Policy and Practice Report

Fishery Monitoring and Catch Reporting for Commercial and Aboriginal Fraser River Sockeye Salmon Fisheries

March 17, 2011

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Introduction

1 This policy and practice report provides an overview of the Department of Fisheries and Oceans' ("DFO" or "the Department") policies and programs related to fishery monitoring and catch reporting for commercial and Aboriginal communal Fraser River sockeye salmon fisheries. The information contained in this report is derived from documents disclosed to the commission or otherwise obtained through the commission's investigations. The accuracy of this report is therefore subject to the accuracy of those documents. Descriptions of policy and program objectives, purposes, intentions, outcomes, reviews or any other qualitative assessments contained in this report are as provided in the documents cited and are not necessarily the views of the commission.

2 This report is not comprehensive of all DFO policies or programs related to fishery monitoring or catch reporting for commercial and Aboriginal communal fisheries. It is intended to provide a contextual background for the catch monitoring portion of the commission's hearings, scheduled for Spring 2011. Certain topics not covered in this report, but relevant to fishery monitoring and catch reporting, such as recreational catch monitoring, fishery licensing and fishing practices, are covered by other sections of the commission's hearings. For information on the recreational fishery, see the commission's policy and practice report entitled "Recreational Salmon Fishing: Licensing, Management and Related Issues." For commercial fisheries information, see the commission's policy and practice report entitled "Commercial Salmon Fishing: Licensing, Allocation, and Related Issues." For information on the Aboriginal fishery, see the commission's policy and practice report entitled "Department of Fisheries and Oceans Policies and Programs for Aboriginal Fishing."

3 The commission's Terms of Reference direct the Commissioner to use the automated documents management program specified by the Attorney General of Canada, the Ringtail Database. Source references in this report refer to the unique document identifier attached to a given document by the Ringtail

Database (such as CAN000059). To identify a document that has been referred to by its Ringtail identifier, see Appendix 2. Documents that have been disclosed to the commission but that have not yet been entered into the Ringtail Database are identified as "Non-Ringtail documents" and will be provided to participants to the inquiry directly.

Legal Framework

4 The legal framework guiding DFO fishery monitoring and catch reporting policies and programs stems from the *Fisheries Act* and associated regulations, international agreements and First Nations treaties. This policy and practice report highlights a selection of provisions from this legal framework but is not comprehensive.

Fisheries Act and Regulations

Fisheries Act (R.S., 1985, c. F-14)

5 The *Fisheries Act* authorizes the Governor in Council to make regulations for carrying out the purposes and provisions of the *Act*.[1] This general regulatory power broadly includes the ability to make regulations respecting fishery monitoring and catch reporting activities, such as the designation of fishery observers, incorporation of reporting requirements into terms and conditions of a licence, and the keeping and production of records, books of account and other documents.

6 To ensure compliance with these regulations, the *Fisheries Act* empowers fishery officers and fishery guardians with the authority to make inspections. In general, fishery officers or fishery guardians may enter and inspect any place (premises, vehicles, vessels) where the officer or guardian believes on reasonable grounds that there is any work, undertaking, fish or other thing covered by the *Act* and

[1] *Fisheries Act*, s. 43

regulations.[2] The fishery officer or guardian may also open any container believed on reasonable grounds to contain fish, may examine any fish or other thing found, and may require any person to produce records, books, accounts or other documents that may reasonably contain information relevant to the administration of the *Act* or regulations.[3] Fishery officers and guardians must be designated as such. Catch monitors who are not designated as fishery officers or guardians are not similarly authorized to carry out inspections.

Fishery (General) Regulations (SOR/93-53)

7 The *Fishery (General) Regulations* contain a number of provisions that relate to fishery monitoring and catch reporting. For example, s. 22(1) authorizes DFO to set licence conditions for the proper management and control of fisheries and for the conservation and protection of fish. Such licence conditions may include, *inter alia*, requirements on a licence holder to report to the Department, including details as to what information is to be reported and when. Licences may also require verification of fish caught by observers, particular landing methods, record keeping, fish transport restrictions, identification or marking of fish and segregation of fish, among other things.

8 The *Fishery (General) Regulations* also authorize the Regional Director General to designate fishery observers, who may be responsible for monitoring fishing activities, recording data, taking samples, monitoring fish landings, verifying weight and species of fish caught and so on.[4] Vessel masters are required to assist these observers in their fishery monitoring activities, including, *inter alia*, allowing observers onto their boats, providing information and providing workspace of storage facilities for sampling.[5]

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[2] *Fisheries Act*, s. 49(1). One limit on the powers of inspection is that a fishery officer or guardian may not enter a "dwelling house without the consent of the occupant except under the authority of a warrant issued under subsection (3)."
[3] *Fisheries Act*, s. 49(1)(a) to (c).
[4] *Fishery (General) Regulations*, s. 39.
[5] *Fishery (General) Regulations*, s. 46.

Aboriginal Communal Fishing Licences Regulations (SOR/93-332)

9 The *Aboriginal Communal Fishing Licences Regulations* ("ACFLR") provide a licensing mechanism for Aboriginal communal fisheries, whether to access fish for food, social or ceremonial purposes, or for economic purposes under the economic opportunity (formerly "pilot sales") fisheries as part of the Aboriginal Fisheries Strategy.[6] Under the ACFLR, the Minister may specify licence conditions that are substantially the same as those provided for under the *Fishery (General) Regulations.*[7] In practice, however, the fishery monitoring and reporting requirements appear to vary between commercial and Aboriginal communal fisheries, and among Aboriginal communal fisheries by gear and location.

International Agreements

10 Please refer to the commission's policy and practice report entitled "International Law Relevant to the Conservation and Management of Fraser River Sockeye Salmon" for a fuller discussion of relevant international law instruments.

11 Several international agreements inform Canada's obligations in respect of fishery monitoring and catch reporting. For example, the 1992 *Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean,* entered into by Canada, the United States of America, Japan, South Korea and China, creates an enforcement scheme that monitors and addresses illegal fishing in a "Convention Area" roughly covering a portion of the North Pacific ocean.

12 International agreements also provide fishery monitoring and catch reporting direction applicable to domestic waters. For example, Canada contributed to the development of the UN Food and Agricultural Organization's 1995 Code of Conduct for Responsible Fishing and in 1998 introduced the Canadian Code of

[6] CAN000059 at p. 2
[7] *ACFLR,* s. 5

Conduct for Responsible Fishing Operations.[8] Guideline 4.1 of the Code states Canada's commitment to do as follows:

> *Where appropriate, establish, in consultation with relevant regulatory agencies and industry groups, effective monitoring systems to monitor and evaluate the adherence to sustainable development principles and practices.*

13 Another example of Canada's international obligations is found in the 1985 *Pacific Salmon Treaty,* as amended.[9] Under this agreement, the parties (Canada and the United States of America) consider it necessary to develop a coast-wide stock assessment and management data system,[10] and committed, *inter alia*, to exchange in-season management and assessment information, which includes catch and catch per unit effort data.[11] The parties also agreed to share post-season statistical information regarding Fraser River sockeye catches by time, area, species and gear type.[12]

First Nations Treaties

14 Modern treaties formed between Canada and First Nations governments may also contain fishery monitoring and catch reporting provisions. Generally, these provisions describe requirements on the part of the First Nation signatory to perform monitoring and reporting activities.

15 The Tsawwassen First Nation Final Agreement, which came into effect on April 3, 2009, is currently the only modern treaty applicable to the management of Fraser River sockeye salmon. Under this treaty, the Tsawwassen First Nation assumes fishery monitoring and catch reporting responsibilities as follows:

- providing catch data and other information related to fish and aquatic plants harvested under the Tsawwassen Fishing Right (as defined in the treaty)

[8] http://www.dfo-mpo.gc.ca/fm-gp/policies-politiques/cccrfo-cccppr-eng.htm
[9] http://www.psc.org/publications_psctreaty.htm
[10] *Pacific Salmon Treaty,* Appendix 2, Memorandum of Understanding, Data Sharing.
[11] *Pacific Salmon Treaty,* Appendix to Annex IV, Chapter 2, s. 2(b)
[12] *Pacific Salmon Treaty,* Diplomatic Note of August 13, 1985 regarding implementation of Article XV (paragraph 3) of the *Pacific Salmon Treaty* at Part D, Para. 1(c), (d).

required by the Tsawwassen Harvest Document (similar to a licence), or under federal or provincial law;[13] and

- developing a Tsawwassen Annual Fishing Plan that includes, *inter alia*, preferences as to the monitoring of harvests, notifications and identification and reporting of harvest.[14]

16 The Tsawwassen Fisheries Operational Guidelines[15] which accompany the Tsawwassen First Nation Final Agreement and are developed jointly with Canada, set out detailed fishery monitoring and reporting requirements. These are described further in the section of this policy and practice report on Aboriginal communal fisheries.

Fishery Monitoring and Catch Reporting Basics

Purpose

17 According to DFO and the Integrated Salmon Dialogue Forum's ("ISDF") Monitoring and Compliance Panel, the goal of fisheries monitoring and catch reporting is "to have accessible, accurate and timely fisheries information, such that there is sufficient information and public confidence for fisheries to be managed sustainably and to meet other reporting obligations and objectives."[16] In order to manage fisheries, information on fishing effort and catch levels is essential, and according to DFO, "catch monitoring is one of the key functions of fisheries management."[17]

18 A broad range of people rely on fishery monitoring and catch reporting data. Resource managers require catch and effort data (such as the quantity, timing, species, stock and location of catch and by-catch, and the number of vessels and types of gear used) to make in-season management decisions on a week by week basis.[18] These decisions include fishery openings and closings, and

[13] *Tsawwassen First Nation Final Agreement*, Chapter 9, s. 22.
[14] *Tsawwassen First Nation Final Agreement,* Chapter 9, s. 65-66.
[15] CAN070649
[16] CAN022443 at p. 1
[17] CNA077022 at p. 3. See also CAN285083 at p. 5.
[18] See Cohen Commission, Exhibit 330 at p. 194 for a sample Fraser River Sockeye In-season Status report used by fisheries managers to determine appropriate openings and closings.

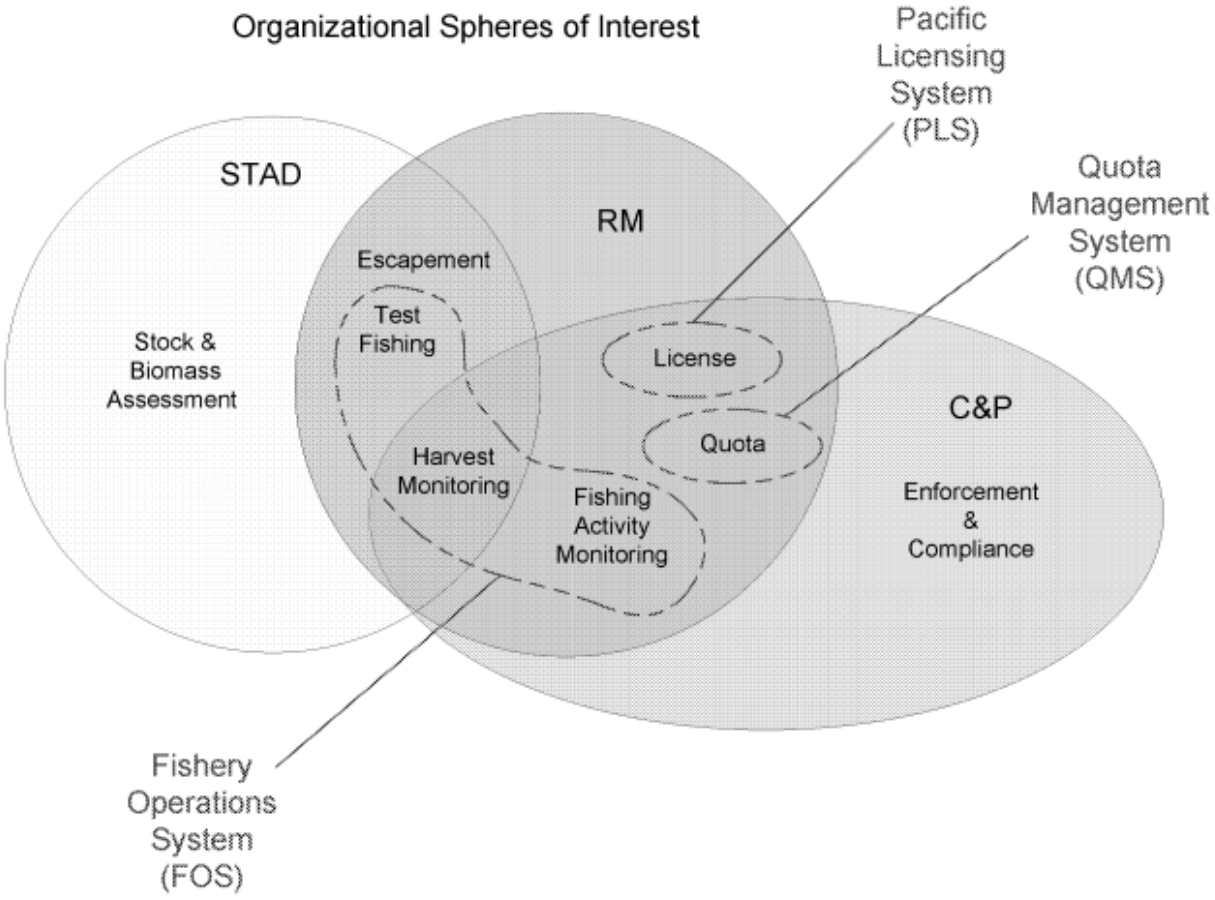
therefore require current and accurate information. Resource managers also use catch and effort information for pre-season planning and post-season evaluations.[19]

19 Scientists need data on fishing mortality and various biological characteristics (such as sex, age, size of fish) to support their stock assessment activities and research.[20] Fishery officers require catch and other data for carrying out compliance and enforcement with respect to catch and by-catch limits, gear restrictions, area closures, seasonal restrictions and other regulations and licence conditions.[21] Government planners and policymakers use fisheries information for socioeconomic analyses and administration of programs. They may also be required to provide information to others, for example to satisfy reporting provisions of domestic and international treaties.[22] Fishers may rely on catch information to plan their fishing activities, and Aboriginal communities may rely on it to plan their communal fisheries and ensure that food, social and ceremonial needs are meet.

20 The following diagram illustrates the overlapping fields of interest for fisheries monitoring and catch reporting within DFO. This diagram shows how stock assessment (STAD), conservation and protection (C&P) and resource managers (RM) are all engaged in and partially accountable for this management function.

[19] CAN285064 at p. 8
[20] CAN285064 at p. 8
[21] CAN285064 at p. 8
[22] CAN285064 at p. 8

Figure 1: Organizational Spheres of Interest for Stock Assessment, Resource Management and Conservation and Protection regarding Fishery Monitoring and Catch Reporting Related Activities[23]



21 Under monitoring and under reporting of fisheries carries significant risks, not least of which being the conservation concerns associated with the over-harvesting of fish. Poor stock assessment, management uncertainty, risks to fishing opportunities, unsustainable fisheries, loss of access to certain markets, loss of public confidence and inability to meet reporting requirements under international and domestic treaties are also possible concerns.[24]

[23] CAN170369 at p. 28
[24] CAN285158 at p. 7

Introduction to Basic Fishery Monitoring and Catch Reporting Concepts

What is fishery monitoring and catch reporting?

22 According to DFO, "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, including the counting of fishing vessels or gear and the sampling of any fish caught. Fishery monitoring is generally carried out by someone other than the harvester, such as contracted service providers, fishery officers, Aboriginal fishery guardians, catch monitors, resource managers or scientists.[25] However, information from harvesters may be required to facilitate monitoring activities.[26] Some of the questions asked in fisheries monitoring may include: who fished and under what authorization, how did they fish (what gear type, mesh size and number of traps), when did the fishing occur, where did the fishing occur, what animals were encountered (catch and by-catch)?[27]

23 Catch reporting, on the other hand, involves making collected information available to those who generate the catch estimate for the fishery.[28] It means providing information either verbally, in writing or electronically on the catch and on other essential details related to the fishing activity, as required.[29] Catch reporting is performed by harvesters or fish buyers, off-loaders or contracted third party dockside monitors or observers.[30]

What information is required?

