, the audit "didn't recognize the significance of the paradigm shift towards selective fishing, whereby this is a long-term benefit over time of changing how we all view fisheries and how we prosecute fisheries, and the importance of that to move to a more responsible fishery. And that was a significant aspect of this program and I don't think it was covered that well."[658] However, he testified that fishing standards are set out generally throughout the IFMP and in the conditions attached to commercial fishing licences, but that the selective fishing standards are not articulated as a formal set of standards.[659]

Dr. Hargreaves and Mr. Curry were both of the opinion that the program resulted in a "paradigm shift" or a "fundamental shift" toward selective fishing.[660] Dr. Hargreaves commented:

> I think we [DFO] did a very good job during the period of the CFAR [Canadian Fisheries Adjustment and Restructuring] funding. So as I said earlier, this was a fundamental shift in the way that we [DFO] conserved stocks and managed the fisheries for salmon on the Pacific Coast. It meant major changes both within DFO and also within the harvest sectors, all of the harvest sectors. I think the CFAR funding jumpstarted that. It got a lot of people fishing when we wouldn't have been fishing. It provided opportunities to experiment and to make progress, and I think many people were very excited about that opportunity.
>
> I think with the end of the CFAR funding, even though there was a clause, if you like, in both the Allocation Policy and also the Selective Fishing Policy, that we would continue to use a portion of the available catch, the TAC, the total allowable catch, each year to continue to develop selective fishing, particularly the methods and education, and so on. We didn't really go there. Very little of that five percent was used. And then subsequently with the *Larocque* decision, it became basically not possible to use the resource to take fish to pay for this sort of thing.

> So I think from about 2003 or so, shortly after the end of the CFAR funding, selective fishing has stalled to a large degree. There are a number of elements that continue to be a part of our normal practices, both for conservation and management. For example, things like revival tanks and brailing of sets in seine fisheries, and so on.[661]

Both DFO witnesses testified that, after the conclusion of the Selective Fisheries Program in 2002, DFO has conducted little research on selective fishing. According to Mr. Curry, without someone actively working on selective fishing, research has lagged:

> Since the end of the program, selective fishing has been carried out through the Salmon Working Group within [DFO] and actual hands-on carried out by the fisheries managers within DFO. And it's without having a directed funding source and without having someone working to continue to work with First Nations and recreational and commercial harvesters to progress with some of these gear and methods that we had started, some that could definitely use completion, there wasn't someone driving that. So it has relaxed and there isn't the same type of push that I feel there should be in order to solve some of these issues that are getting more and more stringent as we move to Wild Salmon Policy, SARA [*Species at Risk Act*] legislation, more and more a need to solve some of these by-catch issues.[662]

Dr. Hargreaves said this delay in research has led to a critical knowledge gap:

> I think one of the biggest gaps, if I can insert it here, is that the question of post-release mortality rates is something that we committed to as a Department that we would continue to work on, and very little work, essentially no work has been done on that since the end of the CFAR Program. And to me that's a critical gap in our knowledge. Even if we developed all the selective fishing methods in the world, and they worked wonderfully, the value of those methods depends entirely on the post-release survival rates and the effectiveness of those fish to get back and spawn successfully, and we have not addressed in my mind, to my satisfaction, of knowing that we understand that yet.[663]

However, during her testimony in September 2011, Ms. Farlinger responded to the concerns raised by Dr. Hargreaves and Mr. Curry by telling me that DFO's Pacific Region has "focused on continuing those [selective fishing] tests through the fishery management plans." In making this statement, she was referring to the demonstration fisheries under the Pacific Integrated Commercial Fisheries Initiative.[664]

The Selective Fishing Policy, 2001

In May 1999, DFO released *Selective Fishing in Canada's Pacific Fisheries: A New Direction – The Third in a Series of Papers from Fisheries and Oceans Canada*. This document set out a policy framework and served as a discussion paper among First Nations and stakeholders before the adoption of the selective fishing policy. In January 2001, just over one year before the end of the Selective Fisheries Program, DFO released A Policy for Selective Fishing in Canada's Pacific Fisheries (Selective Fishing Policy) as part of *A New Direction for Canada's Pacific Salmon Fisheries*.[665]

Selective fishing is defined in the Selective Fishing Policy as "the ability to avoid non-target fish, invertebrates, seabirds, and marine mammals or, if encountered, to release them alive and unharmed."[666] Selective fishing is a way to avoid what is called "by-catch," which is described in the Selective Fishing Policy as

> [f]ish that are harvested in a fishery, but usually not sold or kept for personal use, as well as seabirds and marine mammals that become entangled or caught by fishing gear … By-catch does not include fish legally retained in a fishery and kept for personal or cultural use, or that enter commerce through sale, barter or trade. By-catch does not include fish released alive under a recreational catch-and-release fishery management program.[667]

As set out in the Selective Fishing Policy, the stated objective of the policy is

> to ensure that selective fishing technology and practices are adopted where appropriate in all fisheries in the Pacific Region, and that there are continuing improvements in harvesting gear and related practices.
>
> Selective fishing is a requisite element of conservation-based fisheries. In meeting conservation objectives, fishing opportunities and resource allocations will be shaped by the ability of all harvesters – First Nations, commercial and recreational anglers – to fish selectively.[668]

The Selective Fishing Policy contains five principles toward achieving that objective:

> *Principle 1 – Conservation of Pacific fisheries stocks is the primary objective and will take precedence in managing the resource.*
>
> A precautionary approach to fisheries management will continue to be adopted in all fisheries, and an ecosystem approach will guide Fisheries and Ocean's [*sic*] management in future.
>
> …
>
> *Principle 2 – All Pacific recreational and commercial fisheries will adhere to selective fishing standards within set timelines.*
>
> Fisheries and Oceans Canada will, working with recreational fishing and commercial harvester organizations, develop selective fishing standards and implementation action plans for all Pacific recreational and commercial fisheries by January 2003 …
>
> Selective fishing standards will be described in the plans for each fishery. The Department will set implementation standards for each fishery. They may be implemented through conditions of licence or, in some cases, through voluntary adoption by licence holders.
>
> …
>
> *Principle 3 – In fisheries where selective harvesting standards are not met within prescribed timelines, and by-catches prevent achievement of conservation objectives, fishing opportunities will be curtailed.*
>
> …
>
> The Allocation Board described in the October 1999 Fisheries and Oceans Canada policy paper, *An Allocation Policy for Pacific Salmon*, may be tasked with providing advice on such salmon allocations.
>
> *Principle 4 – Four fundamental strategies in fishing selectively to minimize mortalities and maximize chances for survival of non-target fish, invertebrates, seabirds and marine mammals will be adopted through increased knowledge of fishing gear and practices.*
>
> In order of preference they are
>
> 1 avoidance of non-target species and stocks through time and area restrictions;
> 2 avoidance through gear design;
> 3 release alive and unharmed before being brought aboard or ashore, through gear design; and
> 4 release alive and unharmed from the deck of the vessel or landing site (e.g. shore or fishing pier).[669]
>
> …
>
> *Principle 5 – First Nations and the recreational and commercial fishing sectors will be responsible for continuous learning and skills development and transfer of responsible and selective harvesting practices.*[670]

In the Selective Fishing Policy, DFO reiterated the policy set out in the Salmon Allocation Policy – that to encourage selective fishing, a portion of the commercial total allowable catch will be set aside for existing commercial licence holders to test alternative, more selective harvesting gear and technology, and over time, commercial allocations will favour those who can demonstrate their ability to fish selectively.[671]

As noted above, the Salmon Allocation Policy specifically reserved 5 percent of the commercial TAC for selective fishing experiments in the years 1999–2000 and allowed for the adequacy of the allocation for selective fishing to be reviewed and revised at the end of those two years as necessary. Although the Selective Fishing Program ended in 2002, the ability to use up to 5 percent of the commercial TAC for selective fishing projects remains under the Salmon Allocation Policy. Since the decision by the Federal Court of Appeal in *Larocque*, however, there is uncertainty as to whether the use of TAC for selective

fishing projects is possible.* In the words of Dr. Hargreaves, "[W]ith the *Larocque* decision, it became basically not possible to use the resource to take fish to pay for this sort of thing."[672]

Criticism of selective fishing

Mr. Curry agreed that "buy-in" from the various fishing sectors is critical for the continuation of selective fishing and that both the Selective Fisheries Program and the Selective Fishing Policy met with mixed responses.[673]

In this respect, Mr. Brown, said that, in his opinion, selective fishing is "a marginal issue," "almost irrelevant" with respect to the Fraser River sockeye fishery, and a "make work project for some individuals in DFO."[674] Ms. Scarfo, a commercial fisher, put it this way:

> Moving into selective fisheries will make a very small difference on the health and recurrence of building reproductive Fraser River sockeye runs. Selective fishing is one of the tools for commercial fishery to access fish around those runs, but it will not rebuild Fraser River sockeye. So I think you need to keep that in mind, that when we talk about the importance of selective fishing, it is not a rebuilding mechanism. It is a tool for harvesting.[675]

For commercial fisher Mr. McEachern, who is an Area D gillnetter, "[P]art of the problem with a selective fishing strategy and why it got a lot of kickback, pushback over time in my area is that it became seen as very much a political tool as a way to alter the allocation formula in the back room."[676]

A similar sentiment was expressed by Mr. Morley, who noted that, without an incentive for the commercial fishers, selective fishing would be difficult to implement:

> [T]he incentives need to be there, and part of the failing of the selective fishing policy is that any individual or group who have seen [an] advantage in getting access to more fish or more fishing time .... want to keep doing it because they're getting to fish when other people aren't ... they're getting a special allocation that they wouldn't otherwise get ... everyone's going to be in favour of carrying on if they're in that situation.
>
> What we need to do is provide the incentives for everybody who is willing to undertake the additional cost and additional care to ... actually be able to get something back for that, and I believe that if we get into a share-based system that has allowable by-catch mortalities where we measure total by-catch mortality ... and allocate that as well ... you will find that people will get very inventive and will find new ways in which to fish more selectively within that system.[677]

Selective fishing in the recreational fishery

Ms. Adams, recreational fisheries coordinator, said that, in the late 1990s, DFO conducted research studies in the recreational fishery to examine the difference between J-hooks and circle hooks (both of which are used in the commercial fishery) in terms of their impact on fish, especially in freshwater. The studies found that coho, in particular, would ingest the J-hooks, causing internal damage

* I note that on June 29, 2012, Bill C-38, *An Act to implement certain provisions of the budget tabled in Parliament on March 29, 2012 and other measures*, received royal assent. Part 4, Division 18, of Bill C-38 amends the *Fisheries Act,* allowing the minister to allocate fish for financing purposes, as follows:

> 411. The *Fisheries Act* is amended by adding the following after section 9:
>
> FISH ALLOCATION FOR FINANCING PURPOSES
>
> 10 (1) For the proper management and control of fisheries and the conservation and protection of fish, the Minister may determine a quantity of fish or of fishing gear and equipment that may be allocated for the purpose of financing scientific and fisheries management activities that are described in a joint project agreement entered into with any person or body, or any federal or provincial minister, department or agency.
>
> (2) The Minister may specify, in a licence issued under this Act, a quantity of fish or of fishing gear and equipment allocated for the purpose of financing those activities.

and increased mortality when released; the circle hook, in contrast, caused less mortality because the fish were generally hooked in the mouth. Ms. Adams told me that the recreational fishing community requested that DFO proceed with a regulation under the *Fisheries Act* allowing circle hooks in the recreational fishery; however, she testified that it has been difficult to progress with any amendments or revisions to the *Fisheries Act*.[678]

Ms. Adams also said that there are very limited options for DFO under the existing fisheries regulations to improve selectivity in the recreational fishery. She noted that the main restrictions which could be implemented would be for barbed hooks, the length of the hook shank, and the types of bait.[679]

Frank Kwak, a recreational fisher, described the techniques used for in-river salmon fishing, noting that most people use "bottom bouncing" or "flossing" when fishing for sockeye. He described "bottom bouncing" as taking a 1–4 ounce weight and tying it to a main line, stretching out a leader (6–20 feet), and tying a barbless hook on the end of the leader and baiting it.[680] Ms. Sneddon, acting program coordinator, Lower Fraser Resource Management, told me that, as a fishing technique in the recreational fishery, bottom bouncing is more selective, but only in clear (marine) waters (as opposed to the turbid or cloudy water of the Fraser River). She explained that bottom bouncing is a selective fishing technique because it causes minimal damage – the hook usually attaches to the mouth of the fish. However, bottom bouncing is indiscriminate and doesn't meet the criteria for a selective fishing technique, which is to avoid non-target species.[681]

Current status of selective fishing

In its 2001 IFMP for the South Coast, DFO introduced selective fishing measures, which were then translated into commercial fishing licence conditions, including the use of brailing and revival tanks for the seine fleet, maximum set times and revival tanks for the gillnet fleet, and the use of barbless hooks and revival tanks for the troll fleet.[682] These licence conditions and the use of some of the techniques or practices arising out of the Selective Fisheries Program continue to this day (e.g., revival boxes – in which a fish is placed in a box with running water – or brailing fish out of a purse-seine net using a dip net).[683]

According to Ms. Farlinger, selective fishing is "very much a topic of interest and policy and evolution" – a reality that is reflected in DFO's national Sustainable Fisheries Framework, which includes (or will include) a bycatch policy (discussed in Chapter 4, DFO overview).[684]

As quoted above, Dr. Hargreaves told me that the Selective Fishing Policy is still a current policy and that DFO could initiate new efforts to implement it, although no directed program currently addresses selective fishing.[685] The regional salmon resource manager is the ostensible lead for selective fishing. Mr. Curry and Mr. Grout, salmon resource manager, DFO, told me that salmon managers are implementing selective fishing, but that there is no designated DFO lead for the policy.[686]

Ms. Sneddon testified that DFO is participating in a four-year release mortality study, though it is a short-term study, looking at mortality in fish released from the in-river recreational fishery over a 24-hour period (as opposed to long-term survival).[687] In the opinion of Dr. Hargreaves and Mr. English, the principal author of Technical Report 7, Fisheries Management, as a result of the cessation of the Selective Fisheries Program there is a gap in the research concerning the long-term survival of released fish. Although some recent work has focused on short-term survival after handling, little research has been done to date on long-term survival.[688] Dr. Hargreaves considered this information critical: "[T]he value of those [selective fishing] methods depend entirely on the post-release survival rates and the effectiveness of those fish to get back and spawn successfully."[689]

Findings

I find that selective fishing provides important tools for the Department of Fisheries and Oceans (DFO) to meet its conservation mandate. I accept the evidence that the former Selective Fisheries Program was a useful program. I commend DFO for its stated intention, under the Sustainable Fisheries Framework, to release a national bycatch policy. I encourage DFO to designate an individual to coordinate selective fisheries activities.

I discuss this finding and any related recommendations in Volume 3 of this Report.

Fisheries monitoring and catch reporting

In the Terms of Reference of this Commission, I am directed to consider the DFO policies and practices that cover the monitoring and counting of stocks. This section of the Report addresses fisheries monitoring and catch reporting, providing a general overview of the methods employed in the commercial, recreational, and Aboriginal fisheries, followed by a discussion of DFO's monitoring policies and programs.[690]

Knowing the number of fish harvested is important for a number of reasons:

> Timely and accurate information on harvest and harvesting practices is essential to assess the status of fish stocks and to ensure the conservation and the long-term sustainability of fish resources. Effective monitoring and accurate catch reporting in all fisheries whether they are First Nations, recreational or commercial are integral to resource management and the enforcement of fisheries rules. They are essential to ensuring responsible fishing. In addition, effective fishery monitoring and accurate catch reporting are equally important to support fishery planning by First Nations, stakeholders and all levels of government. Finally, accurate and timely catch reporting is fundamental to meeting Canada's international and other reporting obligations for fisheries.[691]

The information obtained through monitoring and reporting programs is an important component of fisheries management. DFO scientists use the previous years' catch estimates in preparing pre-season forecasting models, which fisheries managers then use to plan the fisheries (as discussed above in the section on pre-season forecasting). Historical catch information is also a component of the models used to set DFO's escapement targets, which are in turn used in fisheries management (as discussed above in the section on pre-season escapement target planning). The Fraser River Panel relies on estimates of catch from Canada in its planning of fisheries in Panel Area waters.[692] DFO's scientists rely on data obtained through monitoring and reporting to support stock assessment research and activities.[693]

Accurate catch information is also critical in determining conservation requirements. As stated by Lester Jantz, area chief of resource management, BC Interior, DFO, without "very accurate catch information, it can be difficult to determine what the impact of a particular fishery may have on ... individual stocks [of concern]."[694]

I received public submissions concerning DFO's monitoring programs, including the following comments:

> I fish a native food fishery just above Hell's Gate and the things we wonder about when we are fishing are ... why is there no one to collect information about the fish from me, I am standing at the water holding the fish.[695]

> I have many friends that sport fish for sockeye salmon ... It is very common talk for sports fishermen to only claim the limit of the fish that are allowed and not actually claim the limit they really caught.[696]

Fisheries–monitoring and catch–reporting programs and requirements differ among the sectors (commercial, recreational, and Aboriginal fisheries) and among the gear types and areas in the commercial fishery. For several years, DFO has faced criticism of its monitoring.[697] Those involved in the fisheries have acknowledged that the mistrust directed at DFO is in part attributable to a lack of understanding of the monitoring used in the different fisheries.[698] As recently as April 2011, the state of DFO's monitoring and reporting was described in the report of the Integrated Salmon Dialogue Forum, *Charting Our Course: Fishery Monitoring in the Pacific Region*, as follows:

> BC's salmon fisheries are currently suffering from what might fairly be described as a crisis of confidence. This lack of confidence is in part rooted in concerns over the accuracy and reliability of reported catch. Managers, fishermen and the public at large often don't believe the numbers being reported by other sectors, or even by their own sectors.[699]

The distinction between monitoring and reporting is described in DFO's recent draft Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries[700] (2010 Draft Strategic Framework):

> *Fishery monitoring* means observing and understanding the fishery and its dynamics. It includes observing and examining the catching and landing of fish and any related activities, such as counting of vessels and gear and sampling of any fish caught. Monitoring is carried out by harvesters, First Nations, and, increasingly, third party observers designated by DFO. Departmental staff including fishery officers, fishery guardians, fishery managers, biologists and scientists also conduct monitoring activities.
>
> *Catch reporting* means providing information either verbally, in writing or electronically on the catch and other essential details related to the fishing activity (location, gear type, etc.). Reporting is performed by harvesters or by fish buyers, off-loaders or contracted third party dockside monitors / observers (also RDG-designated) on behalf of harvesters.
>
> Other activities associated with monitoring and reporting include the specification of information and biological sampling requirements, auditing of collected data for accuracy and completeness, information management, compliance enforcement of catch reporting regulations and licence conditions, summarizing and analysis of catch and fisheries monitoring data, and the internal communication and public reporting of catch estimates and other information. All of these activities are the Department's responsibility.[701]

These definitions reflect that monitoring and reporting activities include reporting both the actual numbers of fish caught (harvested) in the fisheries and the biological information that is obtained during monitoring and reporting.[702]

Although senior DFO management acknowledge the importance of accurate catch information in fisheries management, as noted in Technical Report 7, Fisheries Management, and reiterated by Mr. English, DFO does not know the true catch values or numbers.[703] As he said, "[A]ll the numbers for most fisheries are estimates."[704] Further, DFO has no process in place to estimate illegal or unauthorized catch.[705] The issue of illegal or unauthorized catch is discussed in greater detail in Chapter 7, Enforcement.

In the face of criticism regarding its management of the monitoring and reporting data, DFO has recently introduced management information systems, such as the Catch and Release Estimation Tool (CREST) in 2009, for recreational and some FSC fisheries, and the Pacific Fisheries Data Initiative (PacFish), launched in 2008 and still in its implementation phase.[706]

Monitoring and reporting methods

Methods to monitor and report catch information can be either "fisher dependent" (the individual fisher or group of fishers self-monitor and report their own catch) or "fisher independent" (an independent, third-party source monitors and verifies the catch reported).[707] In all fisheries where the monitoring and reporting are fisher dependent, there is the potential for inaccurate reporting of catch, whether inadvertent or intentional, and this problem is discussed in turn as each fishery is described.[708]

In its 2010 Draft Strategic Framework, DFO set out the history of its fishery-monitoring programs in the Pacific Region for each sector:

> *Commercial sector*: In 1951, catch reporting began for the commercial salmon fisheries with the submission of sales slips generated at time of landing showing the quantity, value and species of the catch. As fisheries developed, this approach became increasingly flawed due to its failure to account for releases / discards, time lags between fishing and catch deliveries, non-compliance and other problems. In 1998, as part of *A New Direction for Canada's Pacific Salmon Fisheries*, logbooks and on-board observers were introduced to address some of these deficiencies. Harvesters record their kept and released catch and report the results by telephone and mail. In addition to fisher-supplied data, for most commercial salmon fisheries trained and DFO-certified observers collect detailed data on the harvest and bycatch as well as biological samples (e.g. lengths, weights, tissue for DNA analysis).
>
> The use of at-sea observers in the groundfish fisheries dates back to the late 1980s. Mandatory 100% observer coverage was implemented for the groundfish trawl fleet in 1996. By 1994, most of the fleet also had

compulsory dockside monitoring in place, where DFO-approved monitors documented the harvest at designated landing sites. While all groundfish fisheries now require 100% dockside monitoring, this approach is used only periodically in the salmon fisheries, e.g., for the commercial salmon demonstration projects and the lower Fraser River pilot sales fishery.

Other techniques including on-ground hails, charter patrols and aerial over-flights have also been used to provide gear counts, location and timing of fishing and additional information. The recent emergence of video monitoring and electronic vessel tracking systems offer potential cost efficiencies and more timely data reporting.

Recreational sector: From the mid-1950s through the 1970s, DFO estimates of catch and effort in the sport fishery relied on subjective assessments by fishery officers and small-scale creel surveys. The need for greater rigour and consistency led to the launch in 1980 of a major creel survey program focused on salmon for the Strait of Georgia. Since then, creel surveys have been added for other coastal areas and in some freshwater systems, as the scope of recreational fishing has expanded geographically and to include other species. To conduct these surveys, aerial overflights estimate effort and fishery technicians visit marinas, boat ramps and river locations to interview anglers about their catch and take biological samples where needed.

First Nations fisheries: For many years, FSC fisheries, like sport fishing, were monitored on an *ad hoc* basis by fishery officers. Currently, methods such as census programs, roving or access point surveys and mandatory landing sites for pilot sales fisheries are being implemented in cooperation with First Nations.[709]

In Technical Report 7, Fisheries Management, the authors evaluated available data on catch estimates of Fraser River sockeye in each of these three fishing sectors noted above. This report provides a qualitative rating of the catch information for each fishery on the basis of accuracy (the degree managers can be confident that the reported catch reflects the actual harvest), precision (looking at variance around the catch estimate, although the authors noted that this information is not readily available for a lot of the fisheries), and reliability (the degree managers can rely on the catch estimates for in-season and post-season assessments).[710] The findings and commentary of the authors is noted in turn for each fishery discussed below.

Monitoring and reporting in the commercial fishery

Dr. Robert Houtman, a catch-monitoring biologist with DFO's Pacific Biological Station in Nanaimo, described the department's current catch reporting for the commercial fishery.[711] DFO requires commercial fishers to complete phone-in reports (or "hails"), typically by early morning the next day or within 24 hours of a day spent fishing, and it tracks these daily reports.[712] All commercial licence holders have a logbook in which they record their catch along with information on the location and hours fished and the number of sets. Commercial fishers are required to return their logbooks at the end of the fishing season to DFO, or to a service provider, and those books are then compared to the daily phone-in reports.[713] DFO also conducts on-water reporting by a charter patrol or a fishery officer, and dockside monitoring in some commercial fisheries.[714]

Dr. Houtman described the use in the commercial fishery of fish slips (or sales slips), which are required for all commercial fish sales. As noted in the excerpt from DFO's 2010 Draft Strategic Framework reproduced above, and in the evidence of Dr. Houtman, enforcement of compliance with generation and submission of fish slips became difficult "as fishers were finding alternative ways to sell fish."[715] Dr. Houtman told me that the decrease in compliance with fish-slip submission "was a major cause for the logbook program to be created about ten years ago."[716]

Recently, in commercial demonstration salmon fisheries piloting a quota fishery (Area H troll and Area B seine), participants adopted and agreed to contribute to the funding of enhanced monitoring to verify "all catch" (meaning that all fish caught are counted) through 100 percent mandatory landing site and 100 percent dockside monitoring programs.[717] According to Mr. English, 100 percent

dockside monitoring, compared with no dockside monitoring, should vastly improve the estimates of catch. He said that 100 percent dockside monitoring is generally the approach used in other fisheries to improve the reliability of catch.[718] These pilot fisheries also required participants to provide catch reports by phone or electronic logs (E-Logs) and, in the Area B seine fishery, set-by-set reports to fishery managers and observers.[719]

As well, all gear types have been testing the use of E-Logs – a DFO-approved computer application by which the vessel master enters his or her catch information into an on-board computer and the data are transmitted directly to DFO's fishery operations system database (through cell phone or satellite modem from sea).[720] Although it is a fisher-dependent reporting system, DFO senior management favour the use of E-Logs and encourage their increased use.[721]

Compliance with certain catch-reporting requirements has been low; for example, in 2004, 63 percent of Area D gillnet fishers returned their logbooks;[722] that same year, 56 percent of Area B seine, 68 percent of Area E gillnet, and 50 percent of Area H troll fishers returned their logbooks.[723] In 2005, DFO added requirements that 2006 commercial licences would not be issued until individual fishers returned their logbooks and, since that time, logbook returns dramatically improved and have stayed high, increasing the accuracy of catch-reporting information.[724] Dr. Houtman also referred to the recent inclusion of "start-fishing" and "end-fishing" reports as a licence condition that

> provides a very strong start of a paper trail that the fisher is on the water, is fishing. Then there's the ability for the Department to confirm that they made a catch report for that day. It provides a very strong sort of incentive for the fisher to comply with the other catch reporting requirements and it's a very practical thing and I think enforceable if C&P [Conservation and Protection] could help enforce start-fishing reports. It's a fairly new requirement so compliance has not been great.[725]

Dr. Houtman acknowledged the potential for inaccuracies in catch reporting in the commercial fisheries:

> Fishers could sort of give the wrong information intentionally or unintentionally. It could be misread or mis-recorded or misheard by the telephone operator if it's a phone-in, or misread by the people who enter the data from the logbooks. So that would be sort of unintentional.
>
> There could be intentional reasons including under-reporting the target species for strategic reasons, if they think that could influence their opening days … also more likely is under-reporting of sensitive bycatch species.[726]

However, Dr. Houtman told me that his "sense" and the "Department's sense" is that commercial catch estimates for sockeye are "quite a good estimate." When asked to explain what "quite good" meant, he said that it is "difficult to put a number on" it but suspects that 95 percent of the commercial catch is accounted for.[727]

The authors of Technical Report 7, Fisheries Management, rated the catch estimates for each of the commercial fisheries, as set out in Table 1.5.8.

Dr. Houtman testified that commercial fishers are "covering basically 100% … or a large fraction" of the cost of the private company, Archipelago Marine Research, which administers the commercial logbook program, but that it is not certain whether DFO will require commercial fishers to cover the costs of other reporting programs.[728] In recent years, DFO has moved some of the costs of monitoring to the commercial fishers (e.g., fishers pay for the enhanced monitoring in the individual transferable quota [ITQ] demonstration fisheries in Area H troll and Area B seine).[729] Colin Masson, lead, Enhanced Accountability Element, PICFI, testified that it is DFO's "stated intention" to move costs associated with monitoring onto commercial fishers, especially for enhanced monitoring.[730]

According to Mr. McEachern, the share-based management fishery (discussed below) improves the accuracy of the monitoring and reporting information: "[W]hen you move the responsibility from a fleet level down to an individual level for your catch monitoring, your landing, your by-catch, issues like that, you will see a greater compliance, because people will feel a stronger connection to that fish as being theirs."[731]

Table 1.5.8 Summary of information related to catch-monitoring programs for Canadian commercial fisheries

Country/ Area	Fishery Location	Fleet Size (2004)	Average Catch (2001-09)	% of Catch (2001-09)	Catch Reporting	Catch Monitoring System	Validation	Data Quality Accuracy	Precision	Reliability
Canada										
Fraser Panel Areas										
Areas 121-122 Troll	WCVI	142 troll in 2002	23,333	2.6%	Daily reports	Daily catch estimates from phone-in reports. Relies on complete catch reporting by fishers	No validation at landing sites, >80% phone-in compliance	Good	Unknown	Medium
Area 17-18 and 29 Troll	Georgia Strait	3-30 troll	38,649	4.3%	Daily reports	Weekly overflight effort counts and average catch rates from fishers phone-in reports and charter patrol hails.	No validation at landing sites, >80% phone-in compliance	Good	Unknown	Medium
Area 20 Net	Juan de Fuca Strait	2-60 seine	4,703	0.5%	Daily reports	Overflight effort count every net fishery and average catch rates from fishers phone-in reports and charter patrol hails.	No validation at landing sites, 10-25% phone-in compliance	Fair	Unknown	Medium
Area 29 Net	Lower Georgia Strait & Fraser River below Mission	320 gillnet	248,408	27.9%	Daily reports	Overflight effort count every net fishery and average catch rates from fishers phone in reports, a few on-board observers and charter patrol hails. A dockside monitoring program was introduced in 2010 with the goal of sampling 35% of sockeye landings	No validation at landing sites, 10-25% phone-in compliance	Fair	Unknown	Medium
Non-Panel Areas										
Area1-10 Troll & Net	North Coast	250	0	0.0%	Daily Reports	Daily catch estimates from phone-in reports. Relies on complete catch reporting by fishers	No validation at landing sites	Good	Unknown	Medium
Area 11-16 Net	Johnstone Str. & Georgia Str.	230 gillnet 130 seine	450,714	50.7%	Daily Phone In Reports	Overflight effort count every net fishery and average catch rates from fishers phone in reports and charter patrol hails.	No validation at landing sites, 10-25% phone-in compliance	Fair	Unknown	Medium
Area 11-16 Troll	Johnstone Str. & Georgia Str.	105 troll	80,014	9.0%	Daily Phone In Reports	Weekly overflight effort counts from net fishery days and average catch rates from fishers phone in reports and charter patrol hails.	No validation at landing sites, >80% phone in compliance	Good	Unknown	Medium
Area 124-127 Troll	WCVI	142 troll in 2002	6,222	0.7%		Daily catch estimates from phone-in reports. Relies on complete catch reporting by fishers	No validation at landing sites, >80% phone-in compliance	Likely Good	Unknown	Medium
Selective Fisheries			37,000	4.2%		Certified observers on board each vessel or at each fishing site	100% of catch validated	High	High	High
Canadian Total			889,044	100.0%				Fair	Unknown	Medium

Source: Reproduced from Technical Report 7, Fisheries Management, Appendix D, p. D-2.

David Bevan, associate deputy minister, focused on the self-reporting aspects of share-based management, which DFO supports:

> [W]e've seen tremendous changes in compliance in a number of fisheries, as we've moved to that kind of model where it's the obligations of the fisherman and the participants to tell us how they're going to demonstrate they're in control and that they're compliant with the requirements. It's a reverse onus of proof in those cases. It's not our obligation to prove [to] them that they are out of control, we do that in court, but on an ongoing basis it's their obligation to prove to us and the market and the Canadian public that their harvest is sustainable.[732]

However, Mr. Sakich, a commercial fisher, said that commercial fishers are not content to bear the increased expense of the enhanced monitoring.[733] Ms. Scarfo told me that the expense of dockside monitoring (in particular, for small amounts of fish) is so high that, in her opinion, it would bankrupt the majority of the individual commercial fishers.[734]

Monitoring and reporting in the recreational fishery: creel survey

The bulk of the evidence I heard regarding monitoring and reporting in the recreational sockeye fishery focused on the creel surveys conducted in the Fraser River recreational fishery, which is considered a "moderate to high impact" fishery.[735] The creel survey is "a systematic, planned, structured method for assessing recreational effort and catch."[736] Its purpose is stock assessment – estimating fish caught – rather than monitoring and enforcement.[737]

Some recreational fishing of sockeye occurs in the marine environment, generally conducted through fishing lodges and fishing guides; it is considered a "low-impact" fishery.[738] As noted by the authors of Technical Report 7, Fisheries Management, recreational harvest of Fraser River sockeye in tidal waters accounted for 7 percent of the total recreational catch of Fraser sockeye from 2001 to 2009, and the "vast majority of the recreational catch of Fraser sockeye" occurs within the Fraser River.[739] DFO has introduced the use of voluntary electronic (and paper) logbooks with some sport-fishing lodges and guides in British Columbia, in which the fishing guides provide DFO with catch information.[740] DFO conducts a creel survey in the Strait of Georgia, but its focus is on chinook and coho salmon (the majority of fish caught in the marine recreational fishery, though any sockeye identified will be counted).[741]

Mr. Tadey, who is responsible for the recreational creel surveys for salmon fisheries in the Lower Fraser River, stressed that the creel survey is "completely voluntary … there's no recourse at all … should [a recreational fisher] choose not to participate."[742]

DFO typically conducts the in-river creel surveys from May through mid-October of each year, although in past years it has run longer.[743] DFO surveyors will randomly sample recreational fishers during three days of the five-day workweek and all day on weekends and holidays, when there are typically more recreational fishers on the river.[744]

Mr. Tadey explained that the creel survey is a "complemented" survey, which uses two independent surveys – an access survey and "rod counts" (the number of people fishing on the river at a given time).[745] In the access survey, DFO staff interview recreational fishers as they are leaving their fishing locations at access points along the river (boat ramps or trails), obtaining information from the individual fishers regarding how long they were fishing, their target species (what were they trying to catch), the species of fish they caught, and how many fish they kept and how many fish they caught but released.[746] During the access survey, DFO staff inspect the fish to verify species identification and collect samples. The access survey provides DFO with information illustrating the rate of what the angler has caught by species.[747]

The rod count has two components, Mr. Tadey explained: an hourly count, in which DFO counts the number of people (or rods) actively fishing at a particular site at the top of every hour, and an "instantaneous effort count," in which DFO counts the number of anglers on

the river during an overflight from Mission Bridge up to the confluence of the Coquihalla River.[748] The rod counts provide DFO with information on the angler effort.[749] DFO then estimates the total recreational fishery catch by using a calculation expressed as follows:

> To estimate harvest in the Fraser River recreational fishery, we use two key pieces of information:
> 1) a *Rate of Harvest* estimate: in the Fraser Creels, this is expressed as the number of fish harvested per hour of effort (or fish harvested per angler-hour); and
> 2) an *Angler Effort* estimate: this is expressed in hours of angling (or angler-hours).
>
> And one key calculation:
> 1) the *Harvest* estimate is generated by multiplying together the two estimates above (Rate of Harvest *x* Angler Effort = Harvest).[750]

I heard criticism that the creel survey may not be the most accurate way to monitor or determine recreational catch, given that it is voluntary and the information obtained from individual fishers can be subjective as "the recreational angler tends to exaggerate."[751] Mr. Tadey said that, in his experience, up to 95 percent of anglers interviewed in the access surveys allowed DFO to inspect their catch, so it was difficult for individuals to minimize the number of fish caught. However, he acknowledged that anglers may inadvertently misrepresent the number of fish that were caught but released, and DFO has no way to verify the number of fish released.[752] Ms. Sneddon explained to me:

> When you're talking about whether or not somebody's going to be telling the truth, you have to look not just at the recreational fishery but at all fisheries – all – and you can look at all salmon fisheries and whether or not what type of catch monitoring program they have. If it's not a mandatory landing program where somebody's inspecting your catch, there's the opportunity for somebody to misrepresent, and it may be intentional; it may be unintentional.
>
> And in the recreational fishery for the most part, what we find is if there's a misrepresentation, it's usually unintentional. It's usually more about releases than catch, because we're inspecting catch. And you know, if you're in a situation where there's a lot of fish going through at a time that you're not allowed to keep [them], when you start releasing them and you get over three or four fish, you start to lose track of how many fish you've released.[753]

The authors of Technical Report 7, Fisheries Management, commented on the importance of accurately counting the number of fish released in a non-retention fishery:

> Recent high profile declines in the abundance of some iconic salmon populations (e.g. Interior Coho and Cultus sockeye)[,] coupled with declines in productivity for most Fraser River sockeye stocks[,] ha[ve] raised awareness that accurate estimates of mortality for fish released from mixed stock / species fisheries is crucial for developing sustainable fisheries management strategies.[754]

The creel survey methodology (how DFO arrives at its numbers) was also criticized, because it may be difficult for people to understand, and DFO does not have the resources to educate people about the creel survey.[755] As well, I heard testimony criticizing the aerial rod counts as a method of enumerating effort, on the basis that the surveyor cannot distinguish the type of fish the fisher is seeking to catch (e.g., similar gear is used to fish for both sturgeon and chinook) or whether an individual in a boat on the river or in the marine waters is actively fishing.[756]

The authors of Technical Report 7, made the following comment about the catch estimates for the recreational fishery:

> The overall ratings for recreational fishery catch estimates were "Fair" for accuracy, "Unknown" for precision, and "Medium" for reliability (Table 17). These ratings reflect the uncertainty associated with the catch estimates for the lower Fraser recreational fishery, which represents 93% of the esti-

> mated recreational sockeye catch in recent years. In contrast to the creel surveys used to monitor recreational fisheries in Georgia Strait, the documentation of catch monitoring efforts and estimates of precision was notably lacking for the lower Fraser recreational fishery.[757]

Mr. Tadey acknowledged that budgetary constraints limit the geographic scope of the creel survey and that certain areas where recreational fishing occurs are not surveyed. In his opinion, however, the fishing in these areas was 1 percent of the fishery.[758] He also expressed concern about the ending of PICFI funding in 2012, because those funds were used to hire additional staff to conduct the creel survey during the busy summer months. He said that he would like to see secure funding for seasonal survey staff.[759]

Monitoring and reporting in the Aboriginal fisheries

Aboriginal peoples participate in the commercial sockeye salmon fishery, but in this section I focus on Aboriginal food, social, and ceremonial (FSC) fisheries and on economic opportunity fisheries. In 1992, DFO introduced the Aboriginal Fisheries Strategy (AFS) to provide for, among other things, the effective management of the Aboriginal fishery (the AFS is discussed in the section on DFO Aboriginal fishing policies and programs below). Through AFS agreements, DFO negotiates parameters with Aboriginal organizations for their fisheries and typically provides funding, which may include funding for monitoring programs.

For the purposes of fisheries management, DFO divides the Lower Fraser River area into three sections: from its mouth to the Port Mann Bridge; from the Port Mann Bridge to Mission; and from Mission to Sawmill Creek.[760] DFO also partitions the BC Interior Aboriginal fisheries into three major management areas: the mid-Fraser, Upper Fraser, and Upper-Upper Fraser areas.[761] DFO's South Coast management area includes all Vancouver Island and the Central Coast of British Columbia, and, in this region, FSC fishing occurs in both the marine and the terminal areas.[762]

FSC fisheries

FSC fisheries have priority access to the resource, second only to conservation.[763] In its 2009 document, *First Nation FSC Catch Monitoring and Reporting: Preliminary Considerations, Standards and Recommendations*,[764] DFO stated that two key factors determine the specific information requirements for monitoring and reporting in FSC salmon fisheries:

- The paramount consideration is conservation risk. This may range from the need to prevent over-harvesting of a single stock to the need to manage a complex mix of species and stocks. Guidance is provided in the Wild Salmon Policy.
- The need to meet a variety of management objectives such as allocations, assessment of indicator stocks, eco-certification, or ecosystem / habitat effects.[765]

The FSC fisheries conducted in the Lower Fraser River – from the mouth to the Port Mann Bridge area – generally use drift nets and, less commonly, set nets and shallow beach seines. Catch is monitored using a census program for both drift net and set net. Some bands use hail programs, complemented by DFO or Aboriginal fishery officer patrols, and final hail counts are collected by Aboriginal fishery monitors at the close of the fishery.[766]

In the Lower Fraser River – from the Port Mann Bridge to Mission – FSC fisheries are conducted using drift nets, with some set nets and fish wheels. The set net and drift net fisheries are monitored using a census program, with hails collected on the water by charter patrols, and final hails and counts of catch are also obtained at landing sites by Aboriginal fisheries monitors.[767] As noted by the authors of Technical Report 7, Fisheries Management:

> Virtually all of the sockeye harvested in Fraser River FSC fisheries below Sawmill Creek are caught using gillnets[,] and catch estimates are reported after each opening. Below the Mission Railway Bridge, most fishers use drift gillnets. Above Mission, fishers use both

> drift and set gillnets but the majority of the catch is taken using set gillnets. The quality of the catch monitoring programs in the lower Fraser River improved substantially through the 1990's, in part because of funding through AFS programs … Catch estimates for drift net fisheries conducted above Port Mann rely on reports obtained from a fixed set of landing sites. These landing sites probably capture the majority of the catch but not the entire harvest.[768]

In the Lower Fraser River – from Mission to Sawmill Creek – more than 20 groups conduct Aboriginal fisheries, generally using a mix of set and drift net fishing, along with limited beach seines and dip net fishing. The Fraser Valley Aboriginal Fisheries Society (FVAFS) collects drift net catch and effort data, using a census program with on-water hails or final hails at landing sites, for all Aboriginal peoples in this area, except for four bands. Set net fisheries are monitored using a survey-based estimation program (similar to the creel survey) conducted by the FVAFS, which collects the data through interviews or overflights, and catch is then estimated by DFO.[769] Councillor June Quipp of the Cheam Band (Stó:lō) testified that the Stó:lō have a monitoring program where all their fish are counted every week and reported to DFO; the Cheam Band has not signed an agreement with DFO for the past two years, so has not received funding for its monitoring program for those years, but Councillor Quipp was of the opinion that the monitors were "still out there."[770]

According to Matthew Parslow, acting management biologist for DFO in the Lower Fraser Area, monitoring in the set net fishery in the Lower Fraser River is operated primarily by Aboriginal fishery monitors, with some DFO support (data management and spot checks). He felt that this system gave DFO a "fairly good estimate" of the catch[771] and that possibly 90 percent of the catch, if not more, was accounted for.[772] However, he agreed that, in the drift net fisheries in the Lower Fraser River, DFO does not have a strong ability to count the nets and relies on hails, which means DFO is not doing much validation.[773] The authors of Technical Report 7, Fisheries Management, made this conclusion:

> Overall, we rated the accuracy of catch estimates for Fraser River FSC fisheries below Sawmill to be "Good." Estimates of precision are limited to a few years but those that are available indicate an adequate level of precision. The overall rating for reliability was "Medium" because of the intensive monitoring of the Mission–Sawmill set gillnet fishery, which accounts for the majority of the harvest, offset by the uncertainty associated with growing drift gillnet effort in the fishing areas between Mission and Hope.[774]

In the Fraser River and Lower Thompson River portion of the mid-Fraser area of the BC Interior, nets and dip nets are used and the fishery is monitored using an aerial roving access survey – a form of creel survey.[775] For the Upper Thompson River, the fishery is conducted using set nets, beach seines, drift nets, spears, gaffs, and enumeration weirs. This fishery is monitored using a census program. In the Upper Fraser River area, fisheries are conducted using dip nets and one fish wheel, and the fishery is monitored using a census program. In the Upper-Upper Fraser River area, the fisheries are conducted using nets and an enumeration weir, and the fishery is monitored using a census program.[776] Mr. Jantz told me that the major Aboriginal fisheries in the BC Interior are monitored with programs that provide a "fairly reliable catch estimate under the current funding levels."[777]

Mr. Jantz testified that DFO verifies the catch in some areas through boat-operated patrols on the river, by talking to individual fishers, and by obtaining verification and samples – not on a daily basis, but periodically.[778] I heard from witnesses in both the BC Interior area and the Lower Fraser area who said that, on occasion, some individual fishers have chosen not to report their catch, and some bands have refused to report their catch.[779] Both Mr. Parslow and Mr. Jantz attributed inaccuracy in catch reporting by some Aboriginal organizations in their areas to a reliance on "fisher-reported" data, noting that "there's always the potential that that data could be biased one way or the other."[780] According to Mr. Parslow, independent validation of catch would improve the accuracy of the information.[781]

First Nations also conduct their FSC fisheries in DFO's South Coast management area, which includes all of Vancouver Island and the Central Coast of British Columbia.[782] In general, these marine FSC fisheries are conducted by commercial vessels, using different gear (seine, gillnet, and troll). Fishing effort is estimated in terms of the number of fishing permits issued by a First Nation under its communal licence, with some verification by Aboriginal fishery guardians, DFO catch monitors, or charter patrols.[783] The authors of Technical Report 7, Fisheries Management, noted:

> The majority of the harvest of Fraser sockeye in marine FSC fisheries is taken by purse seine in Areas 12 and 13. DFO reports that most of the seine catch is validated by certified observers on board the fishing vessels or by monitors at the landing sites. The general approach for estimating FSC sockeye catch by seine vessels is to sum up the observed catches and report the total catch on a daily basis. Catch estimates for FSC gillnet and troll fishers are seldom verified and are thus less reliable than estimates for seine vessels. Reports of sockeye caught by gillnet and troll vessels are submitted by the First Nation Bands either weekly or monthly.
>
> Overall, we rated the accuracy of catch estimates for marine FSC fisheries to be "Good" for seine fisheries and "Fair" for gillnet fisheries. No estimates of precision are available for any of the marine FSC catch estimates, thus the rating of "Unknown." The overall rating for reliability was "Medium," which reflects the combination of highly reliable catch estimates for seine harvests and the uncertainty associated with catch estimates for gillnet vessels.[784]

Economic opportunity fisheries

First Nations economic opportunity fisheries for Fraser River sockeye have typically been held in the Lower Fraser area between the mouth of the river and Sawmill Creek, and are monitored using a mandatory landing program with 100 percent validation by a dockside monitor. These programs are run by Aboriginal monitoring groups funded by DFO through agreements with First Nations fisheries organizations.[785] Farther up the Fraser River, demonstration economic opportunity fisheries also exist, supported by PICFI.[786] I heard evidence that, in the economic opportunity fisheries, there is no requirement that the fishers report start and end times for fishing; instead, the First Nations involved send DFO a list of those fishers designated to participate in the economic opportunity fisheries, and, in place of the usual sales slip system, a system of "landing slips" is used.[787] DFO has no plans to transition monitoring costs to First Nations at this point, although it might in the future.[788]

Post-treaty fisheries

The Tsawwassen First Nation Final Agreement, which came into effect on April 3, 2009, is currently the only modern treaty relevant to Fraser River sockeye. It provides for the management of the Tsawwassen First Nation's Fraser River sockeye fishery by the First Nation itself, including the monitoring and reporting of catch, consistent with DFO regional catch–monitoring and stock assessment standards.[789]

Auditing of catch monitoring by Conservation and Protection

During his testimony, Randy Nelson, regional director of Conservation and Protection, Pacific Region, told me that he believes that "one of the large gaps [is] the accuracy of the catch reporting … in all fisheries."[790] He attributes some of the inaccuracies to illegal harvest and told me that, when Conservation and Protection staff (e.g., fishery officers conducting enforcement) observe illegal harvest, they have "regularly over the years … provided some of this catch information to our resource managers, … sometimes [they] don't know what to do with it, and it doesn't fit within existing models."[791]

Mr. Nelson also believes that fishers don't provide accurate catch information to DFO's monitors; he provided an anecdote where a catch

monitor reported 25 fish caught, but fishery officers later counted 275 fish.[792] For these reasons, Conservation and Protection staff disagree with resource management staff on the accuracy of catch monitoring.