24 According to DFO and the ISDF Monitoring and Compliance Panel, information requirements for a given fishery may vary depending on the degree of conservation risks involved and the particular fishing practices used.[31] Around

[25] CAN285158 at p. 4
[26] CAN184729 at p. 2 and CAN285064 at p. 3
[27] CAN077022 at p. 5-6
[28] CAN077022 at p. 5
[29] CAN265064 at p. 3
[30] CAN265064 at p. 3 and CAN285158 at p. 5
[31] CNA077022 and CAN285083

2009, DFO and the ISDF began to work on developing a set of criteria that could be consistently applied in evaluating the information requirements of a given fishery. With these criteria, fisheries could be categorized as requiring moderate, enhanced or low (basic) levels of monitoring. The default category would be moderate, with some fisheries raised to enhanced or lowered to low (basic) reporting based on their information needs.[32] In determining what level of monitoring is required, however, the first priority would be to ensure the level of catch and by-catch reporting that is required to address conservation risks.[33]

25 According to DFO, the following factors may support a low (basic) level of monitoring:[34]

- Conservation risks are low
- Abundance level of target stock is stable with no recent indications of a significant downward trend
- Failure to achieve management plans as developed anticipate no known jeopardy to conservation objectives
- Conservation goals are expected to be achieved (the calculated uncertainty associated with fishery impacts pose acceptable levels of risks to management objectives)
- Fisheries take place in areas and times where there is confidence that harvestable surpluses exist and anticipated by-catch impacts are negligible
- The biological sampling strategy enables basic stock assessment capabilities to evaluate the health of the stocks (no requirement for additional biological sampling)
- Ecosystem or habitat impacts are anticipated to be benign
- Catch and effort reporting is known to be reliable
- Catch data is not required to manage specific quotas or defined shares

[32] CAN077022 at p. 14
[33] CAN077022 at p. 14
[34] CAN273530

26 An example of a fishery monitored at the low (basic) level includes a small recreational intertidal clam fishery that has no significant ecosystem impacts and does not interfere with a food, social and ceremonial fishery.[35]

27 According to DFO, the following factors may support a moderate level of monitoring:[36]

- Conservation risks are moderate, but manageable
- The abundance level of the target stock is reasonably stable but may have some recent indications of a downward trend
- There is an incidental or by-catch impact on a species that is demonstrating some recent downward trends
- Failure to achieve management plans as developed could pose a moderate risk to conservation objectives for either the target species or the incidental harvest or by-catch species
- There is an adaptive management plan comparing the in-season fishery performance to pre-season models of expected catches as the basis for management decisions
- Fishery impacts are relatively predictable in terms of known effort and potential harvest
- Reasonably reliable catch reporting has been demonstrated in recent years
- Catch data is not required for managing quotas and/or defined shares

28 As an example, most of the Aboriginal food, social and ceremonial fisheries would fall under the moderate monitoring category, where the fishing activity is known and reasonably predictable.[37]

[35] CAN285064 at p. 15
[36] CAN273530
[37] CAN285064 at p. 15

29 According to DFO, the following factors may support an enhanced level of monitoring:[38]

- Conservation risks are high
- The target stock has demonstrated recent trends approaching or below minimum conservation objectives (target reference point)
- There is a likelihood of an incidental or by-catch impact on a species that is in or trending towards the red zone
- Failure to achieve management plans as developed could pose a significant risk to conservation objectives for either the target species or the incidental harvest or by-catch species
- Harvest opportunities and subsequent fisheries need to be based on high quality effort and catch data
- Target stock is used as indicator or index stock
- Fishery requires tracking of quota and/or defined shares
- Quality data is required for eco-certification
- The fishery is a mark retention fishery

30 Fisheries operating under a share-based or individual quota system would require enhanced monitoring.[39]

How frequently should the information be reported?

31 As set out in DFO's 2003 Commercial Salmon Fishery Monitoring and Catch Reporting Consultation Document,[40] catch reports need not all be submitted with the same frequency. The timeliness of information will vary depending on the characteristics of the fishery.

32 Some fisheries may need to report in real time. This may include fisheries that are coming close to conservation limits or for which there are allocation arrangements for sectors and gears. This is especially so where fishing effort is

[38] CAN273530
[39] CAN285064 at p. 15
[40] CAN282389 at p. 7

high in relation to allowable catches or where catches include species or stocks of significant conservation concern. Fisheries managers will require real-time, or near real-time information in order to consider the possibility for openings or closings on a short-notice basis.[41]

33 Other fisheries do not require real time reporting, and may suffice with reports submitted at specified times. Such fisheries may include those where ongoing catch and fishing effort is low in relation to known conservation limits for target species, and where by-catch is low or does not significantly affect stocks of significant conservation concern. Rather, daily reporting or even trip reporting may be adequate for management purposes. In general, specified time reporting is appropriate where tight controls over fishing activity are unnecessary because the level of conservation concern is lower. [42]

34 In some fisheries, reporting at the end of the season may be sufficient. End-of-season reporting of catch and effort is generally inadequate to meet the needs of a commercial salmon fishery. However, annual reporting of other harvest-related information, such as annual landed value, may suffice.[43]

How should information be gathered?

35 An overview of selected fishery monitoring and reporting tools is set out in the following section of this policy and practice report. However, a few of the overarching concepts are described here.

36 Fisheries managers may need to decide whether to rely on fisher dependent or fisher independent methods of monitoring or reporting. Fisher dependent systems require individual or groups of harvesters to monitor and report their catch. This requires positive engagement by fishers, adequate training and appropriate reporting technologies, but can be a cost effective method of gathering information for DFO. Examples of fisher dependent activities include

[41] CAN282389 at p. 7
[42] CAN282389 at p. 7
[43] CAN282389 at p. 7

the completion of sales slips and logbooks, phoning in catch, responding to surveys, and fisher-collected biological samples.[44] Fisher dependent reporting may not always be accepted by the public, resource managers, or other harvest sectors. In some cases there may be a perceived conflict of interests involved with reporting one's own catch. However, these concerns may be reduced using independent verification of catch for some fisheries.[45]

37 Fisher independent methods of fishery monitoring and catch reporting may be appropriate where there are conservation risks, defined share fisheries, or other circumstances that demand greater objectivity and certainty of information.[46] Fisher independent activities may include aerial overflights, charter patrols to count gear and vessels, on-board observers, camera systems (video monitoring), mandatory landing sites, dockside monitoring programs and post-season surveys.[47] These activities typically involve fishery officers, managers, guardians, catch monitors, scientists or designated observers,[48] and may be costly depending on the method used.[49]

38 Fisheries managers may also need to decide whether to operate a census or survey-based monitoring program. A census program involves collecting information from every fisher in order to determine total catch. Information on the amount of effort expended to achieve that catch is not necessarily required in a census count, and because it is assumed that all fishers have been contacted, the reported numbers are typically not expanded in any way.[50] If a fisher's catch was missed, then it will not be included in the final calculation of catch. In previous reports it has been suggested that a census program may be appropriate for obtaining total catch numbers where fishing sites are isolated or access to the fishery is controlled. However, it may not be appropriate in respect

[44] CAN285064 at p. 17
[45] CAN077022 at p. 6
[46] CAN285158 at p. 9
[47] CAN285064 at p. 17
[48] CAN285158 at p. 9
[49] CAN285158 at p. 9
[50] CAN285158 at p. 10

of fishing in vast remote areas or where fishers do not comply with catch reporting requirements.[51]

39 A survey program measures a representative fraction of the fishery as a sample upon which a total catch estimate is produced. The calculation involves measuring the number of fish caught per unit of effort expended (for example, two fish per net hour)[52] and multiplying that with a measure of the total effort that has been expended (for example, four net hours).[53] In this example, the total catch would be eight fish. Because a survey program does not collect information from every fisher, an expansion factor may be applied to account for those fishers who were not counted directly.[54] An advantage of a survey approach is that costs may be reduced in comparison to a census. Disadvantages are that surveys require greater technical expertise in performing calculations of catch per unit effort and total effort, and because a representative fraction of the fishery is relied upon, the system is vulnerable to bias.[55]

Overview of Selected Fishery Monitoring and Catch Reporting Tools

40 The following summarizes a selection of fishery monitoring and catch reporting tools discussed in this policy and practice report. This list is not comprehensive.

[51] CAN046940 at p. 5
[52] Meaning two fish caught in every hour that a net is being used. Also called the "CPUE".
[53] Meaning the total number of hours that nets were in the water, for example, one net in the water for four hours, or two nets in the water for two hours each, etc.
[54] CAN285158 at p. 10
[55] CAN046940 at p. 5

Aerial overflights

41 Fixed wing aircraft or helicopter overflights are used to count the number of vessels or nets participating in a fishery.[56] This information provides an instantaneous effort count only, and must be corroborated by actual catch information obtained through hails or phone-in catch reports.[57] Information from aerial overflights may be used to expand catch estimates, if flights suggest that not all fishers reported their catch.[58] Also, aerial overflights provide timely information that can support enforcement activities. However, they are weather dependent, can be expensive, and provide a snapshot of effort information only.[59]

Biological Sampling

42 Trained biological samplers may be located at landing sites to collect information on the fishery. This information may include fish length, weight, sex, maturity, age structures, scales and tissues for genetic analysis. Together with data on the area of capture, biological samples may assist fisheries managers in defining stock structures, sizes and health. Where an on-board observer program (described below) is in place, sampling may also be performed at sea.[60] Scale and DNA samples are typically sent to the Pacific Salmon Commission for processing.

Charter Patrols

43 Charter patrols vessels are contracted for finite periods of time to observe, record and report on fishing activity. In some salmon fisheries, charter patrols provide information from on-ground hails and provide gear counts as either in-season

[56] CAN047791 at p. 3
[57] CAN184756
[58] CAN047791 at p. 3
[59] CAN184756
[60] CAN184756

supplements or alternatives to other monitoring methods.[61] Charter patrols may have the added benefit of promoting compliance in remote areas, and can provide timely estimates of catch. However, charter patrols may be expensive, will typically not involve validation of catch numbers, and may not cover the entire fishing fleet, potentially resulting in catch estimates of uncertain precision or accuracy.[62]

Creel Surveys

44 Creel surveys involve interviews and in some cases, inspections of individual catches. Different approaches are used to conduct creel surveys, including roving surveys (conducted by mobile surveyors on the water) and access point surveys (conducted by surveyors stationed at a fixed point such as a boat ramp or marina). Hybrid surveys combine these two methods in the same survey. In some cases, creel surveys are complemented with aerial overflights to collect data on fishing effort. Creel surveys are used for recreational fishery and a similar survey-based monitoring program is used for certain Aboriginal communal fisheries. They can be fairly effective in identifying catch but are reliant on adequate funding for complement sampling and effort monitoring.[63] As described above, surveys rely on a representative sample to estimate total catch, and are therefore susceptible to bias. In addition, interview-based counts may be subject to the accuracy of information that is told to creel surveyors.

Dockside Monitoring Program

45 This is a third-party catch verification program run by an arms-length company [64] that is typically hired by the commercial fishing industry. Dockside monitors are stationed on packing vessels or at shore-based plant sites throughout a fishing area.[65] They are to randomly select a given percentage of fishers for catch

[61] CAN184756
[62] CAN184756
[63] CAN184756
[64] CAN285158 at p. 218
[65] CAN285158 at p. 218

validation (counting). For additional details, a National Dockside Monitoring Program Policy and Procedures book describes the detailed procedures for dockside monitoring and the requirements for dockside monitoring companies.[66] Dockside monitoring programs can provide timely catch information and opportunities for biological sampling. However, they do not provide information on fishing effort or released fish. Dockside monitoring programs may also be expensive, and in some cases may not be convenient where fishing occurs over a wide geographic range and where fish are landed within short periods of time at limited landing sites.[67]

Electronic Transponders / Vessel Monitoring Systems (VMS)

46 Electronic transponders and other forms of electronic information distribution are still in experimental stages of development. These systems may entail the use of an aerial receiver/transmitter and a hand-held computer (e.g. palm pilot). Vessel Monitoring System (VMS) software is installed in the palm pilot and linked with GPS technology. The GPS function may be used to track vessel fishing locations. The vessel's position is relayed to DFO via satellite on a predetermined schedule. Other types of data (catch, biological, effort, etc.) can also be tracked and relayed to DFO to support logbook and sales slip reporting compliance.

Fish Slips

47 The fish slip program was implemented in 1951 to cover a large portion of the commercial fishing fleet for in-season and post-season catch data.[68] Historically, fish slips were the principal means for capturing information on commercial fish landings, and are required under both federal and provincial law. These forms are filled out at the time that commercial fishers offload their harvests, whether the fish are sold, kept for personal consumption or disposed of otherwise. The information to be recorded includes the commercial buyer, the date, the catching

[66] CAN017655
[67] CAN184756
[68] CAN047791 at p. 4

vessel, statistical area of the catch, number of days fished, gear type, catch in numbers and weight by species, the price per pound and overall value of the catch. Fish slips are to be completed and submitted to DFO within seven days of landing fish.[69] Fish slip information is then entered into the PacHarv3 database, as described in the "Information Management" section of this policy and practice report.

48 Note that fish slips do not account for fish released or discarded at sea. Also, the time that it takes for gathering and processing fish slip information makes this system insufficient for in-season use in intensively managed fisheries, like salmon.[70] In addition, as more fishers market their own products directly to consumers or small commercial buyers, it becomes increasingly difficult to enforce compliance with the fish slip system. According to some, there are "variable but growing amounts of unreported catch missing from the fish slip system."[71]

Hails

49 Hail counts are typically verbal reports by fishers of fishing intentions, effort and catch information that are provided to charter patrol vessels, Aboriginal fishery monitors, DFO fishery monitors or contracted service providers. Hails are typically phoned in, or collected during patrol interviews. This information can be used for mid-opening catch estimates, or to verify reported catch following the close of the fishery.[72] Hails provide timely information and allow for estimates of total catch prior to landing. However, accuracy depends on the fisher's cooperation and ability to estimate catch numbers. There may be incentives for inaccurate reporting where fisheries are closed following reports of by-catch of at-risk species[73] or where catch is allocated in a share-based manner.

[69] CAN047791 at p. 4
[70] CAN184729 at p. 6
[71] CAN184729 at p. 6
[72] CAN285372 at p. 440
[73] CAN184756

Logbooks

50 Where a logbook program is in place, each fisher is required to record their catch in a logbook purchased from a particular logbook manufacturer, and, for many salmon fisheries, to deliver their logbook to a contracted service provider by January 31 of the year following the fishery.[74] Information from logbooks is not used for in-season management purposes. Rather, the primary purpose of the logbook program is to provide an alternate catch estimate for caught and released catch.[75] The logbook program is 100% industry funded and is therefore very cost effective for DFO.[76] However, it is difficult to verify logbook data, the data is not received in-season, and some fishers may forget to submit their logbooks.[77] The accuracy of logbook information depends on fisher cooperation and ability to estimate catch.[78]

51 Electronic logbooks or "eLogs" are also available in some fisheries. An eLog is a computer application approved by DFO that captures catch and other fishery-related information in an electronic format.[79] The vessel master enters his or her catch information into an on-board computer, and this data is then transmitted via cell phone or satellite modem from sea, directly to DFO's Fishery Operations System (FOS) database.[80] Where eLogs are used, no paper logbook is required. Currently, the eLog program is being piloted in a handful of fisheries, including the Area E salmon gillnet fishery.[81]

Mandatory Landing Sites

52 A mandatory landing site program requires every vessel to report to a designated landing site (land based, or packer) at the conclusion of each opening.[82] After

[74] CAN285158 at p. 220
[75] CAN047791 at p. 3
[76] CAN282909 at p. 4
[77] CAN285053 at p. 18
[78] CAN184756
[79] CAN143056 at p. 2
[80] CAN047791 at p. 4
[81] CAN065903 at p. 4
[82] CAN047791 at p. 2

reporting to the landing site coordinator and answering a series of questions on fisher and vessel identification, catch and effort, each vessel master is issued a sticker or unique identifier to affix to his or her logbook.[83] Landing site coordinators may also create landing slips, or other reports which are then submitted to DFO.[84] In some cases a mandatory landing site requirement may be coupled with a dockside monitoring program.

On-board Observers

53 A limited number of independent observers are placed on board fishing vessels to observe catch and, particularly, by-catch and fish releases.[85] This program is not broadly applied to the commercial salmon fishery,[86] but where used, can allow for very detailed and accurate in-season data[87] including information about location, gear, by-catch, releases and biological sampling.[88] However, the program is costly, and therefore cannot cover a large proportion of the fleet. In addition, the presence of on-board observers may affect the behaviour of fishermen, therefore creating catch bias. There are also logistical limitations associated with placing observers on smaller boats.[89]

Video Surveillance

54 Basic trials using video cameras have taken place within the commercial salmon fishery, with the intention that video monitoring may provide for some of the functions of on-board observers without the need for on-board observers to be physically present. However, video surveillance programs may be limited by high initial costs for setting up the video system and the challenges to ascertaining volumes of catch and identification of species via video recording.[90]

[83] CAN047791 at p. 2
[84] CAN184756
[85] CAN285372 at p. 440
[86] CAN130453
[87] CAN285053 at p. 3
[88] CAN184756
[89] CAN285053 at p. 19
[90] CAN184756

Chronology of Selected Policies, Programs and Reviews for Fishery Monitoring and Catch Reporting

Context: Transition from Unmonitored to Increasingly Monitored Fisheries

55 Although Aboriginal traditional knowledge may describe the volume of fish observed and harvested in the past, monitoring and reporting of fish under federal management systems is relatively new. Nineteenth century fishery managers did not monitor or require reporting of catch because fisheries then were based on the belief that harvests would not limit future abundance.[91] With industrialization, however, catch became recorded in economic terms (barrels and pounds), and as the industry grew, managers began to accept the finite nature of the resource. Regulation increased and catch reporting in economic units became formalized and shared with federal managers through the introduction of commercial fish slips in 1951.[92]

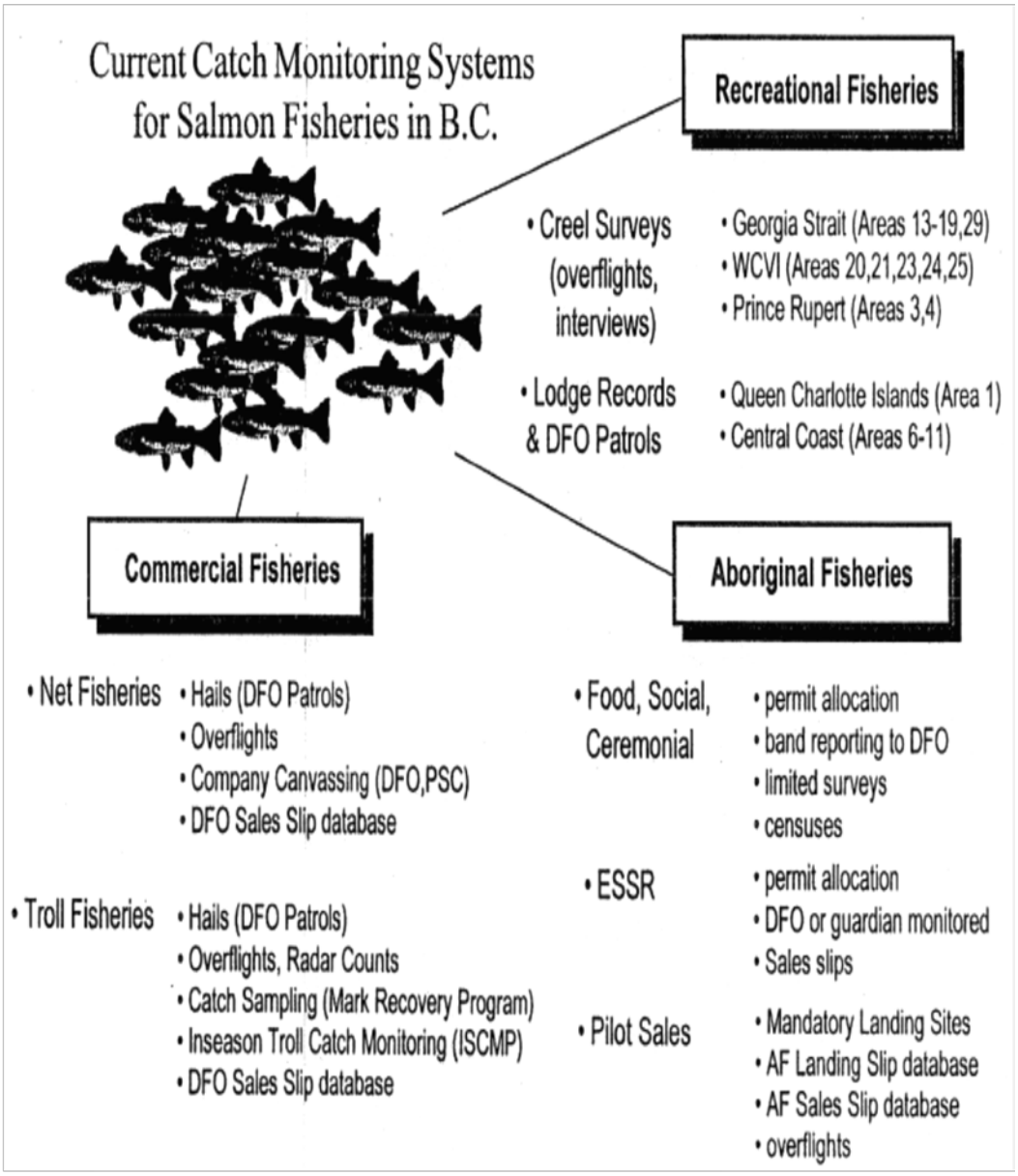
56 Eventually, with increasing understanding of stock dynamics and the linkage between productivity and harvests, fishery monitoring and catch reporting assumed greater importance. In addition, the signing of international and First Nations treaties, emergence of precautionary management concepts, moves towards defined share and quota fisheries, and traceability requirements for eco-certification and access to export markets have all highlighted the importance of fishery monitoring and catch reporting.[93] As described above, DFO's current goal for fisheries monitoring and catch reporting is "to have accessible, accurate and timely fisheries information, such that there is sufficient information and public confidence for fisheries to be managed sustainably and to meet other reporting obligations and objectives."[94]

57 This policy and practice report highlights various policies, programs and reviews of DFO fishery monitoring and catch reporting practices over the past decade. To set a background, the following figure illustrates the then-current catch

[91] CAN077022 at p. 3
[92] CAN285053 at p. 3
[93] CAN077022 at p. 4
[94] CAN022443 at p. 1

monitoring systems for salmon fisheries in place in 1996. In the commercial fisheries, hails, overflights, and sales slips were the primary means for monitoring. In Aboriginal food, social and ceremonial fisheries, permits, band reports, limited surveys and census data was used, whereas mandatory landing sites, sales slips and overflights were used for the pilot sales fishery.

Figure 2: Catch Monitoring Systems for Salmon Fisheries in BC as of March 1996[95]



[95] CAN000283 at p. 5

2000: DFO Catch Monitoring Discussion Paper

58 In March 2000, a Pacific Region catch monitoring advisor prepared a "Catch Monitoring Discussion Paper"[96] which noted that in the Pacific Region, "most fisheries have some form of catch reporting, but the catch monitoring and reporting standards are inconsistent and the timeliness and accuracy of catch reporting is variable amongst fisheries."[97] This discussion paper identified seven principles for catch monitoring as follows:

- Principle 1 – Timely and accurate catch monitoring and reporting information is the cornerstone of precautionary fisheries management; it is essential to achieve conservation and sustainable fisheries.
- Principle 2 – All fisheries will have catch monitoring and reporting programs appropriate for conservation and proper management and control.
- Principle 3 – The department will work with fishery harvest groups to bring all catch monitoring and reporting programs up to an acceptable standard. Standards will vary by fishery but all fisheries will need to meet minimum standards.
- Principle 4 – Harvesting groups will be accountable for the provision of catch data to acceptable and mutually agreed upon standards.
- Principle 5 – Catch monitoring and reporting requirements are a necessity of conducting fishing activities. The Department will place a strong priority on achieving compliance with catch monitoring and reporting regulations.
- Principle 6 – Catch monitoring and reporting costs will be progressively assumed by fish harvesters by 2002.
- Principle 7 – First Nations will be consulted to review and co-operatively plan catch monitoring and reporting arrangements for their fisheries and to implement programs by 2002. Where a treaty exists with a First Nation, catch monitoring and reporting arrangements will be consistent with the provisions of the treaty.

59 This 2000 Catch Monitoring Discussion Paper then proposed a minimum catch monitoring standard to apply generally, with the understanding that different standards may apply to a given fishery depending on stock assessment and

[96] CAN001689
[97] CAN001689 at p. 1

management frameworks for that fishery. This minimum standard included monthly reports for numbers, weights and locations of target and non-target fish landed and released, monthly reports of fishing effort, and published annual reports of all licensed fisheries.[98]

2002: DFO Pacific Regional Fishery Monitoring and Reporting Framework

60 In 2002, a new DFO "Pacific Regional Fishery Monitoring and Reporting Framework"[99] was released. This 2002 Framework was intended to facilitate a review by DFO, in cooperation with First Nations and stakeholders, of fishery monitoring and catch reporting systems in the Pacific Region.

61 The 2002 Framework also sets out seven principles, which, though similar, are different from those articulated in the 2000 Catch Monitoring Discussion Paper. The principles in the 2002 Framework are as follows:

- 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.

[98] CAN001689 at p. 7
[99] CAN184729

- 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.*

62 The 2002 Framework proposed a series of consultations with First Nations, recreational and commercial advisory groups on issues related to monitoring and reporting. These included cross-sectoral forums in 2003 to discuss: (1) minimum fishery monitoring and reporting standards, programs and regulations for each fishery; (2) schedules and action plans for changes; and (3) self-funding plans for fishery monitoring and reporting for recreational and commercial fisheries.

63 Overall accountability for the 2002 Framework resided jointly with four members of a Fishery Monitoring and Catch Reporting Steering Committee reporting to the Regional Director General and including representatives from Stock Assessment, Fisheries Management, Information Management and an Area Director.[100] According to DFO, the 2002 Framework was generally well received from all harvesting groups[101] and it "established a policy foundation for improvements" in fishery monitoring and catch reporting.[102]

2004: Revisiting the 2002 Framework

64 According to one DFO employee, the 2002 Framework soon "went off the radar screen" and "not much happened with it."[103]

65 In 2004, the Regional Management Committee ("RMC") seems to have agreed, noting the "significant lack of progress on this file."[104] At that time, the RMC revisited the 2002 Framework and proposed a review and update to the terms of reference, roles and responsibilities for the Fishery Monitoring and Catch

[100] CAN209610 at p. 2
[101] CAN004920
[102] CAN005671 at p. 1
[103] CAN007400 at p. 4
[104] CAN063122 at p. 2

Reporting Steering Committee. The Regional Management Committee questioned who should have the lead in organizational changes related to fishery monitoring and catch reporting and agreed that an action plan should be developed.[105]

66 In 2004, however, DFO viewed its fishery monitoring and catch reporting activities to be adequate. A 2004 Catch Monitoring Program Post Season Review states the following:

> *It is the Department's view that the catch estimates provide adequate information on the harvest by First Nations, commercial and recreational fisheries required for the management of fisheries.*[106]

67 Around the same time, the Salmon Working Group was developing justifications for not monitoring the fishery, and drafted a document entitled "When is it Acceptable to not Monitor a Fishery?"[107] This document notes that although the first principle in the 2002 Framework was that all fisheries must have fishery monitoring and catch reporting programs, "the current reality in the Pacific Region is that not all fisheries, or strata within fisheries, are monitored."[108] At the time, instead of spreading resources thinly to provide complete monitoring coverage for all fisheries, it was decided that certain fisheries would not be monitored so that others could be monitored more rigorously.

68 DFO articulated two justifications for not monitoring a given fishery as follows:

1. "Fishery small enough that no estimates required" – If there is good evidence that a fishery will result in insignificant impact on stocks requiring catch estimation, then fishery monitoring is unnecessary. This is generally applied when a fishery is relatively expensive to monitor, but is deemed, based on best information available, to have small impacts spread over a large area and time.[109]

2. "Indirect methods of generating estimates are available" – Where indirect methods that rely on an assumed relationship between an unmonitored

[105] CAN063122 at p. 2
[106] CAN021998 at p. 32
[107] CAN241149
[108] CAN241149 at p. 1
[109] CAN241149 at p. 2

fishery and another monitored fishery are available, then direct monitoring may not be necessary. Indirect methods were then applied for both recreational and commercial catch estimation.[110]

2005: Pacific Region Fisheries Monitoring and Catch Reporting Initiative

69 In 2005, DFO announced the Pacific Fisheries Reform Initiative, as its "vision for the fishery of the future" – a fishery that allows for sustainability, certainty and stability for all participants in the fishery.[111] The Pacific Fisheries Reform Initiative noted that a fishery of the future would require improved monitoring and catch reporting practices.

70 However, during a meeting of the Pacific Region Strategic Directions Committee, fisheries managers identified that catch data was unavailable, inconsistent, inaccurate and untimely for reporting purposes and for managing fisheries to achieve conservation and other departmental or public objectives.[112] Data was collected from various sources and not effectively synthesized or shared. The system was insufficient to support their needs, and there was no single authority to oversee regional catch data because the scope and responsibility for fishery monitoring was unclear. In addition, they felt that an improved estimate of unauthorized catch was required.[113]

71 In response, DFO introduced its "Pacific Region Fisheries Monitoring and Catch Reporting Initiative" to "plan and implement cohesive, objectives-based, regional fishery monitoring and catch reporting programs."[114] This involved setting a policy foundation to support programs, designing a region-wide business model and researching investments in information management and information technology support systems for fisheries data.[115] The 2005 Initiative was to have a clear governance structure, which included a Project Director (Colin Masson), a Project Sponsor (Paul Sprout), several Fisheries Teams (for specific fisheries)

[110] CAN241149 at p. 3
[111] CAN000964 at p. 1
[112] CAN005671 at p. 1
[113] CAN005671 at p. 1
[114] CAN042895 at p. 9
[115] CAN042895 at p. 9

and an Information Management Team. The 2005 Initiative was to obtain direction from the Fisheries Monitoring and Catch Reporting Steering Committee, and its activities would be subject to Regional Management Committee approval.[116] As a first priority, the Initiative would focus on monitoring and reporting of "salmon fisheries, particularly Fraser sockeye."[117]

2006: NHQ Audit of the Management Control Framework Supporting Statistical Information on Fisheries

72 In 2005, Bryan Williams' 2004 Southern Salmon Fishery Post-Season Review was released. For a summary of recommendations related to fishery monitoring and catch reporting, see Appendix 1.

73 In 2006, as part of its response to the Williams' recommendations, DFO endeavoured to, *inter alia,* review catch monitoring in the Pacific Region, develop a strategy to estimate unauthorized fishing, increase coverage of First Nations and commercial fisheries in the Lower Fraser, increase on-the-ground catch monitoring capabilities, increase overflight coverage, and develop an electronic system for recording and reporting catch.[118] The increased budget for Fraser River fishery monitoring and catch reporting activities following the William's Report was $400,000 for 2005 and an estimated $540,000 for 2006.[119] To put this into perspective, the budget for the catch monitoring program for the entire BC Interior Area in 2005 and 2006 was $372,000 per year.[120]

74 In 2006, however, a national "Audit of Management Control Framework Supporting Statistical Information on Fisheries" was conducted.[121] The objective of this audit was to determine the extent to which the acquisition, storage and retrieval of data pertaining to the fisheries supports the creation of accurate, timely, accessible and secure statistical fisheries information to meet the

[116] CAM004920 at p. 11
[117] CAN042895 at p. 9
[118] CAN165333
[119] CAN165333 at p. 5
[120] CAN153469 at p. 1
[121] CAN024032

requirements of the Department in managing fisheries.[122] Findings of the audit include, *inter alia*, the following:[123]

- The Department does not have an adequate model to estimate the amount of catch that is not reported;
- There is a lack of departmentally accepted standards and principles to provide guidance and consistency of approach in the determination and controls for catch monitoring and reporting; and
- The roles, responsibilities and accountability for the administrative processes supporting [statistical information on fisheries] are adequately clear in all regions except the Pacific.

75 This audit particularly emphasized the need for improvements to the Pacific Region. In regards to accountability, roles, and responsibilities, the auditors found that several organizations were engaged in fisheries data management, including the Regional Data Unit in Corporate Services, Resource Management, Science and the Treaty and Aboriginal Policy Directorate. The audit determined that accountability for the regional statistics function was ambiguous and no single organization was clearly accountable for the collection and management of statistical information on fisheries, or to ensure data quality in terms of completeness, accuracy, timeliness and security of the data.[124]

76 The auditors noted that regional management fully acknowledged the lack of adequate systems, processes and controls for statistical information on fisheries, and that they were responding with the creation of the Pacific Region Fisheries Monitoring and Catch Reporting Initiative. However, its recommendations included the following actions:[125]

- A departmental fishery monitoring and reporting framework should be developed and applied in all regions;
- Departmental models to estimate unreported catch should be developed and implemented;

[122] CAN024032 at p. 2
[123] CAN024032 at p. 3
[124] CAN024032 at p. 24-25
[125] CAN024032 at p. 3

- The departmental functional authority for the management and integration of licensing, catch, effort and pricing information should be clarified; and
- A detailed requirements analysis for the integration of statistical information on the fisheries at the departmental level should be carried out.

2007: Pacific Integrated Commercial Fisheries Initiative

77 In 2007, increasing concerns were raised about fishery monitoring and catch reporting in the Pacific Region. For example, in May 2007, a paper presented by Gordon Gislason to the 5th International Observer Conference found that "the evidence is striking as to how poorly the BC salmon fishery scores on biological sustainability grounds" and "in our opinion, this is directly related to the lack of independent third party catch monitoring and individual responsibility embodied in the current salmon management regime."[126]

78 In response to these and similar concerns, DFO took several actions to address fisheries monitoring and catch reporting. One of these actions was to launch to Pacific Integrated Commercial Fisheries Initiative (PICFI) in July 2007. PICFI is structured around four key elements: (1) increased First Nations access to commercial fisheries; (2) capacity building; (3) co-management; and (4) enhanced accountability.[127] This policy and practice report focuses on the enhanced accountability element of PICFI only. For a more thorough discussion of PICFI, please refer to the commission's policy and practice report entitled "Department of Fisheries and Oceans Policies and Programs for Aboriginal Fishing."