At one point, Pacific Region Conservation and Protection staff conducted "audits" at mandatory landing sites operated by the Stó:lō, but that no longer occurs. Pacific Region Conservation and Protection staff – in particular, Mr. Nelson – appear open to the idea of playing a larger role in auditing catch reports in the future, given sufficient resources and personnel.[793]

DFO catch-monitoring policies and programs

DFO has produced policies and programs addressing monitoring, and I address them in this section. As part of its New Directions Policy for the Pacific fisheries,[794] DFO released the Pacific Region Fishery Monitoring and Reporting Framework[795] (2002 Monitoring Framework), which was intended to facilitate a review by DFO, in co-operation with First Nations and stakeholders, of fishery-monitoring and catch-reporting systems in the Pacific Region.[796]

The 2002 Monitoring Framework set out seven principles that reflected DFO's monitoring and reporting "directions and requirements" and were "intended as a starting point for discussion with stakeholders around necessary changes to monitoring and reporting programs in their individual fisheries":[797]

- Principle 1 – All fisheries must have fishery monitoring and reporting programs and they must be of sufficient accuracy and precision to address conservation needs, including the need for the appropriate and timely control of fishing.
- Principle 2 – Fishery monitoring and catch reporting programs must be adequate to meet the provisions of international treaties and other agreements, First Nation treaties and other domestic agreements or arrangements.
- Principle 3 – Fishery monitoring and catch reporting programs must address all known significant ecosystem concerns including information on discards, by-catch and habitat impacts.
- Principle 4 –Fishery monitoring and reporting standards will be established for all fisheries and will be the basis for the selection of appropriate fishery monitoring and reporting tools and for establishing appropriate coverage requirements.
- Principle 5 – Data will be collected in the most cost-effective manner to meet the required standards.
- Principle 6 – Harvesters are individually and collectively responsible for providing monitoring information and catch data to the department.
- Principle 7 – All catch and effort data will be owned and managed by the department who will report and release catch data in such a fashion that confidentiality is respected in accordance with the policies determined by the *Privacy Act* and *Access to Information Act.*[798]

Mr. Masson testified that Principle 1 of the 2002 Monitoring Framework recognizes that the "key thing is to ensure information is available to ensure conservation can be achieved" – and that the principle remains true today. Although DFO considers the 2002 Monitoring Framework a foundation for much of the monitoring work that continued, Mr. Masson agreed that it did not receive the necessary attention after 2002 and that it "went off the radar" for DFO.[799]

In September 2004, DFO prepared a draft Recreational Fishery Monitoring and Catch Reporting Consultation Document, which referenced the seven principles of the 2002 Monitoring Framework.[800] However, Mr. Tadey testified that he had never seen the draft document before it was shown to him by Commission counsel at an interview.[801]

In March 2005, the Honourable Bryan Williams released his report, *2004 Southern Salmon Fishery Post-Season Review* (Williams Report), which contained six recommendations relating to catch monitoring.[802] In June 2005, DFO released its response to the Williams

Report, *Building Capacity and Trust,* in which it committed to improve the department's catch monitoring.[803]

On April 14, 2005, DFO announced Pacific Fishery Reform – Building a Sustainable Fishery[804] (also called Pacific Fisheries Reform), which it identified as a response to two external reports: the Joint Task Group on Post-Treaty Fisheries, *Treaties and Transitions: Towards a Sustainable Fishery on Canada's Pacific Coast*,[805] and the First Nations Panel on Fisheries report, *Our Place at the Table: First Nations in the B.C. Fishery*.[806] Mr. Masson testified that, through Pacific Fisheries Reform, DFO took "a more focused look at the fishery monitoring issues and [at] developing a broad strategy," which included the development of a system of standards for fishery monitoring and catch reporting.[807] In April 2005, DFO announced the Pacific Region Fisheries Monitoring and Catch Reporting Initiative, which was introduced to "plan and implement cohesive, objectives-based, regional fishery-monitoring and catch-reporting programs."[808] In September 2005, DFO released its *Discussion Paper on the Implementation of Pacific Fisheries Reform* in which it acknowledged that it needed "improved fishery monitoring and catch reporting systems in many fisheries … [which] will require the full cooperation of harvesters and appropriate cost sharing arrangements between harvesters and DFO."[809] In the discussion paper, DFO stated that "catch monitoring and independent validation will be implemented."[810]

In January 2007, DFO launched the Salmon Fisheries Reform – Fisheries Monitoring and Catch Reporting / Traceability Lower Fraser Focus project.[811] Its purpose was to design and implement improved oversight of Lower Fraser River salmon fisheries, through monitoring and reporting of catch, together with strengthened enforcement, compliance, and traceability.[812]

In 2007, DFO launched the Pacific Integrated Commercial Fisheries Initiative, a "$175 million, 5-year [2007–12] initiative, developed to support the implementation of much needed reforms."[813] PICFI is structured around four key elements, including the following measures:

Enhanced Accountability Measures

- Will include enhanced fisheries monitoring, catch reporting, and enforcement, in support of share-based management approaches.
- Will enable development of a new traceability program to address emerging market-place and food safety issues.
- A concrete step towards implementing the recently announced "Ocean to Plate" initiative in Pacific Region.
- Initial steps are planned for the 2007 salmon season in Lower Fraser, with expansion to other areas and fisheries in subsequent years.
- Key components include: mandatory landing sites for Area E fishers with a minimum 35% catch verification, and independent catch verification for First Nations.[814]

Mr. Masson, who is responsible for the enhanced accountability element of PICFI, testified that, through PICFI, he focused on ensuring that the catch-monitoring initiative "has legs … that the lag in progress that we might have observed from 2002 does not happen again."[815] According to the five-year plan produced by the PICFI Steering Committee in December 2008, DFO had three objectives associated with the enhanced accountability element:

- Increased and sustainable Fisheries Monitoring and Catch Reporting (FM&CR), with a focus on Pacific salmon;
- Enhanced Compliance Monitoring; and
- Development of a Traceability Framework for Pacific Seafoods – to address food safety issues and eco-certification requirements, [and to] enable the tracking of legally harvested seafood products and the identification of product not harvested in legal commercial fisheries.[816]

Associated with these three objectives were three main funding areas, described as follows:

1) Increased FM&CR
- Develop and implement strategies for improving FM&CR in priority fisheries:
  - Aboriginal FSC fisheries[;]
  - Recreational – all species;

- Commercial fisheries (salmon ...);
- Establish and implement catch monitoring and reporting standards[;]
- Improve FM&CR information management, clarify roles and responsibilities & executive / sector accountabilities for FM&CR.

2) Compliance Monitoring
- Foster compliance with monitoring and reporting requirements
- Provide compliance management in support of the evolving "defined shares" approach to integrated commercial fisheries
- Create a dedicated unit with specialized training and expertise in intelligence-led policing
  - This involves gathering and analyzing intelligence, identifying and targeting problems and evaluating results
  - Will restrict the access of unlawful product to the commercial marketplace, removing the economic incentive for illegal harvest

3) Traceability Framework
- Includes the design and implementation of a program to enable regulators and certifiers to trace fish from the point of harvest to the point of final sale.
- Collaborative effort with Province, industry, CFIA, and others.
- Line with / complement national initiatives on traceability and eco-certification[.][817]

Mr. Masson told me that, through PICFI, DFO identified two important roles not previously funded within the department, one providing "integrated fisheries information and ... [looking after an] information management framework," and the other a "regional monitoring coordination role."[818]

Ms. Farlinger said that DFO is currently in the process of "pulling together" all the work under PICFI, "analyzing what has been done, did we meet all our objectives with the PICFI program, where we haven't met them, where should we go from here, and those kinds of things that really happen at the end of a program in terms of, is this ready to implement now, or is there more work required, or what will we do about it to carry it forward?"[819] The work on monitoring commenced under PICFI has continued through the development of the 2010 Draft Strategic Framework (see discussion below).[820]

In 2008, DFO released a consultation document, Interim Fishery Monitoring and Catch Reporting Standards for Commercial Salmon Fisheries, which was to form the basis for discussions with the commercial salmon fleet regarding monitoring and reporting standards.[821] In February 2009, DFO developed a Pacific Region Fisheries Monitoring Framework for Improvements, which was built on the 2002 Monitoring Framework and set out a fisheries-monitoring and catch-reporting work plan for 2008–11.[822] By late 2009, DFO developed a catch-monitoring Roadmap Strategy, which contains four guiding principles:

- Principle 1 – Information necessary to sustain and conserve fisheries resources and their habitat is the first priority.
- Principle 2 – Utilize consistent monitoring standards.
- Principle 3 – Accessible, accurate and timely fisheries data.
- Principle 4 – Harvesters are individually and collectively responsible for providing fisheries monitoring and catch reporting information.[823]

The Roadmap Strategy contains a matrix for determining whether a given fishery should be monitored at low, moderate, or enhanced levels, based on the degree of conservation risk involved, type of information required, and desired statistical quality for data analysis purposes, as set out in Table 1.5.9.[824]

In November 2009, DFO released its discussion paper, First Nation FSC Catch Monitoring and Reporting: Preliminary Considerations, Standards and Recommendations (FSC Discussion Paper), created to serve as a starting point for discussions with First Nations, to provide a general context and rationale for improved fisheries monitoring and catch reporting, and to propose a framework for improving consistency across all fisheries.[825] As a

Table 1.5.9 Overview of categorizing fisheries based on information requirements, DFO Roadmap Strategy

INFORMATION REQUIREMENT

Starting Point
move to *Basic* or *Enhanced* due to specific fishery characteristics

Information Category	LOW	MODERATE	ENHANCED
Monitoring Need			
Conservation Risk	**Low** – eg. v. low effort & high abundance (green zone) -no by-catch issues -low relative fishing capacity -single stock/species	**Moderate** – eg. target and by-catch in yellow zone, -moderate effort, -moderate abundance	**Enhanced** – abundance of target may be trending to red zone -non-target (by-catch) impacts on CUs of concern -high relative fishing capacity
Fishery Operations; Effort	Ability to determine the key characteristics of the fishery	Ability to quantify effort levels. High consistency across years to establish reliable trends of catch per unit of effort (CPUE)	Accurate and timely records of operational details required (e.g. effort/location/gear details) -managed by defined share/allocation
Catch	Ability to judge magnitude of catch and catch-related mortality relative to other fisheries	Ability to quantify annual catch and catch-related mortality. High consistency across years to establish reliable trends	Accurate and timely records required of catch and catch-related mortality
Ecosystem / Habitat	Ability to qualitatively identify any potential impacts, however, none are anticipated	Ability to quantify the magnitude of impacts (for any species/habitats that apply); some limited impacts are possible	Accurate and timely records required of any impacts (e.g. incident reports for marine mammal/bird/reptile encounters and mortalities. Other ecosystem or habitat effects)
Statistical Quality	**Low:** +/-50%, little if any independent verification	**Moderate:** +/-20%, <20% independent verification	**High:** +/-5%, 20-100% independent verification

Source: Reproduced from Policy and Practice Report 12, Catch Monitoring, p. 44.

fundamental premise, the 2009 FSC Discussion Paper suggests that "shared fishery information, of known and rigorous quality, is the foundation for the dialogue" between government, First Nations, resource users, conservation groups, and others.[826]

The most recent policy statement by DFO on catch monitoring in the Pacific Region is its 2010 Draft Strategic Framework, developed at the same time that the Monitoring and Compliance Panel (M&C Panel) of the Integrated Salmon Dialogue Forum (ISDF) was producing *Charting Our Course,* its report on catch monitoring in the Pacific Region (discussed below).[827] Mr. Masson testified that, although the work of the M&C Panel (on which he sits and which is discussed below) informed the development of DFO's 2010 Draft Strategic Framework, DFO has "objectives of [its] own that [it] needed to spell out in [its] document."[828]

As stated in the 2010 Draft Strategic Framework, its purpose is to set out a strategic framework to guide Pacific fishery monitoring and catch reporting into the future, noting that, despite improvements, "deficiencies remain in information gathering, in terms of coverage of fisheries, missing or unreliable data, reporting delays and other issues."[829] Like the 2002 Monitoring Framework before it, the 2010 Draft Strategic Framework is a consultation document, described by Mr. Jantz as

> a consultation … or discussion document that the Department has developed over a number of years which we are now in the process of taking out for a consultation with the various users of the resource and First Nations in trying to establish exactly what it says, a strategic framework for fishery monitoring into the future for Pacific fisheries. So this is identifying objectives and different levels of monitoring for different levels, different kinds of fisheries and so on and so forth … we're trying to develop a final document to be implemented in the 2012 season.[830]

After restating the fishery-monitoring and catch-reporting goal from its Roadmap Strategy and from *Charting Our Course*, the 2010 Draft Strategic Framework sets out the following five principles:

- Principle 1: Conservation and sustainable use
  Fishery monitoring and catch reporting must provide the right information to support prosperous sustainable fisheries that ensure the protection of fish populations, their habitat and the broader ecosystem.

- Principle 2: Consistency and transparency
  While monitoring and reporting requirements will vary by fishery, they will apply equally to all harvesters and will be determined based on consistent criteria and in a transparent manner that allows information to be easily accessed and understood by resource managers, other data users and the general public.

- Principle 3: Tailored requirements
  Information requirements will depend on the nature and scope of the fishery, reflecting the particular risks and management regime; further, they may change over time.

- Principle 4: Shared accountability and access
  Everyone involved in monitoring and reporting – harvesters, DFO and third parties – must be committed to providing timely, accurate fisheries information. Continued access to the resource and its benefits is contingent on all harvesting groups fulfilling their roles in data provision, which in turn demands a clear assignment of responsibilities and accountabilities.

- Principle 5: Cost effectiveness
  Fishery monitoring and catch reporting programs will ensure that the information requirements are achieved as cost-effectively as possible.[831]

To achieve improvements in fishery monitoring and catch reporting, and in light of the five principles, the 2010 Draft Strategic Framework sets out six strategies (which are similar to but different from the four strategies set out in its Roadmap Strategy and in *Charting Our Course*):

- Strategy 1: Monitoring and reporting requirements
  DFO resource managers to use consistent criteria to assess the information level needed for each fishery and develop tailored requirements for fishery monitoring and catch reporting.

- Strategy 2: Monitoring and reporting programs
  [DFO] will work with harvesters and others to identify and implement a cost-effective package of monitoring and reporting measures to meet the specified information requirements.

- Strategy 3: Data management
  DFO will complete its major information management project, PacFish, to facilitate access to Pacific fisheries data for resource managers and all other users.

- Strategy 4: Other program support
  [DFO] will work with harvesters and others to clarify accountabilities, develop funding mechanisms, identify and address capacity needs, and provide further support for monitoring and reporting programs, as required.

- Strategy 5: Monitoring and reporting plans
  A formal monitoring and reporting plan will be prepared and implemented for each fishery that will specify the roles and responsibilities of harvesters, DFO and third parties.

- Strategy 6: Continual improvement
  Regular reviews will be conducted to update standards and monitoring and reporting programs and evaluate progress; as well, best management practices and new technologies will be identified.[832]

Ms. Farlinger described the 2010 Draft Strategic Framework as a partner process to the work of the M&C Panel, but internal to DFO.[833] She said that the 2010 Draft Strategic Framework is a consultative document that

> looks at the fishing power, it looks at various elements related to effective fisheries management and how you have to set standards for different kinds of fisheries, different fishing power, different situations, mixed stock situations and other things, so that DFO is in a position to do its job to set those standards … I would say that we're quite advanced on that work … this is partially a social and education process, which is really letting all the stakeholders know that the same criteria are being applied to developing their management standards, and to setting priorities. And therefore to take the work that we do bilaterally with any group or First Nation and put it into this framework so that people understand why the catch monitoring standards are there. That's sort of a really important social step that has been a very big part of the development of catch monitoring in PICFI.[834]

In response to a question about why DFO would create a document through a separate consultative process that duplicates the work of the M&C Panel (*Charting Our Course*), Mr. Masson explained DFO's rationale as follows:

> [I]t became clear in discussions with the senior managers that the Department had objectives of our own that we needed to spell out in our document. It's clearer for the Department to undertake a consultation process where we can specifically engage the harvest sectors for feedback.
>
> Also it's appropriate for the Department to be setting direction for its staff and to establish the appropriate policy foundations by which we can have discussions with our national counterparts on the same issues. So the regional executive had directed that really the Department needs its own framework that establishes its role in trying to develop and firm up policy.[835]

In 2009–10, through its national Sustainable Fisheries Framework, DFO announced the development of a Monitoring and Compliance Policy; however, DFO has not produced any documents relating to this new policy to date.

ISDF Monitoring and Compliance Panel

The Integrated Salmon Dialogue Forum resulted from a recommendation contained in the 2001 report of the University of Victoria's Institute for Dispute Resolution, *Independent Review of Improved Decision Making in the Pacific Salmon Fishery*, although the ISDF was not formed until 2007.[836] It was a collaborative forum where "participants have agreed to make best efforts to work through their respective processes, agencies and organizations to give effect to any consensus reached in the forum, and to address any differences that emerge."[837] Volunteer participants in the ISDF were drawn from commercial and recreational fishers as well as First Nations, DFO, and the Province of British Columbia. However, representatives at the ISDF were not mandated to speak on behalf of their groups, and any consensus reached there was non-binding.[838]

The ISDF Monitoring and Compliance Working Group was one of the ISDF's three working groups. Its purpose was twofold: first, to examine ways to improve monitoring, catch reporting, and compliance in the salmon fisheries by bringing together an independent panel of participants representing Aboriginal, commercial, recreational, and conservation interests; and second, to work with DFO in mapping "a better pathway for monitoring and compliance."[839]

In 2009, the ISDF created its M&C Panel with a three-year mandate (2009–12).[840] Mr. Masson testified that the M&C Panel "arose from a recognition that fisheries catch information was a critical piece to get right," recognized by all the participants in the ISDF.[841] This sentiment was echoed by Mr. Crey, fisheries and policy advisor, Stó:lō Tribal Council, during his testimony:

> Both [Grand Chief Ken Malloway] and I joined in on the discussions at the Integrated Salmon Dialogue Forum. And in particular both of us were interested in the Monitoring and Compliance Committee, because both he and I know that right at the very heart of the issue in the fishery is [the]confidence that … groups … have in the numbers [for] the catches … that are recorded and reported. We feel that right at the heart of the issue is catch and the reliability of catch information. So we both zeroed in on the Compliance and Catch Monitoring Committee and the work that it's doing.[842]

DFO provides funding of approximately $85,000–90,000 per year to the M&C Panel, which is matched by the Fraser Salmon and Watersheds Program.[843]

In 2010, the M&C Panel released *Charting Our Course* as a draft discussion paper (the final version was released in April 2011).[844] Mr. Masson described its purpose as to "develop a framework … [to] examine monitoring programs in a consistent way … [and] to serve as a guide to move forward with suggestions and recommendations to the Department and to harvesters."[845] Mr. Sakich, current chair of the M&C Panel, described *Charting Our Course* as a "living document [which must] keep going in the future."[846] It sets out the following four principles to guide the development of fisheries monitoring and catch reporting (which are identical to the principles set out in DFO's 2009 Roadmap Strategy discussed above):

- Principle 1: Information necessary to sustain and conserve fisheries resources and their habitat is the first priority
- Principle 2: Use Consistent Monitoring Standards
- Principle 3: Accessible, Accurate and Timely Fisheries Data
- Principle 4: Harvesters are individually and collectively responsible for providing [fisheries monitoring and catch reporting] information[847]

To ensure the use of consistent monitoring standards (Principle 2), *Charting Our Course* provides a matrix, as set out in Table 1.5.10, for determining whether a fishery should be monitored at the basic, moderate, or enhanced levels.[848]

Mr. Masson told me that, in his opinion, Table 1.5.10 captures well the concept of a consistent approach to fisheries monitoring.[849] In *Charting Our Course,* the M&C Panel acknowledged DFO's development of a monitoring framework and strategy and the way it works with the panel's strategic approach contained in *Charting Our Course* and Table 1.5.10:

Table 1.5.10 Overview of categorizing fisheries

Monitoring Standards and Information Requirements

Starting Point = Moderate Level.
Move to Basic or Enhanced Level based on
Abundance levels, conservation risks and specific fishery characteristics

MONITORING LEVEL

INFORMATION CATEGORY	BASIC	MODERATE	ENHANCED
CONSERVATION RISK	▪ Low – e.g. v. Low effort & high abundance (green zone) ▪ No by-catch issues ▪ Low relative fishing capacity ▪ Single stock/species	▪ Moderate – e.g. Target and/or by-catch spp in yellow zone ▪ Moderate effort ▪ Moderate abundance	▪ High – abundance of target spp may be trending to red zone ▪ Non-target (by-catch) impacts on CUs of concern ▪ High relative fishing capacity ▪ High value fishery (incentive to under-report)
FISHERY OPERATIONS	▪ Ability to determine the key characteristics of the fishery	▪ Ability to quantify effort levels. High consistency across years to establish reliable trends of catch per unit effort (CPUE)	▪ Accurate and timely records of operational details required (e.g. effort/location/gear details.) ▪ Managed by defined share(s)/allocation.
CATCH	▪ Ability to determine magnitude of catch and catch-related mortality relative to other fisheries	▪ Ability to quantify annual catch and catch-related mortality. High consistency across years to establish reliable trends	▪ Accurate and timely records of catch and catch-related mortality
ECOSYSTEM HABITAT	▪ Ability to qualitatively identify any potential impacts. However none are anticipated	▪ Ability to quantify the magnitude of impacts (for any species/habitats that apply). Some limited impacts are possible	▪ Accurate and timely records of any impacts (e.g. incident reports for marine mammal/bird/reptile encounters and mortalities; other ecosystem or habitat effects)
STATISTICAL QUALITY	**LOW**	**MODERATE**	**ENHANCED**
	Low: +/- 50%, little if any independent verification	**Moderate:** +/- 20%, <20% independent verification	**Enhanced:** +/- 5%, >20% independent verification

Each fishery will be evaluated to determine the level of information required. The factors used in this evaluation will vary depending on the specifics of each fishery, but the goal is to provide consistent monitoring programs across fisheries.

Note: CU: Conservation Unit; SPP: species.

Source: Reproduced from Exhibit 855, p. 10; Policy and Practice Report 12, Catch Monitoring, p. 49.

> As a result of growing concerns with fisheries monitoring and catch reporting in the Pacific Region, Fisheries and Oceans Canada released a FM&CR Policy Framework in 2002. The Framework initiated preliminary work on which a broad strategy was subsequently developed to address the fundamental requirements for effective management of fisheries information, development of monitoring standards and for clearly established accountabilities. Since 2007 the Enhanced Accountability component of the Pacific Integrated Commercial Fisheries Initiative (PICFI) has incorporated this strategy. The current PICFI workplan and the proposed strategy for moving forward are therefore consistent and provide a coordinated approach to achieve the objectives and goal outlined in Figure 1.[850]

Charting Our Course sets out four strategies to achieve its vision for improved confidence in fisheries monitoring and catch reporting:

> Strategy 1: Use consistent standards to determine monitoring requirements and to plan and implement FM&CR in all fisheries.
>
> Strategy 2: Identify and implement cost-effective monitoring programs for all fisheries to collect required information by sharing best-management practices, considering alternate harvesting and management strategies, and taking advantage of technological advances.
>
> Strategy 3: Implement standardized data format and effective information management systems to enable data integration and timely access to data and fisheries information.
>
> Strategy 4: Clarify and document departmental and harvester responsibilities within a formal monitoring plan.[851]

Grand Chief Malloway and Mr. Masson said they felt that the M&C Panel's work had been successful and that its members would like it to continue, because there is still work for it to do.[852]

The funding of catch monitoring

Fisheries monitoring is conducted by DFO's resource management staff and stock assessment staff as part of their regular work, relying on ongoing operational funding.[853] In addition, DFO has allocated limited-term funds to improve catch-monitoring programs (e.g., PICFI, the funding of which is presently scheduled to end in March 2012). Catch-monitoring activities are part of both ongoing DFO operations and limited-term programs. Some witnesses expressed concern about ongoing monitoring activities in the face of budget cuts.[854] Mr. Jantz worried about the ongoing monitoring of Aboriginal fisheries, which in his area is funded through PICFI money and scheduled to sunset in March 2012:

> [W]e have fairly good coverage under the current funding level that we have. The concern I have is what is going to happen post March 2012. There are opportunities for improving some of the catch estimates in the section of the Fraser River immediately above what we call the mid-river area, so it's the upper Fraser. In that particular area, we don't have full coverage of the fishery and our current funding levels[,] through the AFS [Aboriginal Fishing Strategy] programs primarily, in many years, often do not cover the full duration of the fishery.
>
> As well, [I am] working with some groups that currently do not have AFS dollars. There are a number in the Interior, primarily terminal harvesters, so their catch levels are not very large. But nevertheless, they are not monitored. We do not have information for those fisheries. So working with those groups to try to get some funding and programs established there, whether they're just phone-in numbers or various different techniques for doing that, but that's one area that could be improved.[855]

Mr. Masson told me that DFO has not conducted an assessment of the costs for implementation of the 2010 Draft Strategic Framework, although it is doing some preliminary work on it.[856]

DFO provided a table summarizing its expenditures on catch monitoring in different areas in southern British Columbia from 2000 to 2010–11.[857] It also provided information regarding its expenditures on the monitoring of Aboriginal fisheries.[858] According to Ms. Sneddon:

> In recent years, resources have been a problem in some times. You don't have enough money to do what you'd like to do. I think any catch monitoring program, whether it's recreational, First Nations, or commercial, some resources – additional resources could help us in getting better estimates. The question is how much better of an estimate? If our point estimate is plus or minus five or ten percent, do you need to spend a lot of money to get plus or minus five percent? It doesn't make any difference in your management, so those are trade-offs that we have to look at when we're allocating our budgets every year.
>
> Questions around over-estimating, under-estimating harvest … I think there [are] definitely questions from all sectors about the recreational catch and release numbers. We're doing our best in order to educate people around our programs. That's the main problem, is that there's a real lack of understanding of how we do catch-monitoring programs in all sectors.[859]

Findings

I am satisfied that knowing the number of fish that are harvested in the commercial, recreational, and Aboriginal (food, social, and ceremonial [FSC] and economic opportunity) fisheries is an important component of the management of the fishery. It is also essential to the conservation and long-term sustainability of the fishery.

The catch-reporting programs differ among the commercial, recreational, and Aboriginal sectors, and among the gear types and areas in the commercial fishery. I am satisfied that most catch-reporting data are estimates only, and I accept that, where catch reporting is primarily fisher dependent, there is the potential for inaccurate reporting of catch, whether inadvertent or intentional.

The authors of Technical Report 7, Fisheries Management, were unable to do more than provide a qualitative rating of the accuracy of the various catch-reporting methods. In my view, that is not acceptable. The Department of Fisheries and Oceans (DFO) should work toward a catch estimation regime for the Fraser River sockeye salmon fishery that achieves an enhanced level of fisheries monitoring and catch reporting.

As long as DFO supports a largely fisher-dependent system for catch reporting, it should commit itself to a robust random audit / monitoring program, and it should use its powers of suspension and non-renewal of licences as a compliance tool.

Finally, if DFO decides that those engaged in commercial fisheries should bear some or all of the costs associated with catch monitoring, I see no reason in principle why commercial fishers and those engaged in Aboriginal economic opportunity fisheries should not be treated in the same way.

I discuss these findings and any related recommendations in Volume 3 of this Report.

Post-season management and review

Transfer of control from Pacific Salmon Commission back to DFO

The fishing of Fraser River sockeye typically concludes in late September or early October, at which point the Fraser River Panel no longer manages the commercial fishery in Panel Area waters and control is transferred back to DFO as the various runs of salmon complete their cycles. The regulatory letters specify the dates on which the Fraser River Panel will relinquish control in Panel Area waters – typically when the commercial fisheries are completed.[860]

Fraser River Panel post-season review

Following each management season, the Fraser River Panel first holds a post-season meeting to assess the fishery relative to the predictions and, second, prepares a post-season review for consideration at the January meeting of the Pacific Salmon Commission and the Fraser River Panel. After the conclusion of the fishing season, the panel has two main objectives: to establish a post-season accounting of the total return for each of the stock groups, and to prepare a report that documents the main events of the season and

the achievement of objectives specified under the Pacific Salmon Treaty.[861]

DFO post-season review

DFO prepares three reports in the post-season phase of management of the Fraser River sockeye fishery: the Record of Management Strategies; the Pacific Salmon Treaty Report (in which both Canada and the United States are obliged to report their allocations, limits, and conditions under the treaty); and a post-season report for southern BC fisheries.[862] DFO also hosts post-season review meetings with the Integrated Harvest Planning Committee, First Nations representatives (independent of the IHPC process), the Sport Fishing Advisory Board, and the Commercial Salmon Advisory Board.[863] DFO evaluates its own performance in meeting its spawning escapement objectives, as well as the allocations to First Nations and to commercial and recreational fisheries.[864]

Differences between estimates

Mr. Lapointe, told me that, in 1992, the Fraser River Panel started to track the "differences between estimates" (commonly referred to as DBEs) of Fraser River sockeye – between the one made at the Mission hydroacoustic location and the one made on escapement by DFO.[865] As discussed above in the section on management adjustments for the Fraser River sockeye fisheries, a difference is always anticipated between the estimates made at Mission and the escapement estimates at a particular spawning ground. Mr. Lapointe described this difference as a "subtlety" about Fraser River sockeye: "[T]here is an element of the management that's outside your control that relates to the impacts of these fish [sockeye] in the river that causes your escapement target to not be anywhere near what you would have hoped it would have been."[866]

The differences between estimates is calculated as part of the Fraser River Panel's post-season analysis and, except that it is retrospective, it addresses issues similar to management adjustments in pre-season and in-season planning. It is a calculation of the difference between the post-season escapement estimate on the spawning ground and the abundance estimate at Mission (minus any catches between Mission and the spawning grounds), and Mr. Lapointe described the process in these words:

> [W]e compare the number of fish that reach the spawning grounds with the number of fish that we would have expected to reach the spawning grounds where that latter quantity is estimated by taking the Mission escapement and subtracting any catches that occurred between Mission and the spawning grounds. So it's a projection of what should have reached [the spawning grounds] if all the fish made it and the Mission escapement was correct and the catch estimates were correct, as well.[867]

Mr. Lapointe provided a PowerPoint presentation explaining the differences between estimates.[868] On the first page, the calculation of 195,000 for 2009 (the potential spawning escapement minus the counted upstream spawning escapement) is set out as follows:

Mission escapement	1,303,000
– Catch upstream of Mission	52,000
– En-route losses	**????**
= Potential spawning escapement	1,251,000
Upstream spawning escapement	1,056,000
Difference Between Estimates =	195,000[869]

The Fraser River Panel must determine what the total run size was and whether the differences between estimates represent real fish that were lost or simply bias in the estimates. The possible causes of the differences between estimates are statistical error; measurement or statistical bias in the abundance estimate at Mission; bias in the estimates of in-river catch (e.g., because of illegal harvest or of unreported or misreported catch); en route losses (fish die en route because of biological and environmental conditions); and measurement or statistical bias in escapement enumeration.[870]

The results of the difference between estimates analysis are fed back into the data used

to run the management adjustment models pre-season and in-season.[871] These calculations are made every year, and the Fraser River Panel must decide whether they should be part of the estimate for the total run.[872] This decision is based on whether the difference between estimates is likely to be a real loss of actual fish (through mortality in-river) or whether it is due to measurement bias or errors.[873] Mr. Lapointe said that the Fraser River Panel is finding that the majority of the calculations since 1992 associated with real en route loss of fish are attributable to factors such as high water temperature or high or low water flow.[874]

Stock assessment

Stock assessment for Fraser River sockeye, in particular spawning ground assessment, has been a priority for DFO because of the Pacific Salmon Treaty.[875] Stock assessment also includes test fishing and run size assessment, but in this section of the Report I review the stock assessment conducted in freshwater (escapement enumeration, juvenile / smolt assessments, and lake productivity assessment) – the main focus for DFO in its Stock Assessment section. Dr. Brian Riddell, now chief executive officer of the Pacific Salmon Foundation but formerly with DFO, stressed the importance of stock assessment in his testimony:

> Stock assessment is long-term monitoring … there is an annual need for advice for managers and management. Fundamentally though you're talking about the long-term monitoring of Canada's natural resources and I see that that's a core responsibility of [DFO] and [DFO puts] a lot of effort into [it].[876]

Timber Whitehouse, area chief, Fraser Stock Assessment Program, DFO, explained to me that DFO's stock assessment program is based on science. He said that, with respect to Fraser River sockeye, the stock assessment program includes the following tasks:

- "escapement enumeration of spawning grounds (which involves the assessment of adult spawning stocks of salmon as they return to their spawning grounds, including detailed assessment and calculation of abundance)";[877]
- "assessments of fry (juvenile) production out of incubation habitats, as well as irregular (only in years of large escapements) assessments of some fry abundances in sockeye nursery lakes throughout the watershed";[878]
- "nursery lake productivity assessments (the ability of a lake to support juvenile sockeye, based on the food bases and chemical and physical properties of the lake nutrients)";[879] and
- "monitoring of smolt output at Chilko and Cultus lakes."[880]

Sampling of spawners, Adams River, BC, 2010

Mr. Whitehouse explained that stock assessment is used to understand population dynamics and the production of different stocks, both in the run size forecasting process and in developing post-season estimates of total return (for looking at calculations of total allowable catch [TAC] and for obligations under the Pacific Salmon Treaty).[881]

The Wild Salmon Policy, in its Strategy 1, envisions a formalized stock-monitoring plan that features monitoring specific to each Conservation Unit. Mr. Whitehouse told me that DFO's current

stock assessment activities are aligned with, and support the delivery of, the Wild Salmon Policy because the way the sockeye are counted "allows you to roll the escapement data up to the level" of a Conservation Unit (see the discussion in Chapter 10, Wild Salmon Policy).[882]

Adequacy of escapement enumeration methods

Mr. Whitehouse told me that escapement enumeration has high-precision and low-precision methods. Low-precision methods come in two forms: visual counts that are not calibrated, and recovery of salmon carcasses as an index of the number of fish. High-precision estimates use techniques such as mark-recapture surveys, fence counts, hydroacoustics, and calibrated visual surveys. He said that the methods used to enumerate the fish are well established and are considered scientifically reliable.[883]

In 2005, because of funding pressures, DFO raised the escapement threshold for the use of the mark-recapture method from populations larger than 25,000 to populations larger than 75,000.[884] Some people had concerns about this change: Mr. Saito, former DFO fisheries manager and former chair of the Fraser River Panel, said that he recalled discussing this change with his DFO colleagues at the time the decision was made and that he felt it was a reasonable accommodation; under cross-examination, he agreed that this policy change would diminish the quality of the stock enumeration data.[885]

However, Mr. Whitehouse said that there are very few populations in this range (between 25,000 and 75,000), and accordingly, DFO is of the opinion that the change did not have a negative impact on stock assessment. He acknowledged that there is an unresolved issue regarding the appropriate calibration / expansion index for spawning populations in the 25,000–75,000 range, but said that DFO Science staff are conducting research on this issue.[886]

Assessments of fry and nursery lakes

DFO also conducts assessments of fry abundance in nursery lakes and some rivers, using hydroacoustics and mark-recapture.[887] In addition, it does habitat assessments of nursery lakes, which involve detailed assessment of algae and zooplankton communities in each lake as well as its chemical and physical properties.[888] In the 1980s and 1990s, DFO conducted a fairly extensive survey of nursery lakes within the Fraser River watershed, though Mr. Whitehouse said that this program is currently not as extensive.[889]

Smolt assessments

DFO regularly monitors smolt outmigration at Chilko and Cultus lakes through the use of fences.[890] Mr. Whitehouse said, however, that Chilko Lake is a unique system and is unlikely to be a valid indicator for freshwater productivity, although useful as an indicator of marine survival.[891]

Budgeting, funding, and cuts

DFO's Stock Assessment Coordination Committee (discussed earlier) is responsible for regional coordination of priorities for stock assessment in the Pacific Region.[892] The Science sector, however, has budget responsibility for regional stock assessment work.[893]

I received a public submission from the Rivers and Smith Salmon Ecosystems Planning Society (RSSEPS), based in Comox, which reads:

> It is our impression that the DFO Stock Assessment budgets have been progressively diminished over the years. It seems as if the government has made the decision to give preferential option to the aquaculture industry. With fewer financial resources, it falls to non-profits like RSSEPS to take on the responsibility of monitoring local fish stocks.
>
> We would like the Commission to examine DFO's Stock Assessment budgets to determine the minimum amount of funding required to adequately monitor and manage stocks of wild Pacific salmon.[894]

The stock assessment program illustrates DFO's A-based versus B-based funding. A-based funding is core government funding; B-based funding is money for specific projects.[895] In 1985, with the signing of the Pacific Salmon Treaty, the Pacific Region received $32 million in B-based

funding for stock assessment programs through 1999 (a fixed amount for a fixed term, not part of the department's core budget).[896] However, in 1999, when the treaty was revised and renewed, the associated B-based funding was rolled into A-based funding, which is subject to ongoing core budget reductions.[897]

Mr. Whitehouse said that the cyclic dominance of Fraser River sockeye creates difficulties for stock assessment budgeting because the assessment needs vary with the cycles – dominant cycle years require additional funds that are not acknowledged in budgeting.[898] DFO has reduced juvenile and nursery lake productivity assessments from the level it conducted in the 1980s and 1990s, and from the level the former International Pacific Salmon Fisheries Commission conducted before it.[899] Although Fraser River sockeye is a top priority for DFO, and the programs relating to it have suffered fewer budget cutbacks than other programs, the cutbacks to stock assessment of other species may have an adverse effect on the sockeye fishery (by requiring restrictions on salmon co-migrating with threatened species where assessment of those other species is inadequate) and on DFO's ability to assess the stocks in the red zone under the Wild Salmon Policy.[900] Mr. Whitehouse told me how critical the situation is:

> We're reaching a critical tipping point in terms of being able to provide the necessary monitoring, particularly outside of the Fraser. I think this is an important distinction that is worth making for this commission, that maintaining Fraser sockeye assessment has come at a high cost and that there are not many additional pieces that can fall off without getting to the point where the word "crisis" could come into play.[901]

Findings

I am satisfied that stock assessment is essential to the management of the fishery, including data obtained through assessments of nursery lakes, juveniles, and escapement, and that all of these calculations are important aspects of stock assessment. In addition, I encourage the Department of Fisheries and Oceans (DFO) to assess smolt outmigration at the mouth of the Fraser River. I accept the evidence of Timber Whitehouse, area chief, Fraser River Salmon Stock Assessment, that DFO's escapement enumeration methods are adequate, with the caveat that the department needs to determine the calibration factor in populations ranging from 25,000 to 75,000.