79 The enhanced accountability element of PICFI is intended to create consistent, transparent standards for monitoring and reporting in the commercial sector, with the proviso that enhanced information requirements may also be required in the recreational and food, social and ceremonial fisheries.[128] The goal is to "ensure that all commercial salmon fisheries will meet the same [fishery monitoring and

[126] CAN284657 at p. 5
[127] CAN002480
[128] CAN285064 at p. 6

catch reporting] standards and be self funded" by the end of the PICFI program.[129]

80 To achieve this goal, the enhanced accountability element is further broken down into three sub-components: (1) increased fisheries monitoring and catch reporting; (2) enhanced compliance monitoring; and (3) development of a traceability framework.[130] Under the increased fisheries monitoring and catch reporting sub-component, DFO plans to establish and implement catch monitoring and reporting standards, improving information management systems and clarifying roles and responsibilities with respect to fishery monitoring and catch reporting activities.[131] It plans to achieve this by expanding on progress made by the Salmon Working Group in defining monitoring standards,[132] consolidating and integrating data sources, increasing access to information, and automating and streamlining information management.[133] Under the traceability framework sub-component, DFO plans to design and implement a program to enable regulators and certifiers to trace fish from the point of harvest to the point of final sale.[134]

81 PICFI is a major source of funding, with $175 million to be spent over five years in achieving its four key elements.[135] Approximately $10.5 million of that budget is to be spent supporting enhanced accountability. This funding flows through to projects that relate to PICFI objectives, and that allow for "transformative work." Transformative work is described as projects that create more effective and efficient monitoring, as opposed to creating new and ongoing funding demands that cannot be met once PICFI expires in 2012.[136] This includes work that is aimed at gaining the confidence of harvesting groups, developing electronic monitoring systems, setting standards, supporting data system development,

[129] CAN168295
[130] CAN043586 at p. 7
[131] CAN043586 at p. 8
[132] CAN007400 at p. 5
[133] CAN007400 at p. 6-7
[134] CAN043586 at p. 10
[135] CAN002480 at p. 6
[136] CAN139848 at p. 2

supporting commercial demonstration fisheries, and improving food, social and ceremonial fishery monitoring.[137]

82 As of 2009, PICFI has supported the following developments for fishery monitoring and catch reporting:[138]

- Funding the development of the PacFish information management system[139]
- Introduction of fishery monitoring and catch reporting standards for commercial fisheries
- Creation of a Monitoring and Compliance Panel
- Customization of the A'Tlegay fisheries database
- Creation of the Data Management Advisor position to assist in fishery monitoring and catch reporting by First Nations organizations
- Testing of electronic logbooks[140]
- Funding the purchase of Blackberrys so that conservation and protection officers can access hail numbers while on patrol[141]

83 PICFI is set to expire on March 31, 2012. DFO employees have expressed concerns that loss of PICFI funds may impact upon operational level catch monitoring programs. For example, in 2010, one project description in the BC Interior area notes the following:[142]

> *A very large portion of funding for the BCI Catch Monitoring Program (CMP) has been Williams dollars (200k). Last year PICFI provided 200k in funding necessary and essential to the BCI FSC monitoring program. This funding was used to fill very large potential gaps in the program: (1) helicopter instantaneous counts – effort dist. (2) contracts with First Nations without AFS agreements.*
>
> *Without this funding again this year there will be significant impacts to:*
>
> *1) PICFI initiatives;*

[137] CAN187876. See also CAN004913
[138] CAN018478 at p. 3-4, unless otherwise noted
[139] CAN046957 at p. 6
[140] CAN004925 at p. 12
[141] CAN063237 at p. 1
[142] CAN153469 at p. 1

2) *Monitoring accountability and;*
3) *FN/DFO relationships*

Salmon Fisheries Reform – Fisheries Monitoring and Catch Reporting/Traceability Lower Fraser Focus

84 In January 2007, DFO also launched the "Salmon Fisheries Reform – Fisheries Monitoring and Catch Reporting / Traceability Lower Fraser Focus" Project.[143] The purpose of this project was to design and implement improved oversight of Lower Fraser salmon fisheries, through monitoring and reporting of catch, together with strengthened enforcement and compliance, and traceability.[144] Specifically, the objectives of this project included the following items:[145]

- Design and implement fishery monitoring and catch reporting programs
- Design and implement initial phase of a regional salmon traceability program
- Design and implement strengthened enforcement and compliance
- Design and implement information management processes and systems
- Clarify roles, responsibilities and fundamental accountabilities
- Design a review process to examine the regional applicability of the 2007 project (which focuses on Lower Fraser)

85 The 2007 Salmon Fisheries Reform project would be supported by a 14-member Project Team, a nine-member fishery monitoring and catch reporting working group, a compliance and enforcement workgroup, an information management workgroup, a project manager, a project sponsor and a project lead,[146] operating with an annual budget of $400,000.[147]

86 In 2007, this project set out to enhance Lower Fraser fishery monitoring and catch reporting programs. Proposed changes for the Area E Gillnet fishery

[143] CAN193769
[144] CAN193769 at p. 3
[145] CAN193767
[146] CAN193769
[147] CAN146292

included, among other things, moving towards 100% mandatory landing sites[148] with 35% dockside monitoring, piloting electronic logbooks,[149] and developing non-compliance reports for conservation and protection officers and resource management.[150] Aboriginal economic opportunity fisheries were to be enhanced with independent verification of catch by DFO monitors to improve the accuracy of catch estimates above Mission.[151] Food, social and ceremonial and recreational fisheries were to be enhanced through improvements to the creel survey data system, and with independent verification through the use of DFO monitors.[152]

87 Several of the 2007 Salmon Fisheries Reform project's goals appear to be supported by PICFI, which was launched after it. PICFI funds supported a "New Monitoring Development Support Team" to create an integrated monitoring plan for the Lower Fraser, and strategic audits of fish plants and cold storage facilities were considered for verifying product sources, [153] as linked to PICFI objectives of increasing fishery monitoring and reporting, increased enforcement and developing a traceability framework for fish.[154]

[148] Note that the 100% mandatory landing site requirement was dropped for the 2010 Area E gillnet fishery.
[149] CAN170369 at p. 6
[150] CAN008822 at p. 1
[151] CAN008822 at p. 1
[152] CAN008822 at p. 1
[153] CAN170369 at p. 7
[154] CAN170369 at p. 15

2008: Integrated Salmon Dialogue Forum (ISDF): Monitoring and Compliance Working Group

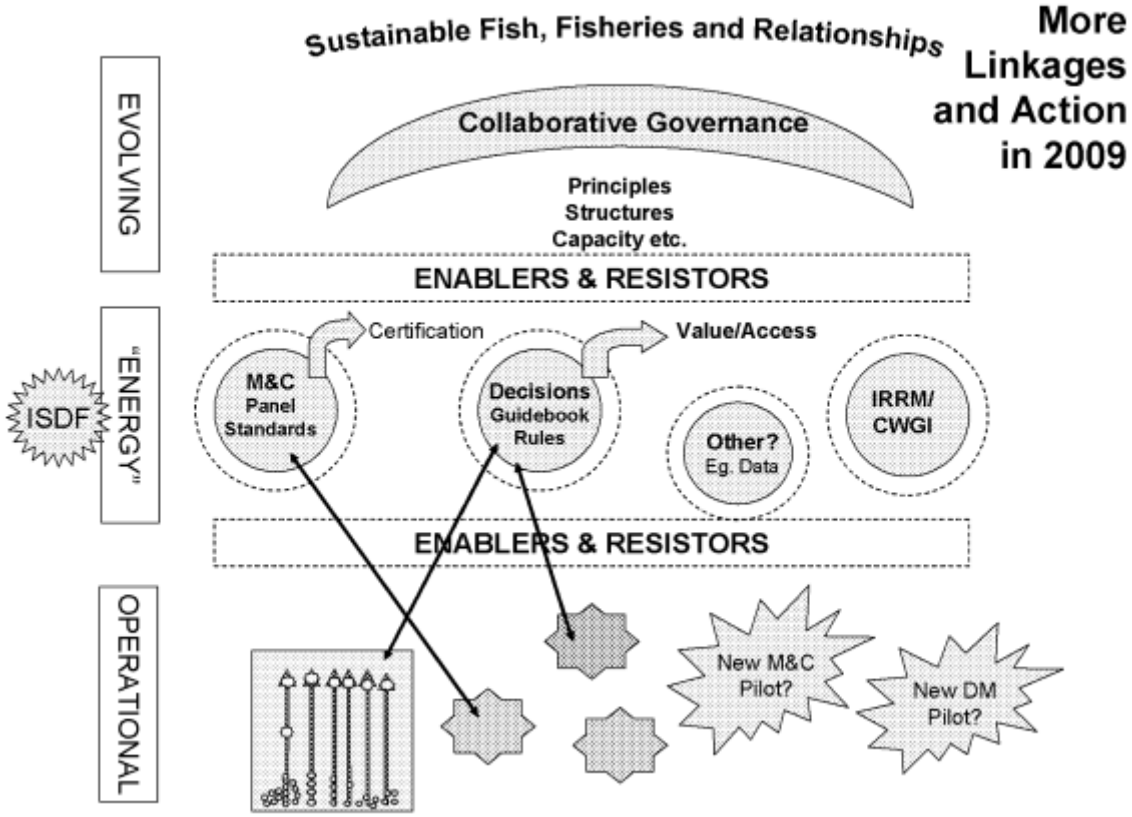
88 The Integrated Salmon Dialogue Forum is a "collaborative and inclusive opportunity for all interests to work towards a fully integrated sustainable salmon fishery" where "participants have agreed to make best efforts to work through their respective processes, agencies and organizations to give effect to any consensus reached in the forum, and to address any differences that emerge."[155] According to the ISDF, its mandate is set by participants to the forum, and not by DFO or any other authority.[156] However, the ISDF works with DFO[157] and receives funding from DFO as well non-DFO sources, such as the Fraser Salmon and Watersheds Program.[158]

89 The ISDF hosts meetings, which are intended to be a "comfortable and safe space for often difficult conversations" to develop information, share goals and interests, understand differences and identify common ground that may be helpful to take back to discussions within sector based organizations and processes.[159]In this way the forum "incubates, not implements" ideas.[160] Participation in the forum is voluntary and it does not involve a formal system of representative membership.

Figure 3 is an illustration by the ISDF that explains its role as providing an "energizing zone" between operational activities and evolving collaborative governance processes.

[155] CAN004999 at p. 1
[156] CAN004999 at p. 1
[157] CAN285083, foreward
[158] CAN285083, cover. See also CAN005002 at p. 5.
[159] CAN004999 at p. 2
[160] CAN004999 a tp. 2

Figure 3: ISDF Linkages and Priorities Schematic, February 2009[161]



90 The ISDF has three working groups: the Decision-Making Working Group (to improve how fisheries decisions are made), the Governance Working Group (to work towards collaborative fisheries governance) and the Monitoring and Compliance Working Group.[162]

91 The Monitoring and Compliance Working Group is a multi-sectoral group that formed in 2008.[163] Its purpose is to examine ways to improve monitoring, catch reporting and compliance in the salmon fisheries, by bringing together an independent panel of participants from First Nations, commercial, recreational and conservation interests, to work with DFO in mapping "a better pathway for monitoring and compliance."[164] In working with DFO, the Monitoring and

[161] CAN005009 at p. 13
[162] CAN004999
[163] CAN285064 at p. 6
[164] CAN285064 at p. 6

Compliance Working Group hopes to serve as a "sounding board" in the development of regional catch monitoring frameworks, through "open and honest dialogue" and constructive processes.[165] Its role is to develop consistent monitoring and compliance standards for all fisheries, to engage sectors in monitoring and compliance decisions and processes, and to develop an appropriate regime of incentives, rewards and penalties to promote self-regulation and higher levels of compliance.[166]

Interim Fishery Monitoring and Catch Reporting Standards for Commercial Salmon Fisheries – Discussion Paper

92 In 2008, DFO released a consultation document entitled "Interim Fishery Monitoring and Catch Reporting Standards for Commercial Salmon Fisheries."[167] This document was to form the basis for discussions with the commercial salmon fleet regarding interim fishery monitoring and catch reporting standards necessary to meet specific monitoring objectives in an affordable way. Specifically, the discussion paper describes data requirements and priorities, and proposes fishery monitoring and catch reporting standards applicable to the commercial fishery.[168] DFO intended to obtain feedback on standards proposed within this discussion paper, for possible revisions to the 2010 fishery.[169]

2009: DFO Catch Monitoring Roadmap Strategy

93 In February 2009, DFO developed a "Pacific Region Fisheries Monitoring Framework for Improvements,"[170] which was built upon the 2002 Pacific Regional Fishery Monitoring and Reporting Framework (described above).[171] The 2009 Framework noted several fundamental regional challenges, including the following: missing, unclear or duplicated internal accountability; information

[165] CAN022443 at p. 1
[166] CAN004999 at p. 10
[167] CAN001120
[168] CAN001120
[169] CAN045971 at p. 110
[170] CAN004920
[171] CAN004920 at p. 6

shortfalls and lack of integrated data systems; inconsistent data requirements and inconsistent use of monitoring tools and technologies.[172]

94 The 2009 Framework then set out a fisheries monitoring and catch reporting work plan for 2008-2011. This involved establishing and implementing monitoring standards, improving information management systems (including the development of PacFish, described in the Information Management section of this policy and practice report), clarifying roles, responsibilities and accountabilities, establishing inspection and intelligence analysis capacity within conservation and protection, and supporting a seafood traceability framework.[173]

95 Around the same time, the Regional Management Committee acknowledged that the "Pacific Region has recognized the need to improve fisheries monitoring and catch reporting ... for over a decade."[174] The Regional Management Committee also recognized that barriers to change included lack of effective and efficient fisheries monitoring management systems, duplicated and unclear accountabilities and inconsistent fishery monitoring.[175] As a result, Susan Farlinger requested the creation of a high level "Fisheries Monitoring Roadmap Strategy" to be used as a public document to describe the state of current catch monitoring in all fisheries and as a basis for planning improvements.[176]

96 In November 2009, the Salmon Working Group reviewed a "DFO Catch Monitoring Roadmap Strategy" presentation that sets out a fishery monitoring and catch reporting goal as follows:[177]

> *To have accessible, accurate and timely fisheries information, such that there is sufficient information and public confidence for fisheries to be managed sustainably and to meet other reporting obligations and objectives.*

[172] CAN004920 at p. 14
[173] CAN004920 at p. 17
[174] CAN022443 at p. 1
[175] CAN002443 at p. 1
[176] CAN273530
[177] CAN006863 at p. 2

97 To achieve this goal, the DFO Roadmap Strategy develops a new set of "guiding principles" which appear related to, but different from the seven principles in the 2000 Catch Monitoring Discussion Paper[178] or the seven principles in the 2002 Pacific Region Fishery Monitoring and Reporting Framework,[179] both described earlier in this policy and practice report. The four principles in the DFO Roadmap Strategy are as follows:[180]

- Principle 1 – Information necessary to sustain and conserve fisheries resources and their habitat is the first priority.
- Principle 2 – Utilize consistent monitoring standards.

  This principle recognizes that different levels of information are required in different situations and that a consistent approach is needed to determine what level of information is required for each fishery.[181]
- Principle 3 – Accessible, accurate and timely fisheries data.

  Fisheries information (monitoring and catch data) must be of defined quality and available (accessible) to meet fisheries management and integrated data requirements as and when needed.[182]
- Principle 4 – Harvesters are individually and collectively responsible for providing fisheries monitoring and catch reporting information.

  Harvesters may experience greater access and additional resource benefits where arrangements can be made to ensure the information is available to effectively address risks to achieving conservation objectives.[183]

98 In order to ensure the use of consistent monitoring standards as articulated in Principle 2, the DFO Roadmap Strategy provides a matrix for determining whether or not a fishery should be monitored at the low, moderate or enhanced levels. This is based on the degree of conservation risk involved, the types of information that are required, and the desired statistical quality for data analysis purposes. All fisheries would start at the "moderate" information requirement

[178] CAN001689
[179] CAN184729
[180] CAN006863 p. 3ff
[181] CAN006863 at p. 3
[182] CAN006863 at p. 4
[183] CAN006863 at p. 5

level, and may be moved to low or enhanced categories on a fishery-by-fishery analysis.

Table 1: Overview of Categorizing Fisheries based on Information Requirements, DFO Roadmap Strategy[184]

	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 -** e.g. 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%indepnedent verification

99 The DFO Roadmap Strategy appears to have been considered by the Integrated Salmon Dialogue Forum's Monitoring and Compliance Panel. In 2010, the ISDF Monitoring and Compliance Panel, discussed below, released a discussion paper entitled "Fishery Monitoring in the Pacific Region – Charting Our Course: A

[184] CAN0068763 at p. 8

strategy for improved confidence and support," [185] which adopts the goal stated in the DFO Roadmap Strategy, as well as its principles and categorizations of low, moderate and enhanced information requirements.

Integrated Salmon Dialogue Forum: Monitoring and Compliance Panel

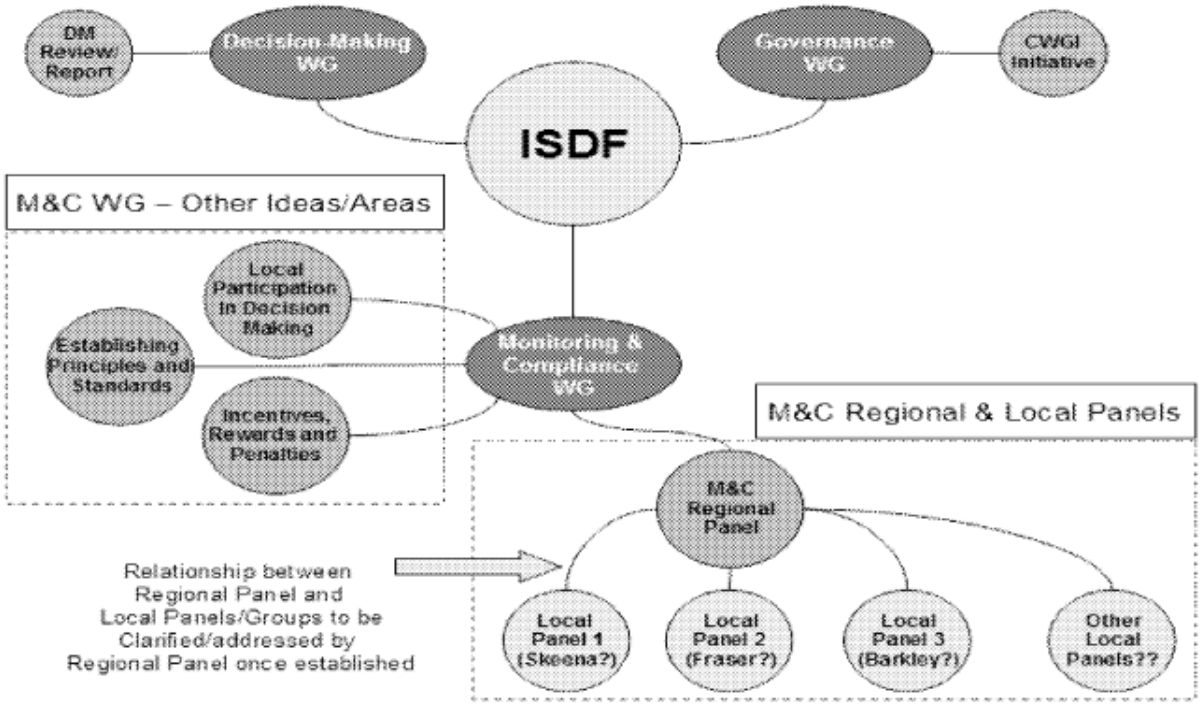
100 In February 2009, the ISDF Monitoring and Compliance Working Group (discussed earlier) created a Monitoring and Compliance Panel, to support its activities.[186] The Panel is intended to be less operational and more "principled/enabling" and was tasked with framing the issues.[187] The Panel is also intended to communicate with the public and to create an "overarching group that develops the operating principles and guidelines generated through dialogue and work of the ISDF" and to act as an independent body to build trust between the sectors and the public (it was thought that this Panel should operate at "arms length" from the ISDF).[188] In addition to this regional Panel, the Monitoring and Compliance Working Group considered the formation of Local Panels.