I also accept the evidence that further funding cuts to DFO's current stock assessment programs for both Fraser River sockeye and other Fraser salmon stocks could adversely affect the conservation of the resource and the sustainability of the Fraser River sockeye fishery.

I discuss these findings and any related recommendations in Volume 3 of this Report.

Aboriginal fishing policies and programs

Managing the fishery in the context of Aboriginal rights

As described in Chapter 3, Legal framework, the Supreme Court of Canada has articulated an analytical framework to determine Aboriginal and treaty rights. However, this analysis has not been judicially applied for the majority of Aboriginal groups asserting rights in the Fraser River sockeye salmon fishery. Evidence before me indicates that many Aboriginal groups in British Columbia assert the right to fish, to manage the fishery, to share in the economic benefits of the fishery, and, in some cases, to Aboriginal title.[902] Significant legal uncertainty surrounds what rights are held by which groups and what management, economic, title, or other dimensions these rights may or may not include.

As Commissioner of this Inquiry, my jurisdiction is circumscribed by my Terms of Reference.[903] Several participants appearing before me, Aboriginal and non-Aboriginal, submit that my Terms of Reference do not provide me with jurisdiction to make rulings or findings of fact in respect to Aboriginal or treaty rights and that I am not called upon by them to do so.[904] Indeed, my Terms of

Reference do not refer to Aboriginal or treaty rights at all.

Taking into consideration my Terms of Reference, the existence of ongoing litigation over Aboriginal fishing rights, and the limited time frame for this Inquiry, I agree with participants that I am not well placed to make any determination of Aboriginal rights, including any right to fish. I am also not well placed to make findings of fact that depend on an assessment of rights, such as whether a particular right was infringed in a specific circumstance, whether any infringement was justified, or whether a duty to consult arose and was or was not met. However, I must consider and be informed by the current status of Aboriginal and treaty rights to fish, as discussed in Chapter 3, Legal framework.

Ms. McGivney, former regional director of Treaty and Aboriginal Policy and Governance Directorate, Pacific Region, told me that DFO is aware that its fisheries management actions have the potential to infringe on Aboriginal rights.[905] However, I was also told that DFO holds no mandate to determine whether an Aboriginal group holds an Aboriginal or treaty right to fish, nor does DFO have any mandate to assess the nature or scope of such right.[906] When Aboriginal rights claims arise, DFO does not have any process to assess them. Instead, it takes the position that questions related to the scope and extent of Aboriginal rights are to be resolved through the treaty process or through litigation.[907] Ms. McGivney acknowledged that treaty negotiators and courts have yet to resolve Aboriginal rights claims, creating challenges for DFO in managing the Fraser River sockeye salmon fishery.[908]

Instead of determining what Aboriginal fishing rights are held by whom, DFO manages Aboriginal participation in the fishery by using a policy-based approach and by offering programs to support Aboriginal participation in the fishery and in fisheries management.[909] These policies and programs are described below.

Aboriginal fishing policies and programs

DFO has a long history of managing Aboriginal participation in the Fraser River sockeye salmon fishery, as described in Chapter 1, Commission's mandate. Many of DFO's current programs follow the Aboriginal Fisheries Strategy (AFS), introduced in 1992 to provide for the management of the fishery in a manner consistent with the minister's conservation responsibilities and with the Supreme Court of Canada's 1990 decision in *R. v. Sparrow*.[910]

Aboriginal Fisheries Strategy

The Aboriginal Fisheries Strategy is a national program that involves the negotiation of time-limited fisheries agreements (AFS agreements) between Aboriginal organizations and DFO regarding fisheries allocations and conditions attached to Aboriginal communal fishing licences. In addition to addressing allocations for food, social, and ceremonial (FSC) fishing purposes, AFS agreements may provide commercial fishing access, as discussed below. Also, AFS agreements may provide funding for participation in fisheries management or other projects. These agreements expressly do not recognize an Aboriginal or treaty right to fish and are made without prejudice to the positions taken by any party with respect to such rights.[911]

An Aboriginal group is eligible to enter into AFS agreements if it represents an identifiable community base, has a history of fishing, is presently active in fishing, and has a governance structure in place that represents its membership in the negotiation of the particular AFS agreement.[912] To receive AFS funding between 1993 and 1999, Aboriginal groups were also required to sign onto the 1993 Fraser Watershed Agreement, as described below in the section describing the history of DFO's co-management efforts.[913]

In 1992, DFO announced the AFS as a seven-year, $140 million, national program with 70 percent of the funds to be spent in British Columbia.[914] At the time, DFO hoped that the AFS would serve as a bridging arrangement in fisheries matters during the negotiation of land claims and self-governance agreements, such as treaties, which Canada anticipated would be completed within a decade.[915] As described later in this Report, treaty negotiations have not yielded agreements as quickly as originally hoped. The AFS is now a permanent program.[916] From 1992 to 2010, AFS agreements provided a total of $303,884,982 to Aboriginal organizations in the Pacific Region to fund a variety of activities.[917] For example, in

the 2009/10 fiscal year, Pacific Region Aboriginal organizations received approximately $14.4 million in AFS funds for co-management activities.[918]

Policy for the Management of Aboriginal Fishing

In 1993, DFO created its national Policy for the Management of Aboriginal Fishing, to guide the implementation of the AFS.[919] It defines Aboriginal fishing* as fishing under the authority of a communal licence issued pursuant to the *Aboriginal Communal Fishing Licences Regulations*, whether for FSC purposes or for sale.[920] The Policy for the Management of Aboriginal Fishing applies to all species of fish and covers a broad range of Aboriginal fishing topics.

As discussed above, DFO takes a policy-based approach to managing the Aboriginal fishery.[921] The Policy for the Management of Aboriginal Fishing sets out many of DFO's core policy principles, such as limiting Aboriginal communal fishing to an Aboriginal group's historical fishing areas, issuing communal rather than individual fishing licences, providing Aboriginal groups with priority access for FSC fishing, and consulting with Aboriginal groups regarding fisheries allocations, whether they have entered into a treaty or obtained a determination of an Aboriginal FSC fishing right in court.[922] This policy remains in effect.

Allocation Transfer Program

In 1994, DFO introduced the Allocation Transfer Program (ATP) as part of the AFS.[923] According to DFO, the goal of the ATP is to increase Aboriginal access to commercial fisheries and to support fisheries-based economic development for coastal First Nations.[924] The ATP acquires commercial fishing access for Aboriginal groups by purchasing commercial fishing licences from commercial fishers on a voluntary basis. The fishing licences are then permanently retired from the general commercial fishing fleet, and an equivalent commercial fishing capacity (licence or allocation) is issued to Aboriginal organizations under AFS agreements.[925] ATP funds may also be used to pay for fishing gear, equipment, commercial fishing vessels, and other related costs.[926]

When DFO announced the ATP in 1994, it was presented as a national six-year program with $42 million in funding over six years.[927] The ATP was later extended and provided with relatively stable funding, including $4 million to $6 million in ATP funds to the Pacific Region each year.[928] For example, in the 2009/10 fiscal year, approximately $5.4 million in ATP funds were used for Pacific Region Aboriginal groups to acquire fishing equipment and commercial fishing access across a range of species.[929] With respect to salmon, DFO spent $19,115,103 in ATP funds between 1994 and 2011 to purchase commercial Pacific salmon access (licences and quota) for transfer to Aboriginal organizations.[930] DFO spent an additional $2,124,579 to purchase commercial Pacific salmon fisheries access in pre-ATP programs from 1992 to 1994.[931]

Aboriginal Aquatic Resources and Oceans Management Program

In 2004, DFO introduced the Aboriginal Aquatic Resources and Oceans Management Program (AAROM) as a national contribution funding program with three areas of focus: co-management, capacity building, and economic opportunities for First Nations.[932] The co-management component of AAROM pays for the creation of Aboriginal fisheries organizations formed by multiple Aboriginal groups working together. These groups, referred to as AAROM bodies, allow First Nations to share administrative and communications capacity and to engage shared biologists, technicians, and fisheries advisors.[933] DFO intends that AAROM bodies will facilitate Aboriginal participation in DFO advisory and decision-making processes, but these aggregate groups are not expected to replace existing relationships between the department and individual First Nations.[934] The capacity-building component of AAROM provides funding to groups that have not formed an AAROM body

* I note that on June 29, 2012, Bill C-38, *An Act to implement certain provisions of the budget tabled in Parliament on March 29, 2012 and other measures* (Bill C-38), received royal assent. Part 3, Division 5, of Bill C-38 amends the *Fisheries Act*, including a new definition for "Aboriginal" in the context of fisheries: "'Aboriginal', in relation to a fishery, means that fish is harvested by an Aboriginal organization or any of its members for the purpose of using the fish as food or for subsistence or for social or ceremonial purposes" (s. 133).

but are interested in working together with other Aboriginal organizations. These funds may be used to pay for meetings among Aboriginal groups, develop business practices, and pay for administrative, financial, and legal preparations for the establishment of an AAROM body.[935] The economic opportunities component of AAROM funds the acquisition of commercial fisheries access for AAROM bodies and the development of Aboriginal aquaculture-related activities.[936]

When DFO announced AAROM in 2004, it was presented as a five-year contribution program. However, it has since been extended to March 31, 2014.[937] In the Pacific Region, between $6 million and $7 million are spent on AAROM funding each year.[938] Between 2004 and 2010, $28,586,433 in AAROM funds were distributed to Aboriginal organizations in British Columbia, several of which* participated in this Inquiry.[939] Also, between 2004 and 2006, $3,291,200 in AAROM funds were used in the acquisition of commercial Pacific salmon fisheries access for Aboriginal organizations.[940]

Integrated Aboriginal Policy Framework

DFO's 2006–10 national Integrated Aboriginal Policy Framework (IAPF) sets out seven action plan strategies for the department:

- building and supporting strong, stable relationships with Aboriginal people;
- taking into account Aboriginal and treaty rights by carrying out DFO's mandate in a manner consistent with constitutional principles;
- participating in the negotiation of land claims agreements as part of the processes led by Indian and Northern Affairs Canada;
- supporting increased Aboriginal participation in co-management of aquatic resources;
- providing for increased Aboriginal participation in integrated commercial fisheries and other economic opportunities;
- building Aboriginal capacity to participate in the aquatic sector; and
- building DFO's capacity to serve Aboriginal groups.[941]

DFO says the IAPF will guide its employees in discussions with federal agencies, provinces, territories, stakeholders, and Aboriginal groups and provide employees with strategic policy direction for the development of operational guidelines and programs.[942] The IAPF does not replace the Policy for the Management of Aboriginal Fishing. The definition of co-management contained in the IAPF is discussed below in the section on co-management.

Pacific Integrated Commercial Fisheries Initiative

In 2007, DFO introduced the Pacific Integrated Commercial Fisheries Initiative (PICFI), a five-year $175 million initiative to "support the long-term economic viability of BC commercial fisheries and the sustainability of fisheries resources."[943] PICFI objectives include "lay[ing] the foundation for all industry participants, First Nation and non-First Nation, to work together on harvest strategies to maximize the value of commercial fisheries" and "provid[ing] greater certainty around the participation of BC First Nations in the commercial fishery, while supporting sustainable First Nation communities and greater economic self-sufficiency."[944] According to DFO, PICFI also supports conservation objectives by increasing catch monitoring and reporting for all resource users and by supporting the enforcement activities of DFO's Conservation and Protection Branch (see discussion in Chapter 7, Enforcement).[945]

PICFI is structured around four "elements," with funding distributed among them over five years as follows:

1 increased First Nations' access to commercial fisheries – $115 million
2 capacity building – $12.5 million
3 co-management – $11 million
4 enhanced accountability – $10.5 million[946]

The commercial access component of PICFI pays for the acquisition of commercial fishing licences, quota, vessels, and gear from the general commercial fishery in order to support Aboriginal commercial fisheries enterprises.[947] A maximum of 15 percent of PICFI licence relinquishment funding is applied to

* For example, the Upper Fraser Fisheries Conservation Alliance, the First Nations Fisheries Council, and the Aboriginal Caucus of the Fraser River Aboriginal Fisheries Society.

salmon access, with the remainder of funds used for other coastal fisheries.[948] The capacity-building component of PICFI pays for the creation of Aboriginal commercial fisheries enterprises and for training and business planning.[949] The co-management component of PICFI pays for Aboriginal participation in fisheries management processes and for work on developing new governance models and share-based management.[950] The enhanced accountability component of PICFI pays for increased fisheries monitoring and catch reporting, compliance monitoring, and the development of a harvest traceability framework. (For further information, see Chapter 7, Enforcement, and the previous section of this chapter on catch monitoring and reporting.)

As described above, PICFI is a five-year, $175 million initiative. From 2007 to 2010, PICFI funds were distributed to Aboriginal organizations through AFS agreements ($303,104),* PICFI agreements ($249,700), and AAROM agreements ($1,266,807).[951] In addition, from 2007 to 2011, $14,674,685 in PICFI funds were used to acquire commercial Pacific salmon fisheries access for Aboriginal organizations.[952] At the time of the hearings in September 2011, PICFI was set to expire on March 31, 2012.†

Aboriginal Fisheries Framework

DFO's 2009 Aboriginal Fisheries Framework is a brief document that, according to DFO, is intended to provide "a more coherent, policy-based approach to addressing Aboriginal participation in BC fisheries and managing *Charter* section 35 rights, both inside and outside of treaty."[953] In drafting the framework, DFO recognized that "the negotiation and implementation of First Nation fishing arrangements in BC treaties have become increasingly challenging" and that it needed to explore options that are "significantly different from the current approach to treaty negotiation in BC."[954] These options may include (a) negotiation of fisheries treaties or agreements with First Nations aggregates, independent of other treaty elements, and (b) non-treaty alternatives such as enhancing current Aboriginal fishing programs, declaring overall First Nations shares for salmon by major watershed, and developing sharing arrangements and integrated management processes with First Nations.[955]

The Aboriginal Fisheries Framework sets out overarching principles for Aboriginal fisheries management, many of which originate from previous policies.[956] Significantly, it also contains an undisclosed percentage representing the overall proportion of the available salmon harvest to be allocated to First Nations for both FSC and economic fishing purposes.[957] However, the clerk of the privy council certified this percentage allocation and related information as a cabinet confidence and, as a result, DFO could not provide it to me.

DFO's budget for Aboriginal fisheries programs

As described in Chapter 4, DFO overview, Pacific Region Aboriginal fisheries policies and programs are implemented by the Treaty and Aboriginal Policy and Governance Directorate (TAPG Directorate).[958] In the 2009/10 fiscal year, the TAPG Directorate spent approximately $56.7 million, down from approximately $58 million the year before.[959] In comparison, in 2009/10, DFO's Pacific Region Conservation and Protection Branch spent $20.6 million, Pacific Region Resource Management spent $20.4 million, and Pacific Region DFO spent $1.1 million on environmental assessments.[960]

Of the $56.7 million spent by the TAPG Directorate, $2.6 million was used for DFO salaries and $1.9 million was spent on internal operating expenses.[961] The remaining $52.1 million was distributed to Aboriginal organizations as follows:

$6.2 million	Aboriginal Aquatic Resource and Ocean Management Program (AAROM)
$1.4 million	AAROM and Pacific Integrated Commercial Fisheries Initiative (PICFI)
$14.4 million	Aboriginal Fisheries Strategy (AFS) – Co-management
$5.4 million	Allocation Transfer Program (ATP)

* This amount is included in the value given for total AFS agreement funds described earlier.

† I note that in the budget tabled in Parliament on March 29, 2012, the government proposes to provide "$33.5 million in 2012–13 to extend the Atlantic Integrated Commercial Fisheries Initiative and the Pacific Integrated Commercial Fisheries Initiative."

$21.5 million	PICFI – Acquisition of Fisheries Access*
$3.2 million	PICFI – Other[962]

In fiscal years 1992–2010, the total value of AFS funding agreements entered into with Aboriginal organizations in DFO's Pacific Region was $303,884,982.[963] In addition, $28,586,433 in AAROM funds were distributed from 2004 to 2010, and from 1992 to 2009, a total of $36,706,162 in ATP,† AAROM, and PICFI funds were used to acquire commercial Pacific salmon fisheries access for Aboriginal organizations.[964]

I heard from DFO and Aboriginal witnesses that DFO's internal capacity to manage Aboriginal fisheries is strained. Mr. Shepert, chair of the Upper Fraser Fisheries Conservation Alliance, told me that DFO staff are "spread thin" and that it is sometimes difficult to get the right people to the negotiation table.[965] Mr. Huber, Aboriginal affairs advisor, BC Interior, DFO, put it this way: "Our department, I would say, is facing more challenges in many cases than the First Nations, as we have a lot of staff that need capacity built as well."[966]

DFO's management of food, social, and ceremonial fisheries

My Terms of Reference direct me to develop recommendations for improving the future sustainability of the Fraser River sockeye salmon fishery. I begin by considering those aspects of DFO's management of Aboriginal food, social, and ceremonial fishing that relate to the sustainability of the Fraser River sockeye salmon fishery as a whole.

Lack of definition for FSC fishing

DFO has no specific definition for the term "food, social, and ceremonial" fishing except that fish harvested for such purposes cannot be sold.[967] Ms. McGivney agreed that there is no clarity on what this term means.[968] As discussed below, this lack of definition has led to Aboriginal and non-Aboriginal concerns about the appropriate quantification of FSC fishing allocations, which enjoy a priority of access over commercial and recreational fisheries.

Aboriginal witnesses offered some guidance as to their understanding of the meaning of FSC fishing. In relation to food, Chief William Charlie of the Chehalis Indian Band explained that salmon is the main diet of his people.[969] Chief Kimberley Baird of the Tsawwassen First Nation similarly said that salmon has been the mainstay of the Tsawwassen diet for "all of living memory," and Joseph Becker of the Musqueam First Nation explained that salmon is required to meet the food needs of elders and people with disabilities.[970] A lack of salmon for food has been particularly troubling for Councillor June Quipp of the Cheam Indian Band, who sees the impact of such loss on "people in her community who live in poverty" and who rely on fish to avoid starvation.[971]

Several witnesses also offered their views on the definition of "social" fishing. Grand Chief Clarence Pennier of the Stó:lō Tribal Council said that the Stó:lō peoples conduct a dry-rack fishery for both food and cultural purposes.[972] Chief Fred Sampson of the Siska First Nation (Nlha7apmx Nation) explained that food is only part of the story; "the community's social needs are also critical."[973] Grand Chief Saul Terry of the St'at'imc Nation explained that the cultural aspect of fishing is a "profound thing" that reaches beyond simply catching fish for food to include all the practices surrounding such activity.[974] For the Cheam fishers, that includes sharing a fishing lifestyle, taking pride in feeding salmon to guests visiting their territory, and caring for elders.[975] The Stó:lō peoples, among other groups, teach the importance of feeding guests at social functions – and the menu includes salmon.[976] The act of fishing itself may also be considered a social activity. Chief Baird said that Tsawwassen fishers want to participate and be on the river, whether one fish or a hundred are caught.[977] Captain Gary Ducommun of the Métis Nation of British Columbia similarly said that "fishing is a social practice for Métis people."[978] Members of the Laich-kwiltach Treaty Society consider it important to have whole families engaged in fishing, allowing youth and elders to spend time together every year.[979] DFO has no clear definition of "social," and there has

* This value is not exclusively salmon access.

† This total includes funds preceding the ATP, beginning in 1992. See Exhibit 1430.

been a long-standing disagreement between First Nations and DFO on this point.[980] Despite this lack of agreement, Ms. McGivney acknowledged that she has not specifically worked with indigenous peoples on reaching an agreed definition of social fishing.[981]

According to Ms. McGivney, DFO views ceremonial fishing as including fishing for weddings, funerals, births, and celebrations around those events.[982] However, DFO area office staff members have expressed concerns about elevating levels of ceremonial catch in the Lower Fraser River area, and they have noted a lack of guidance on how to respond. A June 2009 email from a resource management director to Aboriginal fisheries managers observes:

> DFO staff are concerned about escalating levels of ceremonial catch in the Lower Fraser. There is a growing number of requests to fish for ceremonial purposes during the week when there is communal fishing during the weekend. There are no guidelines on what should be considered appropriate criteria / circumstances for ceremonial harvest.[983]

First Nations have offered various views on the definition of "ceremonial" uses for fish. Chief Edwin Newman of the Heiltsuk Nation stated that salmon has an important place in the Heiltsuk potlatch ceremony, and Grand Chief Pennier stated that the Stó:lō require salmon for an annual "first salmon ceremony" in addition to memorials, weddings, winter dances, naming ceremonies, births, and womanhood and manhood ceremonies.[984] Chief Charlie offered a more inclusive definition, which, in addition to winter, wedding, life, death, change of life, and naming ceremonies, would include other gatherings with a "spiritual purpose," because "one cannot define what a ceremony is."[985]

Despite the absence of a clear definition for food, social, and ceremonial fishing, Mr. Rosenberger told me that DFO tries to arrive at FSC allocations that reflect the genuine food, social, and ceremonial needs of Aboriginal communities.[986] It attempts to do so through negotiations between its resource managers and representatives from Aboriginal groups.[987] DFO provides its resource managers with a "mandate" or maximum number of FSC sockeye that may be included in an AFS agreement as well as with "guiding principles" related to managing FSC fisheries.[988]

To inform negotiations on FSC allocation, DFO considers a number of factors.[989] The 1993 Policy for the Management of Aboriginal Fishing lists these factors as including the group's population, recent FSC harvests, harvest preferences, and the availability of fish species in the area.[990] Ms. McGivney said the First Nation's interests in a fish species, the breadth of species available, access of other First Nations to the species, and the status of fish resources are further considerations.[991] In quantifying FSC allocations, DFO may consider whether past FSC fish harvests have been sold, but during Ms. McGivney's time as regional director of the Treaty and Aboriginal Policy and Governance Directorate, DFO has never reduced an FSC allocation on that basis.[992] The factors applied by DFO in determining FSC allocations are publicly available information,* and it appears that some Aboriginal groups are aware of them. The *BC First Nations Fisheries Action Plan*, a report prepared in 2007 by the BC First Nations Leadership Council,† advises First Nations to "increase food, social and ceremonial use to increase baseline calculations used by governments in developing their [FSC allocation] mandates."[993]

Where negotiations fail to produce an agreement on the quantity of fish to be taken and the conditions under which a group may fish for FSC purposes, DFO's policy is to issue a communal licence to the group in any event, with an FSC allocation as determined by DFO.[994] Once an overall FSC allocation is determined, it is up to the Aboriginal group to manage its use of the fish and to set aside fish as necessary to meet its various food, social, and ceremonial needs.[995] During the fishing season, an Aboriginal group may request a change to its FSC allocation, and the request will be considered by DFO according to an evaluation and decision framework it developed to assist fisheries managers to respond to such requests.[996]

I heard many concerns regarding DFO's current method of determining FSC allocations. Several Aboriginal witnesses felt that the allocated numbers

* For example, the 1993 Policy for the Management of Aboriginal Fishing is available on the DFO website.

† Consisting of the BC Assembly of First Nations, the First Nations Summit, and the Union of BC Indian Chiefs.

were arbitrary.[997] Chief Robert Mountain of the Namgis First Nation did not see any relationship among the allocated number, the need for conservation, and the food fishery needs expressed by his Aboriginal group.[998] Chief Baird also said that the allocation "ceiling" was arbitrary and stated that First Nations lack clarity on how they are arrived at.[999] Further, Heiltsuk fisheries advisor Ross Wilson said he did not know where the 20,000 sockeye allocation for Heiltsuk came from.[1000] Chief Newman testified that the Heiltsuk did not want DFO or anyone outside to number their FSC needs; rather, they wanted to determine that number.[1001] In fact, the Heiltsuk have produced a study to determine the needs of their people, including the number of sockeye required to meet their "basic food and feasting requirements."[1002] Similarly, Grand Chief Terry testified that an FSC need is something that groups "have to determine for [themselves]."[1003]

Mr. Rosenberger testified that, although some First Nations have supported their FSC allocation requests with documentation, others have requested a fixed number without such support.[1004] Ms. McGivney said that First Nations often have not quantified their needs.[1005] Mr. Shepert was not aware of any Upper Fraser Aboriginal group that had determined what their food requirements were.[1006] Some witnesses expressed reluctance to be tied to any number. For example, Councillor Quipp testified that her "indicator … as to whether we've filled an allocation that we need, or that the needs of our people are being filled, is if we don't hear any more complaints about one of our members getting enough salmon for the year."[1007] Similarly, Grand Chief Terry said: "We don't go to DFO a lot of times to be able to calculate these matters. The need is there … our folks, when they go fishing, they are the ones that determine what it is that they're going to need for the winter in their calculation."[1008]

In 2009, DFO allocated a total of 1,029,650 Fraser River sockeye salmon for harvest in Aboriginal FSC fisheries as follows: 260,050 to South Coast area groups, 437,000 to Lower Fraser area groups, and 332,600 to groups in the BC Interior area.[1009] Allocations for FSC purposes, in general, remain fairly static.[1010] A 2006 presentation to DFO's Regional Management Committee from the Treaty and Aboriginal Policy and Governance Directorate noted that there had been "no global or strategic review of FSC allocations since they were first established under [the] AFS in 1992."[1011] Although agreeing that the global allocation had remained consistent, Mr. Rosenberger told me that a few groups have had substantial changes to their allocations.[1012]

The sufficiency of allocations appears to be of broad concern for First Nations. Several Aboriginal witnesses testified to their desire for increased FSC fishing allocations. Mr. Wilson told me that the Heiltsuk requested an increase of 5,000 sockeye to their allocation in 2011, and a DFO memorandum indicates that First Nations throughout the South Coast area have said that their FSC allocations for salmon do not meet their needs.[1013] In 2004, the First Nations Panel on Fisheries recommended in *Our Place at the Table: First Nations in the BC Fishery* that Canada take immediate steps to allocate to First Nations a minimum 50 percent share of all fisheries, with the understanding that this proportion may reach 100 percent in some fisheries.[1014] Similarly, the 2007 First Nations Fisheries Action Plan states as an action item that "First Nations will develop a political, public relations and inter-governmental strategy to achieve a First Nations majority share of all fisheries resources, based on Aboriginal priority rights to the fishery."[1015] I note that the First Nations Panel on Fisheries and the *BC First Nations Fisheries Action Plan* recommendations were not limited to FSC allocations but are indicative of the desire for a greater Aboriginal share in the fisheries generally.

I also heard concerns that FSC allocations for Fraser River sockeye may be inconsistent among Aboriginal groups. A DFO memorandum to the regional director general in 2005 noted that "the combined allocation to the 21 First Nations on southeast Vancouver Island results in an average of 10 sockeye per person, but ranges from 5 to 22 per person on a band by band basis."[1016] There are also inconsistent allocations among the Lower Fraser and Upper Fraser groups situated on the migratory path of Fraser River sockeye. For example, in the Lower Fraser in 2009, the Musqueam First Nation was allocated an average of 61 sockeye per person, while the Squamish First Nation was allocated five sockeye per person.[1017] In the BC Interior in 2009, the High Bar First Nation (north of Kamloops) was allocated an average of 110 sockeye per person, while the Kluskus First Nation (near Quesnel) was allocated only seven sockeye per person.[1018]

The concern over potentially inconsistent allocations appears to have been present for some time. In 1987, before the introduction of pilot sales fisheries, a DFO memorandum noted that the Stó:lō caught roughly 600 pounds (272 kg) of sockeye per person, whereas the Carrier Sekani caught 50 pounds (22.6 kg) per person.[1019] An internal DFO presentation dated 2006 indicates that DFO is aware of the existence of FSC allocation disparities. It states that fisheries managers are often asked to expand FSC fishing allocations and access "without an analytical framework or clear administrative framework" and that this gap "has lead to ad-hoc decisions, confusion, disparities among [First Nations], and inconsistencies between AFS and treaties."[1020] In a written response to an information request from Commission counsel, DFO, through its counsel the Department of Justice, explained that "the FSC allocation per capita can be highly variable" because "population size is only one factor that would inform an appropriate FSC allocation."[1021] DFO would not "impose equal per capita allocations but would consider the approach if proposed collectively by all affected First Nations."[1022]

I also heard concerns that some FSC allocations may be too high. For example, in 2002, the Kwantlen First Nation harvested 39,249 FSC Fraser River sockeye for a population of 173 people, or over 226 sockeye salmon per person.[1023] This total is in addition to the 1,035 chinook, 21 steelhead, 224 coho, and 1,504 chum harvested by this group, for a total of 42,033 fish, or almost 243 fish per person harvested for food, social, and ceremonial consumption.[1024] Mr. Crey, of the Stó:lō Tribal Council, acknowledged that "on the face of it, it looks like a lot of fish," but he explained that, though fish are used for food, they are also shared more broadly, and the harvest should not be considered simply on a per person basis.[1025]

Allocating FSC fisheries access in a transparent manner

As described above, DFO seeks to allocate fisheries access to Aboriginal organizations through a process of negotiation.[1026] It provides its negotiators with confidential mandates setting out the maximum number of fish and funding they may agree to with First Nations.[1027] These mandates are the "long-term upper limit for allocations," and DFO has developed a mandate for each Aboriginal group holding a communal licence to participate in the Fraser River sockeye fishery.[1028] Mandate numbers are not disclosed to Aboriginal groups or to the public.[1029] However, a 2006 internal review of fisheries mandates found that the majority of First Nations communal fishing licences already reflect maximum mandate levels.[1030]

In addition to setting existing mandates, I heard that, around 2008, DFO began to examine how future Aboriginal and non-Aboriginal fisheries allocations might compare following the completion of treaties.[1031] This project was called the Coastwide Framework, and it was intended to address public concerns that fisheries allocations made to First Nations under treaties might not leave sufficient allocation room to support non-Aboriginal fisheries.[1032] The Coastwide Framework was developed over a number of years and involved the creation of thousands of documents shared among the most senior officials at DFO.[1033] This process led to the creation of the Aboriginal Fisheries Framework (discussed above), which received ministerial approval in the fall of 2009.[1034] However, the finalization of the Coastwide Framework was deferred pending the findings and recommendations of this Inquiry.[1035]

The Aboriginal Fisheries Framework represents the culmination of work under the Coastwide Framework process and captures the current status of DFO's policies on Aboriginal fisheries.[1036] Like other DFO framework documents, it sets out an overarching approach to Aboriginal fisheries and lists key principles, but it does not provide specific direction on its application or implementation.[1037] Many of these principles have appeared in previous policies.[1038] Perhaps the most substantial development in the Aboriginal Fisheries Framework is the articulation of an overall percentage of the available salmon harvest to be allocated to First Nations for both FSC and economic opportunity fisheries.[1039] The actual percentage was not provided to the Commission because, as I explained above, the clerk of the privy council certified the percentage allocation and related information as a cabinet confidence. However, DFO confirmed that the FSC component of this allocation will, for the purpose of treaties, include a negotiated one-time increase over current FSC fishing levels to account for future population growth.[1040]

DFO has not specifically consulted with First Nations or others on its development of the Aboriginal Fisheries Framework, on the concept of an overall salmon allocation for First Nations, or on the actual salmon allocation itself.[1041] Instead, Ms. McGivney told me that DFO created the Aboriginal Fisheries Framework based on information from previous consultations with First Nations, from documents such as *Our Place at the Table* and the *BC First Nations Fisheries Action Plan*, and from previous discussions with commercial and recreational fishers.[1042]

Although neither I nor the public are privy to the overall percentage of salmon allocated to First Nations in the Aboriginal Fisheries Framework, I have learned through this Inquiry some of the ways in which it is applied. According to Ms. McGivney, the percentage allocation covers both FSC fishing and Aboriginal communal fishing for economic purposes.[1043] The percentage allocation is to be achieved over a number of years, on average, recognizing that in years of low salmon returns, the FSC fishery may form a higher percentage of catch.[1044] Although the overall salmon allocation percentage is not currently used to set negotiation mandates, any changes to existing mandates must be consistent with this percentage.[1045] The ATP and PICFI commercial access programs are guided by this percentage; treaty negotiations, when they occur, take this percentage into account; and any new programs or provision of economic opportunity fisheries, including a move to terminal fisheries, must also be consistent with this percentage.[1046]

FSC fisheries access in years of low abundance

DFO policies such as the 1993 Policy for the Management of Aboriginal Fishing, the 1999 Allocation Policy for Pacific Salmon, and the 2005 Wild Salmon Policy all state that the first priority of access to fish after conservation is to Aboriginal people for FSC purposes.[1047] As described in Chapter 3, Legal framework, the priority of access for FSC fishing originates from the Supreme Court of Canada's decision in *R. v. Sparrow*. Without making any determination on whether DFO has met its obligation to grant priority of access to FSC fisheries, I note that, in years of low abundance of Fraser River sockeye, the majority of these fish were harvested by Aboriginal fishers. For example, nearly 100 percent of Fraser River sockeye returns were harvested in FSC fisheries in 2009 and 2007, over 90 percent in 2008, and over 80 percent in 2005 and 1999.[1048]

Nevertheless, I heard that many Aboriginal groups experience difficulty in harvesting their FSC allocations. Mr. Huber told me that the poor returns of certain fish stocks meant that many First Nations have not met their FSC allocations for some time.[1049] Chief Newman advised that the Heiltsuk have not caught their FSC allocation for "a number of years" because the fish aren't there or else have passed Heiltsuk fishing areas before anyone realized they were there.[1050] Mr. Shepert told me that most of the Aboriginal groups north of Williams Lake had not received their FSC fish and that, for the 15 years he has been working on fisheries matters, he has never seen First Nations in the Upper Fraser obtain the number of fish they need.[1051] The year 2009 was especially difficult. The 2010 southern salmon Integrated Fisheries Management Plan post-season review notes that, due to low returns in 2009,* the total First Nations FSC harvest was only 61,429 sockeye in the Fraser River watershed and 10,144 Fraser River sockeye in the marine waters, totalling a small fraction of the 1,029,650 Fraser River sockeye allocated for FSC fisheries that year.[1052] This evidence emphasizes the importance of conservation, to ensure that sufficient numbers of fish return to meet FSC fishing and other purposes.

DFO's management of Aboriginal economic opportunity fisheries

I turn now to the department's policies and practices surrounding the Aboriginal economic opportunity fishery. In particular, I consider how they may affect the future sustainability of the Fraser River sockeye salmon fishery as a whole.

DFO's programs to support Aboriginal economic opportunity fishing

As described in Chapter 1, Commission's mandate, Aboriginal fishers participate in the

* In 2009, there were no commercial fisheries openings for Fraser River sockeye salmon.

general commercial fishery on an individual basis. In addition, several DFO programs seek to provide Aboriginal groups with communal access to economic fisheries. In 1992, DFO initiated the Pilot Sales Program to provide Aboriginal groups with economic access to fisheries in three locations: the Lower Fraser River, the Skeena River, and the Alberni Inlet–Somass River.[1053] In the Lower Fraser River, DFO authorized pilot sales fisheries under AFS agreements and communal fishing licences issued to the Stó:lō, Musqueam, and Tsawwassen nations.[1054] Between 1992 and 2003, pilot sales agreements set out a single allocation of fish that combined both FSC and economic fishing access: First Nations could decide how much of the allocation they wished to sell.[1055]

The Pilot Sales Program was suspended in 2003 and replaced the following year by communal "economic opportunity fisheries."[1056] Economic opportunity fisheries differ from pilot sales in that they clearly separate fishing allocations for economic purposes from allocations for FSC purposes.[1057] According to Ms. McGivney, the idea was to provide a "level playing field" and have a "fishery that's of the same priority for all of the groups" involved.[1058] It is currently DFO's policy not to provide any priority for Aboriginal economic opportunity fisheries unless such a right has been proven in court.[1059] However, there are several differences in fisheries management between the general commercial fishery and the Aboriginal economic opportunity fishery. For example, the management of economic opportunity fisheries does not fall under the authority of the Fraser River Panel, and DFO does not, to Ms. McGivney's knowledge, enter into comprehensive fisheries agreements or monitoring and enforcement protocols with general commercial fishers.[1060]

According to DFO, economic fishing access is provided to First Nations through the voluntary relinquishment of equivalent access from the general commercial fishery.[1061] DFO programs to acquire fisheries access from the general commercial fishery include the ATP, AAROM, and PICFI, as described above. These programs have invested significant funds in acquiring access for First Nations to commercial Pacific salmon fisheries:

- ATP: $19,115,103 from 1994 to 2011 and $2,124,579 in pre-ATP funds from 1992 to 1994.
- AAROM: $3,291,200 from 2004 to 2006.
- PICFI: $14,674,685 from 2007 to 2011.[1062]

As of January 2011, DFO had spent $39,205,567 to acquire commercial salmon fishing access for Aboriginal organizations in the Pacific Region.[1063] As of August 2011, 21.7 percent of Pacific salmon seine licences, 17.5 percent of salmon gillnet licences, and 11.0 percent of salmon troll licences were held in the Aboriginal communal commercial fishery.[1064] Including other species as well as gear and vessel acquisition, DFO has spent approximately $210 million since 1994 to provide Pacific Region First Nations with commercial fishing access.[1065] According to the First Nations Fisheries Council, PICFI has facilitated the creation of 25 Aboriginal commercial fishing enterprises in British Columbia, and each of these businesses has received between $4 million and $7 million in commercial licences and quota acquisition.[1066] However, a First Nations Fisheries Council report suggests that "a larger base of licenses and quota is needed to ensure widespread success for First Nations seafood businesses."[1067]

According to DFO, programs such as ATP and PICFI are "important components of Canada's economic development programming for First Nations."[1068] Chief Sampson told me that economic fisheries in his area provide "opportunities to those who are often the poorest of the poor in this province" and that benefits from such fisheries are significant.[1069] However, I also heard some witnesses prioritize their conservation and FSC fishery concerns over increasing economic benefit. Mr. Huber testified that, for several years after PICFI started, "there just wasn't fish available" for harvest, and it was difficult for many First Nations in the BC interior to consider the development of economic fisheries in their region "when they felt their own food fisheries, traditional fisheries, were being threatened."[1070] Other witnesses noted that achieving healthy fish stocks is a prerequisite to commercial fishing success. For example, Chief Sampson told me that "a viable commercial fishery can only happen when the stocks are able to sustain themselves again."[1071] Julie Stewart, director of PICFI, said that the economic fisheries would be successful only if fish return in sufficient numbers to support them.[1072]

As described above, PICFI was announced in 2007 as a five-year, $175 million program. It is currently the largest program in British Columbia for increasing Aboriginal access to commercial fisheries. Several Aboriginal witnesses and participant groups suggested that DFO should renew PICFI to continue transferring commercial fisheries access to First Nations. Chief Russ Jones, a hereditary chief of the Haida Nation, a member of the First Nations Panel on Fisheries,* and a council member of the First Nations Fisheries Council, told me that the PICFI program is the "first step to addressing those longstanding injustices" of limited Aboriginal access to the fishery.[1073] He said that the First Nations Fisheries Council would like to see PICFI renewed for a further five years and with an additional $450 million in funds to increase the First Nations' share of commercial fisheries to 33 percent.[1074] According to a report by the First Nations Fisheries Council, "conditions are right so that a major surge in transfer can quickly generate widespread success" for First Nations commercial fishers. After 2017, the report suggests, additional programs would be necessary for First Nations to achieve a majority share in all fisheries by the year 2024.[1075]

An internal DFO review of PICFI, dated August 2010, noted that "PICFI's effectiveness to date has been mixed."[1076] Although PICFI acquired licences from the commercial fishery, the program had yet to reach any long-term access agreements with Aboriginal organizations, and the development of Aboriginal capacity-building and governance structures had been "slower than expected."[1077] The review also stated that 37.5 percent of individuals interviewed felt that PICFI was economical, and 62.5 percent said either that they did not know if it was economical or that it was not economical (34.4 percent and 28.1 percent, respectively).[1078] Ultimately this review "found some evidence that PICFI is efficient and economical" and recommended that DFO "plan for the continuation of PICFI activities after the five-year program ends, contingent on available resources."[1079]

Efforts to build a co-management relationship with Aboriginal peoples

A history of DFO's co-management efforts

In recent decades, DFO has attempted to build a co-management relationship with Aboriginal peoples, many of whom have long desired more involvement in the management of the fishery. In this section of the Report, I describe the efforts both DFO and Aboriginal organizations have made toward the development of a co-management relationship and the challenges they have faced in doing so.

Although the discussion of policies and practices for Aboriginal fishing contained in this Report has primarily focused on the period following the 1990 *Sparrow* decision, Aboriginal organizations have long expressed their desire for a role in fisheries management. As early as 1987, an internal DFO memorandum on the status of the Aboriginal fishery noted that Aboriginal organizations had, over the years, submitted more than 25 co-management proposals to the department.[1080] These proposals included one from the Stó:lō Tribal Council seeking "the equal sharing of Fraser River fishery resource management responsibilities between Stó:lō people as original owners of the resource, and the Canadian government, representing other resource users and the Canadian people."[1081] In 1991, with pressure from Aboriginal groups for co-management mounting and before the launch of the Aboriginal Fisheries Strategy, DFO introduced an Aboriginal Fisheries Co-operative Management Program to fund Aboriginal participation in fisheries management, enhancement, and habitat improvement activities.[1082]

In 1992, DFO launched its Aboriginal Fisheries Strategy, which, as described earlier in this chapter, includes the licensing of Aboriginal communal fishing access for FSC purposes and, in some cases, the provision of economic fisheries access. The Aboriginal Fisheries Strategy also allowed for "AFS Sub-Agreements" setting out the co-management responsibilities of Aboriginal organizations over specific and limited aspects of the fishery.[1083] DFO's Policy for the Management

* The First Nations Panel on Fisheries, consisting of Russ Jones, Marcel Shepert, and Neil J. Sterritt, prepared *Our Place at the Table* in May 2004 (Exhibit 493).

of Aboriginal Fishing describes these areas of responsibility as, possibly, designating individuals to fish under allocations made to a First Nation, providing individuals designated to fish with evidence of such designation, monitoring harvests and reporting catch to DFO, and participating in enforcement activities.[1084] At the time, DFO saw Aboriginal Fisheries Strategy agreements as a "bridge" to the formal treaty relationships that it expected to negotiate within a decade.[1085]

In November 1992, Peter Pearse delivered a report to the minister of fisheries and oceans following an investigation of the Fraser River salmon fishery. Noting the increase in co-management arrangements with individual groups and the introduction of pilot sales, Mr. Pearse reported on the importance of river-wide coordination among Aboriginal fisheries:

> Co-management arrangements and commercial sales of Indian catches make river-wide co-ordination essential. It is widely understood among the Indian communities that such an arrangement is required for managing escapement through the succession of fishing areas on the river; for sharing access and available catches; for facilitating habitat management and for co-operating in surveillance and enforcement. It is imprudent for the government to proceed otherwise.[1086]

In 1993, perhaps heeding Mr. Pearse's recommendation for river-wide coordination of the Aboriginal fishery, DFO proposed a watershed-wide management structure to be formed under a Fraser Watershed Agreement.[1087] This agreement was intended to provide a "coordinated approach to the conservation, protection, and enhancement of fisheries, fish, and fish habitats of the [Fraser River Watershed], including fish health and quality, and allocations."[1088] It expressly did not serve to "define or to limit aboriginal rights" but, rather, facilitated Aboriginal participation in fisheries management through membership on a joint Aboriginal-DFO co-operative management structure consisting of a steering committee, a technical committee, and a monitoring and enforcement committee.[1089] A Fraser River Aboriginal Fisheries Secretariat (FRAFS) was established to create a central Aboriginal fisheries office with biologists, consultants, administrative staff, and communications staff to assist in the work of the Fraser Watershed Agreement committees.[1090]

Although the Fraser Watershed Agreement was intended to include all the First Nations within the watershed, not all First Nations signed on. According to Mr. Huber, several groups were reluctant to sign the agreement because they felt coerced into doing so; signing on was a prerequisite to receiving Aboriginal Fisheries Strategy funding, and groups that refused to sign were left unfunded.[1091] Other Aboriginal groups refused to sign on because of wording in the Fraser Watershed Agreement which acknowledged the authority of the federal minister to manage the fishery, while not acknowledging any Aboriginal authority.[1092] I heard that the funding disparity between Aboriginal groups that signed on and those that did not created feelings of division among them.[1093]

In 1995, the Honourable John Fraser reported to DFO on problems in the Fraser River sockeye fishery during 1994.[1094] The report recommended that First Nations be given "greater and more meaningful access to and involvement in the management process" and that DFO work with First Nations and with commercial and recreational fishing groups to increase co-operation and enhance fisheries management.[1095] However, Mr. Fraser also emphasized the importance of DFO maintaining its responsibility for the fishery. In particular, he said that "DFO has no right to transfer Canada's constitutional responsibilities to protect the resource to anyone, Native or otherwise," and that "this responsibility must be retained always by the Government of Canada."[1096] His recommendations to DFO included the following: "We recommend that DFO retain and exercise its constitutional conservation responsibilities and not in any way abrogate its stewardship of resources under federal jurisdiction."[1097] And, "We recommend that DFO ensure that AFS agreements clearly identify the Minister's responsibility for conservation, and that final authority to regulate and protect fish and fish habitats remains vested in DFO."[1098]

On March 31, 1999, the Fraser Watershed Agreement lapsed and was not renewed.[1099] Following its expiration, the Stó:lō once again presented a co-management proposal to DFO, but it was not approved.[1100] Instead, DFO appeared to focus on co-management relationships involving

not only First Nations but also commercial and recreational fishing sectors. In 1999, DFO launched its "national co-management initiative" and formally introduced its Integrated Fisheries Management Plan (IFMP) process in the Pacific Region.[1101] DFO's national co-management initiative is set out in a three-volume *Framework and Guidelines for Implementing the Co-Management Approach*, which describes a standard framework for fisheries co-management as involving two steps: first, the IFMP document; and second, a legally binding, voluntary Joint Project Agreement, which spells out the roles and responsibilities of DFO and resource users with respect to specific co-management projects.[1102]

However, as DFO furthered its efforts toward co-management involving both First Nations and stakeholders, it once again received an external report on the importance of asserting the minister's authority over fisheries management. The 2001 Report of the Standing Committee on Fisheries and Oceans, led by Tom Wappel, recommended that "the Minister of Fisheries and Oceans reassert his authority to manage the fishery."[1103]

By the early 2000s, almost 10 years had passed since several Fraser River watershed First Nations first entered treaty negotiations, and it became clear that little progress had been made in coming to permanent fisheries management agreements through treaty. The Fraser Watershed Agreement had lapsed, and Aboriginal groups were becoming increasingly frustrated with their level of participation in DFO decision making. In 2003, DFO met with Aboriginal groups to hear their concerns. That fall, DFO released a document entitled *Strengthening Our Relationships: The Aboriginal Fisheries Strategy and Beyond*, in which it acknowledged that Aboriginal groups were "seeking greater participation in decision-making and advisory processes used for aquatic and resource management."[1104] This paper recommended federal funding to build Aboriginal capacity for participation in aquatic resources and oceans management.[1105]

In July 2003, the federal and provincial governments jointly announced the creation of a task force to advise on "vital issues relating to the fishery" in a post-treaty era. Donald McRae and Peter Pearse were appointed as members of the task force, and they released a report entitled *Treaties and Transitions* in April 2004. Noting that there was no Aboriginal representative on the task force, the BC First Nations Summit and the BC Aboriginal Fisheries Commission lobbied for funding to produce a report offering the Aboriginal perspective. Their efforts led to the creation of the First Nations Panel on Fisheries and a report entitled *Our Place at the Table*, released in May 2004.[1106]

The Pearse and McRae report supported the notion of "participatory management" for salmon involving Aboriginal groups and others, which the authors said would "provide a much more promising basis for managing the fishery."[1107] Although they noted that DFO had "accommodated the development of co-management regimes," they criticized the government for not setting out clear procedures, requirements, or criteria for establishing co-management arrangements and for not clearly articulating its position on such arrangements.[1108] Pearse and McRae recommended that the minister "issue a policy statement declaring that the government supports co-management as a means of improving the management of the fisheries."[1109] They also recommended amendments to the *Fisheries Act* that would allow for the devolution of authority from the minister to fishery participants. In particular, Pearse and McRae suggested that one of the "fundamental weaknesses" of the *Fisheries Act* is that "it makes all fisheries management rest on Ministerial discretion," which they say results in "a highly centralized management system, which is inimical to the meaningful involvement of fishers and others."[1110] This recommendation runs counter to those of Mr. Fraser in 1994 and of the Standing Committee on Fisheries and Oceans in 2001, noted above, which both recommend a clear assertion of the minister's ultimate authority.

The First Nations Panel on Fisheries report, *Our Place at the Table*, supported a three-tiered management structure: the first tier involving discussions and organizational relationships among First Nations only; the second tier involving First Nations and the federal government; and the third tier involving First Nations, the federal and provincial governments, and third parties.[1111] The authors asserted an Aboriginal right to manage the fisheries, saying that "a legal foundation exists for First Nations to pursue management and conservation schemes in consultation with the Crown," and suggested that "[s]uch a scheme would reflect aboriginal values and practices; seek reparation and mitigation for past and on-going impacts; and

provide for First Nations' and Crown participation to determine the appropriate levels of resource use and management."[1112] The authors recommended that "Canada immediately recognize in policy, and implement through negotiated agreements, the aboriginal right to manage fisheries."[1113]

Following release of the Pearse and McRae report and the First Nations Panel on Fisheries report, DFO responded by introducing a new Aboriginal capacity-building program and seeking feedback from Aboriginal and other communities on potential changes to fisheries management. In October 2004, DFO launched AAROM (discussed above) to develop Aboriginal participation in fisheries management. This program provides $6 million to $7 million in funding per year to Pacific Region Aboriginal organizations to facilitate Aboriginal capacity building, pay for technical staff, and increase Aboriginal participation in DFO advisory and decision-making processes.[1114] From October 2004 to March 2005, DFO held consultations with more than 30 First Nations and stakeholder organizations to discuss how it should respond to *Treaties and Transitions* and *Our Place at the Table*. A DFO presentation summarized these consultations as showing "general support" for "adoption of co-management, with increased stakeholder input to decision making."[1115]

In 2005, efforts to build a new "government-to-government" relationship between Aboriginal governments and the federal and provincial governments went well beyond the fishery. Three of the leading Aboriginal organizations in British Columbia (the First Nations Summit, the Union of BC Indian Chiefs, and the BC Assembly of First Nations) committed to work together in the form of a First Nations Leadership Council to advance Aboriginal rights and reconciliation with other Canadians. The First Nations Leadership Council soon after entered into agreements with the province (the New Relationship Vision Document) and the federal government (the First Nations–Federal Crown Political Accord on the Recognition and Implementation of First Nations Governments), each of which sought to respect Aboriginal governments and lead to policy transformations in areas of common interest. By November 2005, a Transformative Change Accord was signed by the First Nations Leadership Council, the Government of Canada, and the Government of British Columbia, acknowledging "the importance of First Nations governance" and highlighting mutual respect and responsibility as a key principle.[1116]

It is in this context of renewed government-to-government relationships that, in 2005, DFO developed the Pacific Fisheries Reform as its response to the Pearse and McRae report and the First Nations Panel on Fisheries. A "key element" of this plan was "shared management responsibility and accountability" over the fisheries with First Nations, stakeholders, and others. Documentary evidence before me suggests that, at this time, DFO contemplated a greater role for these groups in its decision-making process and in assuming part of DFO's fisheries management responsibilities. In fact, a DFO discussion paper dated September 2005 suggests that fisheries management functions that rely heavily on the federal government are inconsistent with the sharing of responsibility and accountability that DFO sees in "modern governance":

> [Fisheries] reform needs to re-define the role of First Nations, stakeholders and government in the management of fisheries. Although management practice in recent years has shifted towards more sharing of management responsibility and accountability with harvesters and others, progress across fisheries has been uneven and less than fully adequate, resulting, in some cases, in frustration in one or more parties. Current practice in many fisheries still relies heavily on government, where the DFO is responsible for defining conservation goals, developing fishing plans, opening and closing fisheries, monitoring and collecting data on fish stocks and fisheries and the enforcement of all rules and regulations. This type of approach is out of synch with the direction of modern governance and the demand of citizens for greater engagement in decisions that directly affect them.[1117]

DFO's Pacific Fisheries Reform envisions a situation in which participating First Nations and stakeholders are "involved in decision-making and share accountability for the conduct of the fishery."[1118] They would assume "a greater role in operational decision-making and program delivery through effective co-management processes."[1119] This plan contemplated a multi-stakeholder co-management process in the form of the Integrated Harvest Planning Committee. DFO saw the IHPC

as "the forum where First Nations, recreational fishery, commercial fishery and environmental organization representatives come together to develop coastwide integrated salmon management plans," while "[b]i-lateral consultations between First Nations and DFO" would occur for "specific planning purposes."[1120]

However, DFO continued to receive concerns regarding co-management. In 2004, after nearly 1.3 million fish failed to reach spawning grounds as expected that year, the Honourable Bryan Williams, a former chief justice of the BC Supreme Court, was tasked with reviewing the salmon fishery. His report, released in March 2005, offered a strong critique of DFO's recent efforts to share management of the fishery with fishery participants. He suggested that, instead of focusing on managing fisheries and ensuring sustainability of the resource, DFO had shifted its goals to attempting to satisfy the demands of stakeholders.[1121] Although he recognized the potential for co-operation in the fishery, he doubted co-management's "net effectiveness in delivering the core mandate of DFO" and suggested that DFO's attempts to satisfy all parties might lead to actions that satisfy none:

> DFO has concluded that resource management will be easier if all stakeholders: First Nations, commercial fishers, sports fishers and environmental organizations, can be brought into a room, express their views and agree with DFO on a management plan. In theory this approach seems laudable, and if consensus is achieved would be political nirvana. Striving to achieve solutions that satisfy every interest may result in actions that satisfy none. More important though is the question of whether this approach will result in fisheries that satisfy the core mandate of DFO: resource conservation and sustainable use that maximizes society's cultural, social and economic benefits. This test is more of an objective standard than the opinions of stakeholder groups … The 2004 Fraser River sockeye situation is strong evidence that DFO strategy is failing on this test.[1122]

Mr. Williams recommended that public involvement is a "good thing" and that the public ultimately holds DFO responsible and accountable. For that reason, costly collaborative management approaches should be "evaluated explicitly against the goals set for fisheries management."[1123]

In June 2005, DFO continued efforts toward co-management as part of its Wild Salmon Policy, but it did so in a manner that clearly articulated the ultimate authority of the minister.[1124] This policy states that "co-management will be promoted with First Nations, and more partnerships will be necessary with public and private groups."[1125] (For further discussion, see Chapter 10, Wild Salmon Policy). Action Step 4.2 of the Wild Salmon Policy contemplates the creation of an "integrated strategic planning process" for Pacific salmon, taking into account the views of First Nations, provincial and territorial governments, communities, and stakeholders.[1126] However, unlike Pacific Fisheries Reform, which describes the sharing of accountability as a "key element," the Wild Salmon Policy asserts that the minister "retains the authority and accountability for the protection and sustainable use of fisheries resources and their habitat."[1127] Indeed, although the Wild Salmon Policy contemplates co-management in developing strategic plans for salmon conservation and sustainable use, such plans are subject to final approval by the minister.[1128]

By 2006, however, DFO returned to policy language that, on a plain reading, suggests something less than the ultimate authority resting with the minister. DFO's Integrated Aboriginal Policy Framework sets out seven strategies for the management of Aboriginal fisheries, including "supporting increased aboriginal participation in co-management of aquatic resources."[1129] Co-management is defined in the IAPF as a sharing of accountability, the devolution of management authority, and a shift away from DFO's current management structure:

> Co-management is defined as: "the sharing of responsibility and accountability for fisheries management between Fisheries and Oceans Canada and resource users. Co-management will eventually encompass the sharing of authority for fisheries management";
>
> It is the policy of DFO to shift from top-down centralized management of the fisheries resource by the Department to a shared stewardship of the resource that includes the devolution of certain fisheries management authorities to resource users.[1130]

As a "critical outcome" of co-management, the IAPF envisions "*Fisheries Act* amendments that provide for greater involvement of aboriginal groups and others in decision-making processes" and the creation of management structures that would allow the government and users of the resource to share responsibility for resource management.[1131] The IAPF also recognizes "various systems of authority and decision making in fisheries management," and nowhere in the document does DFO assert the ultimate authority of the minister.[1132] The former regional director of Treaty and Aboriginal Policy and Governance Directorate explained, in testimony, that the IAPF was drafted during a time when the federal government contemplated revisions to the *Fisheries Act* that did not occur.[1133]

By 2008, DFO's AAROM program had funded the creation of a multitude of sub-regional Aboriginal fisheries organizations and at least one province-wide Aboriginal fisheries organization, all of which were formed for the purpose of increasing Aboriginal capacity to participate in fisheries management. Aboriginal groups continued to express a desire to develop a co-management process between DFO and First Nations regarding Fraser River salmon.[1134] In response, DFO established the Fraser River Salmon Roadmap (Roadmap). The Roadmap provides a forum where Aboriginal groups from throughout the Fraser River watershed, Vancouver Island, and marine approach areas can meet with each other and with DFO staff to design a permanent co-management process for Fraser River salmon.[1135] A DFO overview of the Roadmap suggests that such a co-management process will include "a more prominent role for First Nations related to fisheries management, policy and decision-making."[1136] However, after several years of meetings, the Roadmap has yet to result in an agreement on a co-management structure for DFO and First Nations.

Issues arising from DFO's efforts to build co-management relationships

Defining co-management

In 1987, a Pacific Region area manager wrote to his regional director of fisheries management and voiced his concern over DFO's lack of definition for co-management:

> The concept of co-management is not yet fully defined and at present, each side applies a different meaning to the term. The view of the [First Nations] is that co-management implies recognition of ownership and that the fishery is then co-managed between the Government of Canada and the native people (owners). The Departmental view is that co-management is a program activity, funded by government, and cooperatively implemented with varying levels of native involvement (up to 100%). There is a fundamental philosophical difference over the co-management issue and to proceed to any shared programs at this point with such widely divergent agendas is to risk disappointment.[1137]

More than two decades later, DFO employees told me that the department still has no single definition for co-management and that it is "trying to come up with different … definitions."[1138] Though definitions of co-management are found in both the Pacific Fisheries Reform discussion paper ("meaningful involvement") and in the Integrated Aboriginal Policy Framework ("sharing of responsibility and accountability" and "devolution" of management authorities), none of them was to be taken as definitive.[1139]

As I heard witnesses describe their efforts to develop a co-management relationship between First Nations and DFO, it became apparent that they all carried their own understanding of the term. Ms. McGivney described co-management as "management with partners," Ms. Stewart as "participatory management," Mr. Rosenberger as "shared responsibilities," and Ms. Farlinger as "an effective process to consult and collaborate on designing a plan at a strategic and operational level."[1140]

As discussed above, many First Nations assert an inherent Aboriginal authority over fisheries management. The definition of co-management that I heard from several Aboriginal witnesses reflects this desire for equal decision-making authority with the minister. Some witnesses preferred the term "joint management" rather than "co-management," to capture this equality.[1141] This preference is explained in a recent First Nations Fisheries Council communiqué:

> A joint management arrangement based on section 35.1 rights is different than the types of

> "co-management" relationships that DFO has with third parties. The term co-management is typically used more broadly at and between all three tiers, and is [an] inclusive reference to working together, whereas joint management can be specifically in reference to a government to government working relationship between First Nations and DFO.[1142]

Challenges caused by the differences between DFO's multiple definitions for co-management and Aboriginal aspirations for co-management, or "joint management," were not lost on the witnesses. Grand Chief Pennier told me that "there [are] different interpretations and we need to come up with one where we all believe that it's going to work towards making good decisions on fishing."[1143] Similarly, a recent report on the Roadmap process suggested that participants must "figure out what co-management or joint management means" and that, "without agreement on the term co-management, Roadmap participants have not been able to agree what to call the arrangement they are seeking."[1144]

Authority of the minister

In the testimony of Ms. McGivney and in internal DFO documents such as the Aboriginal Fisheries Framework, it appears that DFO regards the minister as the ultimate authority and that it has no intention at present of entering into an agreement that fails to respect such authority.[1145] However, DFO's assertion of this position has not always been clear. For example, Mr. Huber told me that DFO has removed the assertion of the minister's authority from recent AFS agreements so as not to offend Aboriginal signatories.[1146] In addition, public DFO documents still in effect from the 2005 and 2006 period, such as the Pacific Fisheries Reform discussion paper and the Integrated Aboriginal Policy Framework, give the impression that the minister's authority may be shared. Specifically, to the extent that these documents refer to the potential for "sharing of management responsibility and accountability" or the "devolution" of fisheries management authority, they may raise an expectation that the minister's ultimate authority may be shared. Claire Dansereau, deputy minister, told me that "there is potential for modernizing the *Fisheries Act* in some parts to ensure that there is room outside of the Minister constantly being the final decision point."[1147] I find such comments unhelpful in clarifying either DFO's current authority under the law or its intended policy direction.

In contrast, First Nations have been clear and consistent in asserting an inherent Aboriginal jurisdiction over fisheries management.[1148] Several witnesses told me that, in their view, such jurisdiction requires that DFO share decision-making authority with them in an equal manner.[1149] First Nations have been working toward this goal, and they have expressed it clearly to DFO. For example, the *BC First Nations Fisheries Action Plan* states that "a central First Nations role in management is necessary, based on aboriginal and treaty rights and title" and in setting as a goal "that First Nations, federal and provincial governments jointly manage aquatic species and ecosystems."[1150] Similarly, the First Nations Fisheries Council's Co-Management Discussion Paper, using language similar to that found in DFO's Pacific Fisheries Reform, describes co-management as the "sharing of management responsibility and accountability."[1151] In view of this expectation for shared responsibility and accountability, this discussion paper points to the ultimate authority of the minister as a "key barrier" to achieving co-management.[1152]

Parties to engage in fisheries management

The First Nations Panel on Fisheries recommended in its 2004 report that fisheries management apply three tiers of decision-making relationships (as described above).[1153] In brief, the first tier would involve Aboriginal groups meeting with each other (Tier 1); the second tier would involve meetings between Aboriginal groups and DFO (Tier 2); and the third tier would involve meetings among First Nations, government, and stakeholders (Tier 3).

I heard significant support for Tier 1 processes from both DFO witnesses and Aboriginal witnesses, as well as through the documentary evidence. A First Nations Fisheries Council paper suggests that Tier 1 forums allow First Nations to come together, share information, and articulate shared priorities and approaches to fisheries management.[1154] Councillor June Quipp told me that such meetings help Aboriginal peoples to build trust among themselves.[1155] Mr. Shepert told me of the "tremendous amount of understanding, trust and knowledge"

of other groups' fisheries that he has seen develop through such meetings in recent years.[1156] Mr. Rosenberger agreed with the importance of Tier 1 relationships, telling me that Aboriginal groups need a process to resolve their disputes and that this meeting together would be "key" for long-term improvements in fisheries management.[1157] Several witnesses also told me that, with adequate organizational and Tier 1 funding support, First Nations could select mandated representatives to participate effectively in meetings with DFO and other groups.[1158]

As described in Chapter 3, Legal framework, DFO has a legal obligation to consult directly with First Nations when it contemplates conduct that may adversely affect an Aboriginal right. With respect to such consultation, Tier 2 relationships will always be required in any fisheries management process. In addition to meeting potential legal obligations, DFO has policy reasons for building on its relationship with Aboriginal groups. As previously discussed, the purpose underlying Aboriginal rights is to ensure the continued existence of distinctive Aboriginal societies. The Aboriginal perspective must be taken into account, and as I heard from several witnesses, Tier 2 relationships are necessary to provide a venue in which First Nations can express their needs in the fishery to DFO.[1159] I also heard optimism from Aboriginal witnesses that Tier 2 relationships could improve management relationships between First Nations and DFO.[1160] As an example, I heard from Grand Chief Terry that the Northern St'at'imc Fisheries Commission has established a working group with DFO to develop fisheries plans for the Lillooet area, including catch monitoring and weak-stock protections. In his view, the working group has allowed the St'at'imc to pass on their knowledge and understanding of certain stocks to DFO, and vice versa.[1161]

With regard to Tier 3 processes, although I heard support from some Aboriginal witnesses, I heard significant resistance from several others. For example, Chief Jones told me that forcing First Nations to participate in meetings with other fisheries groups on an equal basis would not recognize asserted Aboriginal rights to the fishery.[1162] Mr. Wilson testified that, as owners of the fish, First Nations ought not, in his view, to be lumped into meetings with others.[1163] Neil Todd, operations manager of the Fraser River Aboriginal Fisheries Secretariat, suggested that management meetings take place with DFO and First Nations only, with DFO representing the interests of all non-Aboriginal groups.[1164] In contrast, I heard from DFO witnesses on the importance of Tier 3 processes.[1165] For example, Mr. Rosenberger explained that fisheries co-management is not a concept for First Nations and DFO only; rather, DFO's concept of a "fishery for all" requires that collaborative management arrangements integrate everyone.[1166] According to Mr. Matthew of the Secwepemc Fisheries Commission, DFO has "made many attempts to try to allow First Nations to provide representatives" to processes such as the IHPC, and First Nations, in turn, have been trying to coordinate representation at that panel.[1167]

The Wild Salmon Policy states that "inclusiveness" is one of the key attributes of an effective integrated strategic planning process for fisheries.

> All parties that are affected by a planning outcome should have the opportunity to provide input to the articulation of objectives, the identification of management options, and the evaluation and selection of management alternatives. All parties should respect the others' opinions and processes, and work towards consensus.[1168]

Although the existence of Aboriginal rights in relation to the fishery, whether proven or claimed, will give rise to a special relationship between First Nations and DFO, I agree with the emphasis on an inclusive fisheries management process outlined in the Wild Salmon Policy. As described in Chapter 3, Legal framework, the Supreme Court of Canada has determined that the fishery is a common property resource. At present, there is no judicially recognized Aboriginal right to manage the Fraser River sockeye fishery, and consequently, the fishery ought to be managed in a manner that is inclusive of all concerned.

Aboriginal capacity to participate in fisheries management

The management of Fraser River sockeye fisheries can be complex, highly technical, and time consuming. I heard that, in order for Aboriginal organizations to participate in fisheries management,

they require adequate funding, organizational infrastructure, and technical support.[1169]

On certain issues, some First Nations seek the capacity to coordinate their views and speak with one voice toward the development of fisheries policy.[1170] DFO supports the formation of such aggregates: Ms. McGivney told me that, by working with a broad, collaborative group of First Nations, DFO hears multiple issues at the same table and can thereby manage the fishery more effectively and efficiently.[1171] Similarly, Mr. Rosenberger testified that aggregated meetings allow DFO to hear concerns across a broader geographic area – a process that assists DFO in integrating its fisheries planning.[1172]

DFO has provided funding for Aboriginal capacity building through its AFS, AAROM, and PICFI programs. In 2009, DFO distributed $6.2 million to Aboriginal fisheries organizations in the Pacific Region through the AAROM program, and an additional $1.4 million to AAROM organizations through its PICFI program.[1173] In 2009, DFO also distributed an additional $14.4 million to Aboriginal organizations as part of AFS co-management funding.[1174] As of August 2010, there were 14 AAROM-funded Aboriginal fisheries organizations in the Fraser River and South Coast areas of British Columbia.[1175]

At the time of the hearings, there did not appear to be a clear preference among Aboriginal witnesses as to which aggregated Aboriginal fisheries organization ought to represent them, and some witnesses expressed the view that no one aggregated organization can speak on behalf of their community.[1176] Some witnesses suggested that certain fisheries matters that may affect Aboriginal rights must be dealt with at the local community level, such as consultation, accommodation, and allocations.[1177] As a result, DFO engages with several aggregate Aboriginal organizations in addition to engaging with individual First Nations.

An internal DFO presentation on co-management dated July 2010 notes that DFO's development of a multitude of management relationships with various organizations has led to confusion. It states, "The absence of a coherent 'framework' that outlines linkages between the various processes (bilateral vs. multi-sectoral, local vs. coastwide) results in fragmented, inconsistent participation, [and] uncertainty about how input from different processes informs decision-making."[1178]

This presentation goes on to suggest that one of the key challenges facing DFO's efforts toward co-management is a "lack of coordination and overarching strategy" whereby "DFO is involved in a wide range of co-management and advisory processes, but it's not clear how they all fit, or [have] an overall structure and approach to co-management."[1179] Without clarity around the process scope, and the roles and responsibilities of participants, this presentation suggests that DFO is left asking, "Where does DFO lead and where [does it] participate?"[1180]

The development of modern treaty fisheries

Fraser River sockeye are harvested by Aboriginal groups both inside and outside treaties. As explained in Chapter 3, Legal framework, I agree with participants in this Inquiry that my Terms of Reference do not direct me to make any determination of the existence or content of Aboriginal and treaty rights. As such, I make no recommendations on the interpretation or implementation of existing treaties, whether historical or modern. However, certain aspects of DFO's Aboriginal fisheries policies and programs which relate to the conservation and sustainability of the Fraser River sockeye salmon fishery (discussed above) may inform Canada's future negotiation of fisheries chapters in treaties.

In 1992, the BC Treaty Commission was established under the *Treaty Commission Act* to facilitate the negotiation of modern treaties in British Columbia.[1181] Soon after, several First Nations situated in the Fraser River watershed entered into treaty negotiations, including the Tsawwassen First Nation (1993), the Lheidli T'enneh Band (1993), the Yale First Nation (1994), the Sliammon Indian Band (1994), the Yekooche First Nation (1995), and others.[1182] At the time, some First Nations and the Canadian government were optimistic that long-standing fisheries issues would be addressed and that treaty negotiations would be completed within a decade.[1183]

The completion of treaty arrangements has not occurred as originally hoped. Although the Nisga'a Final Agreement came into effect in May 2000, it was reached as part of a unique process

outside the BC Treaty Commission.[1184] In October 2006, the Lheidli T'enneh Final Agreement became the first modern treaty signed pursuant to the BC Treaty Commission process, and it would have been the first modern agreement to provide treaty rights with respect to Fraser River sockeye salmon.[1185] However, in March 2007, after 14 years of negotiations and effort, the agreement was rejected by Lheidli T'enneh band members, and it has never been ratified.[1186]

More recently, several treaties have completed successfully. In December 2007, the Tsawwassen First Nation Final Agreement was signed, and in April 2009, it came into effect. In 2009, the Maa-nulth First Nations Final Agreement was signed; it came into effect in April 2011.[1187] In February 2010, the Yale First Nation Final Agreement was signed.[1188] It has since been ratified by the Yale First Nation and the provincial government and is awaiting ratification by the federal government.

For the majority of other treaty tables, progress has been slow. In May 2004, the First Nations Panel on Fisheries observed that "parties have not seen eye to eye on many critical issues, including the fisheries," and that "more and more First Nations are turning to litigation to protect their rights and interests."[1189] Similarly, the First Nations Fisheries Action Plan noted in 2007 that litigation, rather than treaty negotiation processes, has "been more successful in effecting changes in the Pacific fishery."[1190] By July 2008, Canada decided to stop fishery-related negotiations at all treaty tables with the exception of the few that had reached late-stage negotiations.[1191] As described above, Canada instead focused on clarifying its internal policies on the future allocation of post-treaty fisheries through the confidential Coastwide Framework and Aboriginal Fisheries Framework.[1192]

This Commission of Inquiry was struck in November 2009. On March 2, 2010, the Government of Canada (minister of fisheries and oceans and minister of Indian and northern affairs) announced that treaty negotiations related to Aboriginal fisheries would be deferred pending the conclusion of this Inquiry.[1193] This deferral did not affect the Yale First Nation, In-SHUCK-ch Nation, and Sliammon First Nation agreements, which had reached their final stages.[1194]

Recognition of the minister's ultimate authority

Modern treaties, such as the Tsawwassen First Nation Final Agreement, have recognized a limited Aboriginal jurisdiction over internal fisheries matters.[1195] As a result, the *Tsawwassen Wildlife Migratory Birds and Renewable Resources Act* and its associated *Fisheries Regulations* set out who may fish in Tsawwassen territory, how fisheries access is distributed among Tsawwassen members, and how their fishing licences will be issued, among other things.[1196] However, according to DFO, a key principle applied to treaty negotiations to date has been that the ultimate authority of the minister to manage fish and fish habitat must be respected.[1197] This principle is "a key bottom line for Canada," and the minister's authority is explicitly stated in all BC treaties.[1198]

Integration of fisheries management processes for treaty and non-treaty fisheries

DFO recognizes that treaties have not provided the broad resolution of Aboriginal fisheries matters as originally hoped. Ms. McGivney told me that Canada is "a ways away from the majority of First Nations in BC having treaties."[1199] Some Aboriginal groups are not interested in entering into treaties at all.[1200] Although DFO's 2005 Pacific Fisheries Reform document reiterated the federal government's belief that treaties would "ultimately secure the place of First Nations in the fishery," it also acknowledged that, "given the slow pace of negotiations, interim arrangements would be necessary."[1201]

Ms. McGivney told me that DFO needs to consider how to manage fisheries for groups in treaty as well as those outside treaties.[1202] The Aboriginal Fisheries Framework describes some of DFO's options as the negotiation of independent fisheries treaties with First Nation aggregates, separate from individual comprehensive treaty agreements, as well as "non-treaty options," such as enhancing current Aboriginal fisheries programming (e.g., AFS, AAROM, PICFI) or declaring overall First Nation shares for salmon by watershed and species through policy.[1203]

My Terms of Reference direct me to make findings of fact on causes for the decline of Fraser

River sockeye salmon and to make recommendations for the future sustainability of the fishery. They do not specifically direct me to investigate the treaty process as it relates to the fishery. I cannot determine, based on the evidence before me, whether treaties are the best solution for bringing stability to management of the Aboriginal fisheries or whether non-treaty options should be pursued instead. However, it is clear that the options chosen ought to allow for an integrated fisheries management process for the Fraser River sockeye fishery as a whole.

DFO has stated that, under modern treaties, "First Nations will be provided with an expanded collaborative role in the management of their fishery, subject to the Minister's authority."[1204] This approach has included the development of joint fisheries committees comprising First Nations and government representatives tasked with planning the FSC fishing activities for the First Nations, stock assessment, fisheries management, stock enhancement, catch monitoring, and enforcement.[1205] The Joint Fisheries Committee strives to reach consensus, but, in the absence of consensus, submits recommendations to the minister for his or her decision. [1206] Chief Baird told me that the Joint Fisheries Committee established under the Tsawwassen First Nation Final Agreement, while not "perfect," was a "step towards the right direction" and formalized her nation's relationship with DFO "in a way that is workable and has access points from the political to technical and the operational."[1207] However, because a separate Joint Fisheries Committee is formed under each treaty, DFO is concerned "whether this approach is affordable, manageable and ultimately viable given the number of Joint Fisheries Committees that may result."[1208]

Allocating FSC fisheries access in treaties

As with other components to a treaty, the FSC allocation is the product of negotiation. As described above, in determining FSC fisheries allocations generally, DFO negotiators consider the following factors: recent harvest levels; species availability; species abundance; allocations for other First Nations; and population size.[1209] In the treaty context, the FSC allocation may also be determined based on the "overall balance of negotiated benefits within the treaty."[1210] Treaty negotiations involve compromise, and a First Nation may opt for more or less FSC fish in exchange for other benefits. For example, according to Chief Baird, the Tsawwassen First Nation accepted a lower percentage allocation of FSC fish in order to obtain a greater share of the commercial fishery through a commercial harvest agreement signed in conjunction with the treaty.[1211] According to DFO, in most cases the FSC allocations negotiated under treaty will be higher than what a First Nation had before treaty. The reason for this increase is to take into account the First Nation's future population growth.[1212]

FSC treaty allocations are typically based on abundance, meaning that they are calculated as a "percentage of [fish] abundance above a conservation threshold."[1213] For example, the Tsawwassen First Nation allocation of Fraser River sockeye salmon for FSC purposes is calculated as a percentage of the total allowable catch returning in a given year, capped at a maximum of 15,226 Fraser River sockeye salmon.[1214] Not all treaties include a maximum or "capped" FSC allocation, however. The Maa-Nulth First Nations Final Agreement contains an allocation of Fraser River sockeye salmon for FSC purposes of 0.13366 percent of total allowable catch, without any maximum limit.[1215] In 2010, the relatively high returns meant that the Maa-Nulth allocation amounted to between 17,000 and 18,000 Fraser River sockeye, despite Fraser River sockeye being a "relatively minor intercepted stock for Maa-Nulth" (according to DFO).[1216]

Allocating commercial fisheries access in side agreements

With respect to treaties formed under the BC Treaty Commission process, commercial fishing allocations are not provided under the treaty itself but may instead be offered as part of a "harvest agreement" negotiated alongside the treaty. According to DFO, harvest agreements are not constitutionally protected, and the communal commercial fishing access that they provide will have the same priority as the general commercial fishery.[1217] However, harvest agreements negotiated to date have been for terms of 25 years and may be renewed in perpetuity.[1218]

Harvest agreements may specify a commercial harvest allocation as a percentage of the total

allowable catch or may provide for the issuance of commercial licences for participation in existing "derby" fisheries (meaning that, with each commercial fishery opening, licensed fishers catch as much of the target species as they can while that fishery is open). DFO asserts that "neither a target nor a range currently exists for harvest agreement allocations." Instead, the extent of commercial benefit contained in a harvest agreement is the product of negotiation. Also, DFO does not conduct an "economic needs" assessment to determine how much commercial access a given First Nation should receive. Not all First Nations are seeking harvest agreements, though some are very interested in them.[1219]

In a written response to an information request from Commission counsel, DFO stated that "to the extent that inland First Nations negotiate harvest agreements for salmon, there will likely be an increase in fish caught in more terminal areas," and this activity will "likely be just one component of a more general increase in stock specific harvesting in more terminal locations in response to conservation concerns for weak stocks." All First Nations economic fisheries access that is provided through harvest agreements will require relinquishment of equivalent licences or catch shares from the general commercial fishery.[1220]

Findings

Definition for food, social, and ceremonial fishing

The Department of Fisheries and Oceans (DFO) has no specific definition for the term "food, social, and ceremonial" (FSC) fishing, and there is a lack of consistent understanding within DFO and among DFO and First Nations as to what this term means. Although DFO has articulated guidelines for fisheries managers in allocating FSC access, in many cases the resulting allocations remain controversial. For their part, few First Nations, I heard, have provided support for their requested FSC allocations, and many other groups view the quantification of FSC access solely for First Nations themselves.

As a result of the disagreement surrounding the FSC allocation process, I heard concerns that some FSC allocations are too low and that others are too high. Both situations have the potential to affect the future sustainability of the Fraser River sockeye salmon fishery. As described in Chapter 1, Commission's mandate, the Fraser River sockeye salmon fishery is made up of commercial, Aboriginal, and recreational sectors, and each of these sectors must be considered in my recommendations on the sustainability of the fishery as a whole.

Ensuring that an adequate FSC allocation is provided to Aboriginal groups is central to the sustainability of the Aboriginal component of the fishery. As described in Chapter 3, Legal framework, Aboriginal FSC fisheries are intended to provide Aboriginal communities with the opportunity to carry out the fisheries practices, customs, and traditions that may be integral to their distinctive Aboriginal cultures. I acknowledge that the underlying purpose of Aboriginal rights recognition, as articulated by the Supreme Court of Canada in *R. v. Sappier* and *R. v. Gray*, is to ensure the continued existence of distinctive Aboriginal societies.[1221] To the extent that any FSC fishing allocations may be less than what is needed by Aboriginal groups to sustain the fisheries practices, customs, and traditions integral to their distinctive Aboriginal cultures, that shortfall may put at risk the sustainability of the traditional Aboriginal FSC fishery as well as the Aboriginal cultural connection to that fishery.

Ensuring that FSC allocations do not exceed the food, social, and ceremonial needs of Aboriginal groups is also important for the sustainability of the commercial and recreational fisheries. As described in Chapter 3, Legal framework, after conservation needs are met, FSC fisheries are to be given priority access over commercial and recreational fisheries. The effect of this priority, as articulated in *R. v. Sparrow*, is that, in years of low abundance, it may be that all the fish caught will be allocated for FSC purposes, and the brunt of conservation measures will be borne by commercial and recreational fisheries.[1222] The larger the FSC allocation, the fewer fish will be available to commercial and recreational fishers after conservation needs are met, and the greater likelihood that fish returns in low-abundance years may not be sufficient to allow any commercial fishery at all. To the extent that any FSC fishing allocations may be more than required to meet FSC needs, this overallocation may put at risk the sustainability of the commercial and, possibly, the recreational fisheries.

I agree with participants that my Terms of Reference do not grant me the jurisdiction to make findings on the existence or content of Aboriginal rights. As such, I make no findings on the appropriate definition or quantification of FSC fisheries. However, I conclude that DFO requires a clear policy definition for food, social, and ceremonial fishing in order to appropriately manage and allocate fisheries for FSC purposes and to ensure that the quantity of FSC fisheries access provided is appropriate, given its effect on the sustainability of Aboriginal, commercial, and recreational fisheries. The development of this policy definition and its application to individual Aboriginal groups should be informed by the views of affected Aboriginal groups. As such, Aboriginal groups should be encouraged to provide information to DFO on the aspects of their cultural and fishery needs they wish DFO to consider.

Transparency in the reallocation of the Fraser River sockeye salmon fishery

Since 2008, DFO has been developing the Aboriginal Fisheries Framework, which, among other things, sets out an overall percentage of the available salmon harvest to be allocated to First Nations for both FSC and economic opportunity fisheries. DFO has not made public the overall percentage allocation contained in the Aboriginal Fisheries Framework. In response to my order requesting that this overall percentage be disclosed, DFO provided me with a letter from the clerk of the privy council certifying this information as a cabinet confidence. However, through the course of the hearings I learned that this overall percentage contemplates a negotiated one-time increase in FSC fishing access in the treaty context.

As discussed above, the Aboriginal FSC fishery receives priority access over the commercial and recreational fisheries in the harvest of Fraser River sockeye salmon. As the amount of fish allocated for FSC purposes increases, so too does the effect of this priority increase in terms of limiting fishing opportunities for the commercial and recreational fisheries. In the context of repeatedly low annual fish returns, a larger FSC allocation could mean that there will be fewer years in which the number of returning fish will be sufficient to allow for a commercial or recreational harvest opportunity after conservation needs and FSC fishing allocations are met. Insofar as the percentage salmon allocation in the Aboriginal Fisheries Framework includes an increase over existing FSC harvest levels, and this increase results in fewer years in which the commercial and recreational sectors may harvest Fraser River sockeye, this new FSC allocation may have a significant impact on the sustainability of these fisheries.

Increasing the percentage of the fishery allocated to Aboriginal fishers also has the effect of decreasing the percentage that is available to the general commercial fishery. Although the transfer of fisheries access to Aboriginal groups is presently mitigated through voluntary relinquishment of commercial licences in the Allocation Transfer Program (ATP) and the Pacific Integrated Commercial Fisheries Initiative (PICFI), this mitigation provides relief only to the individual commercial fishers who have voluntarily relinquished their licences. It does not mitigate the effect of reallocation on the overall commercial fishing fleet or on the public. The result of the fisheries allocation transfer is that the commercial fishing fleet is reduced and there are fewer opportunities for the public at large to enter the commercial fishing industry. Insofar as the percentage salmon allocation in the Aboriginal Fisheries Framework contemplates a change in the overall composition of the fishery, this policy may also have an impact on the sustainability of the general commercial fishery.

The percentage salmon allocation contained in the Aboriginal Fisheries Framework has been certified as a cabinet confidence. However, I find that this new allocation has the potential to affect the sustainability of the Fraser River sockeye fishery, as well as the future commercial, recreational, Aboriginal, and public access to the fishery. I take the view that the underlying policy direction of Canada in relation to such allocation changes ought to be made clear and transparent to all fishing sectors and to the public, so that their concerns and livelihoods may be respected. DFO should develop any policy that may change inter-sectoral allocation of the Fraser River sockeye fishery, such as the Aboriginal Fisheries Framework, openly and collaboratively following a process such as Action Step 4.2 of the Wild Salmon Policy, discussed in Chapter 10, Wild Salmon Policy.

Minister's ultimate authority

In recent decades, DFO has also attempted to build a co-management relationship with First Nations through an assortment of fisheries policies and programs. However, DFO has offered varying descriptions of such a relationship and has at times provided inconsistent articulations of the minister's ultimate authority.

I find that DFO's inconsistent articulation of the minister's ultimate authority over fish conservation and fisheries management has contributed to a lack of clarity surrounding DFO's intentions for Aboriginal participation in fisheries management and, in some cases, has created an expectation that shared authority over the fisheries is likely.

The law currently provides that the ultimate authority over fish conservation and fisheries management rests with the federal minister of fisheries and oceans. For the reasons articulated in Volume 3, I am satisfied that any recommendations I make should be consistent with the ultimate authority of the minister. A discussion of the minister's ultimate authority and the role and funding of Aboriginal and non-Aboriginal participants in the strategic integrated planning process envisioned under Strategy 4.2 of the Wild Salmon Policy is discussed in Volume 3.

DFO reform initiatives in the management of the fisheries

Allocation of the commercial sockeye salmon fishery – share-based management

Definition of share-based management

Traditionally, the Pacific salmon commercial fishery has operated as a derby fishery. This model is not the only way of conducting a fishery and, in recent years, there has been interest in moving the commercial salmon fishery away from derby fisheries and toward share-based management (SBM).[1223] Under this model, catch shares are assigned to specific user groups or individuals, who then know in advance how many fish they are allowed to catch and retain. A catch share provides a sector, licence area, gear type, or licence holder access to a pre-determined share of the total allowable catch (TAC).