101 The Monitoring and Compliance Panel receives funding for a facilitator, secretariat, additional expertise/assistance, travel, honorariums, communications and other items, which, together with eight meetings and one field trip, required a budget of $87,210 for the 2009-2010 fiscal year.[189] Funding support is provided through the Fraser Salmon and Watershed Program and DFO.[190]

102 The following diagram illustrates the organization of the ISDF, including the Monitoring and Compliance Working Group, and Panels.

[185] CAN285083
[186] CAN005003
[187] CAN005003 at p. 2
[188] CAN005002 at p. 4
[189] CAN005002
[190] CAN285083, cover

Figure 4: Overview of Monitoring and Compliance Working Group and Monitoring and Compliance Panel Organizational Structure[191]



First Nation FSC Catch Monitoring and Reporting: Preliminary Considerations, Standards and Recommendations – Discussion Paper

103 In November 2009, DFO released its discussion paper entitled "First Nation FSC Catch Monitoring and Reporting: Preliminary Considerations, Standards and Recommendations."[192] This discussion paper was 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.[193] It appears that this document is to support a process of consultation with First Nations in respect of fishery monitoring and catch reporting, and reflects the three-level categorization of fisheries monitoring set out in the ISDF Charting Our Course discussion paper and the DFO Roadmap Strategy.

[191] CAN005003 at p. 4
[192] CAN077022
[193] CAN077022 at p. 1

104 As a 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.[194]

2010: ISDF Fishery Monitoring in the Pacific Region – Charting Our Course: A Strategy for Improved Confidence and Support

105 In 2010, the ISDF Monitoring and Compliance Panel released a draft discussion paper entitled "Fishery Monitoring in the Pacific Region – Charting Our Course: A Strategy for Improved Confidence and Support: Draft Report for Discussion".[195]

106 In this report, the ISDF Monitoring and Compliance Panel noted that BC salmon fisheries are suffering from a "crisis of confidence" rooted in concerns over 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 their own sectors.[196] The purpose of this report was to offer a new roadmap for the cooperation required to produce practical and necessary changes to fishery monitoring and catch reporting. The ultimate goal was to achieve "accessible, accurate and timely fisheries information, such that there is sufficient information and public confidence for fisheries to be managed sustainably and to meet other reporting obligations and objectives."[197]

107 Four principles were articulated to guide the development of fisheries monitoring and catch reporting as follows:[198]

- Principle 1 – Information necessary to sustain and conserve fisheries resources and their habitat is the first priority.
- Principle 2 – Use consistent monitoring standards.

[194] CAN077022 at p. 2
[195] CAN285083
[196] CAN285083, foreword
[197] CAN285083 at p. 5
[198] CAN285083

This includes the development of criteria to consider the level of conservation risk associated with a fishery and to determine whether monitoring and reporting needs are basic, moderate or enhanced.[199]

- Principle 3 – Accessible, accurate and timely fisheries data.

  Data must be of defined quality and available and accessible to meet fisheries management and integrated data requirements as and when needed.

- Principle 4 – Harvesters are individually and collectively responsible for providing fisheries monitoring and catch reporting information.

  Harvesters may experience greater access and additional resource benefits where arrangements can be made to ensure the information is available to effectively address risks to achieving conservation objectives.

108 These principles are nearly identical to those found in the DFO Roadmap Strategy, described above.

109 In order to ensure the use of consistent monitoring standards, as part of Principle 2, the Charting Our Course discussion paper provides a matrix for determining whether or not a fishery should be monitored at the low, moderate or enhanced levels. This is based on the degree of conservation risk involved, the types of information required, and the desired statistical quality for data analysis purposes. All fisheries would start at the “moderate” information requirement level, and may be moved to low or enhanced categories on a fishery-by-fishery analysis. This chart for information requirements is substantially similar to the table for information requirements in the DFO Roadmap Strategy, reproduced earlier in this policy and practice report.

[199] CAN285083 at p. 9

Table 2: Overview of Categorizing Fisheries Information Requirements[200]

INFORMATION REQUIREMENT			
Starting Point: *Moderate* Move to *Low* or *Enhanced* due to specific fishery characteristics and conservation risks			
Monitoring Need	**Low**	**Moderate**	**Enhanced**
Information Category			
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**: +/- 50%, little if any independent verification	**Moderate**: +/- 20%, < 20% independent verification	**Enhanced**: +/- 5%, >20% independent verification

110 The Charting Our Course discussion paper then sets out four strategies, based on its four principles, to achieve its vision for improved confidence in fisheries monitoring and catch reporting. The strategies are as follows:

- Strategy 1 – Use consistent standards to determine monitoring requirements and to plan and implement fishery monitoring and catch reporting in all fisheries.

[200] CAN285083 at p. 13

- 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.

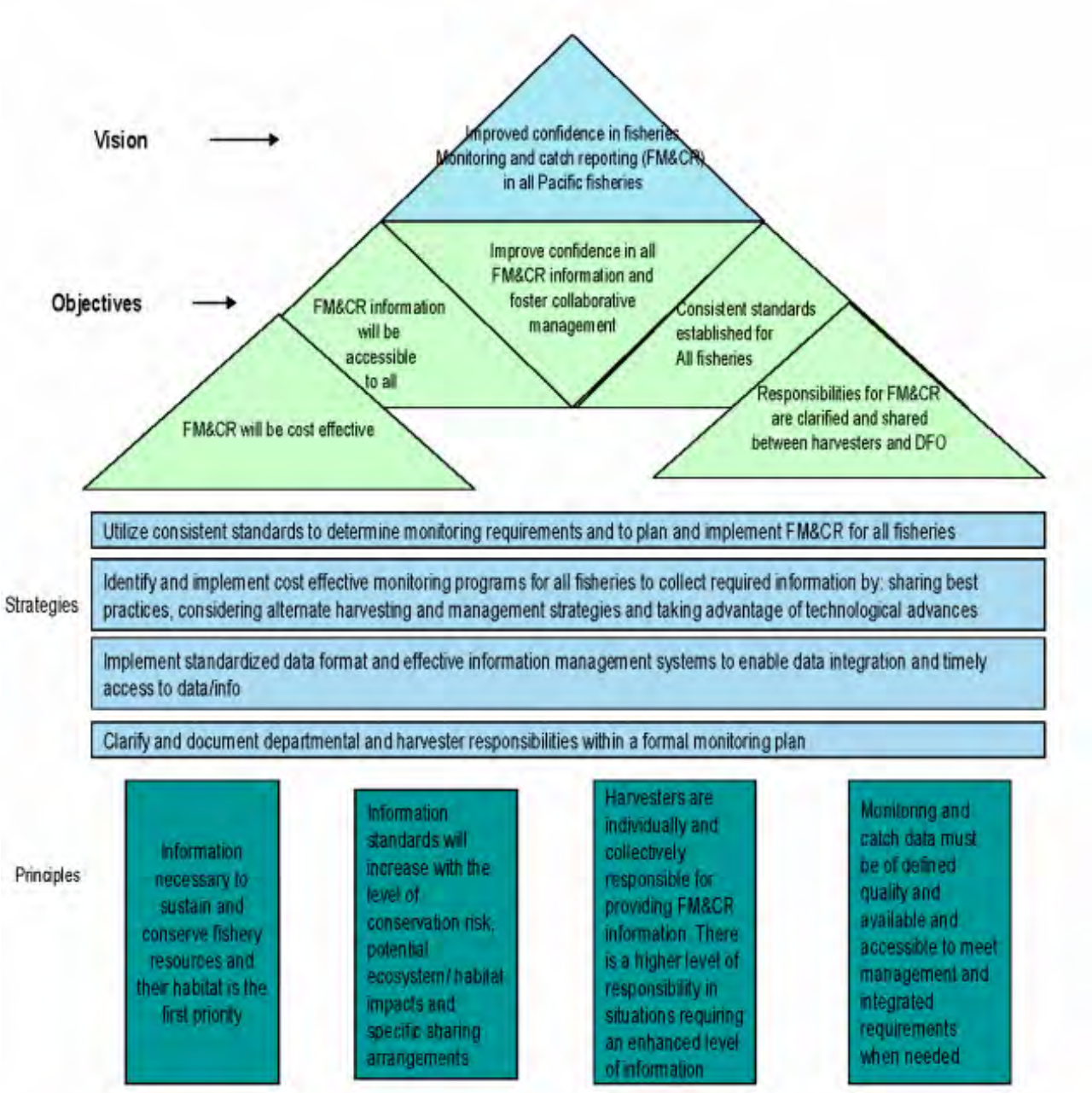
- Strategy 3 – Implement standardized data format and effective information management systems to enable data integration and timely access to data and fisheries information.

- Strategy 4 – Clarify and document departmental and harvester responsibilities within a formal monitoring plan

111 The following figure illustrates the overall fisheries monitoring and catch reporting policy framework described in the Charting Our Course discussion paper. This figure is also found in the DFO Roadmap Strategy.[201]

[201] CAN006863 at p. 6

Figure 5: Fisheries Monitoring and Catch Reporting Policy Framework[202]



[202] CAN285083 at p. 7

DFO Strategic Framework for Fishery Monitoring and Catch Reporting in Pacific Fisheries - Discussion Paper

112 In May 2010, DFO developed a confidential draft "Strategic Framework for Fishery Monitoring and Catch Reporting in Pacific Fisheries." DFO describes this document as having been created in consultation with First Nations, commercial and recreational harvesters and other stakeholders.[203] Its purpose is to set out a strategic framework to guide Pacific fishery monitoring and catch reporting into the future,[204] noting that despite improvements, "deficiencies remain in information gathering, in terms of coverage of fisheries, missing or unreliable data, reporting delays and other issues."[205]

113 After restating the fishery monitoring and catch reporting goal from the DFO Roadmap Strategy and the ISDF Charting Our Course document, this DFO Strategic Framework sets out five similar but revised principles as follows:[206]

- 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

[203] CAN285064 at p. 1
[204] CAN285064 at p. 1
[205] CAN285064 at p. 5
[206] CAN285064 at p. 8ff

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.

114 In order to achieve improvements in fishery monitoring and catch reporting, and in light of these five principles, the DFO Strategic Framework sets out six strategies, which are similar to but different from the four strategies set out 2009 DFO Roadmap Strategy and the 2010 ISDF Charting Our Course discussion paper. The six strategies are as follows:

- Strategy 1 – Determine the fishery-specific 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 – Prepare monitoring and reporting programs to meet the requirements; 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 – Complete the information management system ("PacFish"); DFO will complete its major information management project, PacFish, to facilitate access to Pacific fisheries data for resource managers and all other users.

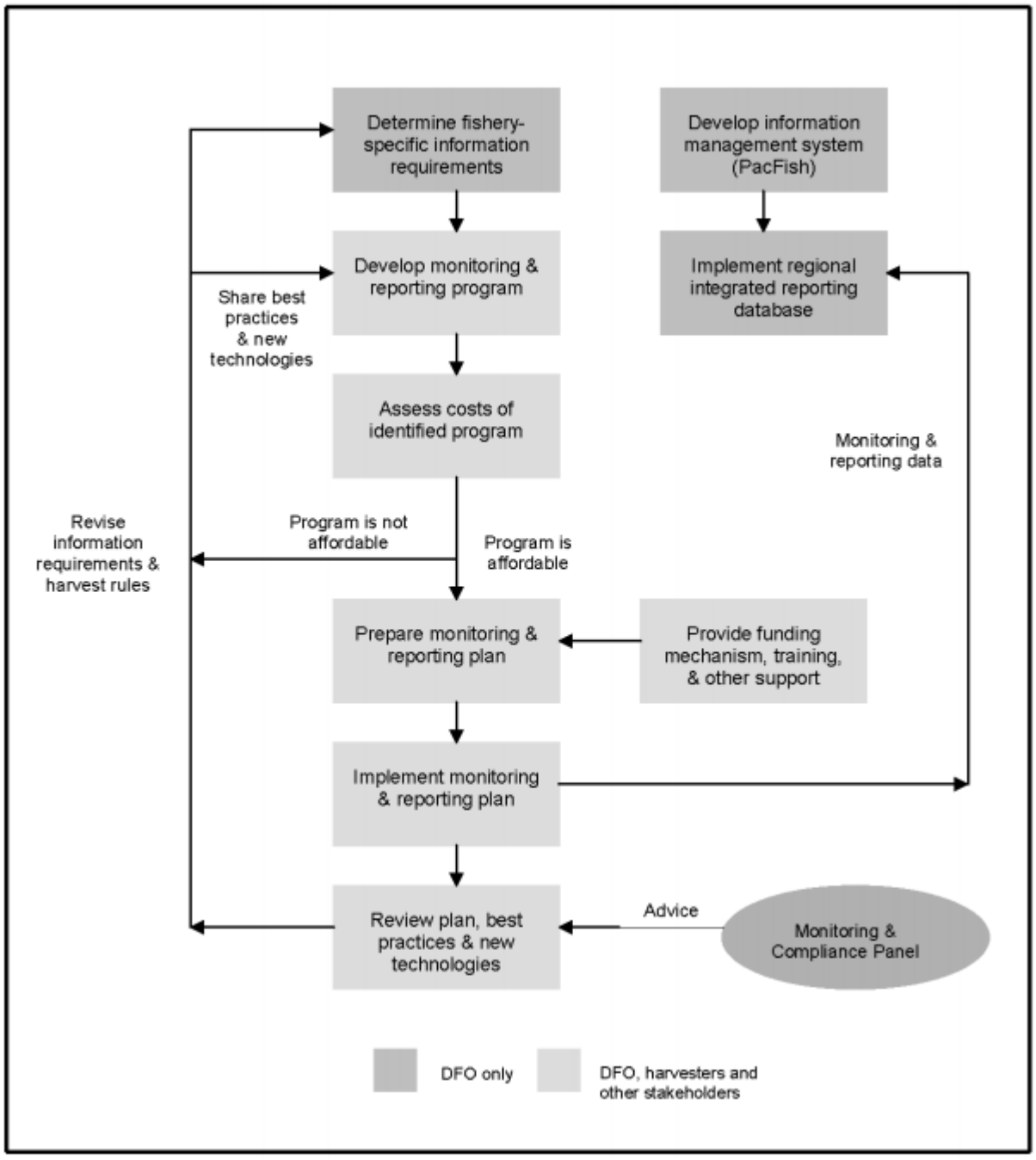
- Strategy 4 – Provide funding mechanisms, capacity building and other support; the department will work with harvesters and others to clarify accountabilities, develop funding mechanisms, identify and address capacity needs, and provide further support for monitoring and reporting programs, as required.

- Strategy 5 – Develop monitoring and reporting plans that specify roles and responsibilities; 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 – Continually improve monitoring and reporting requirements, best practices and technologies; 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.

115 These six steps are to be performed in an iterative manner, with some steps to be undertaken by DFO only, and others to be performed by DFO in conjunction with harvesters and other stakeholders. Figure 6 illustrates the proposed monitoring and reporting process for Pacific fisheries under the DFO Strategic Framework.

Figure 6: Monitoring and Reporting Process for Pacific Fisheries[207]



116 In November 2010, DFO staff presented elements of the DFO Strategic Framework, including the five principles and standardized criteria for fisheries, at the Forum on Conservation and Harvest Planning for Fraser Salmon: Catch

[207] CAN285064 at p. 13

Monitoring Workshop.[208] A November 2010 draft of the DFO Strategic Framework is also available on DFO's Pacific Region website.[209]

Commercial Fisheries

Context: Emerging Policies for Increased Harvest Accountability

117 Throughout the last two decades, increasing harvest accountability has been a recurring theme. On the international stage, reporting requirements under the *Pacific Salmon Treaty* and the commitment to establishing effective monitoring systems under Canada's response to the UN FAO Code of Conduct for Responsible Fishing are but two examples of Canada's expressions of intent with regard to fisheries monitoring and reporting.

118 Domestically, a series of DFO policies have also reiterated the need for harvest accountability, with increasing responsibilities placed on harvesters. In 1998, DFO's "New Direction for Canada's Pacific Fisheries", emphasized the need for government and harvesters to hold joint responsibility and accountability for sustainable fisheries, including management costs and decisions.[210] Similarly, under the 1999 Allocation Policy for Pacific Salmon, DFO remarked on the need to work with representatives from all harvesting sectors to develop adequate monitoring and reporting, and that over the long term, the costs of such monitoring and reporting would be the responsibility of harvesting groups.[211] More recently, Pacific Fisheries Reform in 2005 and the Pacific Integrated Commercial Fisheries Initiative in 2007 have both emphasized the need for harvest accountability, and have lead to increasing monitoring and reporting requirements placed on fishers.