A broad term, SBM refers generally to a system of fishery management that relies on catch shares, rather than the derby model that relies on openings and closings without a cap, or limit, on the number of fish that can be kept. SBM covers a number of different management structures or approaches. When catch shares are assigned to individual licences or vessels, they are often called "individual quotas," or IQs. Share-based management systems can be designed so that shares or quotas are transferable: in that case they are referred to as "individual transferable quotas," or ITQs. An SBM system may also restrict or prohibit transfers of shares within a particular licence area or gear type, or it may allow transfers among gear types or even fishing sectors (e.g., a transfer of TAC from the commercial to the recreational or the First Nations sectors).

History of Pacific Region share-based management in the commercial salmon fishery

Earlier in this chapter I discussed two reports released in 2004; first, the joint task group (JTG) report of Peter Pearse and Donald McRae, *Treaties and Transition: Towards a Sustainable Fishery on Canada's Pacific Coast* (*Treaties and Transition*), and second, the First Nations Panel on Fisheries report, *Our Place at the Table*.[1224] Both reports examined the state of the Pacific fisheries and recommended reform. In response, DFO initiated the Pacific Fishery Reform,[1225] which is described in more detail in its *Discussion Paper on the Implementation of Pacific Fisheries Reform*.[1226]

In the Pacific Fishery Reform discussion paper, DFO set out a "blueprint for reform" with four main themes, one of which was to improve "the economic performance of fisheries so that they reach their full potential, provide certainty to participants and optimize harvest opportunities."[1227] The action plan for 2005 set out 10 separate measures, including that DFO

- Consult with Commercial Salmon Advisory Board on approaches to clarifying and confirming fleet shares within the commercial fishery.

- Conduct demonstration projects.
- Work with the Commercial Salmon Advisory Board and First Nations to develop an approach to defining harvest shares for commercial licenses for the purpose of transferring allocations to First Nations.[1228]

DFO also said this in the discussion paper:

> Ensuring resource conservation and supporting healthy, viable fisheries have been ongoing challenges for fisheries management in the Pacific region of Canada for more than a century ... In addition, the economic viability in some commercial fisheries has declined for a variety of reasons. Further, sharing of the limited available catch of some fish species like Pacific salmon among First Nations, recreational and commercial fishers has become extremely contentious leading to conflict over access to the fishery.[1229]

The discussion paper noted that "virtually all of the analysis and recommendations provided by the [JTG] ... centered on the commercial sector" and that the specific recommendations of *Treaties and Transition* were "to move to long term (i.e. twenty-five year), personal, fully transferable, individual quota entitlements in all commercial fisheries."[1230] It provided the following comments:

> *Defining Catch Shares*
> Under the present management system, the commercial harvest is generally assigned to the established commercial licence holders in the various fisheries. The distribution of the available commercial harvest and the related fishing opportunities between different commercial fishing groups, fleet sectors and among individual fishers within these fleet sectors varies between fisheries. In some instances (e.g. salmon and herring) explicit coast-wide "target" shares for the balance of the available harvest have been assigned by policy to different fleet sectors.
>
> The JTG recommended that the individual quota approach be extended to all commercial fisheries. Under this recommendation each fishing licence in every commercial fishery would have an established quota share of the Total Allowable Commercial Catch (TACC) associated with it.
>
> One possible alternative to an individual quota approach is the distribution of long term quota entitlements to fleets or groups of fisheries collectively.
> ...
> *Transferability*
> Under the present management system, the degree of transferability of fishing opportunities varies dramatically ... In the case of the salmon fishery, licence eligibilities are only transferable upon [the] sale of the licensed vessel and only in conjunction with other licences associated with the vessel.
>
> The JTG recommended that these present restrictions and inconsistencies be eliminated in favour of full transferability of quota licences.
>
> The issues associated with commercial transferability are many and varied.
> ...
> First and foremost, the option of prohibiting the transfer and sale of commercial licence eligibilities, or IQs where they are established is unrealistic.[1231]

In 2006–7, DFO retained a consultant to assist a subcommittee of the Commercial Salmon Advisory Board, the Sub-Committee on Options for Review and Evaluation (known as SCORE), to address future opportunities for the salmon fishery.[1232] During the SCORE process, in July 2007 the minister announced the Pacific Integrated Commercial Fisheries Initiative (described above), which introduced a requirement for a share-based approach to managing Pacific salmon (thereby ending the debate over whether DFO would move toward a catch-sharing arrangement).[1233]

In March 2008, DFO held an internal workshop on implementing share-based management and, in 2009, published a discussion paper, *Towards Share Based Management of the British Columbia Commercial Salmon Fishery* (SBM Discussion Paper), intended to "assist in further advancing reform of the commercial salmon Fishery in British Columbia."[1234] This paper offered the following critique of the current allocation system:

> In summary, the key deficiency of the present sharing system is that it does not provide the

> certainty and security required by commercial harvesters to efficiently plan their fishing operations. This fuels competition and conflict between harvesters and harvesting groups over their harvest shares and undermines financial performance in the fishery. Also, the present sharing system does not provide sufficient flexibility to address the changing needs of the resource and society without significant conflict and controversy.[1235]

The SBM Discussion Paper noted that the JTG report's recommendation for the immediate implementation of fully transferable individual fishing quotas contrasted with the recommendation of the First Nations Panel on Fisheries for a moratorium on new ITQ regimes until First Nations' interests in allocation were addressed.[1236] It also noted that "the complexity of salmon biology and the nature of commercial salmon fishing make it difficult to implement and apply a standardized 'one size fits all' approach to share based management of commercial salmon fishing."[1237] It concluded that "continuing and expanding the current demonstration projects in the fishery is clearly a key element of moving the transition forward."[1238] This impression – of a general commitment on the part of DFO to move toward SBM, but in a deliberate way that would not see DFO forcing abrupt and unwanted change on unwilling fleets – accords with the evidence from the hearings on this issue.

Indeed, during the hearings, I heard witnesses opine on the advantages and disadvantages, the merits and demerits, of a share-based management model. The discussion was often framed in terms of ITQs specifically, but the basic question is the choice between a share-based management model and a derby fishery management approach. It is not surprising that there are different views on whether DFO should move to SBM for the commercial salmon fishery and, if so, when and how.

Mr. Grout, salmon resource manager, DFO, spoke about the merits of SBM:

> On the ITQ side of things, there's better precision in terms of management of the harvest because the individual licences are fishing to a predefined share of the TAC. Each licence condition would specify a percentage share of the commercial TAC. Once the commercial TAC is announced, it's a simple calculation to determine how many pieces of salmon could be harvested. Once the licence holder had fished their allocation, they have to stop.[1239]

Mr. Grout contrasted this system with "competitive derby fisheries" in which, "once the fishery was open, the vessels would be allowed to harvest unlimited amounts of the fish," which he considered "a relatively imprecise way of achieving a catch target."[1240] Under a share-based approach, he explained, "[o]nce the licence holder had fished their allocation, they have to stop fishing."[1241]

As I understood Mr. Grout's evidence, such improved precision for managers allows them to better protect stocks of concern and improves their ability to control the impact of a commercial fishery.[1242] Rather than the blunt tools of opening or closing a fishery (allowing fishers to catch as much as possible during the opening), a share-based approach increases precision. It allows fishery managers to regulate the pace and the impact of commercial fishing, and thereby supports the department's complementary goals of conservation and a sustainable fishery.* Mr. Grout testified that, for fishery managers, "clearly our top priority … is conservation of populations."[1243] Ms. Farlinger said that the department's view is that "[t]here certainly are conservation advantages to the share based fishery."[1244]

In his testimony, Mr. Grout linked share-based management to the Pacific Fishery Reform initiative and described the department's objective of "looking to improve the conservation performance of the fisheries, consistent with the Wild Salmon Policy."[1245] In discussing the benefits of a share-based management model, which manages outputs rather than inputs, Mr. Grout testified as follows:

> One of the themes around bycatch in these output controlled fisheries is [that] the fishery itself tends to be a slower pace, so it's not a competitive race for the fish. The openings can be longer, stretched through time. That allows

* The same point is made in two reviews by independent contractors of pilot projects involving ITQ demonstration fisheries, which are discussed in the section below. See Exhibit 465, p. 41, and Exhibit 467, p. 10.

> the fleet to move away from areas or adjust to deal with bycatch issues and potentially reduce some of those variables, given that they're fishing more to a specific share and able to do it in a way that they're not racing against others.[1246]

Mr. Grout described share-based management as being consistent with the goals of the Wild Salmon Policy:

> The vision laid out in Pacific [F]ishery [R]eform in terms of the move towards share-based management would certainly provide or enable the fleets to meet some of those commitments around implementing the Wild Salmon Policy, especially around the fleets being more self-reliant, able to self-adjust.[1247]

Mr. McEachern, who was one of the commercial fishing representatives who was in favour of implementing ITQs in the salmon fishery, noted that "the biggest advantage for the fishermen in a share based management is the ability to put more fish across your deck."[1248] This sentiment was echoed by Mr. Morley, vice-president of the Canadian Fishing Company:

> [I]ndividual fishermen have benefited greatly in terms of increased income overall from moving to ITQs. In the salmon fishery this past year, the best example I can see is that when we did implement a pilot system for Areas B and H on Fraser sockeye ... with the kinds of markets and volumes we see in that, if we had not had the share based system for Area B and H, I would suggest to you that ... given the normal style of opening that the Department would have come in, we would not have harvested ... maybe 60 percent of what we did harvest.[1249]

I heard from witnesses who did not support SBM for the commercial salmon fishery. Mr. Brown, suggested that an ITQ-style model would face the challenge of a migratory species that is subject to ongoing, in-season estimation as to its size.[1250] He suggested that those communities that have the closest attachment to common property resources are best placed to manage it well.[1251] He also told me that, in his opinion, the implementation of an ITQ system effectively creates individual property rights* out of a public resource.[1252]

Ms. Scarfo, a commercial fisher, also commented about SBM models:

> It is not one size fits all. The government knows it's not one size fits all. The government knows there are cons to this mechanism. They've recognized them ... If you are absolutely determined that ITQs are the only way to go for salmon in B.C., then why aren't we engaging in that discussion of how do you minimize the downsides that come with this?[1253]

Along the same lines, although supportive of SBM, Mr. McEachern pointed out in his testimony that there will be "social ramifications" from a full move to SBM – in particular, that "some fishermen are no longer going to fish."[1254] Testifying on the same panel, Mr. Sakich, also a commercial fisher, pointed out the human impact of the management model employed for the commercial salmon fleet. He indicated that "the average age in the industry is absolutely ancient compared to any other workplace in Canada."[1255]

I received the following submission at the public forum held in New Westminster, in which the presenter stated:

> Access policies need, obviously, to juggle ecological sustainability needs with economic efficiency and social equity. Personally, I think individual transferable quota (ITQ) systems do this better for wild fisheries than most alternatives. I am aware that ITQ

* However, in a publication produced by the participant Watershed Watch Salmon Society, *Transferable Shares in British Columbia's Commercial Salmon Fishery* (Exhibit 9), author Terry Glavin (who also testified at the hearings), wrote:

> There is much concern that transferable shares, particularly "individual quota" regimes, will unavoidably result in the privatization of fisheries resources. This is a myth ...
>
> A commercial fishing licence is subject to conditions attached to the licence, and a licence is precisely that. It is a limited fishing privilege. It is not an absolute or permanent right. It is not property.
>
> ... A transition from a conventional limited entry fishery to a catch-share fishery causes no change to the legal status of the licence. The licence – along with the transferable catch shares attached to it – remains a limited fishing privilege, and not a property right. [p. 17]

> systems have never seemed in the past to be appropriate to the salmon fisheries, but the politics of allocation of catch amongst vested interests are sometimes made, unjustifiably,I think, into fixed constraints on policy innovation.[1256]

A commercial fisher who also spoke at the New Westminster public forum stated, "[I]n my mind[,] an ITQ system that allows harvesting stocks in the most discreet [*sic*] manner possible has to be implemented for all sockeye and other salmon stocks."[1257]

Fraser River sockeye commercial fishery demonstration projects

From DFO's perspective, demonstration fisheries are a way to explore how best to implement elements of Pacific Fisheries Reform.[1258] There is now a small body of evidence that provides some understanding of how SBM models have worked for commercial salmon fishing, albeit in the context of limited size and duration and in demonstration fishing projects involving "willing fleets." A number of individual quota (IQ) and individual transferable quota (ITQ) demonstration projects for salmon in the Pacific Region have been conducted in the past decade, two of which focused on Fraser River sockeye: the Area H Troll Pilot Studies (2002, 2003, and 2006) and the joint demonstration project in both Area B and Area H (2010).[1259] Demonstration projects involving IQs for Area H chum (2007) and Area B chum (2005), and projects involving ITQs for Area F chinook (2005–7), also provided information about implementing share-based management in the salmon fisheries.[1260]

The 2002 pilot study in the Area H troll sockeye fishery involved only 10 vessels, and the parties agreed there were insufficient data to analyze and evaluate the project. The study continued in 2003, involving 25 vessels, and the quotas were not transferable. The 2003 Area H Study project was evaluated by Archipelago Marine Research Ltd., an independent contractor, which, among other things, concluded as follows:

- participants landed 74.1 percent of their allocation; 100 percent of the landings were monitored; and landing data provided an accurate snapshot of the quota fishery activity, leading to confidence in management decisions;
- certainty from the quota fishery led to advance coordination of deliveries to primarily one buyer; and
- the IQ fishery generated "product self-promotion" as individual fish were tagged and traceable to the vessel of origin.[1261]

In 2006, another sockeye ITQ demonstration fishery was held in Area H, involving 73 of the 122 Area H licence holders (of the 73 licences, 64 were active licences that reported landings). In the review of this fishery by G.S. Gislason and Associates Ltd., an independent contractor, the conclusions included the following points:

- The "demonstration ITQ program met sustainability objectives with improved catch monitoring and adherence to the ITQ TAC; but the non-ITQ fleet exceeded their TAC—this is a concern and needs to be addressed in the future."
- Quality "appears to have improved for ITQ fish."
- "The ITQ fleet and some processors report[ed] that the ITQ fish was handled better and was superior quality, on average, to non-ITQ fish."
- "Some ITQ fishermen slowed down the harvest per day and paid more attention to on-board handling."
- Constraints to the ITQ program include that Fraser River sockeye must be caught in a short time frame due to concerns for weaker, Late-run stocks. Accordingly, the ITQ fishery for Fraser River sockeye does not get the benefit that other fisheries get from extending the season.
- The validation program "did not provide timely information to DFO for management purposes. This needs to be addressed in the future."[1262]

Concurrently with the SCORE process, representatives of the Harvest Committees for Areas B, D, and H met to discuss "the possibility of a joint project to test the feasibility, practicality and desirability of implementing share based ITQs."[1263] After a balloting process, an ITQ demonstration project was planned for the 2008 sockeye fisheries in Areas B and H; however, very few vessels participated

because the TAC that year was relatively low (only 100,000 pieces for the entire commercial fleet, which translated into 281 pieces per licence in Area B and 135 pieces per licence in Area H). Gardner Pinfold, the independent contractor that evaluated these pilot projects, made a number of observations about the demonstration fisheries, including the points that follow:

- allocating the TAC to each licence gave "much better management control";
- due to reduced TAC and small run size, the fishery might not have opened at all if not for the ITQ approach; and
- observers agreed that ITQ should help to reduce bycatch because fishermen can take the time to avoid areas of high bycatch; however, "this could not be observed under the short duration low run 2008 fishery."[1264]

In 2010, an ITQ demonstration fishery for Fraser River sockeye took place in both Areas B and H.[1265] Mr. Sakich described the Area H demonstration fisheries as providing "access … economics … fairness and … respect."[1266]

State of share-based management in the commercial salmon fishery

In March 2009, DFO drafted a Strategic Plan for Salmon Share Based Management (SBM Strategic Plan).[1267] This plan espouses the following principles: conservation, consistency with treaties, integration, accountability, responsibility, equal share, and an incremental approach.[1268] It notes that "effective implementation of [share-based management] across all commercial fisheries will require buy-in from [the] licence holders."[1269] The following key incentives are suggested as ways of building support for share-based management and demonstration fisheries: providing additional fishing opportunities through share-based management; providing the ability for the industry to self-adjust its fishing strategies based on the available catch and the marketplace; meeting catch-monitoring standards; and providing transfers to First Nations in a transparent manner.[1270] The SBM Strategic Plan sets out "Keys to Influencing Resistant Fleets," including the following comments about two resistant South Coast fleets:

> Area E – Potential fishing opportunities on small surpluses of all salmon species, particularly Chinook, may cause Area E harvesters to consider some form of SBM, as will the potential loss of access to Fraser sockeye due to ocean mixed stock concerns. Historical opposition to government policies on First Nation fisheries (e.g. pilot sales) makes this group resistant to changes like SBM that may reduce their numbers. Further, the part-time nature of this fishery makes it difficult to effectively use economic incentives.
>
> Area G – This is a highly polarized fleet divided into those who believe that fishermen should have to actively fish their allocation to benefit and those who support an ITQ approach. The elected Area Harvest Committee is dominated by the former group and has rebuffed any attempts by the minority to discuss demonstration fishery options with DFO fishery managers, in spite of the results of the survey in Table 2. Reducing the size of this fleet through the Pacific Salmon Treaty mitigation program may cause this fleet to reconsider.[1271]

According to Mr. Grout, share-based management is a vision outlined in Pacific Fisheries Reform, and DFO is "looking for ways that [it] can move forward with identifying how share-based management can work for salmon."[1272] Mr. Grout recognized that there are a number of complexities affecting DFO's implementation of share-based management in the salmon fishery, such as changing TAC through the season as well as the manner in which shares can be transferred among different fleets and sectors (e.g., to inland Aboriginal fisheries).[1273] However, Ms. Farlinger is optimistic that a move to share-based management in the salmon fisheries is one way to improve conservation:

> There certainly are conservation advantages to the share based fishery. One of the challenges in the commercial salmon fishery is [that] it has been in many instances a mixed-stock fishery … it limits access to some more abundant stocks in order to protect some of the stocks of concern, or weaker stocks. And for that reason, the fishery has been for 15 or 20 years moving closer into the river. One of the advantages of a share based fishery is then that those people

> who … because of gear, because of location, because of their own personal interest – have less access to the stocks, can then move their share around in the fishery … it's not a panacea, it's not the answer to everything, but there are a number of both conservation and economic benefits to individuals who fish around the fishery. That doesn't mean it's perfect.[1274]

Mr. Grout acknowledged that DFO has no firm deadline for the implementation of share-based management and that DFO has approached the implementation of these fisheries only with "willing fleets."[1275] According to Ms. Dansereau:

> [T]hese are pilots that we are testing here. We don't in this Department move quickly when we are changing the regime by which fishermen or fishing people function. We don't simply announce a change without having done a significant amount of work with them and make sure that we have a significant number of them in agreement with the approach.[1276]

Participants have opposing views on the implementation of SBM and ITQs. The Seafood Producers Association recommends that DFO implement defined shares in all salmon fisheries within 12 months, and the Area D and Area B commercial fishers recommend that the commercial, recreational, and non-FSC Aboriginal fisheries move to a fixed defined share by 2015.[1277]

The B.C. Wildlife Federation and the B.C. Federation of Drift Fishers submit that there are several issues that DFO needs to address before it implements share-based management – issues such as obstacles to inter-sectoral allocation.[1278] The Area G commercial troll fishers stated their opposition to the move to SBM and, in particular, ITQs in their submission:

> The DFO policy to convert the fishery from a derby style fishery to an ITQ-based fishery is another example of a harvest management change without any socio-economic assessment in advance or any retrospective assessment after the event in those fisheries where it has been implemented. It appears to have become a pet policy of DFO for reasons of DFO convenience. It is clearly disadvantageous from the point of view of fishers and coastal communities. It creates a financial instrument that can be traded on the market … It adds a layer of expense to fishers who already struggle to meet expenses.[1279]

The First Nations Coalition also expressed concern about moving to an ITQ regime for salmon fisheries because a similar move in other fisheries has "led to permanent change without adequate consultation or consideration of First Nations' rights and interests."[1280] This sentiment was echoed by the Stó:lō and the Cheam.[1281]

Findings

I heard evidence about the benefits of share-based management (SBM) over a derby-style management model for selective fishing. I am satisfied that share-based management serves conservation objectives and that the Department of Fisheries and Oceans (DFO) has committed to moving to share-based management for this legitimate reason. DFO recognizes that managing the entire commercial salmon fishery as a pure competitive derby model is not responsible or sustainable.

The evidence suggests an obvious tension in DFO's approach. It is, at a broad level, committed to moving to share-based management; its analysis of how to win over "resistant fleets" demonstrates that commitment. However, the department to date has elected to pursue a "soft" approach, relying on demonstration fishing projects with those fleets indicating a willingness to engage in a share-based management model. It has not pressed this new management structure on those unwilling to go along.

It is clear that DFO has not undertaken a suitable socio-economic analysis of the consequences of a full move to SBM for the Pacific commercial salmon fleet, and as a result, it does not fully understand the socio-economic impact this approach might have. Although some insights may be taken from consultants' reports describing a few SBM demonstration projects in recent years, those insights are partial and limited. They are not enough.

Although I recognize the limitations in the evidence before me regarding share-based management, there is in principle a sound basis for moving away from a pure derby fishery model and toward

share-based management. I cannot, however, on the evidence before me unequivocally endorse share-based management. Nor would I reject it. What is vital now is to understand the implications for commercial fishers of a full move to share-based management. It is critical that DFO conduct a socio-economic analysis before settling on what management model (or models) it should employ. In the meantime, it should not impose SBM on fleets that are not willing. Once it has completed the socio-economic analysis and developed an approach that accords with the principles and objectives of the Wild Salmon Policy, DFO should clearly and quickly communicate what it intends to do, and when, and see those commitments through.

I discuss these findings and any related recommendations in Volume 3 of this Report.

In-river demonstration fisheries

The words "terminal," "near terminal," and "in-river," though often used interchangeably when discussing the Fraser River watershed, have different meanings. In this section, I use "in-river" to describe a broader category of fisheries occurring in the Fraser River watershed above Mission – fisheries that may include those occurring on the mainstem of the Fraser River. "Terminal" and "near terminal" are used to describe a more limited category of fisheries occurring on tributaries and lakes after sockeye split off from the Fraser River mainstem, with "terminal" fisheries occurring closest to the spawning grounds and usually targeting a single stock.

Historically, DFO has authorized the commercial fishing of Fraser River sockeye only in marine areas and in the Fraser River below Mission. Although these mixed-stock fisheries are primarily directed toward the most abundant stocks, they also affect less-productive (or weak) stocks that migrate at the same time as the abundant (or strong) stocks. Given this co-migration of strong and weak stocks, some have suggested that mixed-stock fisheries are not the optimal way in which to safeguard the genetic diversity of Fraser River sockeye salmon.

One model proposed to address this issue is the use of terminal fisheries. If not harvested in a mixed-stock fishery, Fraser River sockeye eventually separate into individual stocks as they migrate up the river and split off toward their spawning grounds. The primary conservation benefit intended by terminal fisheries is the ability to be more selective in harvesting, thereby protecting weak stocks. It has been suggested to me that this model, by allowing for the protection of weak stocks, may increase the sustainability of Fraser River sockeye.[1282]

DFO has expressed its intention to move a portion of the commercial Fraser River sockeye harvest to in-river locations and, in recent years, has authorized in-river commercial harvest (sometimes referred to as in-river demonstration fisheries) by First Nations' organizations. The movement of commercial fishing effort inland, and the manner in which the department has gone about the transfer of allocation, has been controversial.

DFO's decision to move commercial fishing effort in-river was explored at our hearings and was addressed by a number of participants in their submissions to me. Several participants were strongly supportive of shifting commercial fishing closer to terminal areas, both as a conservation measure and as a potential benefit to inland Aboriginal communities.

Canada took the position that the concept of conducting fisheries in-river is consistent with the objectives of the Wild Salmon Policy and the protection of weaker stocks. Moreover, in-river commercial fisheries, if demonstrated to be viable, could provide Aboriginal groups with economic and employment opportunities that did not exist previously.[1283]

The Conservation Coalition supported the move to more terminal fisheries. It suggested that this change will advance implementation of the Wild Salmon Policy by avoiding over-exploitation of weak stocks.[1284]

The First Nations Coalition took the position that terminal and near-terminal fisheries are beneficial to all because they support the protection of biodiversity needed to facilitate sustainable fisheries.[1285] The FNC suggested that, given the requirements for conservation and biodiversity, and the priority obligation of FSC fishing, there should be continued and improved efforts to explore and implement "terminal and near terminal river fisheries on known stocks in the coastal areas and Fraser watershed." DFO should therefore continue to work with First Nations to develop capacity for conducting such fisheries.[1286]

The Stó:lō Tribal Council and the Cheam Indian Band suggested that the FNC's recommendations related to known stock and selective fisheries could also be met by the fisheries conducted by First Nations in the Fraser River. They supported programs that would enable a transition to increased in-river fishing by First Nations.[1287]

Other participants, however, expressed concerns about the prospect of shifting commercial harvesting to terminal areas. The Seafood Producers Association of B.C. urged me not to recommend a move to further upriver fisheries, pointing to what it views as the decreased value of fish caught in terminal areas and the importance of consistent catches for business viability. It is also concerned about the impact a move to terminal fisheries would have on economic opportunities for coastal First Nations and on Aboriginal people employed in the processing sector.[1288]

The Area D Salmon Gillnet Association and the Area B Harvest Committee (Seine) took the position that DFO's desire to move to more terminal fisheries is "ill thought out" and makes little economic sense, noting several concerns such as the depreciated value of the fish and the impact of en route mortality.[1289] This submission was echoed by the West Coast Trollers Area G Association and the United Fishermen and Allied Workers' Union, which also raised concerns about the absence of "scientific analysis" of the impact a move to terminal fisheries would have. They took the position that commercial fishing in the marine areas is of greater economic value to Canada than commercial fishing in terminal areas.[1290]

The Western Central Coast Salish First Nations raised concerns about the potential negative impact of a move to terminal fisheries on the fishing opportunities of First Nations situated in the marine areas.[1291] The Laich-kwil-tach Treaty Society had concerns that a move to terminal fisheries would conflict with the historical and current reliance on the resource by coastal Aboriginal communities. It submitted that the costs and benefits of terminal fisheries must be further studied before any steps are taken to develop and implement a new terminal fisheries policy. In particular, it identified three main issues that need to be addressed: quality and value, ecological and economic sustainability, and socio-economic impact.[1292]

In-river commercial fishing under the Aboriginal Fisheries Strategy

Before 1992, DFO authorized commercial fishing for Fraser River sockeye in marine and approach areas below Mission only. It also authorized fishing by First Nations in inland areas above Mission, but only for the purpose of personal consumption, not of sale.[1293]

In 1992, following the Supreme Court of Canada's 1990 decision in *R. v. Sparrow,* DFO introduced the Aboriginal Fisheries Strategy (AFS), which included a commercial fishing component known as the Pilot Sales Program (described above). This program authorized communal fishing for the purpose of sale by several First Nations situated in the Lower Fraser River (the Musqueam, Tsawwassen, and Stó:lō).[1294] It was the first time that DFO had authorized commercial harvesting in the Fraser River above Mission (the Stó:lō fishery takes place in the area from Mission to Sawmill Creek).[1295]

In 1993, as part of the AFS, DFO also began, under the Excess Salmon to Spawning Requirements (ESSR) policy, to authorize some harvesting of Fraser River sockeye in terminal areas. This policy authorizes the harvesting of "surplus" salmon that return to the spawning grounds in numbers that exceed the spawning capacity of a natural area or an enhancement facility.[1296] The ESSR policy directs that, where DFO identifies an ESSR surplus, the fish are made available on a priority basis to First Nations for unmet FSC needs, then to First Nations for sale, then to community groups for sale, and, lastly, to competitive tender for sale.[1297]

ESSR fisheries are intended to be opportunistic rather than to create permanent fisheries in terminal areas. Under the ESSR policy, DFO is directed to eliminate or minimize the availability of ESSR surpluses, where possible, through FSC, commercial, or recreational harvesting.[1298] Because of the opportunistic nature of ESSR fisheries, there is no requirement for relinquishment of licences from the commercial fishery or for permanent shifts in allocations from marine to terminal areas.

The Allocation Transfer Program (ATP) was also included under the AFS in 1994.[1299] The ATP operates by purchasing and permanently retiring licences from commercial fishers and by transferring an equivalent commercial fishing licence or allocation to an Aboriginal group on a communal basis.[1300]

Early research by DFO into the viability of terminal fisheries

The programs introduced under the AFS (Pilot Sales, ESSR, ATP) were not intended to establish new commercial fisheries in terminal areas. However, around the time DFO introduced the AFS, it also began to research the viability of in-river commercial fishing.

In 1994, DFO's Program Planning and Economics Branch completed a study* of the quality and financial viability of terminal fisheries targeting Late Stuart and Horsefly sockeye.[1301] This study identified the issue of overharvesting weak stocks in marine fisheries and suggested that increasing the use of ESSR fisheries could potentially provide a solution to this "mixed stock problem."[1302] It also identified a number of practical problems associated with ESSR fisheries, including the "marginal" quality of the fish caught in some of the fisheries.[1303] The findings from this study are discussed below. The study recommended that further work be done to develop a strategy for dealing with ESSR surpluses in the Fraser River watershed.[1304] It suggested that the next steps for developing such a strategy would be to address the following issues: identifying surpluses, developing feasible strategies for harvesting them, considering the effects of harvesting surpluses on co-migrating species, and determining the actual size of economic benefits of these fisheries.[1305] It recommended that these issues be addressed by holding a pilot-scale fishery and documenting the outcome.[1306]

Pacific Integrated Commercial Fisheries Initiative

DFO did not expand ESSR fisheries after the 1994 study. However, in the early 2000s, with an increasing focus on conservation objectives, DFO considered the possibility of developing in-river commercial fisheries. This issue was addressed in a 2004 memorandum written by Mr. Bevan, then senior assistant deputy minister, Fisheries and Aquaculture Management (now Ecosystems and Fisheries Management):

> With weak stock management, as required by [the *Species at Risk Act*], the [Wild Salmon Policy], and the precautionary approach, it appears there will be ongoing returns of sockeye stocks to the Fraser River that could be harvested in terminal in-river areas. Economic losses in marine fisheries could be offset or mitigated to some extent by the development of in-river fisheries. While this would be highly controversial, there is no biological reason for denying these opportunities.[1307]

In this memorandum, Mr. Bevan acknowledged that there may be valid reasons for not pursuing in-river commercial fishing, including harvesting and marketability problems, but suggested that, "given the ongoing pressures to manage for weak populations[,] we cannot continue to forgo potential economic opportunities, simply for the sake of maintaining status quo allocations."[1308]

In 2007, DFO began to support the transfer of commercial harvest to in-river demonstration fisheries through the Pacific Integrated Commercial Fisheries Initiative (PICFI) (discussed above). Its largest financial component ($115 million) is directed to the acquisition of commercial access (licences and quota) from harvesters in marine fisheries, including the salmon fishery.[1309] Like the ATP, PICFI operated by purchasing licences from commercial fishers, on a voluntary basis, and then transferring an equivalent licence or allocation to an Aboriginal group.[1310] In 2008, DFO indicated that 15 percent of the funding for relinquishment under PICFI would be used to acquire commercial access to salmon, with the remaining 85 percent applied to other fisheries (e.g., groundfish, shellfish, halibut).[1311] It also indicated that acquisition of salmon access would primarily be used to support commercial opportunities for in-river First Nations.[1312]

PICFI included a capacity-building element with total funding of $12.5 million. This funding was intended to facilitate the development of First Nation–owned and –operated commercial fisheries enterprises, both in coastal and inland areas, recognizing that simply having access to commercial fishing opportunities would not guarantee long-term economic success.[1313]

* This study is co-authored by Kaarina McGivney, who later became the regional director of the Pacific Region Treaty and Aboriginal Policy and Governance Directorate and also testified at the hearings.

DFO's rationale for shifting commercial harvest to in-river locations under PICFI

Several witnesses discussed DFO's objectives in using PICFI funding to shift a portion of the commercial harvest into the river. According to Paul Sprout, former regional director general, Pacific Region:

> [PICFI] is ... designed principally to transfer licenses from non natives to First Nations, and in doing so offset and actually improve conservation by reducing fisheries in areas where the stocks are more mixed, where there [are] more problems with the fisheries, in terms of conservation, transferring those opportunities to First Nations, typically more inward, and in some cases in the Fraser River.[1314]

Ms. Farlinger, the current regional director general, indicated that, by funding in-river demonstration fisheries, DFO was seeking to support conservation objectives by avoiding mixed-stock fisheries, to provide additional economic access to First Nations, and to test the feasibility of in-river fisheries as an economic exercise.[1315] According to Ms. Stewart, while the shift to in-river demonstration fisheries under PICFI was intended to provide economic opportunities to First Nations and was related to the recent poor performance of the coastal fishery, the economic aspect was secondary to the primary motive of providing for a more sustainable way of fishing.[1316] Mr. Rosenberger also told me that the shift to more terminal fisheries under PICFI is in keeping with an attempt to establish fisheries that are focused on broader Wild Salmon Policy principles and sustainability.[1317]

The choice of a voluntary buy-back program under PICFI was consistent with the principle of "fair transfer of fishing opportunity" adopted by DFO in 2005 under Pacific Fisheries Reform. Under this principle, any transfer of economic opportunities to First Nations would be accomplished through voluntary licence retirement.[1318] Ms. Mijacika explained to me that an important benefit of buy-back programs such as PICFI and ATP is that they provide a willing buyer, where there might not otherwise be one, for commercial licence holders who want to retire their licences.[1319]

Acquisition of commercial access under PICFI and ATP

From 2007 to 2011, DFO spent $14.6 million to acquire 157 salmon licences under PICFI, and $4.8 million to acquire 56 salmon licences under the ATP.[1320] Ms. McGivney advised that, in this period, all the salmon licences acquired through PICFI, and some acquired through the ATP, were used to support in-river commercial fisheries by First Nations.[1321]

Ms. Stewart did not know the proportion of the commercial salmon fishery that the department intends to move inland through PICFI.[1322] Ms. McGivney testified that DFO had no specific plan and that determining how many fish would be moved to inland harvest from marine harvest would be determined through "negotiation," though she did not specify who would be included in the process.[1323]

Transfer of commercial allocations to in-river demonstration fisheries

Transferring a commercial allocation to an in-river location is complex. Because the composition of stocks is different with mixed-stock fisheries in marine areas and targeted fisheries in-river, it is not possible to transfer a commercial allocation directly from a marine to an in-river demonstration fishery.[1324] As a result, commercial salmon licences acquired by DFO are each treated as a "portfolio" of stocks, with different stocks being transferred proportionally to in-river demonstration fisheries.[1325] For example, if a particular sockeye stock (e.g., Chilko) accounts for 20 percent of the harvest under a commercial licence in a mixed-stock fishery, the equivalent of that 20 percent may be reallocated to a demonstration fishery in-river that targets Chilko sockeye.[1326] Mr. Rosenberger explained that the weak stock components of commercial salmon licences acquired by DFO, such as Cultus or Bowron stocks, would not be reallocated to in-river fisheries for conservation reasons.[1327]

In-river demonstration fisheries conducted under PICFI

DFO has used PICFI funds to support several in-river demonstration fisheries conducted by

First Nations.* These fisheries have occurred in a number of locations in the Fraser River watershed, including the Thompson, Chilko, and Quesnel river systems, parts of the Lower Fraser River, the Harrison River, and the Fraser River near Lytton (Siska First Nation).[1328]

Because of low returns, there were no in-river demonstration fisheries targeting Fraser River sockeye in 2007, 2008, and 2009.[1329] Mr. Huber testified that, in the years after PICFI started, "there just [weren't] fish available" for harvest.[1330] However, some inland First Nations did conduct demonstration fisheries that targeted other species of salmon, including pink and chinook.

Mr. Rosenberger testified that harvesting has been "well below the desired outcomes" in many of the in-river demonstration fisheries attempted under PICFI. He noted that, for many in-river groups, the issue is "trying to figure where and how they want to fish," and that increasing the capacity to harvest and improving the understanding of the workings of the gear are going to be "a growing experience." According to Mr. Rosenberger, beach seining has proven fairly successful, although it has been challenging to find areas where it will work. He noted that a significant breakthrough occurred in 2010 with the harvest of nearly 200,000 sockeye by the Riverfresh Partnership in the Shuswap / Thompson area. This fishery involved operating a seine boat on a lake – something that, according to Mr. Rosenberger, had "never occurred in the history of the Interior."[1331]

In 2010, the high returns of Fraser River sockeye allowed DFO to allocate 12–13 percent of the total allowable catch to in-river demonstration fisheries. Mr. Grout testified that the in-river groups were not able to harvest that amount of fish, but "in the future, there may be capacity developed to do that and/or interest for increased allocations."[1332]

Table 1.5.11 summarizes the results of in-river demonstration fisheries that targeted Fraser River sockeye in 2010.

Costs associated with conducting in-river demonstration fisheries

Ms. Stewart told me that DFO is seeking to identify business opportunities through PICFI which, in time, will stand on their own and provide reliable economic opportunities for Aboriginal communities.[1333] However, most, if not all, of the expenses of in-river demonstration fisheries (e.g., catch monitoring, administration, marketing, transportation, business planning) have been funded by DFO. Ms. Stewart explained that DFO has funded these fisheries in their "start-up phases," but their continued funding is "an issue that needs to be addressed."[1334] Mr. Masson indicated that currently there is no plan to pass on any of the costs of catch monitoring to Aboriginal organizations conducting communal commercial fisheries, although there has been some discussion of this possibility.[1335]

Table 1.5.11 In-river demonstration fisheries targeting Fraser River sockeye, 2010

Aboriginal organization	Fishery location(s)	Catch
Chehalis and Scowlitz First Nations	Harrison River	11,298
Riverfresh Partnership (Secwepemc Fisheries Commission / Esh-Kn-am)	Kamloops Lake, Siska First Nation, Thompson River	193,713
UFFCA Partnership (Northern Shuswap Tribal Council and Tsilhqot'in National Government / Xeni Gwet'in)	Quesnel River, Quesnel Lake, Chilko River, and Chilko Lake	995

Source: Compiled using data from Exhibit 1274, pp. 9, 11.

* Demonstration fisheries are projects involving new ways to access salmon resources in a manner that improves economic performance in the fishery, increases economic access to fisheries resources by Aboriginal groups, and improves co-operation among harvesters while ensuring conservation of salmon stocks. See PPR 5, Harvest Management, p. 55.

Opportunities for non-Aboriginal fishers under PICFI

Although one of the objectives of PICFI is to "integrate" Aboriginal and non-Aboriginal commercial fisheries, the program, according to Ms. Stewart, does not contemplate providing non-Aboriginal people with access to in-river commercial fisheries.[1336] Mr. Bevan testified that, when PICFI was first designed, it was intended to allow commercial fishers to move in-river if they wished to do so, but "nobody's interested in doing that at this point."[1337] Ms. Farlinger confirmed that there has been "no explicit provision or request to provide access to non-Aboriginal fishers up the river."[1338]

Dr. Ronald Ignace of the Secwepemc Nation told me that he envisions in-river commercial fisheries being limited essentially to First Nations.[1339] Thomas Alexis of the Tl'azt'en Nation and Chief Fred Sampson of the Siska First Nation added that, by moving fisheries in-river, stocks may be rebuilt to a point where the marine fishery would be viable again, providing opportunities for other interests in addition to First Nations.[1340]

Expiry of PICFI

The PICFI program was scheduled to sunset on March 31, 2012. In September 2011, Ms. Farlinger told me that DFO had not decided whether to pursue in-river commercial fisheries post-PICFI.[1341] Ms. Stewart explained that several options were under consideration by DFO,* but she could not "speak to what the future will hold."[1342] She agreed that, if PICFI were cancelled, it would be a challenge to continue in-river commercial fisheries.[1343] She noted that funding is needed on an ongoing basis for the expenses of conducting in-river fisheries and for research on feasibility and marketing opportunities.[1344]

In August 2010, DFO's Evaluation Directorate completed a mid-term evaluation of PICFI that recommended, among other things, that PICFI continue to lead the move toward a terminal fishery, and, if resources are available, continue PICFI beyond its scheduled expiry.[1345] Ms. Farlinger testified that the recommendations in this evaluation were "generally useful," but that DFO's internal analysis of PICFI is still ongoing and that no decision had been made on those recommendations.[1346]

I have reviewed the report by the DFO Evaluation Directorate and find it to be of little assistance. The authors purport to have considered "multiple lines of evidence," including interviews with internal and external "key informants," and to have reviewed the relevant documents and literature.[1347] However, the report does not identify the key informants, documents, and literature reviewed by the authors, or even the authors themselves.

On terminal fisheries, the report states the following:

> A move toward a terminal fishery would further the goal of an environmentally sustainable fishery by avoiding weak stocks, while the economic viability of the fishery could increase due to a move away from a competitive fishery as in-river allocations are made in a share-based fashion, because of opportunity for efficient capture technology that the concentration of salmon in their native streams affords, and because selectivity would permit optimal harvests of strong stocks. A trade-off on quality could be mitigated by innovative product development and marketing. Consultation with [First Nations] would facilitate the achievement of an optimal balance.[1348]

This paragraph contains a number of optimistic assumptions regarding the benefits expected to arise from a shift to a terminal fishery. Unfortunately, these assumptions are not supported by any analysis in the body of the report.

I find this report to be inadequate as a basis for deciding whether DFO should continue to support a move toward terminal fisheries.

Management of a terminal fishery

Several witnesses discussed the impact that a move to in-river commercial fisheries could have on DFO's approach to managing the fishery. When asked whether a shift to a terminal fishery would require a "sea change" in DFO's approach to management, Mr. Rosenberger replied, "No, I think that change is already occurring." He acknowledged, however, that

* I note that in the budget tabled in Parliament on March 29, 2012, the government proposes to provide "$33.5 million in 2012–13 to extend the Atlantic Integrated Commercial Fisheries Initiative and the Pacific Integrated Commercial Fisheries Initiative."

DFO needs to make adjustments to account for the transfer of commercial access to First Nations.[1349]

Mr. Lapointe noted that DFO policies allowing for in-river fisheries have been in place since 1992. In his view, the Fraser River Panel has been able to cope with the implementation of those policies.[1350] Mr. Rosenberger explained that the Fraser River Panel, despite having jurisdiction under the Pacific Salmon Treaty to waters above Mission, has not exercised authority over in-river commercial fisheries.[1351]

I was told that researchers at Simon Fraser University (SFU) are developing an in-river management model, which Mr. Grout described as "much more complex." The model would look at the migration of fish and how escapement objectives might be set for terminal areas, perhaps at the Conservation Unit level or even a finer-scale resolution.[1352] The model differs from the Fraser River Sockeye Spawning Initiative model (see discussion above), and it is uncertain how the two models could be combined.[1353] Although the FRSSI model does not take into account where the harvest occurs or how it might be allocated, the in-river model might allow managers to differentiate in both these areas.[1354] Mr. Grout noted that the project is "still a work in progress."[1355] DFO meets regularly with the SFU researchers but is not yet contemplating policy changes.[1356]

Terminal fisheries as a conservation initiative

I heard from several witnesses that a terminal fishery could increase the sustainability of Fraser River sockeye by allowing for increased selectivity in harvesting abundant stocks while also protecting weak stocks. Mr. Bevan told me that shifting to a terminal fishery makes sense "from a conservation point of view" by allowing for targeted harvests on specific stocks.[1357] Mr. English, principal author of Technical Report 7, Fisheries Management, noted that a terminal fishery allows for "disaggregation," providing a greater ability to manage returns of specific stocks.[1358]

The commercial sockeye fishery in Bristol Bay, Alaska, offers an example of how a terminal fishery allows for selective harvesting. This fishery targets sockeye on their return migration to nine separate river systems, each of which flows directly into the ocean.[1359] As shown in Figure 1.5.15, the sockeye fishery in Bristol Bay is divided into five "fishing districts" named after the river systems associated with them. Two of the fishing districts (Nushagak and Naknek-Kvichak) target fish returning to multiple river systems.[1360]

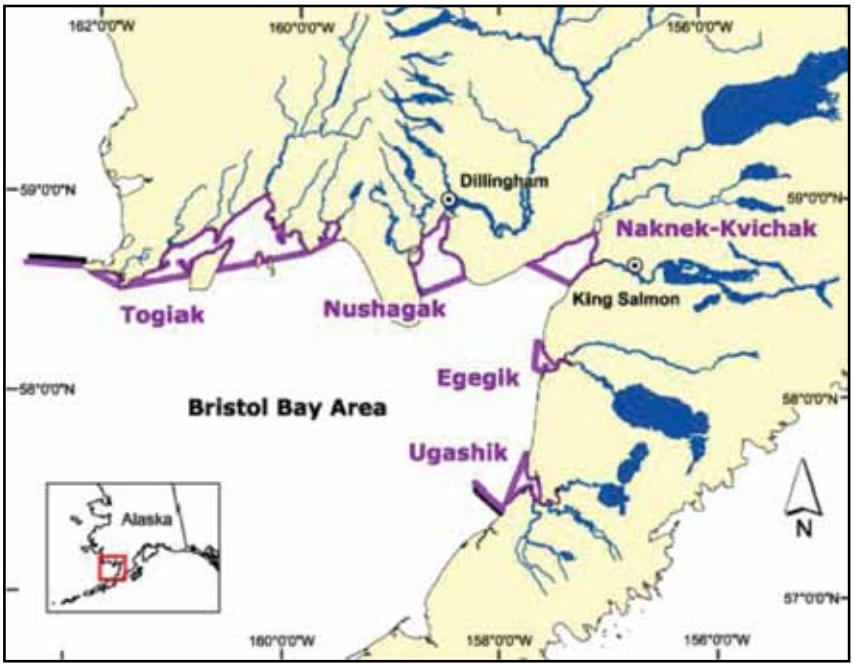


Figure 1.5.15 Map of Bristol Bay, Alaska, indicating the commercial fishing districts for sockeye salmon

Source: Technical Report 7, Fisheries Management, p. 129 (Exhibit 718).

The Bristol Bay fishery primarily occurs close to the mouths of the nine rivers, extending no more than 3 miles offshore.[1361] Because only one or a few sockeye stocks return to each river, commercial fishers are able to harvest selectively either a specific stock or a limited selection of "known" stocks. It is therefore a terminal fishery, even though it occurs almost entirely in marine areas.

Because the geography of the Fraser River watershed differs substantially from that of Bristol Bay, I find the Bristol Bay example to be of only limited assistance. The most significant difference is that all the Fraser River sockeye stocks return to one river before splitting off toward their spawning areas.[1362]

In order to increase selectivity in harvesting Fraser River sockeye, one must shift the location of harvesting to areas higher up in the Fraser River watershed.[1363] Gordon Curry, former fishery manager and Aboriginal affairs advisor, DFO, described the advantage of a terminal fishery for Fraser River sockeye as follows:

> [A]s you move towards the spawning grounds you narrow the array of stocks or species down so that you can then become more selective as you get towards the terminal areas or, in essence, once you're on the spawning grounds, you're dealing with [one] stock of salmon ... So that's the ultimate in terms of being able to be very specific.[1364]

Mr. Shepert described the benefits of harvesting farther inland this way: "The closer you catch them to [terminal areas], the more sustainable you can be. And that's what the First Nations have known for a long time. You can choose between males and females. You can let more females escape. You can take more males."[1365]

Although the ability to target stocks increases closer to terminal areas, I was told that fisheries conducted on the Fraser River mainstem can have a conservation benefit if they are far enough inland to avoid specific stocks of concern. For example, Dr. Brent Hargreaves, acting lead, Salmon Team, noted that Cultus Lake sockeye could be avoided if harvesting occurs after their "normal turnoff" at the Vedder River near Chilliwack.[1366] However, Mr. Curry cautioned that only a few stocks "branch off" from the Lower Fraser River, while many travel a long distance up the Fraser River before branching off.[1367]

Ms. Farlinger told me that one of the primary considerations in deciding where in-river commercial fisheries will take place is to reduce the impact of marine mixed-stock fisheries on weak stocks.[1368]

Mr. Ken Wilson, a fisheries biologist, suggested that, if DFO is "convinced that a particular [large] escapement is hazardous to a particular salmon stock or CU" (see the discussion of large escapements in the escapement target section of this chapter), shifting harvest to the terminal area could potentially help to address that concern.[1369] I note, however, that if large escapements are to be avoided by terminal fishing, the capacity to harvest big volumes of fish in terminal areas must exist. An assessment of this issue would require consideration of the feasibility and the cost of establishing that capacity.

Socio-economic impact of the move to in-river commercial fisheries

Ms. Farlinger acknowledged that DFO has not formally studied the socio-economic impact of a move to in-river commercial fisheries.[1370] I did hear, however, from several witnesses about the potential impact of such a move on Aboriginal communities. Chief Sampson supports in-river commercial fisheries, suggesting that they provide "opportunities to those who are often the poorest of the poor in this province," and that these benefits would be significant.[1371] He supports DFO's licence buy-back programs as a "step in the right direction" to build up in-river fisheries that he hopes will become permanent.[1372]

Rod Naknakim of the Laich-kwil-tach Treaty Society told me that members of his organization, who fish in marine areas, rely on the fishery for their livelihoods and fear that a terminal fishery "will push [them] right out of the industry."[1373] Mr. Morley also noted the potential impact on First Nations in marine areas, explaining that, with respect to the Canadian Fishing Company's operations in Prince Rupert, Aboriginal people make up about 60 percent of the workforce employed at the cannery and 80 percent of the crew and skippers on vessels.[1374] According to Mr. Grout, because vessels and gear used for commercial harvesting in marine areas are also used for harvesting of FSC fish, some First Nations in those areas have raised

concerns that their ability to access FSC fish could be compromised if commercial licences held by Aboriginal harvesters are relinquished through buy-back programs.[1375]

Economic viability of in-river demonstration fisheries

I heard evidence from several witnesses about two specific concerns relating to in-river demonstration fisheries: the availability of fish to harvest, and the quality and value of sockeye caught in terminal areas.

Availability of fish to harvest

Although the economic viability of any commercial fishery depends on having access to reliable returns of fish, this concern is particularly important for inland fisheries because of the high variability in returns from year to year.[1376] Mr. Grout explained that, for terminal fisheries for Fraser River sockeye, years with substantial numbers of sockeye available for harvest are followed by off-cycle years. For example, in the Thompson River system, the usual pattern is two strong years of sockeye returns followed by two relatively weak years.[1377] Mr. Rosenberger observed that it would be difficult to sustain a commercial fishery that occurs in only two of four years.[1378]

Mr. Morley explained how variations in abundance have more serious consequences in a terminal fishery:

> [T]he group who is fishing … is relying on a single population. And if that population is reduced, their economic opportunities are reduced drastically, and they can't sort of say, "Okay, we're going to take conservation action on this population this year and we're going to, instead of harvesting Fraser sockeye we're going to concentrate on Barkley Sound sockeye or we're going to concentrate on chum salmon in Johnstone Straits," because they don't have that opportunity living in that one terminal area. So inherently the fishing activity is less economically sustainable.[1379]

As a way to address the issue of variability, Mr. Rosenberger told me that DFO has encouraged inland First Nations to organize themselves into a larger co-operative or aggregate group. However, he advised that "fairly limited progress has been made" on that issue.[1380]

Mr. Morley also raised a concern about the impact of en route mortality on the availability of fish to harvest in terminal fisheries. He suggested that, because fish die from various causes (e.g., high temperatures) during their migration up the river, the total number of fish available to harvest would be lower in a terminal fishery than in a marine fishery.[1381] I heard from Dr. Scott Hinch, a professor at the University of British Columbia, that en route mortality of Fraser River sockeye has been increasing (his evidence regarding en route mortality is also discussed in Volume 2, Chapter 4, Decline-related evidence). Since 1996, en route loss of at least 30 percent has been observed in at least one run-timing group each year.[1382] In several of those years, en route loss was the dominant fate of the Early Stuart and Late-run groups.[1383]

When asked whether en route mortality could reduce the harvest in the commercial fishery if fishing effort is moved in-river, Ms. Stewart responded that, because DFO is trying to limit harvesting of weak stocks in marine fisheries, a move to in-river fisheries might actually create fishing opportunities that otherwise would not have been available.[1384] Mr. Rosenberger noted the potential for terminal fisheries to increase the available harvest by enabling catches of strong stocks that would otherwise be forgone because of weak stock concerns in mixed-stock fisheries.[1385] Mr. English also told me that, if the goal is to reduce exploitation rates on some stocks while allowing some fisheries on all stocks, then a portion of the harvest could be taken in traditional ocean fisheries, with the surplus harvested in more terminal areas.[1386]

Quality and value of sockeye caught in terminal areas

Ms. McGivney told me that, to her knowledge, the only investigation conducted by DFO directly into the quality of fish in terminal areas was the 1994 study discussed earlier in this section.[1387] According to this study:

> There is controversy over the quality and value of terminally caught sockeye, especially Fraser River sockeye stocks. Commercial interests generally contend that in-river quality is so low

> that sockeye have low or no value and that trying to market such low value catch would affect Canada's reputation for high quality products. Other, mainly Native, interests contend that in-river salmon quality is not necessarily bad. Natives have been eating fish caught from in-river areas for many hundreds of years and for some time have been selling these fish locally. So far, the positions of both groups are based on anecdotal information.[1388]

The covering memorandum for the study suggests that, given the controversial nature of the topic, "it is important to gather relevant information (e.g. quality and value of fish at various locations) and make it generally available to facilitate an informed debate."[1389]

The methodology for the study involved harvesting Horsefly and Late Stuart sockeye at three locations (Tachie River, Quesnel River, Horsefly River) over a four-week period in September 1993. The fish were transported to Vancouver, where a portion of the fish was processed into canned and smoked products, as well as roe products.

DFO staff evaluated the quality of the fresh and processed products through sensory and chemical analysis. They found that, while the quality of the products met DFO's minimum standards for sale, it was below that of comparable commercial products. The smoked products most closely resembled current commercial products, but the texture was grainy and chewy, and in many cases the products were very thin. The fresh fish was designated as "utility grade," with attributes typical of Late-run or sexually mature fish – heavily watermarked and covered with slime. The canned product also had attributes associated with Late-runs, including watermarks, soft texture, and considerable variation in flesh colour. The roe was acceptable for commercial sale but of "very low quality."[1390]

Based on these findings, the authors of the study researched potential marketing opportunities for the various products and concluded that they would not meet the requirements of many of the commercial markets into which sockeye are traditionally sold. They identified potential markets for a caviar product in Japan or Germany and for certain smoked products in Canada, if the products were offered at discount prices, but did not identify any marketing opportunities for the fresh or canned products.[1391]

According to the report, the results are specific to Horsefly and Late Stuart stocks and would not necessarily apply to other sockeye stocks, but they "provide a benchmark of information that may be indicative of the possible outcomes in some other fisheries for stocks with similar timing."[1392] At the hearings, Ms. McGivney referred to the results of this study as "very preliminary."[1393]

I find this study helpful, in particular its analysis of the quality of sockeye caught in terminal fisheries. The analysis of marketing opportunities is less useful because it is now outdated.

Several witnesses also told me that the quality and value of fish caught in terminal and near-terminal areas is lower than fish caught in the marine areas.[1394] Mr. Morley related his view that in-river fisheries are less profitable than marine fisheries because "the market opportunities for the fish [caught] upriver are much more limited" and "the quality of the flesh … provides fewer options in terms of products."[1395] He referred me to a 2006 study prepared by Stuart Nelson, under the direction of the BC Seafood Alliance, which examined the Fraser River sockeye fishery from a business perspective and compared the quality and value of fish caught in different locations, including in terminal areas.[1396] In completing this report, Mr. Nelson relied on a number of sources, including:

- financial data and market information derived from interviews with industry participants;
- reports on the seafood business in British Columbia and in other jurisdictions;
- fishery information derived from DFO publications and interviews; and
- the knowledge and the experience of the author.[1397]

I note that the report does not provide names of the interviewees, nor does it list the other sources of information relied on by the author.

In this study, Mr. Nelson describes the physiological changes experienced by Fraser River sockeye as they migrate toward terminal areas:

> During the Fraser sockeye's journey upriver … the attributes of the fish change. No longer feeding, and battling against the rivers' flows, sockeye are fuelled by built-up stores of energy (fat, oil, muscle). Skin thickens, and colour

> changes from bright blue-silver to duller shades of red-grey. Fish lose body weight, and reproductive organs comprise a growing portion of the sockeye's mass. Some of the red pigment in the flesh is transferred to the skin and eggs, making the flesh paler. As muscle is spent, and energy consumed, flesh becomes softer, and belly-walls thinner. Sockeye arrive at the spawning grounds substantially spent.[1398]

Mr. Nelson suggests that vivid flesh colour is a "vital attribute" for salmon customers, and other "premium" attributes include firm flesh texture, bright skin colour, and high oil / fat content.[1399]

> It is evident that as sockeye proceed through their migration, they possess fewer of the attributes that are prized by the marketplace. Reduced market attractiveness implies a lower commercial value. It follows that a harvest-mix as heavily weighted to ocean-caught Fraser sockeye as possible offers the best prospects for "giving customers what they want."[1400]

Using a financial model, Mr. Nelson calculated profits to harvesters under three capture locations (ocean, estuary, or terminal), based on the assumption that the entire harvest is directed to one capture location. His calculations purported to show that profits to harvesters from ocean-caught sockeye are three to 10 times higher than from terminally caught sockeye.[1401] Mr. Nelson did not testify at our hearings, so I find it difficult to assess the reliability of his results.

Taking a different view of the issue, Mr. Shepert told me that the difficulty with marketing terminally caught sockeye has more to do with perceived rather than actual quality. He believes that marketing opportunities for terminally caught sockeye would increase if consumers understood the conservation benefits associated with terminal fisheries.[1402] Mr. Shepert referred me to a study he completed in 2010 on marketing opportunities for fish caught by Aboriginal organizations in the Upper Fraser River.[1403] For this study, the Upper Fraser Fisheries Conservation Alliance produced value-added salmon products, including cold-smoked lox and dry- and hot-smoked salmon. Mr. Shepert provided the products to six potential buyers in the Lower Mainland (representatives of restaurants, hotels, and grocery markets), who completed a survey.[1404] At the hearings, Mr. Shepert shared his view on the results of this work:

> What we're talking about here is the marketability of the products. And the products that we have been able to generate in the Upper Fraser have been excellent. I've taken them to some of the finest places here in Vancouver: Choices, Meinhardt. It's all in the report. But we went around and … we might not be able to compete toe-to-toe in terms of the lox market. That's kind of sewn up. But we've developed a dry and hot-smoked [product] and putting them into Cryopacs. We've had incredible response from hotels and hotel chains that would love to have something like that to put in their gift baskets to give away. They were asking, "When can we buy this product?" Well, we were just doing the market surveys so I found that at Meinhardt and Choices, the feedback was incredible and positive in terms of, yes, we can market these products, no problem, particularly knowing that they're more sustainable.[1405]

Mr. Shepert's report suggests potential marketing opportunities for one particular product, dry- and hot-smoked salmon. I note, however, the limited scope of the survey and, in addition, that there is no analysis of the potential size of the market.

Evaluation of in-river demonstration fisheries conducted under PICFI

Ms. Farlinger said that the in-river demonstration commercial fisheries funded by PICFI "are still under evaluation as pilots."[1406] According to Ms. Stewart, "during the period that PICFI has been in place … there were limited commercial opportunities in those terminal fisheries. So the ability to … assess viability has been somewhat limited."[1407] Ms. Farlinger told me that DFO is continuing to assess whether the fish could be harvested in a way that not only avoids the capture of other stocks but ultimately allows the fisheries to be profitable.[1408]

Neither Ms. Farlinger nor Ms. McGivney could direct me to any study or analysis by DFO of the economic viability of in-river demonstration

fisheries conducted under PICFI, or to any assessment by the department of any conservation benefits achieved by these fisheries.[1409] I was, however, referred by DFO witnesses to two reports completed by Aboriginal organizations which addressed the financial outcomes of in-river demonstration fisheries conducted under PICFI. A report by the Okanagan Nation Alliance (ONA) reviews the results of the demonstration fisheries it conducted in 2010 targeting sockeye from the Columbia River system. The ONA caught a total of 1,067 sockeye in three fisheries: Osoyoos Lake seine; Okanagan Falls gillnet; and Osoyoos Lake troll.[1410]

The fish were sold to local customers in the Southern Okanagan region in various forms, including fresh whole sockeye and frozen sockeye. Some of the fish were processed into Indian candy (a traditional form of smoked salmon) and given to customers as samples for marketing purposes.[1411] At present, there is no fish-processing facility in the Okanagan, so the frozen fish and the Indian candy were processed at other locations (Siska and Maple Ridge) and shipped back to the Okanagan.[1412]

Table 1.5.12 shows the financial results of the demonstration fisheries, indicating that all three of the fisheries suffered losses.[1413]

Table 1.5.12 Results of demonstration fisheries conducted by Okanagan Nation Alliance, 2010

	Seine fishery	Troll fishery	Gillnet fishery
Sockeye caught	686	62	319
Sales	$10,863	$629	$13,400
Costs	$27,018	$9,477	$13,717
Total losses	($16,156)	($8,848)	($317)

Source: Compiled using data from Exhibit 1424, p. 18.

The report concludes, that based on 2010 market conditions and production costs, a break-even point could be reached with minimum harvests of 2,300 sockeye (seine), 1,500 sockeye (troll), and 800 sockeye (gillnet).[1414]

Ms. Stewart explained that the ONA is still working on market development and that the losses "reflect the fact that this is very early days in a start-up operation."[1415] Mr. Rosenberger told me that many of the fish were sold to restaurants and high-end markets and that the ONA had reached an agreement with a significant restaurant chain in British Columbia to feature these fish.[1416]

A report prepared by the Secwepemc Fisheries Commission (SFC) describes the results of demonstration fisheries it conducted in 2007.[1417] The SFC harvested a total of 10,697 pink salmon and 144 chinook in four fisheries: Thompson River gillnet, Thompson River angling, Kamloops Lake gillnet, and Thompson Lake beach seine. Only the latter two fisheries were successful in harvesting the target fish.[1418]

In the beach seine fishery, the SFC harvested a total of 95 chinook and 10,967 pink salmon over four and a half days, at a cost of approximately $10,000.[1419] The pink salmon were sold directly to a fish buyer / broker on site for $8,068.75. This purchaser also took the chinook but did not pay anything for them.[1420] According to the report, the beach seine fishery could be profitable on the fifth night if production increased to 2,000 pinks per day, or on the second night if the SFC were able to sell the chinook.[1421]

In the gillnet fishery at Kamloops Lake, the SFC caught a total of 45 chinook over a three-day period at a cost of approximately $3,000.[1422] The SFC operated a fish market, where it offered for sale 613 pounds of chinook (fresh and frozen). Of this, it sold 208 pounds of fish at an average price of $2.69 per pound, for total sales of $560.[1423] The report concluded that "the fish market could never approach profitability" with these sales levels but indicated that a break-even point could potentially be reached after eight days if sales could be tripled and the price were increased to $4.00 per pound.[1424] However, the report also noted that the prices were thought to be too high by some customers and recommended that prices at temporary fish markets be set much lower.[1425]

When asked about these results, Ms. Stewart explained that the SFC fisheries are in "early days" and that those involved are still exploring what kinds of products are marketable and looking for ways to streamline and improve production.[1426] She noted that the SFC had been working strenuously at identifying how that fishery could be operated in a profitable manner.[1427]

Findings

The transfer of commercial fishing allocation to in-river demonstration fisheries under PICFI

From 2007 to 2011, the Department of Fisheries and Oceans (DFO) spent $14.6 million through the Pacific Integrated Commercial Fisheries Initiative (PICFI), as well as additional money through the Allocation Transfer Program (ATP), to acquire salmon (not just sockeye) licences for the purpose of transferring allocations to a number of in-river demonstration fisheries. It also provided funding through PICFI to support the development of Aboriginal businesses and to cover costs associated with conducting the demonstration fisheries. Although I commend DFO for exploring ways to conduct more sustainable fisheries and support economic development for First Nations, I have concerns about the way it has done so under PICFI.

First, before launching into such a costly program, in my view DFO ought to have conducted preliminary research. I note that, aside from one study in 1994, DFO witnesses could not point me to any pre-PICFI analysis of such basic matters as the quality and marketability of terminally caught fish.[1428]

Second, despite the scale of DFO's investment in establishing in-river demonstration fisheries under PICFI, its evaluation was ad hoc. As of the time of our hearings, only a few months before the end of the initiative, DFO had not evaluated the economic viability, socio-economic impact, or conservation benefits of these fisheries, nor was there a process in place to do that evaluation. The department's mid-term evaluation of PICFI in 2010 relied on a problematic methodology and did not include any analysis to support its findings. As a result, despite having funded several demonstration fisheries through PICFI over a five-year period, including three fisheries targeting Fraser River sockeye in 2010, I find that DFO is not in a position to make an informed decision as to the desirability of continuing the shift to in-river commercial fishing through PICFI.

Conservation benefits

In theory, because of their selective nature, terminal fisheries have the potential to assist DFO in meeting its conservation objectives for Fraser River sockeye. However, I was not directed to any analysis of the conservation benefits expected to arise from a shift to a terminal fishery for Fraser River sockeye. I find that DFO has not done the work necessary to assess or quantify actual conservation benefits from a shift to harvesting in-river or in terminal areas.

The evidence before me suggests that DFO has, for the most part, met its conservation objectives with its current in-season management process for the marine mixed-stock fishery. In 2007, 2008, and 2009, years with very low returns, DFO and the Fraser River Panel did not open a commercial fishery, even where these returns were unexpected based on pre-season forecasts. In those years, because no commercial harvesting took place at all, transferring allocations to terminal fisheries would not have resulted in higher returns of weak stocks.

The evidence also suggests to me that DFO has been relatively successful in meeting in-season escapement targets. Looking at all Fraser River sockeye stocks on an aggregate basis, I observe that DFO has been able to achieve in-season targets for gross escapement (the number of fish estimated to have migrated past the Mission hydroacoustic facility) in most of the years after 1990 for which data are available.[1429] It has been less successful in achieving in-season targets for net escapement (the number of fish estimated to have returned to the spawning grounds), but has come relatively close to meeting those targets in a number of years.[1430]

Barry Rosenberger, area director, BC Interior, DFO, explained that most of the harvesting in the commercial fishery occurs around the peak of the run, allowing DFO to adjust harvest levels based on the most accurate run size estimates.[1431] With the peak of the run, the uncertainty in the Pacific Salmon Commission's estimates of run size is greatly diminished.[1432]

Economic viability

Although the evidence of economic viability is limited, I find it sufficient to conclude that DFO should proceed cautiously before devoting additional resources to support in-river demonstration fisheries. There is no evidence before me of an in-river demonstration fishery operating profitably. The two evaluations of specific in-river demonstration fisheries conducted by Aboriginal organizations disclosed significant financial losses. I also

heard that most of the costs of the in-river commercial fisheries conducted under PICFI have been subsidized by DFO and that ongoing funding from DFO would be required to support those fisheries.

In addition, serious questions were raised about the quality, value, and marketability of terminally caught sockeye, as well as the availability of fish in terminal areas. The best evidence before me on the issue of quality is DFO's 1994 study, which found that the quality of products from Late Stuart and Horsefly sockeye caught in terminal areas was significantly lower than comparable commercial products.[1433] I am satisfied, on the whole of the evidence, that, at present, sockeye caught in marine fisheries are significantly more valuable than sockeye caught in terminal or near-terminal fisheries. Given this finding, it appears to me that it will be challenging, and potentially costly, to develop markets for terminally caught sockeye.

The future of in-river demonstration fisheries

The evidence before me is not sufficient to decide whether DFO should continue to transfer Fraser River sockeye commercial allocation to in-river fisheries. In reaching such a decision, the department should focus on assessing the extent to which such a shift would assist in achieving its mandate of ensuring the sustainability of the fishery. Claire Dansereau, deputy minister, was unable to say whether funding currently directed at increasing in-river commercial fisheries could be used more effectively for other conservation-related purposes, such as habitat monitoring or marine research.[1434]

Implementing an in-river economic fishery is especially challenging for Fraser River sockeye for two reasons: first, the geography of the Fraser River watershed, with many different stocks returning to the same river; and second, the historical fact that the commercial fishery has taken place in marine and approach areas. Given these challenges, the complex issues involved in shifting commercial harvest to in-river areas must be carefully considered. I find that such issues should be considered within the integrated strategic planning process contemplated under Action Step 4.2 of the Wild Salmon Policy.

I discuss these findings and any related recommendations in Volume 3 of this Report.

Notes

1 The information in this chapter is based on oral testimony and exhibits tendered during the evidentiary hearings; Cohen Commission Policy and Practice Report (PPR) 4: Pacific Salmon Treaty; PPR 5: Harvest Management; PPR 6: Commercial Sector Licensing; PPR 7: Recreational Fishery; PPR 12: Catch Monitoring; PPR 18: Aboriginal Fisheries; and Cohen Commission Technical Report 7: Fisheries Management (Exhibit 718).
2 PPR 5, paras. 37–44.
3 Transcript, January 18, 2011, p. 28; see also PPR 5, paras. 38–39.
4 Transcript, February 10, 2011, p. 13.
5 Exhibit 8, p. 38.
6 Exhibit 143, pp. 276–80.
7 Exhibit 65.
8 PPR 4, p. 13; Exhibit 75, Appendix A.
9 PPR 5, para. 291.
10 PPR 5, paras. 3–4.
11 PPR 5, para. 292.
12 Exhibit 75, Appendix A, p. 6.
13 Transcript, November 8, 2010, pp. 4–5.
14 Exhibit 75, p. 60.
15 Mike Lapointe, Transcript, November 8, 2010, p. 10.
16 Exhibit 75, Appendix A, p. 7.
17 Exhibit 65; PPR 4, FN 6.
18 Exhibit 65, Article 1, para. 6.
19 Transcript, November 8, 2010, p. 16.
20 PPR 4, p. 4.
21 Exhibit 75, p. 321.
22 Exhibit 65, Article II, para. 12.
23 Exhibit 65, Article II, para. 6.
24 Exhibit 65, Article II, para. 3.
25 Transcript, November 8, 2010, p. 13.
26 Exhibit 65, Article II, para. 19.
27 Exhibit 65, Article VI, para. 6 and Annex IV, chap. 4, paras. 5 and 12; Transcript, November 8, 2010, p. 28.
28 Exhibit 74, p. 5.
29 Pat Matthew, Transcript, February 1, 2011, p. 71.
30 Transcript, November 8, 2010, p. 26; Transcript, January 17, 2011, p. 91; PPR 4, p. 24.
31 Barry Rosenberger, Transcript, January 17, 2011, p. 91.
32 Exhibit 65, Annex IV, chap. 4, para. 9.
33 See PPR 4, pp. 27–28.
34 Exhibit 65, Annex IV, chap. 4, paras. 13(a)–(d).
35 See PPR 4, pp. 18–19.
36 Exhibit 65, Article IV, para. 3.
37 Exhibit 65, Article IV, para. 7.
38 Exhibit 65, Article IV, paras. 1–2; see also Exhibit 338, an example of these reports.
39 Exhibit 65, Article IV, para. 6.
40 Exhibit 65, Article VI, paras. 2 and 5.
41 Exhibit 65, Annex IV, chap. 4, para. 4.
42 Transcript, November 8, 2010, pp. 14–15.
43 Exhibit 65, Annex IV, chap. 4, para. 12.
44 Exhibit 74, pp. 53–54.
45 Claire Dansereau and Susan Farlinger, Transcript, November 1, 2010, pp. 24–25.
46 PPR 5, paras. 12–36 and 291–97.
47 PPR 5, paras. 15–16.

48 PPR 5, paras. 23–26.
49 PPR 5, paras. 17–22; see also Transcript, January 17, 2011, pp. 13–14, and Transcript, January 17, 2011, p. 55.
50 Exhibit 1221.
51 PPR 5, paras. 27–28.
52 See PPR 6, paras. 1–59.
53 *Fisheries Act*, RSC 1985, c. F-14, as am, s. 7 (*Fisheries Act*)
54 *Fisheries Act*, ss. 8 and 9.
55 *Fisheries Act*, s. 43(*f*) and (*g*).
56 *Fishery (General) Regulations*, SOR/93-53.
57 *Fishery (General) Regulations*, SOR 93-53, s. 3(5).
58 *Pacific Fishery Management Area Regulations, 2007*, SOR/2007-77.
59 *Aboriginal Communal Fishing Licences Regulations*, SOR/93-332.
60 *Aboriginal Communal Fishing Licences Regulations*, SOR 93/332, s. 2.
61 *Aboriginal Communal Fishing Licences Regulations*, SOR/93-332, s. 3(1)(*d*) and 3(2).
62 *Pacific Fishery Regulations*, 1993, SOR/93-54.
63 *British Columbia Sport Fishing Regulation*, 1996, SOR/96-137.
64 *Fisheries Act*, RSBC 1996, c. 149, as am, s. 8.
65 *Wildlife Act*, RSBC 1996, c. 488, as am, s. 12.
66 Transcript, March 15, 2011, pp. 35–36.
67 See PPR 6, para. 26.
68 Transcript, March 15, pp. 61, 70–71.
69 Transcript, March 15, 2011, p. 36.
70 Chris Ashton, Transcript, February 22, 2011, p. 18.
71 See PPR 6, para. 10.
72 Transcript, March 15, 2011, p. 62.
73 Transcript, February 23, 2011, p. 67.
74 *Pacific Fishery Regulations, 1993*, SOR/93-54, Schedule VI.
75 Transcript, February 23, 2011, p. 67.
76 Transcript, February 23, 2011, pp. 72, 78–79.
77 Transcript, February 23, 2011, pp. 77–79.
78 Lisa Mijacika, Transcript, March 15, 2011, pp. 74–75, 97; see also PPR 6, pp. 15-16.
79 Transcript, March 15, 2011, pp. 67–68.
80 Transcript, March 15, 2011, pp. 68, 75.
81 Transcript, March 15, 2011, p. 75.
82 Transcript, March 15, 2011, p. 76.
83 Exhibit 1270, p. 2; PPR 18, p. 6.
84 *Aboriginal Communal Fishing Licences Regulations*, SOR/93-332, s. 4(2).
85 *Aboriginal Communal Fishing Licences Regulations*, SOR/93-332, s. 4(3) and 4(4).
86 Transcript, March 15, 2011, p. 72.
87 Transcript, March 15, 2011, pp. 72, 97–98.
88 *Aboriginal Communal Fishing Licences Regulations*, SOR/93-332, s. 5.1.
89 *Aboriginal Communal Fishing Licences Regulations*, SOR/93-332, s. 5.1.
90 Exhibit 261.
91 Exhibit 261, p. 6.
92 Exhibit 1741, s. 1.1.
93 Exhibit 1741, s. 2.0.
94 Exhibit 1741, s. 2.0; Transcript, September 2, 2011, p. 26.
95 Exhibit 1741, s. 3.0.
96 Exhibit 1741, s. 3.4.
97 Exhibit 1741, s. 4.1.
98 Exhibit 1741, s. 4.2.
99 Exhibit 1270.
100 Exhibit 1270, p. 1.
101 Exhibit 1270, p. 2.
102 Exhibit 1270, pp. 3–4.
103 Transcript, July 5, 2011, p. 2; Exhibit 261, p. 2.
104 Exhibit 1229, p. 2; see also Exhibit 261, p. 7.
105 Transcript, July 5, 2011, pp. 3–4.
106 *British Columbia Sport Fishing Regulations*, 1996, SOR/96-137, s. 18; see also PPR 7, paras. 31–44.
107 Deborah Sneddon, Transcript, March 3, 2011, p. 43; Jeremy Maynard, Transcript, March 7, 2011, p. 70.
108 Devona Adams, Transcript, March 3, 2011, pp. 42–43; Jeremy Maynard, Transcript, March 7, 2011, p. 69.
109 *British Columbia Sport Fishing Regulations, 1996*, SOR/96-137, ss. 16–17.
110 Exhibit 517.
111 Exhibit 518.
112 *British Columbia Sport Fishing Regulations*, 1996, SOR/96-137, s. 17.
113 Exhibit 517, p. 3.
114 Gerry Kristianson, Transcript, March 7, 2011, p. 13.
115 Gerry Kristianson, Transcript, March 7, 2011, p. 13; see also Transcript, March 2, 2011, p. 11.
116 *User Fees Act*, SC 2004, c. 6.
117 Devona Adams, Transcript, March 2, 2011, p. 11, and March 3, 2011, p. 17; Transcript, February 1, 2011, p. 18; see also Brian Riddell, Transcript, February 3, 2011, p. 58.
118 PPR 5, paras. 164–68.
119 Exhibit 318; see also Transcript, January 17, 2011, p. 9.
120 Exhibit 295, p. 6.
121 Exhibit 295, p. 6.
122 Exhibit 295, p. 6.
123 Exhibit 8, p. 28.
124 Exhibit 342; Exhibit 474, p. 2 (with minor variations); and Exhibit 421, p. 1.
125 Exhibit 342, p. 2.
126 Exhibit 474, p. 2.
127 Exhibit 421, p. 2.
128 Exhibit 473; PPR 5, pp. 64-66; Jeff Grout, Transcript, January 17, p. 18; see also Canada's final written submissions, p. 60, para. 228, available at www.cohencommission.ca.
129 Jeff Grout Transcript, January 17, p. 18; see also First Nations Coalition's final written submission, p. 277, para. 750, available at www.cohencommission.ca.
130 First Nations Coalition's final written submission, p. 277, para. 750, available at www.cohencommission.ca.
131 Canada's final written submissions, p. 202, para. 695, available at www.cohencommission.ca.
132 Exhibit 342, p. 3.
133 Exhibit 342, p. 2, p. 5, and Appendix B.
134 Exhibit 342, p. 1; see also Exhibit 609, p. 4.
135 Exhibit 342, p. 1.
136 Exhibit 342, p. 4.
137 Jeff Grout Transcript, January 17, 2011, pp. 12, 22.
138 Exhibit 609, p. 3.
139 Exhibit 609, p. 2.
140 Brian Assu, Jeffery Young and Peter Sakich, Transcript, February 11, 2011, p. 66; see also Conservation Coalition's final written submissions, pp. 9–10, para. 25, available at www.cohencommission.ca.
141 Exhibit 609, p. 8.
142 Pat Matthew, Transcript, February 1, 2011, pp. 8, 14.
143 Jeffery Young, Transcript, February 11, 2011, pp. 34–35; see also Transcript, June 28, 2011, pp. 49–50; see also British Columbia's final written submissions, p. 25, available at www.cohencommission.ca.
144 Barry Rosenberger, Transcript, July 4, 2011, pp. 38–39.
145 Transcript, September 23, 2011, p. 86 and September 26, 2011, p. 4; see also Exhibit 756, p. 9; see also Canada's final written submissions, p. 11, para. 46, available at www.cohencommission.ca.
146 First Nations Coalition's final written submission, pp. 277–79, paras. 750–54, available at www.cohencommission.ca.
147 Transcript, February 11, 2011, p. 34.
148 Transcript, February 1, 2011, p. 5.
149 Transcript, February 1, 2011, p. 5.

150 Jeff Grout, Transcript, February 24, 2011, pp. 39-40; see also Area D Salmon Gillnet Association & Area B Harvest Committee's final written submissions, p. 51, available at www.cohencommission.ca.
151 Transcript, February 22, 2011, pp. 45–46; see also Gerry Kristianson and Wayne Saito, Transcript, February 1, 2011, pp. 33–34; Transcript, February 24, 2011, pp. 39–40.
152 Dennis Brown, Transcript, February 22, 2011, pp. 44–45; Barry Rosenberger, Transcript, January 17, 2011, p. 78; Pat Matthew, Transcript, February 1, 2011, pp. 14, 15, 28.
153 Transcript, February 22, 2011, p. 47.
154 Transcript, February 1, 2011, p. 17.
155 Transcript, February 1, 2011, pp. 27–28.
156 Transcript, February 11, 2011, pp. 43–44; and Transcript, March 16, 2011, p. 26.
157 Exhibit 474.
158 PPR 6, para. 141.
159 Exhibit 474, p. 2, para. 1.1.
160 Exhibit 474, p. 7, para. 2.3; see also Transcript, January 17, 2011, p. 13.
161 Exhibit 474, p. 3, para. 1.4, and p. 7, para. 2.5.
162 Exhibit 474, p. 3, para. 1.4.
163 Bill Duncan, Transcript, March 1, 2011, p. 37.
164 Transcript, March 1, 2011, pp. 34–35; see also public submission 0263-HAWKSHAW, available at www.cohencommission.ca.
165 Exhibit 474, p. 3.
166 Exhibit 474 p. 4.
167 Exhibit 474, p. 7.
168 Exhibit 474, pp. 4–8.
169 Exhibit 474, p. 4.
170 Transcript, February 23, 2011, pp. 63–64.
171 Transcript, February 23, 2011, pp. 63–64; Exhibit 474, p. 10.
172 Jeff Grout, Transcript, January 17, 2011, pp. 11–12.
173 Jeff Grout, Transcript, January 17, 2011, p. 11.
174 Rob Morley, Transcript, March 1, 2011, pp. 33–34; Transcript, February 22, 2011, p. 39; Wayne Saito, Transcript, February 1, 2011, p. 16.
175 Transcript, February 22, 2011, pp. 39–42.
176 Transcript, March 1, 2011, p. 35.
177 Transcript, February 23, 2011, p. 65.
178 Gerry Kristianson, Transcript, February 1, 2011, pp. 16–17.
179 Transcript, January 17, 2011, p. 15.
180 PPR 7, para. 17.
181 PPR 7, para. 17; Exhibit 421, pp. 1–2.
182 Exhibit 421, p. 3.
183 Exhibit 421, p. 2.
184 Jeff Grout, Transcript, January 17, 2011, p. 14.
185 Transcript, February 1, 2011, p. 18; see also Transcript, March 2, 2011, p. 33.
186 Transcript, January 17, 2011, p. 16; see also Jeffery Young, Transcript, February 11, 2011, p. 40: "[A]ll of our current members each have advanced graduate level training in either fisheries, science or ecology."
187 Transcript, January 17, 2011, p. 91.
188 Transcript, February 11, 2011, p. 32.
189 Transcript, February 11, 2011, pp. 72–73.
190 Marcel Shepert, Transcript, July 4, 2011, pp. 17–18.
191 Exhibit 290, p. 1.
192 Exhibit 289; Marcel Shepert, Transcript, July 4, 2011, pp. 17–18.
193 Marcel Shepert, Transcript, July 4, 2011, p. 50.
194 Exhibit 1220, p. 2; Barry Huber, Transcript, June 30, 2011, p. 6.
195 Transcript, June 30, 2011, p. 6.
196 Marcel Shepert, Transcript, July 4, 2011, p. 18.
197 Exhibit 290, p. 1; see also Exhibit 1220, p. 2.
198 Exhibit 1220; Transcript, June 30, 2011, p. 5; Transcript, July 4, 2011, p. 50.
199 Canada's final written submissions, p. 207, para. 707, available at www.cohencommission.ca.
200 PPR 6, pp. 60-61.
201 PPR 6, p. 61.
202 Exhibit 475, p. 1.
203 Exhibit 475, pp. 1–2.
204 Exhibit 475, p. 2.
205 Exhibit 475, p. 2.
206 Exhibit 473.
207 Exhibit 863, p. 4.
208 Peter Sakich, Transcript, February 11, 2011, p. 42.
209 Exhibit 392, p. 7.
210 Gerry Kristianson, Transcript, February 1, 2011, pp. 76–77; see also Pat Matthew, Transcript, February 1, 2011, p. 81.
211 Gerry Kristianson, Transcript, February 1, 2011, pp. 79–80; Pat Matthew, Transcript, February 1, 2011, p. 81; Peter Sakich, Transcript, February 11, 2011, p. 51; Paul Ryall, Transcript, March 16, 2011, p. 26.
212 Exhibit 392, p. 2.
213 Jeffrey Young, Transcript, February 11, 2011, p. 51.
214 Peter Sakich, Transcript, February 11, 2011, p. 51.
215 British Columbia's final written submissions, p. 25.
216 First Nations Coalition's final written submissions, pp. 244–45.
217 Transcript, February 1, 2011, p. 28; see also Wayne Saito, Transcript, February 11, 2011, p. 8.
218 Transcript, February 1, 2011, pp. 82–83.
219 Transcript, January 21, 2011, pp. 11–13.
220 Marcel Shepert, Transcript, July 4, 2011, p. 7.
221 Ernie Crey, Transcript, July 4, 2011, p. 8.
222 Jeff Grout, Transcript, January 21, 2011, p. 13.
223 Transcript, February 3, 2011, pp. 83–84.
224 Transcript, July 5, 2011, pp. 8–9.
225 Transcript, July 4, 2011, p. 15.
226 Transcript, December 14, 2010, p. 23.
227 Transcript, February 11, 2011, pp. 41–42.
228 Transcript, July 4, 2011, p. 63.
229 Marcel Shepert, Transcript, July 4, 2011, p. 65.
230 See also PPR 6, paras. 60–100.
231 Transcript, December 16, 2010, p. 8.
232 Jeff Grout, Transcript, February 23, 2011, p. 3.
233 Transcript, February 23, 2011, p. 3.
234 Exhibit 264; Transcript, February 23, 2011, p. 3.
235 Transcript, February 23, 2011, p. 2.
236 Public submission 0383-PROBERT, available at www.cohencommission.ca.
237 *Fishery (General) Regulations*, SOR/95-53, s. 22(1)*(a)*.
238 *Fishery (General) Regulations*, SOR/95-53, s. 6(1).
239 Jeff Grout, Transcript, February 23, 2011, pp. 3–4.
240 See also PPR 6, pp. 23-28.
241 Dennis Brown, Transcript, February 22, 2011, p. 7.
242 Exhibit 455.
243 Exhibit 455, p. ix.
244 Exhibit 456.
245 Exhibit 456, p. 30.
246 Exhibit 456, and pp. 7, 12–15.
247 Exhibit 457.
248 Exhibit 457, pp. 5–6.
249 Exhibit 457 (recommendations dispersed through document); see also PPR 6, para. 75.
250 See PPR 6, pp. 28–30.
251 Exhibit 264.
252 Exhibit 264, p. 15.
253 Transcript, February 23, 2011, p. 23.
254 Exhibit 264, pp. 15–36.
255 Exhibit 264, p. 38.
256 Exhibit 264, p. 20.
257 Exhibit 264, p. 25.
258 Exhibit 264, p. 26.
259 Exhibit 718, p. 50; Karl English, Transcript, April 14, 2011, p. 14.
260 Ryan McEachern, Transcript, February 22, 2011, p. 8;