[208] CAN285158 at p. 12ff. For more information on the Forum on Conservation and Harvest Planning for Fraser Salmon, see the commission's policy and practice report entitled, "Department of Fisheries and Oceans Policies and Programs for Aboriginal Fishing."
[209] http://www.pac.dfo-mpo.gc.ca/consultation/picfi-ipcip/monrep-survdecl/index-eng.htm
[210] CAN000323
[211] CAN000543

119 This section of the policy and practice report describes the fishery monitoring and catch reporting programs in place for selected commercial fisheries relevant to Fraser River sockeye. For a discussion of commercial fishing, refer to the commission's policy and practice report entitled "Commercial Salmon Fishing: Licensing, Allocation, and Related Issues." The monitoring and reporting for Aboriginal communal commercial fisheries is discussed in the section of this policy and practice report on Aboriginal fisheries.

Area E Gillnet

120 The Area E Gillnet fleet is composed of approximately 390 licence holders, operating drift gillnets to target sockeye and chum (with non-target retention of chinook and pink salmon).[212] The frequency and duration of fisheries openings and closings for this group is highly variable and dependent on abundance of fish stocks. There may be anywhere from zero to eight sockeye openings per year, each lasting between two to 36 hours.

121 There are numerous fishery monitoring and catch reporting requirements applicable to Area E Gillnetters, largely stipulated in Area E conditions of licence. This policy and practice reports highlights a few of these requirements and associated programs in the order that they occur per fishing trip and season.

122 Prior to starting on a fishing trip, a vessel master must submit a start-fishing report or "hail out." This involves phoning in to a salmon catch reporting service provider to obtain a "Trip Identification Number" to record in the vessel logbook, and to signal his or her intention to participate in the fishery.[213] If selected to do so, the vessel master may also be required to accommodate an on-board observer. On-board observers, however, are not widely used for the commercial salmon fishery.[214]

[212] CAN285158 at p. 214ff
[213] CAN285158 at p. 219. See also CAN047791 at p. 3 and CAN185388 at p. 5. Electronic logbook users may submit start fishing reports by email to the Salmon Fishery Database, instead of calling a catch reporting service provider.
[214] CAN130453

123 During the fishery, a vessel may be counted by fishery monitors performing aerial overflights, which provide an overall effort count for the fishery opening.[215] In addition, conservation and protection fishery officers may stop to record a vessel's registration number during the fishery. This information is used to note that the vessel has been fishing for the purpose of later compliance checks in respect of logbook and (if applicable) mandatory landing site requirements.[216] The vessel master is also required to respond to hail requests, or "interim report requests" upon demand by a fishery officer, fishery guardian or other DFO representative during the fishery.[217] This involves providing an estimate of the amount of fish on board the vessel as well as caught and released, information as to the location and rate of catch, and the name and location of any person buying the catch.[218]

124 A vessel master must also record catch information in his or her logbook, by no later than 23h59 for each fishery. This logbook must be kept on board the vessel whenever participating in a fishery opening, and must be produced for examination on demand of a fishery officer or fishery guardian.[219] If the vessel master uses an electronic logbook (eLog), catch information can be submitted directly to DFO's Fishery Operations System database.

125 In 2009, had there been a commercial sockeye fishery opening, Area E Gillnetters would have been required to comply with a 100% mandatory landing site program.[220] However, Area E Gillnetters strongly opposed the mandatory landing site requirement. They argued that limited mandatory landing sites may cause time-wasting line ups and having to land at set packing sites would restrict their ability to deliver directly to speciality buyers, therefore disrupting their

[215] CAN047791 a tp. 3
[216] CAN047791 at p. 3
[217] CAN285372 at p. 440
[218] CAN143056 at p. 6
[219] CAN143056 at p. 7-8
[220] CAN047791 at p. 2

marketing abilities.[221] In 2010, DFO agreed to drop the mandatory landing site requirement.[222]

126 Wherever commercial fishers land their fish, fish buyers and fishers must complete fish slips, accounting for all fish caught and landed. This includes fish intended for personal consumption, public or private sale, or disposed of otherwise.[223]

127 During the fish landing process, approximately 35% of licensed vessels are to be randomly selected for catch validation as part of a dockside monitoring program.[224] Dockside monitors are stationed on packing vessels or at shore based plant sites throughout the fishing area.[225] However, if a boat is selected for validation but the vessel master does not intend to sell fish to the packer being monitored, then he or she will be exempted from the validation procedure and sent on.[226] In addition, without the mandatory landing site requirement, it is possible for a fisher to avoid the dockside monitoring program by landing at other locations. The 35% dockside monitoring program was implemented for Area E Gillnetters in 2010.[227]

128 After each fishery opening, any fisher that uses a paper logbook must phone in to a call centre to provide a summary of his or her logbook catch information, and to obtain a "Daily Catch Report Confirmation Number" which must be recorded in the vessel logbook before 08h00 the following day.[228] During the call, data is entered directly into the Fishery Operations System.[229] Similarly, fishers using an electronic logbook (eLog) must transmit their daily catch report to DFO within the same timeframe. Fishers who have had their catch validated under the

[221] CAN130453
[222] CAN253561 at p. 2
[223] CAN047791 at p. 4
[224] CAN047791 at p. 2
[225] CAN285158 at p. 218
[226] CAN178100 at p. 3
[227] CAN285158 at p. 217
[228] CAN143056 at p. 5
[229] A computer database for fisheries information, as discussed further in the Information Management section of this policy and practice report.

dockside monitoring program are still required to phone in or electronically transmit their catch data.[230]

129 Within 24 hours of the end of the fishery opening, a vessel master must also submit an end-fishing report or "hail in," by phoning in to a call centre to report on the last date and location of fishing, and to obtain an "End-Fishing Report Confirmation Number."[231] Within seven days of landing fish, vessel masters must also submit commercial fish slips to DFO accounting for any fish landed.[232] Finally, by January 31 in the year following the fishery, each fisher must mail in his or her paper logbook.[233]

Area B Seine and Area H Troll

130 In 2010, both Area B Seine (Strait of Juan de Fuca) and Area H Troll (Strait of Georgia) fisheries participated in share-based individual vessel quota (IVQ) fisheries.[234] These fisheries were monitored using a 100% mandatory landing site and 100% dockside monitoring program.[235] A list of offload ports is contained in the conditions of licence,[236] and vessel masters must make advance arrangements with a dockside monitoring company prior to landing.[237] Catch validation (counting) is performed by an independent monitoring company[238] who then immediately enters catch information into a database for in-season use by fisheries managers.[239] All dockside monitoring is paid for by the harvesters.[240]

[230] CAN178100 at p. 2
[231] CAN285158 at p. 220. See also CAN006863 at p. 22, CAN285158 at p. 219 and CAN185388 at p. 5. Electronic logbook users may submit end-fishing reports by email to the Salmon Fishery Database, instead of calling a catch reporting service provider.
[232] CAN047791 at p. 4
[233] CAN285158 at p. 220. See also CAN143056 at p. 8.
[234] CAN285158 at p. 115
[235] CAN285158 at p. 118
[236] CAN252025 at p. 2
[237] CAN252025 at p. 2
[238] CAN285372 at p. 429
[239] CAN252025 at p. 2
[240] CAN065903 at p. 4

131 In addition, Area B and Area H vessel masters must submit start, end, pause and daily catch reports by phoning in to a catch monitoring service provider or by eLog.[241] Random fish hold checks may also be performed during the fishery.[242]

132 Area B Seiners fishing in Area 20 or Area 29 for Fraser sockeye must also provide set-by-set catch reporting to fishery managers and observers.[243]

Other Licence Areas

133 In general, South Coast commercial fishers are required to submit start fishing and end fishing reports.[244] They are also required to phone in their daily logbook numbers (catch and release for all species etc.),[245] respond to on-the-water hail requests from charter patrols or fishery monitors, carry on-board observers if requested, and to submit their logbooks at the end of the season.[246] During seine fisheries, some major fishing companies also provide their catch information (catch estimates and number of vessels participating) to DFO on a voluntary basis.[247]

134 A charter patrol program to monitor catch and effort is also applied to most fisheries. This provides for a survey of hailed catch reported to local fishery managers on a real-time basis throughout each day of fishing.[248] In addition, overflights may be used to complement effort data obtained from charter patrols, coast guard vessels and hails.[249]

[241] CAN252025 at p. 2
[242] CAN252025 at p. 2
[243] CAN285158 at p. 119. See also CAN285372 at p. 433.
[244] CAN285158 at p. 118
[245] CAN285372 at p. 428
[246] CAN258372 at p. 428-430
[247] CAN285372 at p. 428
[248] CAN285372 at p. 428
[249] CAN285372 at p. 430

Summary of Challenges

135 According to DFO's 2002 Pacific Region Fishery Monitoring and Reporting Framework, the existence of numerous fishery monitoring and reporting systems has its disadvantages. Having numerous different systems means that numerous different estimates of commercial catch may be produced for any given fishery and there is no clear way to differentiate which estimate is most accurate or complete.[250] This may create confusion on the part of the public and may undermine the credibility of fisheries management. Maintaining numerous diverse systems is also expensive and may involve duplication of effort that has the potential for adverse financial impacts on both government and harvesters.[251]

136 The myriad of monitoring and reporting requirements may also cause confusion for fishers. A 2000 audit of catch reporting requirements suggests that some fishers were confused by "all the catch requirements specified in licence conditions; for example they might confuse logbooks with sales slips, might not retain their own copies of catch records, or might not realize that sales slips are required in addition to logbooks."[252] Note that the 2000 audit reflected confusion that existed even prior to the implementation of additional reporting requirements detailed above.

137 Concerns regarding the accuracy of reports have also been raised. As with all hail based catch estimation processes, there is the potential for misreported catch, whether intentionally or unintentionally. Some have raised the concern for under-reporting of target and by-catch due to fear of fishery closures or other enforcement actions.[253]Unauthorized catch is not specifically accounted for in catch estimates, and as described earlier, dockside monitoring programs, where they exist, may be avoided where there is no mandatory landing program.

[250] CAN184729 at p. 6
[251] CAN184729 at p. 6
[252] CAN285053 at p. 7
[253] CAN285053 at p. 20

138 Compliance with certain catch reporting requirements has also been low. For example, in 2004, only 56% of Area B Seine, 68% of Area E Gillnet, and 50% of Area H Troll fishers returned their logbooks.[254] As for phone-in compliance, over one quarter of Area B Seine (2004) and Area H Troll (2003) fishers phoned in their catch more than 24 hours late, or did not phone at all. In 2004, 40% of Area E Gillnet fishers either phoned in their catch over 24 hours late or did not phone in at all.[255] However, in 2006, DFO introduced a requirement that commercial salmon fishers complete the previous year's catch reporting licence conditions (e.g. return of logbooks) before the issuance of the next year's licence. Compliance with certain licence conditions has since improved.

139 Although commercial fishers have generally agreed to the importance of fishery monitoring and catch reporting, they have also expressed concerns as to bearing the rising costs associated with such programs. In 2008, based on projected total allowable catch for Area B and Area H proposed share-based fisheries, the cost for catch validation was estimated to be between $560 and $625 per vessel, or approximately 14% of the landed value for Area H sockeye or 12% of the landed value for Area B sockeye.[256] Such costs are considered excessive by most commercial harvesters. For example, the mandatory landing site program was strongly opposed by Area E Gillnetters because of the costs associated with hiring an additional 23 monitors, and the costly wait times that could be caused.[257]

140 In response to commercial harvester concerns about costs, DFO has made its position clear that the cost of fishery monitoring and catch reporting activities will increasingly be absorbed by commercial fisheries. In a 2005 Questions and Answers document, DFO states:[258]

[254] CAN184771 at p. 6
[255] CAN184771 at p. 6
[256] CAN114126 at p. 1
[257] CAN193777 at p. 2-3
[258] CAN184733 at p. 2. See also CAN194085 at p. 2.

> *It is neither equitable nor fair to ask taxpayers to pay for benefits used by people who profit from the use of public resources. We are asking these fishing stakeholders to pay for the cost of doing their business. It is not unreasonable to expect stakeholders to pay for the cost of doing their business. It is not unreasonable to expect that a self-reliant industry should pay its own way while it gains greater rights to co-management of natural resources.*

Recent Developments

141 In addition to the increased fishery monitoring and catch reporting requirements in the Area E Gillnet fishery implemented in 2010, particularly the 35% dockside monitoring program and the use of eLogs, the most significant change to commercial monitoring techniques has arisen from the piloting of individual quota ("IQ") and individual transferable quota ("ITQ") fisheries. For a description of developments regarding IQ and ITQ fisheries, see the commission's policy and practice report entitled "Commercial Salmon Fishing: Licensing, Allocation and Related Issues."

142 DFO has stated its commitment to implementing defined shares in the management of salmon fisheries.[259] This is intended to provide for greater certainty and stability for both commercial and First Nations fishers.[260] However, IQ and ITQ fisheries may require stronger fishery monitoring and catch reporting, including designated landing sites with independent verification for all fishers,[261] and possibly directed enforcement efforts and regulatory support.[262] It is expected that this may increase costs for fishery monitoring and catch reporting, which will be paid for by harvesters.[263]

143 Another recent development is the creation of a Fishery Monitoring Compliance Program, which has been developed to automate and streamline the process of identifying non-compliant fishers. DFO fisheries managers and conservation and protection staff will receive automated FOS (Fishery Operations Systems) reports

[259] CAN045971 at p. 111 and CAN141765 at p. 2
[260] CAN141765 at p. 3
[261] CAN254077 at p. 4
[262] CAN141765 at p. 12
[263] CAN006863 at p. 22, CAN141765 at p. 8 and CAN254077 at p. 4

via email at one hour intervals during the fishery opening, to help them identify fishers who are not in compliance with fishery requirements.[264]

144 Increasing market demands for eco-certification, or new traceability requirements to access certain export markets, also increase pressures for enhanced fishery monitoring and catch reporting and have been an emerging consideration for fisheries managers and harvesters.[265]

Aboriginal Fisheries

Context: Aboriginal Fisheries Strategy

145 In 1992, DFO introduced the Aboriginal Fisheries Strategy ("AFS") to provide, among other things, for the effective management of the Aboriginal fishery. In March 1993, DFO announced that fish caught under AFS agreements in the Lower Fraser and Somass River areas, whether for sale, or for food, social or ceremonial ("FSC") purposes would be accounted for in a "comprehensive catch program." Mandatory reporting provisions would be negotiated as a component of fisheries agreements and adherence to reporting requirements by Aboriginal groups would be strictly enforced by fishery officers. In addition, all fish caught were to be landed at designated landing sites as pre-declared by fishers.[266]

146 In 1993, DFO also entered into the Fraser Watershed Agreement[267] with a group of approximately two dozen Aboriginal organizations situated in the Fraser Watershed. This agreement expired on March 31, 1999 and was not renewed. However, several of its provisions set the background for catch monitoring during the early implementation of the Aboriginal Fisheries Strategy. For example, s. 5.7 of the Fraser Watershed Agreement provided for a Monitoring and Enforcement Committee to be formed with representatives from the signatory First Nations and DFO. This Committee would provide consensus recommendations on coordinated monitoring and enforcement plans, including details as to landing

[264] CAN285158 at p. 219
[265] CAN285064
[266] CAN002323 at p. 1
[267] CAN285118

sites, inspections, data collection, quality control, monitoring, daily enforcement activities and reporting mechanisms. The Fraser Watershed Agreement also provided that bilateral AFS agreements made between DFO and First Nations signatories would, at a minimum, include provisions on catch monitoring programs, reporting requirements, use of landing sites, inspections, counting of fish, First Nations fishery monitors and enforcement protocols for failure to report catch or appear at landing sites.[268]

147 Although the Fraser Watershed Agreement is no longer in force, the 1993 Policy for the Management of Aboriginal Fishing,[269] which has not been withdrawn, similarly provides that communal fishing licences are to require an Aboriginal organization to "monitor and report to DFO on its harvest"[270] and that AFS agreements and communal licences are to include terms and conditions for monitoring catch to ensure that the group's aggregate harvest does not exceed the communal allocation.[271]

Food, Social and Ceremonial Fisheries

Catch Monitoring Levels

148 In DFO's November 2009 discussion paper entitled "First Nation FSC Catch Monitoring and Reporting: Preliminary Considerations, Standards and Recommendations," three catch monitoring levels for food, social and ceremonial fisheries are described as follows:[272]

- Low or Basic - Applicable where fisheries are carried out by individuals using relatively low impact gear on single stocks or mixed stocks of equal strength. Reporting is generally fisher dependent and catch reports are collected and submitted either monthly or annually. Examples of fisheries to be monitored at the low or basic level include in-river dip net or set net fisheries in terminal areas or occasional marine or freshwater fisheries using sport gear.[273]

[268] CAN285118 at s. 7
[269] CAN008862
[270] CAN008862 at s. 2
[271] CAN008862 at s. 9
[272] CAN077022
[273] CAN077022 at p. 23