Chris Ashton, Transcript, February 22, 2011, p. 10.
261 Rob Morley, Transcript, March 1, 2011, p. 7; Chris Ashton, Transcript, February 22, 2011, p. 12.
262 Transcript, August 19, 2011, p. 56.
263 Barry Huber, Transcript, June 30, 2011, p. 37; Kaarina McGivney, Transcript, August 19, 2011, pp. 3–4.
264 Kaarina McGivney, Transcript, August 19, 2011, p. 4; Barry Huber, Transcript, June 30, 2011, pp. 79–80.
265 Kaarina McGivney, Transcript, August 19, 2011, p. 4.
266 Kaarina McGivney, Transcript, August 19, 2011, p. 4; see also Barry Rosenberger, Transcript, July 4, 2011, p. 28.
267 Kaarina McGivney, Transcript, September 2, 2011, p. 78.
268 Transcript, June 30, 2011, p. 80.
269 Transcript, June 30, 2011, p. 81.
270 Barry Huber, Transcript, June 30, 2011, p. 94.
271 Transcript, June 30, 2011, p. 80.
272 Exhibit 1426, p. 2; Kaarina McGivney, Transcript, August 19, 2011, pp. 38–39.
273 Transcript, August 19, 2011, p. 39.
274 Kaarina McGivney, Transcript, September 2, 2011, pp. 91–92.
275 Transcript, August 19, 2011, pp. 37–38.
276 Exhibit 1426, p. 2.
277 Exhibit 493, p. 75.
278 See PPR 18, p. 66.
279 See PPR 18, pp. 68-69.
280 Exhibit 591, 2010–2011 Salmon Area Report (by fee type).
281 Kaarina McGivney, Transcript, August 19, 2011, p. 3.
282 Exhibit 1426, p. 2.
283 See also PPR 6, pp. 31–34.
284 Exhibit 264, p. 32.
285 Jeff Grout, Transcript, February 23, 2011, pp. 8–9.
286 Exhibit 264, p. 32.
287 Exhibit 264, p. 32.
288 Transcript, February 23, 2011, pp. 9–10.
289 Jeff Grout, Transcript, February 23, 2011, p. 16.
290 Exhibit 459, p. 3.
291 Jeff Grout, Transcript, February 23, 2011, pp. 11-14, 27–28.
292 For an example of the results of this process, see Exhibit 458.
293 Jeff Grout, Transcript, Feb. 23, 2011, p. 9; see also Exhibit 317.
294 Chris Ashton, Transcript, February 22, 2011, p. 10; Rob Morley, Transcript, March 1, 2011, pp. 9 –10; Jeff Grout, Transcript, February 23, 2011, pp. 19–20.
295 Transcript, February 22, 2011, p. 9.
296 Ryan McEachern, Transcript, February 22, 2011, p. 9; see also Jeff Grout, Transcript, February 24, 2011, p. 11; see also Bill Duncan, Transcript, March 1, 2011, p. 6.
297 Chris Ashton, Transcript, February 22, 2011, p. 10; see also Rob Morley, Transcript, March 1, 2011, pp. 9–10.
298 Transcript, March 1, 2011, p. 8.
299 Transcript, February 22, 2011, p. 8.
300 Exhibit 264, pp. 35–36.
301 Exhibit 264, p. 36.
302 Exhibit 264, p. 36.
303 Kathy Scarfo, Transcript, March 1, 2011, p. 13; Jeff Grout, Transcript, February 23, 2011, p. 24.
304 Exhibit 264, p. 29.
305 Exhibit 266, p. 7.
306 Exhibit 264, p. 31.
307 Jeff Grout, Transcript, February 23, 2011, pp. 20–21, 23.
308 Jeff Grout, Transcript, February 23, 2011, pp. 23–25; see also Gerry Kristianson, Transcript, March 7, 2011, pp. 11–12.
309 Jeff Grout, Transcript, February 23, 2011, pp. 20–21, 23.
310 Transcript, March 2, 2011, p. 5.
311 Transcript, March 2, 2011, p. 4.
312 See, for example, Exhibit 445, pp. 115–16.
313 Exhibit 445, p. 112.
314 Exhibit 264, p. 25.
315 Deborah Sneddon and Joe Tadey, Transcript, March 2, 2011, p. 23.
316 Transcript, March 2, 2011, pp. 40–41.
317 Exhibit 526A, p. 2; Transcript, March 2, 2011, p. 40; see also Transcript, April 14, 2011, p. 15, and Exhibit 718, pp. 49–50.
318 Exhibit 526A, pp. 2–3.
319 Exhibit 526A, p. 2.
320 PPR 7, pp. 10–12.
321 Devona Adams, Transcript, March 2, 2011, p. 44.
322 Devona Adams, Transcript, March 2, 2011, pp. 44–45.
323 Exhibit 527.
324 Transcript, March 2, 2011, p. 46.
325 Exhibit 527, p. 1.
326 Exhibit 527, pp. 7–9 (Principles)
327 Exhibit 527, pp. 11–13 (Strategic Goals).
328 Transcript, March 2, 2011, pp. 46–47.
329 Exhibit 320, p. 1 (also tendered as Exhibit 947, DFO website version); see also PPR 5, p. 60.
330 Transcript, January 17, 2011, pp. 20, 21.
331 Jeff Grout, Transcript, January 17, 2011, p. 21.
332 Exhibit 65, pp. 8 (Article IV, para. 3), 76 (Annex IV, chap. 4, para. 4), 79 (Annex IV, chap. 4, para. 13(a)).
333 See also PPR 5, pp. 83–89.
334 Exhibit 65, p. 79 (Annex IV, chap. 4, para. 13(a), (b), and (c)); Mike Lapointe, Transcript, January 18, 2011, p. 31.
335 Transcript, January 21, 2011, p. 44.
336 Exhibit 718, p. 173.
337 Transcript, April 14, 2011, p. 29.
338 Transcript, January 18, 2011, pp. 5, 7; Sue Grant, Transcript, January 26, 2011, p. 79.
339 Mike Lapointe, Transcript, January 19, 2011, p. 28.
340 Transcript, January 19, 2011, p. 40; see also Sue Grant, Transcript, January 26, 2011, p. 40.
341 Transcript, January 24, p. 67; Sue Grant, Transcript, January 26, 2011, pp. 45–47.
342 Jeff Grout, Transcript, January 17, 2011, p. 24.
343 Exhibit 340A; Exhibit 341.
344 Jeff Grout, Transcript, January 17, 2011, p. 24; see also PPR 5, p. 85.
345 Jeff Grout, Transcript, January 17, 2011, p. 29;
346 Mike Lapointe, Transcript, January 18, 2011, p. 9.
347 Jeff Grout, Transcript, January 17, 2011, p. 25.
348 Jeff Grout, Transcript, January 17, 2011, p. 29.
349 Transcript, January 17, 2011, p. 29.
350 Transcript, January 17, 2011, p. 31.
351 Transcript, January 26, 2011, pp. 2–4.
352 Transcript, January 26, 2011, pp. 4, 5.
353 Barry Rosenberger, Transcript, January 21, 2011, p. 69; Sue Grant, Transcript, January 26, 2011, pp. 15–16.
354 PPR 5, p. 85.
355 Transcript, January 26, 2011, pp. 5–6.
356 Transcript, January 26, 2011, p. 6.
357 Transcript, January 26, 2011, p. 7.
358 Timber Whitehouse, Transcript, February 2, 2011, p. 14; Brian Riddell, Transcript, February 2, 2011, p. 14.
359 Sue Grant, Transcript, January 26, 2011, p. 8.
360 Transcript, January 26, 2011, p. 8.
361 Transcript, January 26, 2011, p. 9.
362 Transcript, January 26, 2011, pp. 9–10.
363 Exhibit 351.
364 Exhibit 351, pp. 2–3.
365 Transcript, January 26, 2011, p. 12.
366 Transcript, January 26, 2011, p. 13.
367 Transcript, January 26, 2011, p. 14; see also Exhibit 352, Table 2, p. 43.
368 Jeff Grout, Transcript, January 24, 2011, p. 65.
369 Sue Grant, Transcript, January 26, 2011, p. 19; Barry Rosenberger, Transcript, January 21, 2011, p. 45.
370 Sue Grant, Transcript, January 26, 2011, p. 19.
371 Transcript, January 19, 2011, p. 40.

372 Transcript, January 21, 2011, p. 46.
373 Exhibit 352, p. 3.
374 Transcript, January 26, 2011, p. 28.
375 Exhibit 314, p. 3; PPR 5, p. 86.
376 Exhibit 314, p. 5.
377 Exhibit 314, p. 3; PPR 5, p. 86.
378 Exhibit 314, p. 4; PPR 5, p. 86.
379 PPR 5, p. 88; Exhibit 314, p. 5; Mike Lapointe, Transcript, January 18, 2011, p. 14.
380 Exhibit 314, p. 5.
381 Exhibit 314, p. 7.
382 Exhibit 314, pp. 5–6.
383 PPR 5, pp. 88–89.
384 Exhibit 314, p. 6.
385 Exhibit 65, pp. 8, 76.
386 See also PPR 5, pp. 28–49; Exhibit 400, pp. 12–13.
387 Transcript, November 3, 2010, p. 103.
388 Transcript, February 7, 2011, p. 21.
389 See also PPR 5, pp. 47–48.
390 Transcript, February 9, 2011, p. 12.
391 PPR 5, p. 47; Jim Woodey, Transcript, February 9, 2011, pp. 9–10.
392 Jim Woodey, Transcript, February 9, 2011, pp. 12–13; Carl Walters, Transcript, February 9, 2011, p. 15; Brian Riddell, Transcript, February 9, 2011, p. 14.
393 Exhibit 398, p. 5.
394 See PPR 5, p. 36, Figure 1.
395 Jim Woodey, Transcript, February 9, 2011, p. 5.
396 Exhibit 400, p. 11.
397 Exhibit 398, p. 28; see also PPR 5, p. 40.
398 Exhibit 399, p. 11; Exhibit 400, pp. 11–13.
399 Exhibit 400, p. 13.
400 Transcript, February 7, 2011, p. 42.
401 Jim Woodey, Transcript, February 9, 2011, pp. 3–4; see also Exhibit 416.
402 Jim Woodey, Transcript, February 9, 2011, pp. 7, 8.
403 Rob Morley, Transcript, February 8, 2011, pp. 78–79.
404 Exhibit 395, pp. 1–3.
405 Al Cass, Transcript, February 7, 2011, p. 4; PPR 5, pp. 31–32.
406 Al Cass, Transcript, February 7, 2011, pp. 4–5.
407 Exhibit 396, p. 3; see also Exhibit 400, pp. 3–4; see also David Marmorek, Transcript, September 20, 2011, p. 15.
408 Exhibit 497.
409 Dennis Brown, Transcript, February 22, 2011, p. 16.
410 Exhibit 400, p. 1.
411 Exhibit 396, p. 1; Al Cass, Transcript, February 7, 2011, pp. 8–9.
412 Exhibit 396, p. 4.
413 Exhibit 396, p. 4.
414 Transcript, February 7, 2011, p. 8.
415 Exhibit 397.
416 Transcript, February 7, 2011, p. 12.
417 Exhibit 322, p. 9.
418 Transcript, January 17, 2011, pp. 43–44.
419 Transcript, February 7, 2011, pp. 15–17.
420 Transcript, February 7, 2011, pp. 15–16 (see also p. 25).
421 PPR 5, p. 35.
422 Exhibit 398.
423 Exhibit 398, p. 25; Al Cass, Transcript, February 7, 2011, pp. 20–21.
424 PPR 5, p. 37.
425 Exhibit 322, p. 2; Jeff Grout, Transcript, January 17, 2011, pp. 45–46.
426 Jeff Grout, Transcript, January 17, 2011, p. 46; Exhibit 322.
427 Jeff Grout, Transcript, January 17, 2011, p. 42.
428 Exhibit 322; Jeff Grout, Transcript, January 17, 2011, p. 43.
429 See also PPR 5, p. 37.
430 Transcript, January 17, 2011, pp. 44–45.
431 Transcript, February 7, 2011, p. 24; Mike Staley, Transcript, February 8, 2011, p. 90.
432 Jeff Grout, Transcript, January 17, 2011, pp. 51, 52; see also Mike Lapointe, Transcript, January 18, 2011, pp. 6–8; see also Exhibit 322, p. 18.
433 Transcript, January 17, 2011, p. 51.
434 Transcript, February 8, 2011, p. 121; see also PPR 5, pp. 43–45.
435 Exhibit 399.
436 Exhibit 399, p. 1.
437 Exhibit 399, p. 25.
438 Exhibit 399, p. 4; Al Cass, Transcript, February 7, 2011, pp. 25–26 (as explained by Al Cass, the FRSSI interim benchmark is the "no fishing point").
439 Exhibit 399, pp. 26–27.
440 Transcript, March 16, 2011, p. 5.
441 Al Cass, Transcript, February 7, 2011, p. 29; Paul Ryall, Transcript, March 16, 2011, p. 13.
442 Al Cass, Transcript, February 7, 2011, p. 81; Rob Morley, Transcript, February 7, 2011, p. 78; Ken Wilson, Transcript, February 7, 2011, p. 77; Exhibit 400, p. 25.
443 Rob Morley, Transcript, February 7, 2011, p. 45; Ken Wilson, Transcript, February 7, 2011, p. 44.
444 Al Cass, Transcript, February 7, 2011, p. 50; Rob Morley, Transcript, February 7, 2011, pp. 52, 55; Ken Wilson, Transcript, February 7, 2011, pp. 51–52.
445 See Paul Ryall, Transcript, March 16, 2011, p. 6 (acknowledging more work could be done in that area).
446 Transcript, February 7, 2011, p. 70.
447 Transcript, June 3, 2011, p. 5.
448 Paul Ryall, Transcript, March 16, 2011, p. 73; Rob Morley, Transcript, February 7, p. 83.
449 Carl Walters, Transcript, February 9, 2011, p. 25; Jim Woodey, Transcript, February 9, 2011, p. 16.
450 Transcript, February 9, 2011, pp. 22–23.
451 Brian Riddell, Transcript, February 9, 2011, pp. 24–25.
452 Transcript, February 9, 2011, pp. 30–31, February 10, p. 21.
453 Brian Riddell, Transcript, February 9, 2011, pp. 51–52; see also Carl Walters, Transcript, February 9, 2011, pp. 52, 54, February 10, p. 15; Ken Wilson, Transcript, February 9, 2011, p. 53, February 10, pp. 18–19.
454 Ken Wilson, Transcript, February 7, 2011, p. 51, February 9, 2011, pp. 20–21.
455 Carl Walters, Transcript, February 10, 2011, pp. 28–29; Ken Wilson, Transcript, February 10, 2011, p. 30.
456 See also PPR 5, pp. 56–64.
457 Exhibit 317; Exhibit 445; Exhibit 946.
458 PPR 5, p. 57.
459 Exhibit 274, p. 4; Exhibit 274A, p. 4; see also PPR 5, p. 58.
460 Exhibit 317, p. 10; Exhibit 445, p. 12; Exhibit 946, pp. 12, 15.
461 Exhibit 445, p. 14; Jeff Grout, Transcript, January 17, 2011, pp. 14, 23–24, 50, 58; see also Barry Rosenberger, Transcript, January 17, 2011, p. 64.
462 See, for example, David Bevan, Transcript, September 26, 2011, pp. 6–7; Susan Farlinger, Transcript, September 26, 2011, p. 8; Pat Chamut, Transcript, November 30, 2010, p. 105.
463 Exhibit 597.
464 Jeff Grout, Transcript, January 17, 2011, pp. 72–73, 80.
465 See Exhibits 1252–56; Marcel Shepert, Transcript, July 4, 2011, pp. 58–59; see also Pat Matthew, Transcript, February 1, 2011, p. 8.
466 See Exhibit 1256; also Ross Wilson, Transcript, July 4, 2011, p. 104.
467 Transcript, July 4, 2011, p. 53; see also Ernie Crey, Transcript, July 4, 2011, p. 54.
468 Transcript, July 4, 2011, pp. 54, 60; see also Susan Farlinger, Transcript, September 28, 2011, p. 82.
469 First Nations Coalition's final written submissions, p. 278, available at www.cohencommission.ca.
470 Transcript, February 11, 2011, p. 66.
471 Transcript, January 17, 2011, p. 72.

472 Exhibit 445, pp. 2–3.
473 Jeff Grout, Transcript, January 17, 2011, p. 73; see also David Bevan, Transcript, November 3, 2010, pp. 101–2.
474 Jeff Grout, Transcript, January 17, 2011, pp. 82, 83; Barry Rosenberger, Transcript, January 17, 2011, p. 83.
475 Transcript, January 17, 2011, p. 81.
476 Exhibit 326; Exhibit 327.
477 Exhibit 327, p. 5.
478 Transcript, January 17, 2011, p. 85.
479 PPR 5 p. 62; see also Exhibit 273A.
480 Exhibit 273A.
481 Susan Farlinger, Transcript, December 16, 2010, p. 13.
482 Exhibit 403.
483 Exhibit 403, p. 1; see also Paul Ryall, Transcript, June 2, 2011, p. 72; Susan Farlinger, Transcript, March 4, 2011, p. 6, December 16, 2010, p. 91, September 27, 2011, p. 33.
484 Exhibit 403, p. 2.
485 Exhibit 403, p. 5.
486 Susan Farlinger, Transcript, March 4, 2011, p. 7.
487 PPR 5, pp. 63–64; Exhibit 274A, p. 4.
488 Transcript, December 16, 2010, p. 14.
489 Exhibit 65, pp. 8 (Article VI, para. 6), 77 (Annex IV, chap. 4, para. 5), 79 (Annex IV, chap. 4, para. 12).
490 Barry Rosenberger, Transcript, January 17, 2011, p. 92.
491 Transcript, November 8, 2010, p. 27.
492 Transcript, November 8, 2010, p. 16.
493 Exhibit 330, p. 3.
494 Barry Rosenberger, Transcript, January 21, 2011, p. 7.
495 Transcript, January 18, 2011, p. 23.
496 Exhibit 330, p. 19
497 Exhibit 330, p. 20.
498 Mike Lapointe, Transcript, January 18, 2011, p. 33.
499 Exhibit 330, p. 19.
500 Exhibit 330, p. 20; Mike Lapointe, Transcript, January 18, 2011, p. 37.
501 See Exhibit 331, p. 12.
502 PPR 5, p. 26.
503 Exhibit 65, pp. 75–76, Annex IV, chap. 4, para. 3; see also Mike Lapointe, Transcript, November 8, 2010, pp. 14–15.
504 PPR 5, p. 26.
505 Exhibit 65, pp. 75–76, Annex IV, chap. 4, paras. 2 and 3.
506 Exhibit 65, p. 75 (Annex IV, chap. 4, para. 2).
507 Exhibit 65, p. 76 (Annex IV, chap. 4, para. 3(d)).
508 Exhibit 65, p. 76 (Annex IV, chap. 4, para. 3(d)).
509 PPR 5, p. 49; Mike Lapointe, Transcript, January 18, 2011, pp. 82–83; see also Exhibit 333, p. 2.
510 Mike Lapointe, Transcript, January 18, 2011, p. 82; David Patterson, Transcript, January 27, 2011, p. 96.
511 David Patterson, Transcript, January 27, 2011, pp. 96, 97.
512 David Patterson, Transcript, January 27, 2011, p. 108.
513 David Patterson, Transcript, January 27, 2011, p. 92.
514 Transcript, January 27, 2011, p. 93.
515 David Patterson, Transcript, January 27, 2011, p. 93.
516 David Patterson, Transcript, January 27, 2011, pp. 94–95.
517 David Patterson, Transcript, January 27, 2011, p. 97.
518 David Patterson, Transcript, February 8, 2011, p. 13.
519 David Patterson, Transcript, February 8, 2011, p. 14.
520 Transcript, February 8, 2011, p. 14.
521 David Patterson, Transcript, January 27, 2011, p. 100.
522 Mike Lapointe, Transcript, January 18, 2011, pp. 30–31.
523 David Patterson, Transcript, January 27, 2011, p. 99.
524 David Patterson, Transcript, January 27, 2011, p. 104; see also Mike Lapointe, Transcript, January 18, 2011, p. 31.
525 Transcript, February 8, 2011, pp. 11–12.
526 Transcript, January 27, 2011, p. 105; Transcript, February 8, 2011, p. 10.
527 Transcript, January 27, 2011, p. 105; Transcript, February 8, 2011, p. 9; see also Exhibit 405.
528 Exhibit 405, p. 21.
529 David Patterson, Transcript, January 27, 2011, pp. 93–94.
530 See also PPR 5, paras. 258–71, pp. 96–100.
531 Exhibit 65, p. 79 (Annex IV, chap. 4, para. 12).
532 Exhibit 68; Exhibit 69.
533 Mike Lapointe, Transcript, November 8, 2010, p. 28.
534 Transcript, January 19, 2011, p. 24.
535 Barry Rosenberger, Transcript, January 17, 2011, p. 69.
536 Mike Lapointe, Transcript, January 18, 2011, pp. 38–39.
537 Exhibit 65, pp. 77 (Annex IV, chap. 4, para. 5), 79 (Annex IV, chap. 4, para. 12); Barry Rosenberger, Transcript, January 17, 2011, p. 90; Mike Lapointe, Transcript, January 18, 2011, p. 71.
538 See PPR 5, p. 26.
539 Mike Lapointe, Transcript, January 18, 2011, pp. 43–44.
540 Mike Lapointe, Transcript, November 8, 2010, p. 33; see also Exhibit 65, p. 77 (Annex IV, chap. 4, para. 6).
541 Mike Lapointe, Transcript, November 8, 2010, pp. 33–34.
542 Mike Lapointe, Transcript, November 8, 2010, pp. 34–35.
543 PPR 5, p. 26.
544 Transcript, November 8, 2010, p. 31.
545 Exhibit 65, p. 79 (Annex IV, chap. 4, para. 13).
546 Transcript, January 21, 2011, pp. 41–42.
547 Transcript, January 19, 2011, p. 50.
548 Transcript, January 21, 2011, pp. 5–6.
549 Transcript, February 11, 2011, p. 48.
550 Rob Morley, Transcript, February 8, 2011, p. 66.
551 Gerry Kristianson, Transcript, February 1, 2011, p. 35; Pat Matthew, Transcript, February 1, 2011, p. 38.
552 Transcript, January 17, 2011, pp. 87–90.
553 Barry Rosenberger, Transcript, January 25, 2011, p. 27; Transcript, July 4, 2011, p. 11.
554 Transcript, March 4, 2011, p. 61.
555 Transcript, June 30, 2011, pp. 63–64.
556 Transcript, July 4, 2011, pp. 77–78.
557 Transcript, July 4, 2011, p. 78.
558 Barry Rosenberger, Transcript, January 25, 2011, p. 28.
559 Exhibit 65, p. 7 (Article II, para. 21).
560 Exhibit 65, p. 9, (Article VI, para. 6), p. 77 (Annex IV, chap. 4, para. 5), 79 (Annex IV, chap. 4, para. 12); see also Barry Rosenberger, Transcript, January 17, 2011, p. 90; PPR 5, pp. 99–101.
561 Barry Rosenberger, Transcript, January 17, 2011, p. 90.
562 Barry Rosenberger, Transcript, January 17, 2011, p. 91.
563 Transcript, January 17, 2011, pp. 89–90.
564 Exhibit 65, p. 79 (Annex IV, chap. 4, para. 13); Transcript, January 18, 2011, p. 73.
565 Barry Rosenberger, Transcript, January 17, 2011, p. 60; Transcript, January 21, 2011, pp. 12–13; Jeff Grout, Transcript, January 21, 2011, p. 13.
566 Exhibit 283.
567 Exhibit 283, pp. 83–84 (chap. 9, ss. 5, 59–64). In the TFN Treaty, the communal licences are called "Tsawwassen Harvest Documents."
568 Exhibit 283, pp. 84–87 (chap. 9, ss. 65–73).
569 Exhibit 283, p. 84 (chap. 9, s. 62).
570 Exhibit 283, p. 84 (chap. 9, s. 62).
571 Exhibit 283, p. 92 (chap. 9, ss. 102–5).
572 See also PPR 5, pp. 90–96.
573 Exhibit 315.
574 Transcript, January 20, 2011, p. 32.
575 Exhibit 315, exhibit B, p. 4.
576 Exhibit 315, exhibit B, p. 3.
577 Exhibit 315, exhibit B, pp. 1–2.
578 Exhibit 315, exhibit B, p. 3.
579 Mike Lapointe, Transcript, January 20, 2011, p. 32.
580 Exhibit 315, exhibit B, p. 3.
581 Exhibit 315, exhibit B, p. 3.

582 Transcript, January 20, 2011, p. 34.
583 See also PPR 5, pp. 68–71.
584 Exhibit 366, p. 1; see also Mike Lapointe, Transcript, November 8, 2010, pp. 29–30.
585 Jim Cave, Transcript, January 31, 2011, p. 12.
586 Brian Assu, Transcript, January 31, 2011, p. 22.
587 Paul Ryall, Transcript, January 31, 2011, pp. 16–17.
588 Mike Lapointe, Transcript, January 18, 2011, p. 3; Exhibit 329; Paul Ryall, Transcript, January 31, 2011, p. 24.
589 Exhibit 371.
590 Paul Ryall, Transcript, January 31, 2011, p. 27; Jim Cave, Transcript, January 31, 2011, pp. 10–11, 23.
591 Paul Ryall, Transcript, January 31, 2011, pp. 39–40, 83.
592 Transcript, September 23, 2011, p. 5.
593 Transcript, September 23, 2011, p. 6.
594 Jim Cave, Transcript, January 31, 2011, pp. 28–29.
595 Brian Assu, Transcript, January 31, 2011, p. 29.
596 Jim Cave, Transcript, January 31, 2011, p. 11.
597 Jim Cave, Transcript, January 31, 2011, pp. 25, 97.
598 Exhibit 372; Exhibit 373; Jim Cave, Transcript, January 31, 2011, pp. 58–59.
599 Exhibit 373, p. 3; Jim Cave, Transcript, January 31, 2011, p. 58.
600 Jim Cave, Transcript, January 31, pp. 53–54; Brian Assu, Transcript, January 31, 2011, p. 54.
601 Transcript, September 23, 2011, p. 7.
602 Transcript, January 31, 2011, pp. 14–16, 18–19.
603 Transcript, January 31, 2011, pp. 6–7, 9.
604 Jim Cave, Transcript, January 31, 2011, p. 9.
605 Jim Cave, Transcript, January 31, 2011, p. 8.
606 Exhibit 315, exhibit B, p. 2.
607 Jim Cave, Transcript, January 31, 2011, pp. 19, 20.
608 Jim Cave, Transcript, January 31, 2011, pp. 61, 64; Paul Ryall, Transcript, January 31, 2011, p. 82.
609 Jim Cave, Transcript, January 31, 2011, p. 64; Paul Ryall, Transcript, January 31, 2011, p. 82.
610 Transcript, January 31, 2011, pp. 64–66.
611 Transcript, January 31, 2011, pp. 67–68, 75.
612 Transcript, January 31, 2011, pp. 86, 87.
613 Transcript, December 13, 2010, p. 51.
614 Mike Lapointe, Transcript, January 27, 2011, p. 10; Exhibit 65, Pacific Salmon Treaty, pp. 122–25 (Memorandum of Understanding, 1985); see also PPR 5, pp.72–74.
615 Transcript, January 26, 2011, p. 86.
616 Exhibit 315, exhibit B, p. 2.
617 Transcript, January 26, 2011, pp. 87–88.
618 Transcript, January 26, 2011, pp. 95, 99.
619 Mike Lapointe, Transcript, January 27, 2011, p. 70.
620 Mike Lapointe, Transcript, January 26, 2011, p. 88.
621 Transcript, January 26, 2011, pp. 90, 91.
622 Mike Lapointe, Transcript, January 27, 2011, p. 23; Exhibit 356, p. 2.
623 Brian Riddell, Transcript, January 27, 2011, pp. 12, 18–19. The operation of the Qualark counter was discontinued in 1998 by DFO because of budget constraints: see PPR 5, pp. 73–74. See also Brian Riddell, Transcript, January 27, 2011, p. 12 (not picked up by DFO management or integrated into PSC work).
624 PPR 5, p. 73.
625 Transcript, January 27, 2011, pp. 19–20.
626 Transcript, January 27, 2011, p. 23
627 Mike Lapointe, Transcript, January 26, 2011, p. 83.
628 Mike Lapointe, Transcript, January 27, 2011, p. 30.
629 Transcript, January 27, 2011, pp. 23, 30; Exhibit 356, p. 2.
630 Brian Riddell, Transcript, January 27, 2011, p. 22; Mike Lapointe, Transcript, January 27, 2011, pp. 26–27; Exhibit 356, p. 3.
631 Exhibit 356, p. 3.
632 Transcript, January 27, 2011, p. 32.
633 Transcript, September 23, 2011, p. 9.
634 Exhibit 266, p. 16. see also Gordon Curry, Transcript, February 21, 2011, p. 6; Jeff Grout, Transcript, February 24, 2011, pp. 14–15; PPR 6, pp. 38–49.
635 Brent Hargreaves, Transcript, February 21, 2011, p. 14.
636 Transcript, February 21, 2011, pp. 7, 12.
637 Brent Hargreaves, Transcript, February 21, 2011, p. 7; see also Rob Morley, Transcript, March 1, 2011, p. 27.
638 Transcript, February 21, 2011, pp. 64–65.
639 Brent Hargreaves and Gordon Curry, Transcript, February 21, 2011, pp. 8–9, 57.
640 Transcript, February 21, 2011, p. 65.
641 Transcript, February 21, 2011, p. 42.
642 Transcript, February 21, 2011, p. 40; see also Rob Morley, Transcript, March 1, 2011, p. 27.
643 Transcript, September 23, 2011, p. 10.
644 Exhibit 442; Brent Hargreaves, Transcript, February 21, 2011, p. 44; see also PPR 2, pp. 41–43.
645 Transcript, February 21, 2011, p. 44.
646 Exhibit 266, Annex 3; Exhibit 443; Gordon Curry, Transcript, February 21, 2011, p. 46.
647 Gordon Curry, Transcript, February 21, 2011, p. 46.
648 Exhibit 443, p. 2; Gordon Curry, Transcript, February 21, 2011, p. 46.
649 Gordon Curry, Transcript, February 21, 2011, p. 46.
650 Exhibit 443, p. 3.
651 Transcript, February 21, 2011, pp. 12–13.
652 Exhibit 432, p. 1.
653 Exhibit 432, p. 3
654 Transcript, February 21, 2011, pp. 16–17; Exhibit 432, p. 3.
655 Exhibit 432, p. 5.
656 Exhibit 432, pp. 8–11.
657 Exhibit 441, pp. i–ii.
658 Transcript, February 21, 2011, pp. 33–34.
659 Transcript, February 21, 2011, pp. 38, 39, 43–44; see also Jeff Grout, Transcript, February 24, 2011, pp. 16–17.
660 Gordon Curry, Transcript, February 21, 2011, p. 34; Brent Hargreaves, Transcript, February 21, 2011, p. 34.
661 Transcript, February 21, 2011, pp. 34–35.
662 Gordon Curry, Transcript, February 21, 2011, pp. 35–36.
663 Transcript, February 21, 2011, p. 36.
664 Transcript, September 23, 2011, p. 11.
665 Exhibit 266.
666 Exhibit 266, p. 7; Gordon Curry, Transcript, February 21, 2011, p. 6.
667 Exhibit 266, p. 16.
668 Exhibit 266, p. 7.
669 See also Gordon Curry, Transcript, February 21, pp. 8–10.
670 Exhibit 266, pp. 8–10.
671 Exhibit 266, p. 6.
672 Transcript, February 21, 2011, p. 35; Gordon Curry, Transcript, February 21, 2011, pp. 38–39, 48.
673 Transcript, February 21, 2011, pp. 31–32.
674 Transcript, February 22, 2011, pp. 31, 87, 89.
675 Transcript, March 1, 2011, p. 29.
676 Transcript, February 22, 2011, pp. 32–33.
677 Transcript, March 1, 2011, pp. 27–28.
678 Transcript, March 20, 2011, p. 20.
679 Transcript, March 2, 2011, p. 49.
680 Transcript, March 7, 2011, p. 30.
681 Transcript, March 3, 2011, p. 18.
682 PPR 6, pp. 47–48; see also Jeff Grout, Transcript, February 23, 2011, p. 59.
683 Bill Duncan, Transcript, March 1, 2011, p. 26; Chris Ashton, Transcript, February 22, 2011, p. 34.
684 Transcript, December 16, 2010, pp. 9–10.
685 Transcript, February 21, 2011, p. 36.
686 Gordon Curry, Transcript, February 21, 2011, pp. 35, 38; see also Jeff Grout, Transcript, February 23, 2011, pp. 57–58.

687 Transcript, March 2, 2011, pp. 50–52.
688 Brent Hargreaves, Transcript, February 21, 2011, pp. 21, 36; see also Exhibit 718, pp. 56–62; Karl English, Transcript, April 14, 2011, p. 21; Karl English, Transcript, April 15, 2011, p. 98.
689 Transcript, February 21, 2011, p. 36.
690 See also PPR 12; PPR 7, pp. 26–30; Exhibit 718, pp. 15–56.
691 Exhibit 268, p. 1; see also PPR 12, pp. 9–11.
692 Mike Lapointe, Transcript, January 18, 2011, pp. 40–41.
693 PPR 12, p. 10.
694 Transcript, May 11, 2011, p. 25; see also Peter Sakich, Transcript, May 12, 2011, p. 71; Colin Masson, Transcript, May 12, 2011, p. 71; PPR 12, p. 11.
695 Public submission 0307-WOOD, available at www.cohencommission.ca.
696 Public submission 0162-PEDERSEN, available at www.cohencommission.ca.
697 See, for example, PPR 12, p. 34.
698 Les Jantz, Transcript, May 11, 2011, p. 24; Peter Sakich, Transcript, May 12, 2011, pp. 3, 4; Ken Malloway, Transcript, May 12, 2011, p. 4; Colin Masson, Transcript, May 12, 2011, p. 4; Deborah Sneddon, Transcript, March 2, 2011, p. 73.
699 Exhibit 855, Foreword (no discernible page number).
700 Exhibit 429; see also PPR 12, pp. 52–56.
701 Exhibit 429, p. 3.
702 Peter Sakich, Transcript, May 12, 2011, p. 37; Ken Malloway, Transcript, May 12, 2011, p. 37.
703 Claire Dansereau, Transcript, September 22, 2011, p. 17; David Bevan, Transcript, September 22, 2011, p. 18.
704 Transcript, April 14, 2011, p. 6; Exhibit 718, p. 17.
705 Matthew Parslow, Transcript, May 11, 2011, p. 21; Les Jantz, Transcript, May 11, 2011, p. 28.
706 PPR 12, pp. 89–96; see also Joe Tadey, Transcript, March 2, 2011, pp. 67–68; March 3, 2011, pp. 11–12.
707 PPR 12, pp. 16–18.
708 See, for example, Frank Kwak, Transcript, March 7, 2011, pp. 19, 20–21; Gerry Kristianson, Transcript, March 7, p. 21; Joe Tadey, Transcript, March 2, 2011, p. 63; Deborah Sneddon, Transcript, March 2, 2011, p. 63; Robert Houtman, May 11, 2011, p. 9.
709 Exhibit 429, p. 5.
710 Exhibit 718, pp. 17, 21 (Table 2); Karl English, Transcript, April 14, 2011, pp. 6, 7.
711 Transcript, May 11, 2011, pp. 5–10; see also Exhibit 718, pp. 43–47.
712 Robert Houtman, Transcript, May 11, 2011, pp. 5–6.
713 Robert Houtman, Transcript, May 11, 2011, p. 6.
714 Robert Houtman, Transcript, May 11, 2011, pp. 8, 89; PPR 12, pp. 57–60, 61.
715 Robert Houtman, Transcript, May 11, 2011, p. 8; see also Exhibit 718, p. 43; Mike Lapointe, Transcript, January 18, 2011, p. 40.
716 Robert Houtman, Transcript, May 11, 2011, pp. 8–9; see also Karl English, Transcript, April 15, 2011, p. 64.
717 Exhibit 718, pp. 44–46.
718 Transcript, April 14, 2011, p. 13.
719 PPR 12, pp. 60–61; see also Jeff Grout, Transcript, February 23, 2011, p. 68.
720 PPR 12, pp. 27–28.
721 David Bevan, Transcript, September 22, 2011, pp. 6–7; Claire Dansereau, Transcript, September 22, 2011, p. 8.
722 Robert Houtman, May 11, 2011, p. 6.
723 PPR 12, p. 63; see also Robert Houtman, May 11, 2011, p. 6.
724 Robert Houtman, Transcript, May 11, 2011, pp. 6–7; PPR 12, p. 63.
725 Transcript, May 11, 2011, p. 13.
726 Transcript, May 11, 2011, p. 9.
727 Transcripts, May 11, 2011, p. 13, 51.
728 Transcript, May 11, 2011, p. 12.
729 Colin Masson, Transcript, May 12, 2011, p. 19.
730 Colin Masson, Transcript, May 12, 2011, p. 19; see also PPR 12, pp. 63–64; see also David Bevan, Transcript, September 22, 2011, pp. 18, 19–20, 65.
731 Ryan McEachern, February 22, 2011, p. 27; see also Jeff Grout, Transcript, February 23, 2011, pp. 43, 44, 89.
732 Transcript, September 22, 2011, p. 19.
733 Peter Sakich, Transcript, May 12, p. 20; see also PPR 12, p. 63.
734 Kathy Scarfo, March 1, 2011, pp. 51, 56.
735 Devona Adams, March 2, 2011, p. 5; Joe Tadey, Transcript, March 2, 2011, p. 74.
736 Joe Tadey, Transcript, March 2, 2011, p. 57.
737 Joe Tadey, Transcript, March 2, 2011, p. 58; Exhibit 532, p. 2.
738 Devona Adams, Transcript, March 2, 2011, p. 5; see also Exhibit 526A, pp. 2–3.
739 Exhibit 718, p. 49.
740 PPR 7, p. 28; Devona Adams, Transcript, March 2, 2011, p. 76.
741 PPR 7, p. 29.
742 Transcript, March 2, 2011, pp. 58–59; March 3, pp. 1–2.
743 Joe Tadey, Transcript, March 2, 2011, p. 56.
744 Joe Tadey, Transcript, March 2, 2011, pp. 61–62; Exhibit 532, p. 7.
745 Transcript, March 2, 2011, p. 57; March 3, 2011, p. 13; PPR 7, p. 27.
746 Joe Tadey, Transcript, March 2, 2011, p. 57; see also PPR 7, p. 27.
747 Joe Tadey, Transcript, March 2, 2011, p. 57.
748 Transcript, March 2, 2011, pp. 64–65 ; Exhibit 532, pp. 10–11.
749 Joe Tadey, Transcript, March 2, 2011, p. 66.
750 Exhibit 534, p. 1; see also Joe Tadey, Transcript, March 2, 2011, p. 60; Exhibit 532, pp. 8–13.
751 Frank Kwak, Transcript, March 7, 2011, pp. 19, 20, 21; see also Gerry Kristianson, Transcript, March 7, p. 21.
752 Transcript, March 2, 2011, pp. 62–63.
753 Deborah Sneddon, T ranscript, March 2, 2011, p. 63.
754 Exhibit 718, pp. 56–57.
755 Deborah Sneddon, Transcript, March 2, 2011, p. 73; Joe Tadey, Transcript, March 2, 2011, p. 78.
756 Frank Kwak, Transcript, March 7, 2011, pp. 19–20; see also Jeremy Maynard, Transcript, March 7, 2011, p. 29.
757 Exhibit 718, p. 49.
758 Transcript, March 2, 2011, p. 75; March 3, 2011, p. 14.
759 Transcript, March 3, 2011, p. 15.
760 PPR 12, p. 150; note that in Technical Report 7 (Exhibit 718), the authors discuss First Nations' fisheries in the marine environment as "below Sawmill" and "above Sawmill."
761 PPR 12, pp. 72–73.
762 PPR 12, p. 76.
763 Exhibit 429, p. 2; see also Exhibit 860, p. 2.
764 Exhibit 860.
765 Exhibit 860, p. 14.
766 PPR 12, pp. 68–69.
767 PPR 12, pp. 69–70.
768 Exhibit 718, p. 30.
769 PPR 12, pp. 70–72.
770 Transcript, December 13, 2010, pp. 50, 51; see also Exhibit 278, Councillor June Quipp of the Cheam Indian Band confirmed that the Stó:lō Tribal Council has an agreement with DFO regarding the monitoring of its FSC fishery. The Cheam Band received approximately $60,000 per year from DFO to operate a monitoring program, and the Cheam have their own catch monitors who record numbers of fish as they come in.
771 Transcript, May 11, 2011, p. 16.
772 Transcripts, May 11, 2011, p. 52.
773 Transcript, May 11, 2011, pp. 16–17.
774 Exhibit 718, p. 31.
775 Exhibit 718, p. 32.
776 PPR 12, pp. 74–75.