- Moderate - Applicable where fisheries are carried out by individuals or groups on stocks with low or moderate conservation risks. Exploitation rates and effort are relatively predictable and the target stocks have stable abundance. By-catch is also predictable and manageable and reliable catch reporting has been demonstrated by the harvesting group in recent years. Examples of fisheries to be monitored at the moderate level include in-river dip net or set net fisheries on stocks with moderate and manageable conservation risks, marine or estuary harvest with gillnets or troll gear on stocks with moderate and manageable conservation risks or seine fisheries (purse or beach seine) on abundant stocks in terminal areas with manageable by-catch risks.[274]

- Enhanced - Applicable where fisheries have high or unknown conservation risks. There may be significant by-catch issues or the fishery may occur on an indicator stock. The expected effort and/or exploitation may be high and future fishing opportunities may be dependent on high precision and timely monitoring and reporting. The fishery may require tracking of allocations or shares and may seek eco-certification. Examples of fisheries to be monitored at the enhanced level include Fraser sockeye fisheries with significant conservation concerns for by-catch of Cultus/Early Stuart or Thompson coho, marine coordinated seine fisheries, defined share or demonstration fisheries and terminal seine or gill net fisheries targeting indicator stocks.[275]

149 At present, it does not appear that this categorization has yet been applied to First Nations fisheries.

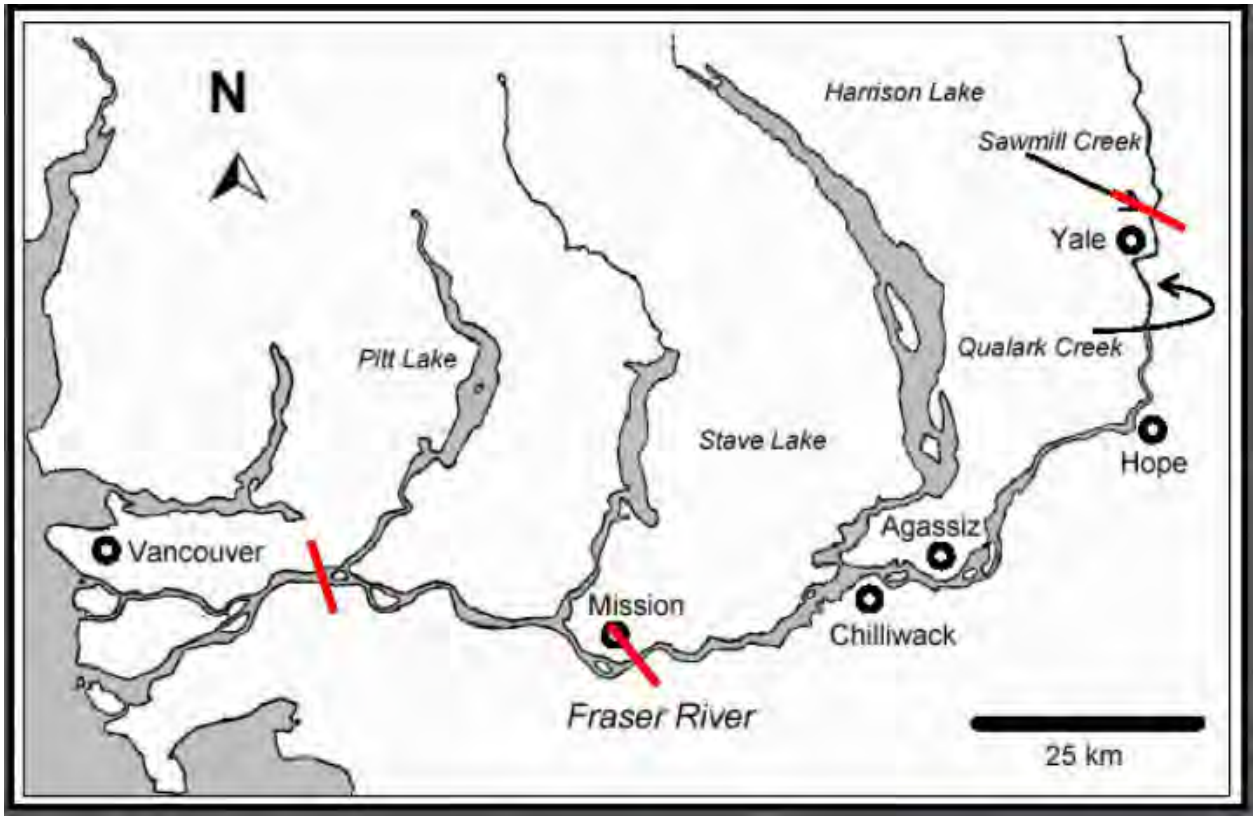
Current food, social and ceremonial monitoring by area

Lower Fraser

150 For the purpose of fisheries management, the lower Fraser is divided into three sections: mouth to Port Mann Bridge; Port Mann Bridge to Mission; and Mission to Sawmill Creek. Figure 7 illustrates the three management areas of the lower Fraser River.

[274] CAN077022 at p. 23
[275] CAN007022 at p. 23-24

Figure 7: Management areas for Lower Fraser Aboriginal fisheries[276]



Lower Fraser: Mouth to Port Mann Bridge

151 From the mouth of the Fraser River to the Port Mann Bridge, Aboriginal fisheries are conducted by Musqueam, Tsawwassen, New Westminster and Tsleil-Waututh peoples.[277] Fisheries are generally conducted using drift nets with limited set nets and shallow seines, for 24-48 hours once per week during the fishing season.[278]

152 Catch is monitored using a census program for both drift net and set net fisheries. For example, Musqueam and Tsawwassen First Nations conduct 100% hail programs, which are complemented by DFO or Aboriginal fishery officer patrols for on-the-water catch reporting and effort assessment.[279] Final hail

[276] CAN285158 at p. 47
[277] CAN285158 at p. 49
[278] CAN285158 at p. 49
[279] CAN285158 at p. 53

counts are collected by Aboriginal fishery monitors at the close of the fishery, either by phoning in or email catch reporting.[280]

153 Pursuant to the *Fisheries Operational Guidelines* of the Tsawwassen First Nation Final Agreement, the Tsawwassen First Nation's fisheries department also operates a catch validation program. This involves calling every registered or licensed Tsawwassen fisher to verify if they fished and to collect a hail of their final catch,[281] and to perform random and representative counts on an average of 20% of fishers at landing sites.[282] Additional information on the Tsawwassen First Nation fishery monitoring and catch reporting program is provided in the section of this policy and practice report on "First Nation Post-Treaty Fisheries."

154 Fishing effort is based on reports and patrols, and no expansion factor is applied to reported catch because the monitoring program is designed as a complete census with all fishers hailed or counted. No confidence estimates are produced.

Lower Fraser: Port Mann Bridge to Mission

155 From Port Mann Bridge to Mission, Aboriginal fisheries are conducted by Kwikwetlem, Katzie, Kwantlen, Matsqui and Sumas peoples.[283] Fisheries are generally conducted using drift nets, with limited set net and fish wheel use.[284] Drift net fisheries typically occur over 8-12 hours one to three times per week, whereas set net fisheries may occur over 24-72 hours once per week.[285]

156 Both the set net and drift net fisheries are reported using a census program with hails and effort counts collected on-the-water by charter patrols funded by DFO.[286] Final hails and counts of catch are also obtained at landing sites by Aboriginal fishery monitors.[287] Effort information is based on fisher reports and

[280] CAN285158 at p. 53
[281] CAN285372 at p. 437
[282] CAN070649 at p. 35ff
[283] CAN285158 at p. 50
[284] CAN285158 at p. 50
[285] CAN285158 at p. 50
[286] CAN285158 at p. 56
[287] CAN044321 at p. 5

charter patrols. Reported catch is not subject to expansion, there is no third party validation of catch rates and no confidence estimates are produced.

Lower Fraser: Mission to Sawmill Creek

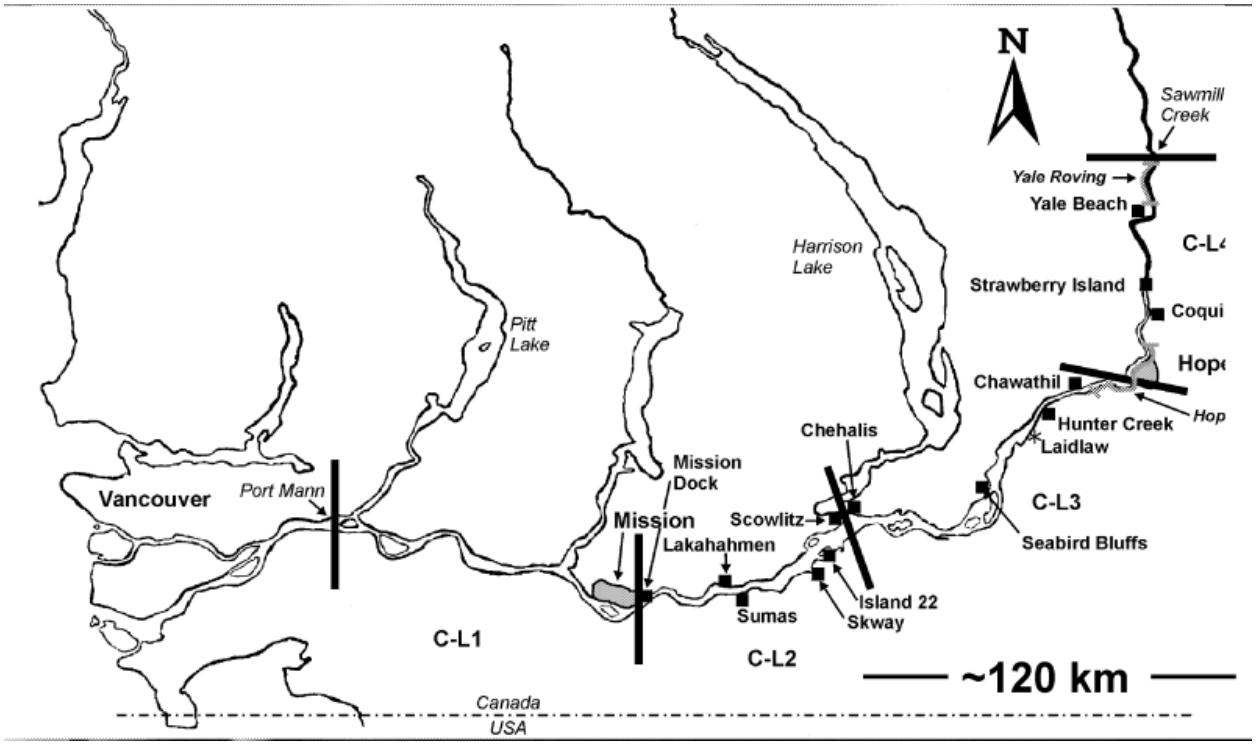
157 From Mission to Sawmill Creek, Aboriginal fisheries are conducted by over 20 groups from the Sto:lo Nation, the Sto:lo Tribal Council and independent Sto:lo bands. Fisheries are generally conducted using a mix of set and drift net fishing, along with limited beach seines and dip net fishing.[288] Set net fisheries typically occur over 24-72 hours, once per week, whereas drift net fisheries may occur over 8-12 hours one to three times per week.[289]

158 Drift nets are monitored using a census program with 100% hails obtained either on-the-water by charter patrols or as final hails at landing sites. Effort information is based on fishery reports and charter patrols. The Fraser Valley Aboriginal Fisheries Society collects drift net catch and effort data for all Aboriginal groups in this area except for Yale, Chehalis, Scowlitz and Cheam bands, which may conduct their own catch monitoring programs.[290] Reported catch is not subject to expansion, there is no third party validation of catch rates and no confidence estimates are produced.[291]

159 Set net fisheries between Mission and Sawmill Creek are monitored using a survey-based estimation program (similar to a creel survey). For the purpose of the survey, this portion of the Fraser River is further divided into three sections and five sub-sections: Mission to Harrison; Harrison to Hope (which is partitioned at Laidlaw); and Hope to Sawmill Creek (which is partitioned at Yale). Figure 8 illustrates the survey areas located between Mission and Sawmill Creek.

[288] CAN285158 at p. 51
[289] PPT: First Nations Fisheries Monitoring in the Lower Fraser River, July 20, 2010, non-Ringtail document
[290] CAN258158 at p. 59
[291] CAN285158 at p. 62

Figure 8: Map detailing Mission to Sawmill Creek survey-based monitoring areas[292]



160 Under the survey-based method, total catch is estimated using the following formula:

Total catch = average catch/net hour x total effort

161 Where average catch/net hour is equal to the catch per unit effort, and total effort is measured in net hours.

162 To obtain catch per unit effort data, hails and counts of catch and hails of effort (nets and hours fished to calculate "net hours") are obtained at various catch monitoring sites by Aboriginal catch monitors. Total effort is determined based on a calculation of instantaneous effort (though aerial overflights) and 24-hour effort profiles based on fisher interviews or patrols. Raw data is collected by the Fraser

[292] Can044321 at p. 3

Valley Aboriginal Fisheries Society[293] and subsequent catch calculations are performed by DFO.

BC Interior

163 The BC Interior Aboriginal fisheries are partitioned into three major management zones: mid-Fraser; upper-Fraser; and upper-upper-Fraser. Figure 9 illustrates these BC Interior management zones.

[293] CAN285158 at p. 60

Figure 9: First Nations Catch Monitoring Program Map[294]

[294] CAN278134 at p. 2

BC Interior: mid-Fraser

164 The mid-Fraser area includes portions of the Fraser River and the Thompson River. As many as 122 nets and 29 dip nets have been observed during peak fishing in this area, with an average catch of just under 138,000 sockeye per year from 2001 to 2008.[295]

165 For the Fraser River and Lower Thompson River portion of this area, the monitoring method used is an aerial roving access survey. This is a form of creel survey that is typically implemented following the Early Stuart fishery closure and uses the MERCI (Management and Evaluation of River Catch Information) database. Catch information is derived from interviews with fishers conducted by vehicle, boat and foot patrols. Effort information is derived from instantaneous effort counts using overflights and boat patrols, coupled with 24-hour effort profiles obtained by performing spiral patrols around known access sites.[296] An estimate of total average fishing effort (net hours) is multiplied by the average catch rate (fish caught per net hour) to achieve a total catch estimate. Catch estimates are calculated on a weekly basis for each gear type and species.[297]

166 For the Upper Thompson River and the remaining Thompson River watershed, fishing is spread out and conducted using set nets, beach seines, drift nets, spears, gaffs and enumeration weirs for an average catch of just under 4,000 sockeye per year from 2001 to 2008.[298] This fishery is monitored using a census program. Aboriginal fishery monitors gather catch information either over the telephone, or by travelling to fishing sites and interviewing fishers. As this is a census program, there is no expansion of catch numbers and missing information may result in an underestimate of catch.[299]

[295] CAN285158 at p. 34
[296] CAN285158 at p. 34
[297] CAN285158 at p. 34
[298] CAN285158 at p. 30
[299] CAN285158 at p. 31

BC Interior: Upper-Fraser

167 The upper Fraser River contains over 40 individual fishing sites on the Fraser and Chilko /Chilcotin Rivers, many of which are actively fished at night. Fishermen target sockeye and chinook using dipnets and one fish wheel for an average catch of just under 30,000 sockeye per year from 2001 to 2008.[300] Fisheries in this area are monitored using a census program that is complemented by sampling for expansion purposes. Fishery monitors attempt to interview all fishers at particular sites to collect catch and effort information. This direct count forms a census. However, catch information is expanded using sampling interviews to account for the limited coverage of the fishery that occurs early and late in the season, from incomplete (mid-trip) interviews, or from unmonitored fishing days. In recent years, between 11% and 20% of the total catch is expanded.[301]

BC Interior: Upper-upper-Fraser

168 The upper-upper-Fraser is a large area that includes portions of the Fraser, Nechako and Stuart River systems. Fishing effort is broadly dispersed throughout this area, with up to 85 nets, one fish wheel (no longer used) and one enumeration weir used during peak fishing times for an average catch of just under 14,000 sockeye per year from 2001 to 2008.[302] This fishery is monitored using a census program where Aboriginal fishery monitors gather information by telephone or by boat and vehicle trips to fishing sites. As this is a census program, there is no expansion of catch numbers and missing information may result in an underestimate of catch.[303]

[300] CAN285158 at p. 32
[301] CAN285158 at p. 32
[302] CAN285158 at p. 28
[303] CAN285158 at p. 28

South Coast

169 DFO's South Coast management area includes all of Vancouver Island and the Central Coast of British Columbia. Here, food, social and ceremonial fishing occurs in the marine areas and also in terminal areas such as Somass, Cowichan, Nanaimo, Nimpkish and other river systems subject to abundance.[304] The following figure illustrates DFO's south coast management area.