777 Transcripts, May 11, 2011, pp. 15–16.
778 Transcript, May 11, 2011, p. 16.
779 Les Jantz and Matthew Parslow, Transcript, p. 14.
780 Matthew Parslow, Transcript, May 11, 2011, p. 16; Les Jantz, Transcript, May 11, 2011, p. 15.
781 Transcript, May 11, 2011, p. 20.
782 PPR 12, p. 76.
783 PPR 12, pp. 76–78.
784 Exhibit 718, p. 30.
785 PPR 12, p. 79; Exhibit 718, p. 36; Colin Masson, Transcript, May 12, 2011, p. 21.
786 PPR 18, pp. 85–86; Exhibits 1422 and 1425.
787 Matthew Parslow, Transcript, May 11, 2011, p. 89.
788 Colin Masson, Transcript, May 12, 2011, p. 21; Julie Stewart, Transcript, August 19, 2011, p. 18.
789 PPR 12, pp. 81–83; see also Exhibit 718, p. 30.
790 Transcript, May 17, 2011, p. 27.
791 Transcript, May 17, 2011, p. 11; see also May 18, 2011, pp. 1–2.
792 Transcript, May 17, 2011, p. 48.
793 Randy Nelson, Transcript, May 17, 2011, pp. 12, 85.
794 Exhibit 32.
795 Exhibit 268; see also PPR 12, pp. 28–29.
796 Colin Masson, Transcript, May 12, 2011, p. 5; see also PPR 12, p. 28.
797 Exhibit 268, p. 4.
798 Exhibit 268, pp. 4–6.
799 Transcript, May 12, 2011, pp. 5, 6.
800 Exhibit 535, p. 5.
801 Transcript, March 2, 2011, p. 71.
802 Exhibit 606, pp. 15–18; see also PPR 12, p. 32, Appendix 1.
803 Fisheries and Oceans Canada, *Building Capacity & Trust*, Response by Fisheries & Oceans Canada to the 2004 Southern Salmon Fishery Post-Season Review, June 2005.
804 Exhibit 480.
805 Peter Pearse and Donald McRae, *Treaties and Transitions: Towards a Sustainable Fishery on Canada's Pacific Coast*, Report of the Federal-Provincial Task Force, April 2004.
806 Exhibit 493.
807 Transcript, May 12, 2011, p. 7.
808 Colin Masson, Transcript, May 12, p. 6; PPR 12, pp. 31–32.
809 Exhibit 269, pp. 5–6.
810 Exhibit 269, p. 27 (Appendix 1).
811 PPR 12, pp. 37–38; Colin Masson, May 12, pp. 6–7.
812 PPR 12, p. 37.
813 Exhibit 270, p. 6; see also Colin Masson, Transcript, May 12, 2011, p. 8.
814 Exhibit 270, p. 10.
815 Transcript, May 12, 2011, p. 16.
816 Exhibit 1437, p. 7; see also Julie Stewart, Transcript, August 19, 2011, p. 72.
817 Exhibit 1437, pp. 8–10.
818 Transcript, May 12, 2011, p. 16.
819 Transcript, September 22, 2011, p. 13.
820 Susan Farlinger, Transcript, September 22, 2011, pp. 20–21.
821 PPR 12, p. 41.
822 PPR 12, pp. 41–42.
823 PPR 12, pp. 42–43.
824 PPR 12, pp. 43–44.
825 Exhibit 860; see also PPR 12, pp. 46–47.
826 Exhibit 860, p. 2; see also PPR 12, p. 47.
827 Exhibit 855.
828 Transcript, May 12, 2011, p. 14; see also Susan Farlinger, Transcript, September 26, 2011, p. 20.
829 Exhibit 429, pp. 1, 5.
830 Transcript, May 11, 2011, p. 23.
831 Exhibit 429, pp. 8–11.
832 Exhibit 429, pp. 12–20.
833 Transcript, September 26, 2011, p. 19.
834 Transcript, September 22, 2011, pp. 20–21.
835 Transcript, May 12, 2011, p. 14.
836 Exhibit 473; see also PPR 12, pp. 39–41.
837 PPR 12, p. 39.
838 Gerry Kristianson, Transcript, February 1, 2011, pp. 76–77; see also Pat Matthew, Transcript, February 1, 2011, p. 81.
839 Exhibit 429, p. 6; see also PPR 12, pp. 40–41; Colin Masson, Transcript, May 12, 2011, pp. 8–9.
840 Exhibit 855, p. 17 (Appendix 2); see also PPR 12, pp. 45–50; Colin Masson, Transcript, May 12, 2011, p. 9.
841 Transcript, May 12, 2011, p. 9.
842 Transcript, July 5, 2011, p. 27.
843 Exhibit 855, cover; Colin Masson, Transcript, May 12, 2011, p. 11; see also PPR 11, pp. 53–54.
844 Exhibit 428; Exhibit 855.
845 Transcript, May 12, 2011, p. 12.
846 Transcript, May 12, 2011, p. 20.
847 Exhibit 855, pp. 5–6; see also PPR 12, pp. 47–48.
848 Exhibit 855, p. 10; see also PPR 12, pp. 45–46.
849 Transcript, May 12, 2011, p. 34.
850 Exhibit 855, p. 12.
851 Exhibit 855, p. 12.
852 Ken Malloway, Transcript, May 12, 2011, p. 35; Colin Masson, Transcript, May 12, 2011, pp. 36, 45.
853 Colin Masson, Transcript, May 12, 2011, p. 25.
854 Matthew Parslow, Transcript, May 11, 2011, p. 15; Colin Masson, Transcript, May 12, 2011, p. 45.
855 Transcript, May 11, 2011, pp. 20–21.
856 Transcript, May 12, 2011, p. 19.
857 Exhibit 841.
858 Exhibit 843; Exhibit 844.
859 Transcript, March 2, 2011, p. 73.
860 Exhibit 68; Exhibit 69; Mike Lapointe, Transcript, January 18, 2011, pp. 75–76; Barry Rosenberger, Transcript, January 21, 2011, p. 30; see also PPR 5, pp. 102–3.
861 Mike Lapointe, Transcript, November 8, 2010, p. 36; see also Exhibit 70; Exhibit 602; Exhibit 603; Exhibit 74.
862 Barry Rosenberger, Transcript, January 21, 2011, p. 31; Exhibit 330; Exhibit 338; Exhibit 339.
863 Barry Rosenberger, Transcript, January 21, 2011, pp. 32–33.
864 Barry Rosenberger, Transcript, January 21, 2011, p. 34.
865 Transcript, January 18, 2011, p. 80.
866 Transcript, January 18, 2011, p. 25.
867 Transcript, January 18, 2011, pp. 79–80.
868 Exhibit 333.
869 Exhibit 333, p. 1.
870 Exhibit 333, p. 2; Mike Lapointe, Transcript, January 18, 2011, p. 82.
871 Mike Lapointe, Transcript, January 18, 2011, p. 83.
872 Mike Lapointe, Transcript, January 18, 2011, p. 80.
873 Mike Lapointe, Transcript, January 18, 2011, pp. 80, 83, 84.
874 Transcript, January 18, 2011, pp. 86, 90.
875 Brian Riddell, Transcript, February 2, 2011, p. 42; Exhibit 65, pp. 7 (Article III, para. 3(c)), (Diplomatic Note of August 13, 1985, para. F); see also Timber Whitehouse, Transcript, February 2, 2011, pp. 49–50; PPR 5, pp. 66–67.
876 Transcript, February 3, 2011, p. 31.
877 Transcript, February 2, 2011, pp. 4, 31.
878 Transcript, February 2, 2011, pp. 4–5.
879 Transcript, February 2, 2011, p. 7.
880 Transcript, February 2, 2011, pp. 13–14.
881 Transcript, February 2, 2011, p. 29.
882 Transcript, February 2, 2011, p. 32.
883 Transcript, February 2, 2011, pp. 30–32.
884 Timber Whitehouse, Transcript, February 2, 2011, p. 33.
885 Transcript, February 11, 2011, pp. 17–18.
886 Timber Whitehouse, Transcript, February 2, 2011, pp. 33–35, 36; February 3, 2011, pp. 24–25; Exhibit 380.

887 Timber Whitehouse, Transcript, February 2, 2011, pp. 4–5.
888 Timber Whitehouse, Transcript, February 2, 2011, p. 7.
889 Transcript, February 2, 2011, pp. 10–11.
890 Timber Whitehouse, Transcript, February 2, 2011, pp. 13–14.
891 Transcript, February 2, 2011, pp. 17–18.
892 Timber Whitehouse, Transcript, February 2, 2011, p. 38.
893 Brian Riddell, Transcript, February 2, 2011, p. 38.
894 Public submission 0129-RSSEPS_866070, available at www.cohencommission.ca.
895 Brian Riddell, Transcript, February 2, 2011, p. 39.
896 Brian Riddell, Transcript, February 2, 2011, pp. 39–40.
897 Brian Riddell, Transcript, February 2, 2011, p. 40.
898 Transcript, February 2, 2011, p. 54.
899 Timber Whitehouse, Transcript, February 2, 2011, p. 12; February 3, 2011, pp. 9–10.
900 Brian Riddell, Transcript, February 2, 2011, pp. 42, 59, 62–63; Timber Whitehouse, Transcript, February 2, 2011, pp. 61–62.
901 Transcript, February 3, 2011, p. 31.
902 Aboriginal assertions of rights are found in several exhibits, including the following: Exhibit 493, p. 76; Exhibit 1747, pp. 2–3; Exhibit 1190.
903 *Rigaux v. Gove* (1998) 155 DLR (4th) 716 (BCSC); 51 BCLR (3d) 228 at para. 25.
904 Submissions on Aboriginal law: PPR 1a, pp. 1–2; PPR 1b, p. 9; PPR 1c, pp. 2–3; PPR 1f, p. 18; PPR 1g, p. 2; see also Musqueam and Tsawwassen, Transcript, October 26, 2010, p. 29; Western Central Coast Salish, Transcript, October 26, p. 36.
905 Transcript, September 2, 2011, pp. 71–72.
906 Kaarina McGivney, Transcript, September 2, 2011, pp. 25, 52; see also Exhibit 1270, p. 1. Barry Rosenberger told me that the Department of Indian and Northern Affairs holds responsibility for "the rights and titles side of things," whereas DFO is focused on managing the fisheries (Transcript, July 4, 2011, p. 66).
907 Kaarina McGivney, Transcript, September 2, 2011, pp. 52–53.
908 Transcript, September 2, 2011, p. 14.
909 Kaarina McGivney, Transcript, September 2, 2011, pp. 14–15.
910 Exhibit 1752, p. 10; PPR 18, p. 46; *R. v. Sparrow* is described in greater detail in Chapter 3, Legal framework.
911 Exhibit 1270, p. 2; Kaarina McGivney, Transcript, August 19, 2011, p. 11.
912 PPR 18, p. 47.
913 Exhibit 290, p. 8.
914 PPR 18, p. 53.
915 Exhibit 1187, p. 16; Exhibit 1189, p. 2.
916 PPR 18, p. 53.
917 Exhibit 1430, including preliminary data for fiscal year 2010/11 provided as at December 2010.
918 Exhibit 1429 (numbers rounded to the nearest $100,000).
919 Exhibit 261.
920 Exhibit 261, p. 3.
921 Kaarina McGivney, Transcript, September 2, 2011, pp. 14–15.
922 Exhibit 261.
923 Exhibit 1752, p. 41.
924 PPR 18, p. 70; see also Exhibit 1752, p. 41.
925 PPR 18, pp. 70–71.
926 PPR 18, p. 71.
927 PPR 18, p. 73.
928 PPR 18, p. 73.
929 Exhibit 1429 (numbers rounded to the nearest $100,000).
930 Exhibit 1442, p. 2 (as at January 2011).
931 Exhibit 1442, p. 2.
932 PPR 18, p. 78.
933 PPR 18, p. 78.
934 PPR 18, p. 81.
935 PPR 18, p. 78.
936 PPR 18, pp. 78–79.
937 Exhibit 290, p. 8.
938 PPR 18, p. 81.
939 Exhibit 1430, p. 5.
940 Exhibit 1430, p. 4.
941 PPR 18, pp. 32–33.
942 PPR 18, pp. 31–32.
943 Exhibit 270, p. 1.
944 Exhibit 270, p. 5.
945 Exhibit 270, p. 12.
946 PPR 18, p. 90; note that a further $26 million is set aside for implementation of PICFI.
947 PPR 18, pp. 85–86.
948 PPR 18, p. 86.
949 PPR 18, pp. 86–87.
950 PPR 18, pp. 87–88; Julie Stewart, Transcript, August 19, 2011, p. 43.
951 Exhibit 1430, pp. 3, 6.
952 Exhibit 1442, p. 2 (as at January 2011).
953 Exhibit 1426, p. 1; see also Kaarina McGivney, Transcript, August 19, 2011, p. 30.
954 Exhibit 1426, p. 1.
955 Exhibit 1426, p. 3.
956 Kaarina McGivney, Transcript, August 19, 2011, p. 55.
957 Exhibit 1426, p. 2; Kaarina McGivney, Transcript, August 19, 2011, pp. 38–39.
958 PPR 18, p. 21 and following.
959 Exhibit 1429; Exhibit 1428.
960 Exhibit 1428.
961 Exhibit 1429.
962 Exhibit 1429 (numbers rounded to the nearest $100,000).
963 Exhibit 1430, p. 1, preliminary data for fiscal year 2010/11 provided at December 2010.
964 Exhibit 1430.
965 Transcript, July 4, 2011, p. 49.
966 Transcript, June 28, 2011, p. 27.
967 Kaarina McGivney, Transcript, August 19, 2011, p. 3.
968 Transcript, September 2, 2011, p. 68.
969 Exhibit 279, p. 2.
970 Exhibit 281, p. 1; Exhibit 282, p. 2.
971 Exhibit 278, p. 4.
972 Exhibit 280, p. 1.
973 Exhibit 291, p. 2.
974 Exhibit 293, p. 2.
975 Exhibit 278, pp. 3–4.
976 Clarence Pennier, Transcript, December 13, 2010, p. 17.
977 Exhibit 281, p. 1.
978 Exhibit 298, p. 2.
979 Exhibit 297, p. 4.
980 Kaarina McGivney, Transcript, August 19, pp. 7–8; Transcript, September 2, 2011, p. 61.
981 Transcript, September 2, 2011, p. 69.
982 Transcript, August 19, 2011, p. 7.
983 Exhibit 1421.
984 Exhibit 300, p. 3; Exhibit 280, p. 2; Transcript, December 13, 2010, p. 18.
985 Exhibit 279, pp. 2, 4; Transcript, December 13, 2010, pp. 27–30
986 Transcript, July 4, 2011, pp. 28–29.
987 Barry Huber, Transcript, June 30, 2011, pp. 36–37; Kaarina McGivney, Transcript, August 19, 2011, p. 3; Exhibit 1279, p. 5.
988 Kaarina McGivney, Transcript, August 19, 2011, p. 3; see, for example, Exhibit 1226; also Exhibit 1432; Kaarina McGivney, Transcript, August 19, 2011, pp. 64–65.
989 Kaarina McGivney, Transcript, August 19, 2011, p. 4; Exhibit 1279, p. 5.
990 Exhibit 261, p. 5.
991 Transcript, August 19, 2011, p. 4.
992 Kaarina McGivney, Transcript, August 19, 2011, p. 6.
993 Exhibit 1189, p. 23.
994 Exhibit 1741, p. 3; Kaarina McGivney, Transcript, September 2, 2011, p. 26.

995 Kaarina McGivney, Transcript, August 19, 2011, p. 7; see also Kaarina McGivney, Transcript, September 2, 2011, p. 61.
996 Exhibit 1433, Draft example.
997 See also Exhibit 1744, p. 2.
998 Exhibit 301, p. 2.
999 Transcript, December 13, 2010, p. 56.
1000 Transcript, July 4, 2011, p. 101.
1001 Transcript, December 15, 2010, p. 36.
1002 Exhibit 303.
1003 Transcript, June 30, 2011, p. 38.
1004 Transcript, July 4, 2011, p. 30.
1005 Transcript, August 19, 2011, p. 5.
1006 Transcript, July 4, 2011, p. 32.
1007 Transcript, December 13, 2010, p. 78.
1008 Transcript, June 30, 2011, p. 38.
1009 PPR 18, Table 4, p. 43.
1010 Kaarina McGivney, Transcript, September 2, 2011, p. 34; see also Edwin Newman, Transcript, December 15, 2010, p. 68.
1011 Exhibit 1225, p. 3.
1012 Transcript, July 5, 2011, p. 53.
1013 Ross Wilson, Transcript, July 4, 2011, p. 102; Exhibit 1744, p. 1.
1014 Exhibit 493, p. 75.
1015 Exhibit 1189, p. 13.
1016 Exhibit 1744, p. 2.
1017 Exhibit 1221, PPR 18, Table 1, p. 40.
1018 Exhibit 1221, PPR 18, Table 2, p. 41.
1019 Exhibit 1277, p. 10.
1020 Exhibit 1225, p. 3.
1021 Exhibit 1279, p. 5.
1022 Exhibit 1279, pp. 8–9.
1023 Exhibit 1221; Exhibit 1275; Exhibit 1276, p. 4.
1024 Exhibit 1276, pp. 3, 5, 6.
1025 Transcript, July 5, 2011, p. 43.
1026 Barry Huber, Transcript, June 30, 2011, p. 37; Kaarina McGivney, Transcript, August 19, 2011, pp. 3–4.
1027 Kaarina McGivney, Transcript, August 19, 2011, p. 4; Barry Huber, Transcript, June 30, 2011, pp. 79–80; Exhibit 1226, p. 4.
1028 Exhibit 1226, p. 4.
1029 Barry Huber, Transcript, June 30, 2011, p. 81.
1030 Exhibit 1226, pp. 4, 10–11.
1031 PPR 18, p. 112; Kaarina McGivney, Transcript, August 19, 2011, p. 30.
1032 Kaarina McGivney, Transcript, August 19, 2011, pp. 30, 34; see also Exhibit 1279, p. 3.
1033 Kaarina McGivney, Transcript, August 19, 2011, pp. 30–31.
1034 Kaarina McGivney, Transcript, August 19, 2011, pp. 29, 30; Exhibit 1426.
1035 Exhibit 1279, p. 1; see also Ruling Re: Heiltsuk Tribal Council's Application for Production of FSC "Mandate Documents"; Coastwide Framework Documents, September 20, 2011, p. 15.
1036 Kaarina McGivney, Transcript, August 19, 2011, pp. 29, 31.
1037 Julie Stewart and Kaarina McGivney, Transcript, August 19, 2011, pp. 80–81.
1038 Kaarina McGivney, Transcript, August 19, 2011, p. 55.
1039 Exhibit 1426, p. 2; Kaarina McGivney, Transcript, August 19, 2011, pp. 38–39.
1040 Exhibit 1279, p. 6.
1041 Kaarina McGivney, Transcript, August 19, 2011, p. 31; Transcript, September 2, 2011, p. 97.
1042 Kaarina McGivney, Transcript, August 19, 2011, pp. 31–32; Transcript, September 2, 2011, p. 96; Exhibit 493; Exhibit 1189.
1043 Transcript, August 19, 2011, pp. 38–39.
1044 Kaarina McGivney, Transcript, September 2, 2011, pp. 91–92.
1045 Kaarina McGivney, Transcript, September 2, 2011, pp. 91–92.
1046 Julie Stewart and Kaarina McGivney, Transcript, September 2, 2011, pp. 89–90; Exhibit 1437, p. 24.
1047 Exhibit 261, p. 5; Exhibit 264, p. 16; Exhibit 8, p. 2.
1048 PPR 18, Figure 9, p. 45.
1049 Transcript, June 30, 2011, p. 98.
1050 Transcript, December 15, 2010, pp. 68–69, 90.
1051 Transcript, July 5, 2011, p. 52; see also Exhibit 1260, p. 2.
1052 Exhibit 445, p. 141.
1053 PPR 18, p. 66.
1054 PPR 18, p. 66.
1055 Exhibit 1279, p. 11.
1056 PPR 18, pp. 68–69.
1057 Exhibit 1279, p. 11; PPR 18, pp. 68–69.
1058 Transcript, September 2, 2011, p. 12.
1059 Kaarina McGivney, Transcript, August 19, 2011, p. 11.
1060 Transcript, September 2, 2011, pp. 5, 6, 10.
1061 Exhibit 1279, p. 11.
1062 Exhibit 1442, p. 2 (as at January 2011).
1063 Exhibit 1442, p. 2 (as at January 2011).
1064 Exhibit 1747, p. 15.
1065 Exhibit 1747, pp. 1–2.
1066 Exhibit 1747, p. 3.
1067 Exhibit 1747, p. 2.
1068 Exhibit 1279, p. 12.
1069 Exhibit 291, pp. 1, 5.
1070 Transcript, June 28, 2011, p. 66.
1071 Exhibit 291, p. 1.
1072 Transcript, August 19, 2011, p. 27, referring to in-river economic opportunity fisheries specifically.
1073 Transcript, June 28, 2011, p. 64.
1074 Exhibit 1747, p. 4; Russ Jones, Transcript, June 28, 2011, p. 68; see also Julie Stewart, Transcript, September 2, p. 41.
1075 Exhibit 1747, pp. 5, 7.
1076 Exhibit 1746, p. 7.
1077 Exhibit 1746, p. 7; as of August 31, 2010, though six agreements were "in negotiations."
1078 Exhibit 1746, p. 35.
1079 Exhibit 1746, pp. 9, 37.
1080 Exhibit 1277, p. 7.
1081 Exhibit 1277, p. 3.
1082 Exhibit 729, p. 13.
1083 Exhibit 261, p. 7.
1084 Exhibit 261, pp. 2–3.
1085 Exhibit 1189, p. 2.
1086 Exhibit 729, p. 31.
1087 Exhibit 1186.
1088 Exhibit 290, p. 10; also, Exhibit 1186, p. 2.
1089 Exhibit 1186, pp. 1, 2; see also Barry Huber, Transcript, June 28, 2011, p. 8.
1090 PPR 18, p. 132.
1091 Transcript, June 28, 2011, p. 8; Exhibit 290, p. 8.
1092 Saul Terry, Transcript, June 28, 2011, p. 9; see also Exhibit 1186, p. 8 (section 12.1).
1093 Marcel Shepert, Transcript, July 4, 2011, pp. 45–46.
1094 Exhibit 77.
1095 Exhibit 77, p. 56.
1096 Exhibit 77, p. 66.
1097 Exhibit 77, p. 45.
1098 Exhibit 77, p. 66.
1099 PPR 18, p. 50. However, the Fraser River Aboriginal Fisheries Secretariat has continued to receive DFO funding and maintains a role in facilitating dialogue between DFO and First Nations. See Exhibit 1181 for a description of FRAFS activities and funding.
1100 Ernie Crey, Transcript, July 4, 2011, pp. 63–64.
1101 Exhibit 1923, p. 28.
1102 PPR5, p. 57.
1103 Exhibit 604, p. 33.
1104 Exhibit 1431, p. 11.
1105 Exhibit 1431, p. 11.

1106 Exhibit 493.
1107 *Treaties and Transitions*, p. 28.
1108 *Treaties and Transitions*, pp. 26–27.
1109 *Treaties and Transitions*, p. 27.
1110 *Treaties and Transitions*, p. 46.
1111 Exhibit 493, p. 2.
1112 Exhibit 493, p. 10.
1113 Exhibit 493, p. 4.
1114 PPR 18, pp. 78, 81.
1115 Exhibit 480, p. 4.
1116 Exhibit 1189, p. 3.
1117 Exhibit 269, p. 7.
1118 Exhibit 480, p. 11.
1119 Exhibit 480, p. 14.
1120 Exhibit 269, p. 24.
1121 Exhibit 606, p. 46.
1122 Exhibit 606, p. 47.
1123 Exhibit 606, p. 47.
1124 Exhibit 8.
1125 Exhibit 8, p. 32.
1126 Exhibit 8, p. 27.
1127 Exhibit 8, p. 2.
1128 Exhibit 8, p. 29.
1129 Exhibit 1187, p. 13.
1130 Exhibit 1187, p. 20.
1131 Exhibit 1187, p. 13.
1132 Exhibit 1187, p. 21.
1133 Kaarina McGivney, Transcript, August 19, 2011, pp. 43–44.
1134 Exhibit 290, p. 1; see also Exhibit 1220, p. 2.
1135 Exhibit 290, p. 2; see also Exhibit 1188.
1136 Exhibit 1220, p. 1.
1137 Exhibit 1277, p. 7.
1138 Kaarina McGivney, Transcript, August 19, 2011, p. 43; Barry Huber, Transcript, June 28, 2011, pp. 12–13; see also Exhibit 1206a, p. 5; Exhibit 1259, p. 5.
1139 Exhibit 269, p. 19; Exhibit 1187, p. 20; Barry Huber, Transcript, June 28, 2011, pp. 12–13.
1140 Kaarina McGivney, Transcript, August 19, 2011, p. 93; Julie Stewart, Transcript, August 19, 2011, p. 94; Barry Rosenberger, Transcript, July 5, 2011, p. 49; Exhibit 1751, pp. 8–9.
1141 See, for example, Neil Todd, Transcript, June 28, 2011, p. 14.
1142 Exhibit 1204, p. 4.
1143 Transcript, December 13, 2010, p. 21.
1144 Exhibit 1258, p. 1; Exhibit 1259, p. 6.
1145 Transcript, August 19, 2011, p. 45; Transcript, September 2, 2011, p. 75; Exhibit 1426, p. 1.
1146 Transcript, June 28, 2011, p. 10.
1147 Transcript, September 26, 2011, p. 5.
1148 See, for example, Saul Terry, Transcript, June 28, 2011, p. 15; Exhibit 1259, p. 3; June Quipp, Transcript, December 13, 2010, p. 83; Ross Wilson, Transcript, July 4, 2011, p. 105; Ernie Crey, Transcript, July 5, 2011, pp. 67–68.
1149 See, for example, Fred Sampson, Transcript, December 14, 2010, p. 14; Ron Ignace, Transcript, December 14, 2010, p. 36; Ross Wilson, Transcript, July 5, 2011, p. 48.
1150 Exhibit 1189, pp. 7, 8.
1151 Exhibit 295, p. 3.
1152 Exhibit 295, p. 11.
1153 Exhibit 493, p. 76.
1154 Exhibit 295, p. 9.
1155 Exhibit 278, p. 5.
1156 Transcript, July 4, 2011, p. 51.
1157 Transcript, July 4, 2011, p. 55.
1158 See for example, Exhibit 291, p. 4; Marcel Shepert, Ernie Crey, and Ross Wilson, Transcript, July 4, 2011, pp. 9–10; Exhibit 293, p. 3; Saul Terry, Transcript, December 14, 2010, p. 23.
1159 See, for example, Pat Matthew, Transcript, February 1, 2011, p. 11.
1160 See, for example, Russ Jones, Transcript, June 28, 2011, p. 16.
1161 Exhibit 293, p. 3.
1162 Transcript, June 28, 2011, p. 45.
1163 Transcript, July 5, 2011, p. 73.
1164 Transcript, June 28, 2011, p. 14.
1165 See, for example, Kaarina McGivney, Transcript, September 2, 2011, pp. 55, 64; Julie Stewart, Transcript, September 2, 2011, p. 64.
1166 Transcript, July 4, 2011, p. 38; Transcript, July 5, 2011, pp. 12–13.
1167 Transcript, February 1, 2011, p. 9.
1168 Exhibit 8, p. 28.
1169 Exhibit 291, p. 5; Russ Jones, Transcript, June 28, 2011, p. 44.
1170 See, for example, Ernie Crey, Transcript, July 4, 2011, p. 13; Robert Mountain, Transcript, December 15, 2010, p. 26; Exhibit 279, p. 6; Exhibit 281, p. 2.
1171 Transcript, September 2, 2011, p. 86.
1172 Transcript, July 4, 2011, p. 8.
1173 Exhibit 1429.
1174 Kaarina McGivney, Transcript, August 19, 2011, p. 46; see also Exhibit 1429.
1175 Exhibit 296.
1176 See, for example, Rod Naknakim, Transcript, December 15, 2010, p. 84.
1177 Ross Wilson, Marcel Shepert, Ernie Crey, Transcript, July 5, 2011, pp. 63–64; see also Ernie Crey, Transcript, July 4, 2011, p. 9.
1178 Exhibit 1206A, p. 4.
1179 Exhibit 1206A, p. 10.
1180 Exhibit 1206A, p. 10.
1181 PPR 18, p. 97.
1182 PPR 18, p. 100 (Table 9).
1183 Exhibit 493, p. 17; Exhibit 1189, p. 2.
1184 PPR 1, para. 135, n. 242.
1185 PPR 18, Table 9, p. 100.
1186 PPR 18, Table 9, p. 100.
1187 PPR 18, Table 9, p. 100.
1188 PPR 18, Table 9, p. 100.
1189 Exhibit 493, p. 18.
1190 Exhibit 1189, p. 21.
1191 Exhibit 1279, p. 3.
1192 Exhibit 1279; Exhibit 1426.
1193 Exhibit 1279, p. 2.
1194 Exhibit 1279, p. 3.
1195 Kimberley Baird, Transcript, December 13, 2010, p. 13.
1196 Exhibit 285; Exhibit 286.
1197 Exhibit 1279, pp. 15–16, 20.
1198 Exhibit 1279, pp. 15–16; see, for example, Exhibit 1447, p. 99.
1199 Transcript September 2, 2011, p. 86.
1200 Guujaaw, Transcript, December 15, 2010, p. 58; Kaarina McGivney, Transcript, August 19, 2011, p. 35.
1201 Exhibit 269, p. 7.
1202 Transcript September 2, 2011, p. 87.
1203 Exhibit 1426, p. 3.
1204 Exhibit 1279, p. 4.
1205 PPR 18, pp. 103–4.
1206 Exhibit 493, p. 65.
1207 Transcript, December 13, 2010, p. 66.
1208 Exhibit 1279, p. 16; see also Kaarina McGivney, Transcript, August 19, 2011, pp. 36–37.
1209 Exhibit 1279, p. 5.
1210 Exhibit 1279, p. 5.
1211 Exhibit 281, p. 1.
1212 Exhibit 1279, p. 6.
1213 Exhibit 1279, p. 9.
1214 Exhibit 287, p. 265.
1215 PPR 18, p. 153 (Appendix 3); Exhibit 1279, p. 8.

1216 Kaarina McGivney, Transcript, August 19, 2010, p. 86; Exhibit 1279, p. 10.
1217 Exhibit 1279, pp. 4, 11.
1218 PPR 18, p. 161 (Appendix 4).
1219 Exhibit 1279, pp. 11, 12, 14.
1220 Exhibit 1279, pp. 11, 13.
1221 *R. v. Sappier; R. v. Gray*, [2006] 2 SCR 686, 2006 SCC 54, at para. 26.
1222 *R. v. Sparrow*, at para. 78.
1223 See also PPR 6, pp. 62–79.
1224 Exhibit 493.
1225 Exhibit 480.
1226 Exhibit 269.
1227 Exhibit 480, p. 8.
1228 Exhibit 480, pp. 9–10.
1229 Exhibit 269, p. 5.
1230 Exhibit 269, pp. 12, 16; see also PPR 6, pp. 66–67.
1231 Exhibit 269, pp. 17–19.
1232 Exhibit 472; see also PPR 6, pp. 67–70.
1233 Exhibit 270; Exhibit 472, p. iii (Executive Summary).
1234 Exhibit 471; Exhibit 469, p. 3.
1235 Exhibit 469, p. 9.
1236 Exhibit 469, pp. 9–11; see also Marcel Shepert, Transcript, July 5, 2011, pp. 64–65.
1237 Exhibit 469, p. 15.
1238 Exhibit 469, p. 18.
1239 Transcript, February 23, 2011, p. 45.
1240 Transcript, February 23, 2011, p. 45.
1241 Transcript, February 23, 2011, p. 45.
1242 Jeff Grout, Transcript, February 23, 2011, pp. 88–89.
1243 Transcript, February 23, 2011, p. 82. See also PPR 6, paras. 173 and 174 and n. 205: Presentation: Supporting Integrated Commercial Salmon Fisheries: Moving to Share Based Management (Community Dialogues – Fall, 2008) ("The Department expects SBM to result in the following benefits for the salmon fishery: 'Conservation and fisheries sustainability facilitated; Addressing Wild Salmon Policy objectives – selective harvest; Lower fishing effort reduces risk of over-fishing …'").
1244 Transcript, September 22, 2011, p. 69.
1245 Transcript, February 23, 2011, p. 29.
1246 Transcript, February 23, 2011, p. 92; see also Transcript, February 24, 2011, p. 18.
1247 Transcript, February 24, 2011, p. 23.
1248 Transcript, February 22, 2011, p. 27.
1249 Transcript, March 1, 2011, p. 25.
1250 Transcript, February 22, p. 25.
1251 Transcript, February 22, 2011, p. 29.
1252 Transcript, February 22, 2011, p. 29; Transcript, February 28, 2011, p. 32.
1253 Transcript, March 1, 2011, p. 20.
1254 Transcript, February 22, 2011, p. 27.
1255 Transcript, February 22, 2011, p. 28.
1256 Public submission 0255-BARKUSKY, available at www.cohencommission.ca.
1257 Public submission 0271-REZANSOFF, available at www.cohencommission.ca.
1258 Jeff Grout, Transcript, February 23, 2011, p. 37.
1259 Exhibit 466 (2003); Exhibit 467 (2006).
1260 Exhibit 465.
1261 Exhibit 466, p. 1.
1262 Exhibit 467, pp. 7, 10.
1263 Exhibit 461, p. 1; see also Jeff Grout, Transcript, February 23, 2011, pp. 33–35.
1264 Exhibit 465, p. 41.
1265 Jeff Grout, Transcript, February 23, 2011, p. 32.
1266 Peter Sakich, Transcript, February 22, 2011, p. 28.
1267 Exhibit 470.
1268 Exhibit 470, pp. 1–2.
1269 Exhibit 470, p. 4.
1270 Exhibit 470, pp. 4–5.
1271 Exhibit 470, pp. 5–6.
1272 Transcript, February 23, 2011, p. 49; Transcript February 24, 2011, p. 44.
1273 Jeff Grout, Transcript, February 23, 2011, p. 50.
1274 Transcript, September 22, 2011, pp. 69–70.
1275 Jeff Grout, Transcript, February 23, 2011, pp. 18, 51; see also Claire Dansereau, September 22, 2011, p. 69.
1276 Transcript, September 22, 2011, pp. 73–74.
1277 Written submissions of the Seafood Producers Association of B.C., p. 9, and of the Area D Salmon Gillnet Association and Area B Harvest Committee (Seine), p. 75, available at www.cohencommission.ca.
1278 Written submissions of the B.C. Wildlife Federation and of the B.C. Federation of Drift Fishers, pp. 34–35, available at www.cohencommission.ca.
1279 Area G's written submissions, pp. 71–72, available at www.cohencommission.ca.
1280 First Nations Coalition's written submissions, p. 309, available at www.cohencommission.ca.
1281 Stó:lō Tribal Council and Cheam Indian Band's written submissions, pp. 61-62, 101, available at www.cohencommission.ca.
1282 Canada's written submissions, p. 164; Conservation Coalition's written submissions, p. 12; First Nations Coalition's written submissions, p. 285, available at www.cohencommission.ca.
1283 Canada's written submissions, p. 164, available at www.cohencommission.ca.
1284 Conservation Coalition's written submissions, p. 12, available at www.cohencommission.ca.
1285 First Nations Coalition's written submissions, p. 285, available at www.cohencommission.ca.
1286 First Nations Coalition's written submissions, pp. 289–90, available at www.cohencommission.ca.
1287 Stó:lō Tribal Council and Cheam Indian Band's reply submissions, p. 21, available at www.cohencommission.ca.
1288 Written submissions of the Seafood Producers Association of B.C., pp. 8–9, 11, available at www.cohencommission.ca.
1289 Written submissions of the Area D Salmon Gillnet Association and Area B Harvest Committee (Seine), pp. 52–53, available at www.cohencommission.ca.
1290 Written submissions of the West Coast Trollers Area G Association and the United Fishermen and Allied Workers' Union, pp. 69–70, available at www.cohencommission.ca.
1291 Western Central Coast Salish First Nations' written submissions, p. 28, available at www.cohencommission.ca.
1292 Laich-kwil-tach Treaty Society's written submissions, pp. 10–12, available at www.cohencommission.ca.
1293 Exhibit 75, pp. 261–62.
1294 PPR 18, pp. 66–67.
1295 PPR 12, pp. 70–71.
1296 PPR 18, p. 64; Exhibit 264, p. 37.
1297 PPR 18, p. 65, Exhibit 264, p. 37.
1298 Kaarina McGivney, Transcript, August 19, 2011, p. 57; PPR 18, pp. 64–64.
1299 PPR 18, p. 70.
1300 PPR 18, p. 70.
1301 Exhibit 1423.
1302 Exhibit 1423, p. 2.
1303 Exhibit 1423, p. 2.
1304 Exhibit 1423, p. iv.
1305 Exhibit 1423, pp. 14–15.
1306 Exhibit 1423, p. 15.
1307 Exhibit 1333, p. 2.
1308 Exhibit 1333, p. 2.
1309 PPR 18, p. 90.

1310 PPR 18, pp. 70, 86; Paul Sprout, Transcript, March 4, 2011, p. 50.
1311 PPR 18, p. 86; Exhibit 1437, p. 24.
1312 Exhibit 1437, p. 24.
1313 PPR 18, pp. 86–87, 90.
1314 Transcript, December 16, 2010, p. 11.
1315 Transcript, September 22, 2011, p. 63.
1316 Transcript, August 19, 2011, pp. 12, 58.
1317 Transcript, January 21, 2011, p. 66.
1318 Exhibit 269, p. 27.
1319 Transcript, March 15, 2011, p. 58.
1320 Exhibit 1442.
1321 Transcript, August 19, 2011, p. 14; see also Exhibit 1422.
1322 Transcript, August 19, 2011, p. 13.
1323 Transcript, August 19, 2011, p. 13.
1324 Barry Rosenberger, Transcript, July 5, 2011, p. 18.
1325 Exhibit 1274, p. 7.
1326 Kaarina McGivney, Transcript, August 19, 2011, p. 15.
1327 Transcript, July 5, 2011, pp. 20–21.
1328 Jeff Grout, Transcript, February 23, 2011, pp. 31–32.
1329 Barry Rosenberger, Transcript, July 5, 2011, p. 65.
1330 Transcript, June 28, 2011, p. 66.
1331 Transcript, January 25, 2011, pp. 36–37.
1332 Jeff Grout, Transcript, January 25, 2011, p. 37.
1333 Transcript, September 2, 2011, p. 44.
1334 Transcript, August 19, 2011, pp. 17–18.
1335 Transcript, May 12, 2011, p. 21.
1336 Transcript, August 19, 2011, pp. 26–27.
1337 Transcript, September 22, 2011, p. 68.
1338 Transcript, September 22, 2011, pp. 68–69.
1339 Exhibit 294, p. 5.
1340 Exhibit 291, p. 5; Exhibit 292, p. 7.
1341 Transcript, September 22, 2011, pp. 65–66.
1342 Transcript, August 19, 2011, p. 18.
1343 Transcript, September 2, 2011, p. 48.
1344 Transcript, August 19, 2011, p. 26.
1345 Exhibit 1747, p. 8.
1346 Transcript, September 28, 2011, p. 57.
1347 Exhibit 1746, p. 13.
1348 Exhibit 1746, p. 22.
1349 Transcript, July 5, 2011, p. 66.
1350 Transcript, January 19, 2011, p. 15.
1351 Transcript, January 21, 2011, pp. 8–9.
1352 Exhibit 337; Jeff Grout, Transcript, January 21, 2011, pp. 24–25.
1353 Ken Wilson, Transcript, February 8, 2011, p. 93; Michael Staley, Transcript, February 8, 2011, p. 95.
1354 Jeff Grout, Transcript, January 21, 2011, p. 25.
1355 Transcript, January 21, 2011, p. 25.
1356 Jeff Grout, Transcript, January 21, 2011, p. 25.
1357 Transcript, September 22, 2011, p. 67.
1358 Transcript, April 15, 2011, p 5.
1359 Exhibit 718, p. 128.
1360 Exhibit 718, p. 139.
1361 Exhibit 718, p. 163.
1362 Karl English, Transcript, April 14, 2011, p. 76.
1363 Mike Lapointe, Transcript, January 19, 2011, p. 34.
1364 Transcript, February 21, 2011, pp. 65–66.
1365 Transcript, July 4, 2011, p. 74.
1366 Gordon Curry, Transcript, February 21, 2011, pp. 58, 104; Brent Hargreaves, Transcript, February 21, 2011, p. 65.
1367 Transcript, February 21, 2011, p. 106
1368 Transcript, September 28, 2011, p. 101.
1369 Transcript, February 9, 2011, p. 56.
1370 Transcript, September 27, 2011, pp. 33–34.
1371 Exhibit 291, pp. 1, 5.
1372 Exhibit 291, pp. 1, 5.
1373 Transcript, December 15, 2010, p. 16.
1374 Transcript, March 1, 2011, p. 64.
1375 Transcript, January 25, 2011, p. 39.
1376 Exhibit 1746, p. 6.
1377 Barry Rosenberger, Transcript, January 25, 2011, p. 38.
1378 Transcript, January 25, 2011, p. 38.
1379 Transcript, March 1, 2011, pp. 42–43.
1380 Transcript, January 25, 2011, p. 38.
1381 Transcript, March 1, 2011, p. 43.
1382 Scott Hinch, Transcript, March 8, 2011, p. 40.
1383 Exhibit 553, p. 41.
1384 Transcript, August 19, 2011, p. 17.
1385 Barry Rosenberger, Transcript, January 24, 2011, pp. 80–81; Julie Stewart, Transcript, August 19, 2011, p. 91.
1386 Transcript, April 15, 2011, p. 61.
1387 Exhibit 1423.
1388 Exhibit 1423, p. 3.
1389 Exhibit 1423, p. 1.
1390 Exhibit 1423, pp. iii, 4–5.
1391 Exhibit 1423, p. iii.
1392 Exhibit 1423, p. iv.
1393 Exhibit 1423; Kaarina McGivney, Transcript, August 19, 2011, p. 19.
1394 Bill Duncan, Transcript, March 1, 2011, p. 42; Gordon Curry, Transcript, February 21, 2011, pp. 65–66; Rob Morley, Transcript, March 1, 2011, p. 43.
1395 Transcript, March 1, 2011, p. 43.
1396 Exhibit 1989.
1397 Exhibit 1989, p. 2.
1398 Exhibit 1989, p. 18.
1399 Exhibit 1989, p. 17.
1400 Exhibit 1989, p. 19.
1401 Exhibit 1989, pp. 31–32.
1402 Transcript, July 4, 2011, p. 74.
1403 Exhibit 1261.
1404 Exhibit 1261, pp. 31–33.
1405 Transcript, July 4, 2011, p. 74.
1406 Transcript, September 28, 2011, p. 58.
1407 Transcript, August 19, 2011, pp. 18–19.
1408 Transcript, September 22, 2011, p. 65.
1409 Susan Farlinger, Transcript, September 22, 2011, pp. 63, 65; Kaarina McGivney, Transcript, August 19, 2011, p. 19.
1410 Exhibit 1424, p. 2.
1411 Exhibit 1424, pp. 2–3.
1412 Exhibit 1424, p. 19.
1413 Exhibit 1424, pp. 17–18.
1414 Exhibit 1424, p. 18.
1415 Transcript, August 19, 2011, p. 21.
1416 Transcript, July 5, 2011, pp. 15–16.
1417 Exhibit 1425.
1418 Exhibit 1425, p. 18.
1419 Exhibit 1425, pp. 17, 24.
1420 Exhibit 1425, pp. 20–21.
1421 Exhibit 1425, pp. 24–25.
1422 Exhibit 1425, pp. 16, 24.
1423 Exhibit 1425, p. 20.
1424 Exhibit 1425, p. 26.
1425 Exhibit 1425, p. 29.
1426 Transcript, August 19, 2011, p. 23.
1427 Transcript, September 2, 2011, p. 48.
1428 Kaarina McGivney, Transcript, August 19, 2011, p. 20.
1429 PPR 10, p. 20, Table 6.
1430 PPR 10, p. 9, Table 1.
1431 Transcript, January 21, 2011, pp. 29–30.
1432 Exhibit 315, p. 3; Mike Lapointe, Transcript, January 20, 2011, p. 34.
1433 Exhibit 1423, p. iii.
1434 Transcript, September 22, 2011, p. 69.