Figure 10: Map of DFO South Coast Management Area[305]

[304] CAN285158 at p. 77

[305] http://www.pac.dfo-mpo.gc.ca/habitat/referral-services/ref-ren_southcoast-eng.htm

170 In general, marine harvests are performed with commercial vessels using seine net or gillnet, although some troll fisheries also occur. 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.[306] Catch information is collected by Aboriginal fishery guardians by date, area and gear type, including numbers for catch, by-catch and releases. These reports are provided to DFO on a weekly basis and DFO may expand reported numbers based on observations of effort.[307]

171 Specific fisheries located in the South Coast area are described below.

South Coast: Northern Johnstone Strait (Area 12)

172 In Northern Johnstone Strait, participation (effort) in the fishery is estimated in terms of permits issued by First Nations under their communal licences. Approximately 40 seine, gillnet and troll licences catch between 30,000 and 50,000 sockeye salmon per year. Fishing effort is verified by Aboriginal fishing guardians and DFO patrols. Catch reports are provided to DFO by the First Nations on a weekly basis, with a limited validation of landings. DFO may expand reported numbers based on its own observations of effort and catch.[308]

South Coast: Southern Johnstone Strait (Area 13)

173 In Southern Johnstone Strait, participation (effort) in the fishery is estimated in terms of permits issued by the A'Tlegay Fisheries Society for seines, gillnets, and trolls. Approximately 130 permits are issued per year for an average annual catch of 40,000 to 50,000 sockeye salmon.[309] Catch estimates are derived from an electronic catch reporting system called the "A'Tlegay FSC Data Reporting System." A'Tlegay fishery guardians monitor food, social and ceremonial fisheries on site and 90% of catch is validated upon offloading.[310] Catch data is

[306] CAN285372 at p. 424
[307] CAN285372 at p. 424
[308] CAN285372 at p. 424
[309] CAN285372 at p. 425
[310] CAN285372 at p. 425

captured in the field electronically by a monitor and is downloaded to a central information system where it is exported automatically to DFO. This database and information system has been functioning successfully for the past six years and is in the process of being expanded to other First Nations groups.[311]

South Coast: Strait of Juan de Fuca

174 In the Strait of Juan de Fuca, approximately two to four seine boats and a number of small gillnet vessels fish under the authority of supplemental communal licences.[312] These licences specify vessel name, catch allocation, time and area to be fished. Vessels are required to carry an aboriginal fishery guardian and to report their catch and place and time of offloading to a fishery manager. Catches by seine vessels are periodically audited at the point of landing, and these audits have generally shown catch reports to be accurate.[313]

South Coast: West Coast of Vancouver Island (Area 20 and Area 121 to 126)

175 In the West Coast of Vancouver Island, approximately ten vessels catch what is generally thought to be less than 500 Fraser sockeye salmon per year.[314] Catch is reported on a monthly basis to an Aboriginal fisheries manager. Compliance and catch reporting is reported as variable and rarely audited.[315]

[311] CAN285158 at p. 84
[312] Note that several Aboriginal groups in this area are not party to AFS agreements.
[313] CAN285372 at p. 432
[314] CAN285372 at p. 430
[315] CAN285372 at p. 430

Economic Opportunity and Demonstration Fisheries

Lower Fraser

176 First Nations economic opportunity fisheries have typically been held in the Lower Fraser area, between the mouth of the river and Sawmill Creek. The gear used in these fisheries includes drift nets, set nets, purse seines and beach seines.[316] Openings can last anywhere from 6 hours to 300 hours depending on gear type and stock abundance[317] but will typically last between 24-48 hours.

177 Lower Fraser economic opportunity fisheries are monitored using a mandatory landing program with 100% validation (counting) by a dockside monitor. Dockside monitoring programs are run by Aboriginal monitoring organizations and currently, third party validation of catch is not required.[318] Landing slips are provided to vessel masters upon offloading of catch and validation. These landing slips have been compared to fish slips for the general commercial fishery,[319] but will include additional information obtained through counts of kept catch and hails of released fish.

178 In the lower Fraser, effort data is provided by overflights for set net fisheries above Mission and by on-the-water vessel and crew counts throughout.[320] However, catch per unit effort is not estimated[321] and because the mandatory landing program is expected to account for all fishers (providing a complete census), confidence estimates are not produced.[322]

179 Economic opportunity or demonstration fisheries in selective fisheries also require 100% observer coverage and set-by-set catch recording.[323] For example, economic opportunity or demonstration beach and shallow seines require a

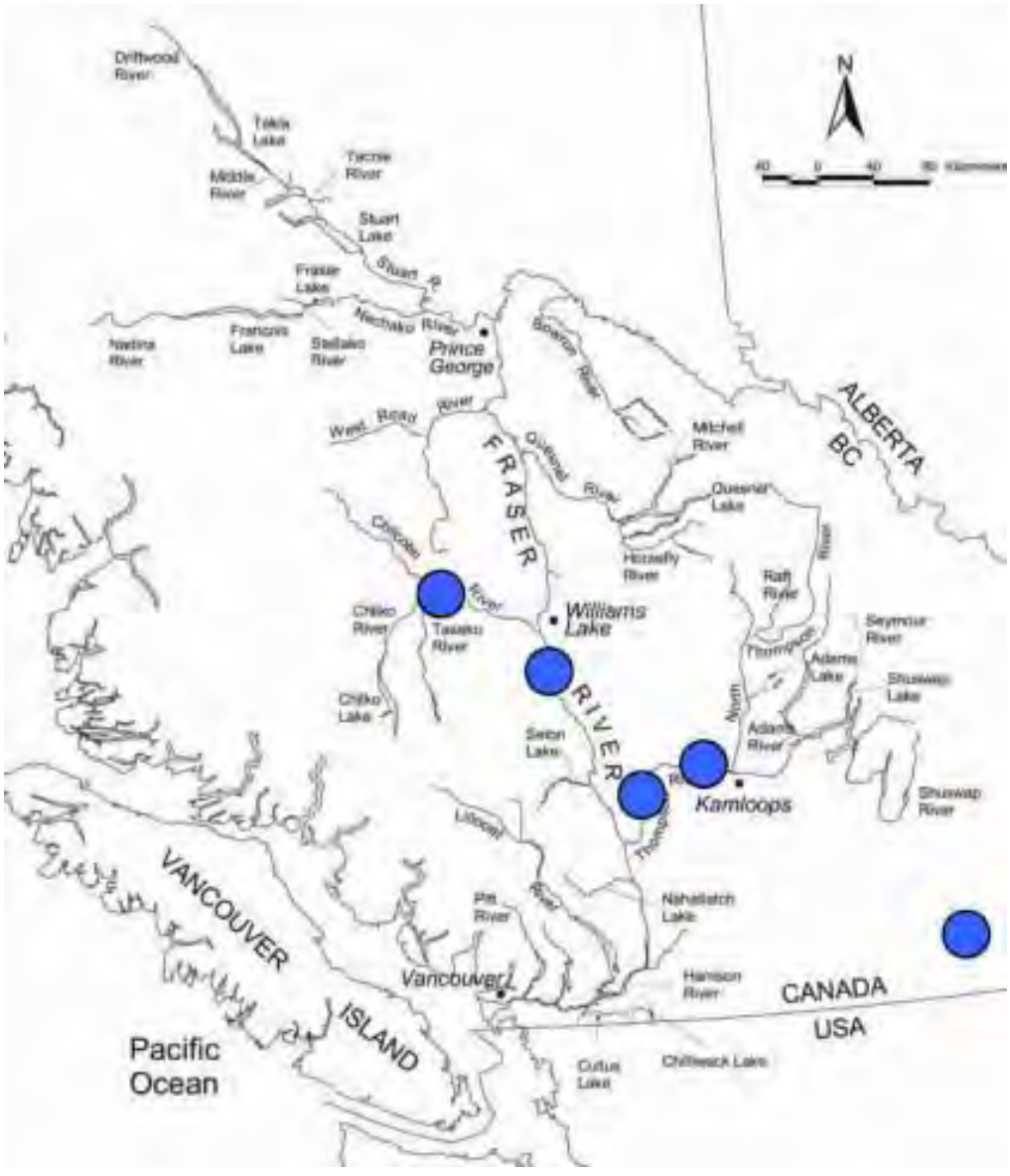
[316] CAN285158 at p. 106
[317] CAN044321 at p. 4
[318] CAN285158 at p. 108
[319] CAN178000 at p. 6
[320] CAN178000 at p. 6
[321] CAN285158 at p. 108
[322] CAN285158 at p. 111
[323] CAN285158 at p. 109

minimum of one observer per fishing crew counting and recording fish (kept and released) for each set and completing landing slip forms.[324]

BC Interior

180 In 2010, several demonstration fisheries were conducted in the BC Interior. Figure 11 illustrates the location of these demonstration fisheries.

Figure 11: Map of BC Interior Demonstration Fisheries, 2010[325]



[324] PPT: First Nations Monitoring in Lower Fraser River, July 20, 2010, non-Ringtail document
[325] CAN285158 at p. 91

181 Demonstration fisheries in the BC Interior are near-terminal or terminal fisheries that typically target abundant stocks in a localized manner, using dipnet, gillnet, fish wheels, beach seine and in one case, commercial seine boat.[326] In 2010, preliminary catch estimates indicate that the demonstration sockeye harvest in Fraser tributaries was approximately 194,000 fish.[327]

182 Catch monitoring for these fisheries is conducted using a census method undertaken by the harvesting group with oversight from DFO. Catch and by-catch is recorded daily and fish are tracked using fish slips.[328] For 2009-2010, First Nations demonstration fisheries were also required to have 100% enumeration of catch using mandatory landing sites[329] with costs paid for by harvest groups.[330] However, catch monitoring records are not independently verified and there may be a need to standardize monitoring practices among different Aboriginal groups.[331]

First Nation Post-Treaty Fisheries

183 The Tsawwassen First Nation Final Agreement, which came into effect on April 3, 2009, is currently the only modern treaty applicable to the management of Fraser River sockeye salmon. Under this treaty, the Tsawwassen First Nation assumes fishery monitoring and catch reporting responsibilities as follows:

- providing catch data and other information related to fish and aquatic plants harvested under the Tsawwassen Fishing Right (as defined in the treaty) required by the Tsawwassen Harvest Document (similar to a licence), or under federal or provincial law;[332] and

[326] CAN285158 at p. 92.
[327] CAN285158 at p. 100
[328] CAN285158 at p. 93
[329] CAN006863 at p. 22
[330] CAN285158 at p. 95
[331] CAN285158 at p. 94
[332] *Tsawwassen First Nation Final Agreement*, Chapter 9, s. 22.

- developing a Tsawwassen Annual Fishing Plan that includes, *inter alia*, preferences as to the monitoring of harvests, notifications and identification and reporting of harvest.[333]

184 The Tsawwassen Fisheries Operational Guidelines[334] which accompany the Tsawwassen First Nation Final Agreement and are developed jointly with Canada, set out detailed fishery monitoring and reporting requirements. Section ten of these Guidelines provides that Tsawwassen fishery monitoring and catch reporting requirements will be consistent with DFO regional catch monitoring and stock assessment standards.

185 In addition to regional standards, Tsawwassen fishery monitoring and catch reporting is enhanced in several respects. Participants in the Tsawwassen fishery are required to notify the Tsawwassen Fishery Department of their intentions to fish prior to the first opening of the fishery they wish to participate in, must maintain daily fishing logs, and must report their catch and fishing effort information to Tsawwassen after completion of each fishing period.[335] If a designated fisher does not report to the Tsawwassen Fishery Department, then Tsawwassen fisheries staff will phone that fisher to verify their participation in the fishery and to obtain catch reports.[336]

186 Tsawwassen fishery monitors are to conduct on-the-water catch monitoring surveys or patrols every day during the fishing period to record vessels participating in the fishery.[337] Shore based fishery monitors are to verify catch per vessel data through a random and representative catch count for 20% of vessel landings.[338] Tsawwassen is required to provide a preliminary catch report to DFO within 24 hours of the close of a fishing period, including names, vessel

[333] *Tsawwassen First Nation Final Agreement,* Chapter 9, s. 65-66.
[334] CAN070649
[335] CAN050557 at p. 4-5
[336] CAN182374 at p. 2-3
[337] CAN050557 at p. 4-5
[338] CAN070649 at p. 70

identification numbers, gear, hours fished, number and species of fish caught and released. This report is to be finalized within 48 hours.[339]

Reviews of Aboriginal Fisheries Monitoring and Catch Reporting Programs

187 DFO's approach to Aboriginal catch monitoring programs has been reviewed several times since the implementation of the Aboriginal Fisheries Strategy. This policy and practice report highlights only a few of these reviews.

188 In 1994, A. Cass and A.R. Kronlund drafted "Catch Estimation Programs in the 1993 Fraser River Indian Fishery: Status and Recommendations."[340] In this report, the authors noted that "political strife" between DFO and First Nations and among First Nations "overwhelmed attempts to implement comprehensive, cooperative catch estimation programs in 1993" and that "within DFO there was no designated responsibility centre to coordinate the activities of at least six distinct groups involved in AFS implementation."[341] This report also suggests that data collected by First Nations groups might not be shared where there is a sense of mistrust in "ownership of data by the Crown."[342] To address these and other issues, the authors made several recommendations, including:

- establishing a Fraser River fisheries management working group to ensure coordination and understanding between fishery managers and First Nations technical staff;
- establishing centralized program coordination within DFO;
- uncoupling funding of data collection from allocation issues;
- separating data collection from enforcement functions; and
- providing timely funding, including for biostatistical research.

189 In 2002, ESSA Technologies Ltd. was hired to review First Nations sockeye catch estimates in the mid-Fraser, in light of reductions in the number of 24-hour

[339] CAN050557 at p. 4-5
[340] CAN046940
[341] CAN046940 at p. vii
[342] CAN046940 at p. vii

effort surveys and aerial overflights as compared to 2001.[343] In this report, ESSA found that the 2001 catch monitoring program in the mid-Fraser was statistically defensible.[344] However, the reduction of funding in 2002 restricted crucial survey components in the catch monitoring program. "Ultimately this funding reduction limited the ability of fisheries management staff to maintain the feature of the 2001 program that created most of its success – repeat 24-hour effort surveys and multiple aerial overflights." As a result of budget cuts, "these restrictions produced a worrisome reduction in program reliability relative to 2001 levels."[345]

190 In mid 2002, a Catch Monitoring Working Group and an Aboriginal Catch Data Subcommittee were formed to improve the quality and accessibility of Pacific Region catch data. In a resulting discussion paper entitled "Aboriginal Catch Data in the Pacific Region,"[346] the groups reported that "there is an inconsistent approach to Aboriginal catch data collection throughout the region, and variable levels of resources allocated to different fisheries and areas."[347] Catch data quality was higher in areas with more resources (staff and funding) and where resources were absent, Aboriginal catch data was also absent. The roles and responsibilities of staff involved in catch monitoring activities was unclear and needed to be defined in work descriptions or annual DFO business plans. Where First Nations refused to provide catch reports, or provided them irregularly, DFO did not usually impose penalties as doing so would conflict with the Department's long-term goal of building cooperative relationships with First Nations.[348]

191 In 2005, another Regional First Nations Fisheries Monitoring and Catch Reporting Team was tasked with developing a strategy to work with First Nations to develop improvements to Aboriginal catch monitoring.[349] This team requested that DFO staff refocus discussion on catch monitoring and also convened various

[343] CAN155909
[344] CAN263241 at p. 1
[345] CAN155909 at p. 1
[346] CAN163862
[347] CAN163862 at p. 2
[348] CAN163862 at p. 2
[349] CAN018552

workshops to develop fisheries monitoring and catch reporting standards for food, social and ceremonial fisheries.[350]

Summary of Challenges

192 A number of challenges have been expressed by both DFO and First Nations in regards to fishery monitoring and catch reporting for Aboriginal fisheries.

193 Aboriginal fishery monitors and fishery guardians paid through Aboriginal Fisheries Strategy agreements may be faced with increasing workload as fishing effort and monitoring needs increase with growing Aboriginal populations.[351] Where funding remains static, increasing workloads may lead to incomplete coverage of the fisheries.[352] In general, some have expressed concerns that funding for First Nations fisheries managers, monitors and guardians is inadequate and inconsistent, leading to shortfalls in technical capacity and high staff turnover.[353] In some cases, Aboriginal groups also question the use of data provided to DFO and may therefore be reluctant to provide it.[354]

194 Unwillingness to report catch numbers or to run catch monitoring programs has been noted for a handful of First Nations.[355] This requires DFO to make "very rough estimates" in some cases, using indirect measures for catch,[356] or to consider alternative monitoring techniques such as the use of long-range video cameras.[357] In other cases, fisheries managers may accept that some catch will not be accounted for. DFO fishery monitors and Aboriginal fishery guardians have also expressed concerns for personal safety when monitoring fisheries

[350] CAN038596
[351] CAN184729 at p. 4
[352] CAN184729 at p. 4
[353] CAN038596 at p. 17-18
[354] CAN077022 at p. 19
[355] CAN088195, CAN087543
[356] CAN017150 at p. 2. See also CAN088195 at p. 1
[357] CAN178049 at p. 4

where they were not welcome[358] and DFO has stopped sending fishery monitors to such locations.[359]

195 Concerns have also been expressed as to the limited validation of catch numbers and release numbers.[360] As with any hail-based reporting programs, there is the potential for inaccurate reporting or missed fishers.[361] There have also been anecdotal reports of under-reported catch.[362]

196 DFO employees have also expressed concerns over decreasing budgets for fishery monitoring and catch reporting. For example, between 2001 and 2004, the budget for catch monitoring in the BC Interior was significantly decreased, resulting in a "drastic decline" in operating capacity for catch monitoring[363] that was anticipated to result in catch estimates subject to a standard deviation of 100% or higher.[364]

197 In the mid-Fraser, sockeye catch monitoring program components also appeared to decrease between 2001 and 2004, and increased after the Williams Southern Salmon Fishery Post-Season Review was released in March 2005. The following table sets out sockeye catch monitoring program components in the mid-Fraser from 2001-2005.

[358] CAN178049 at p. 7
[359] CAN178049 at p. 3
[360] CAN044321 at p. 21
[361] CAN285158 at p. 55
[362] CAN164696
[363] CAN150339 at p. 1. See also CAN263241.
[364] CAN150339 at p. 2

Table 3: Mid-Fraser Sockeye Catch Monitoring Program Components 2001 to 2005[365]

	2001	2002	2003	2004	2005
Helicopter Overflights	41	7	0	0	28
Boat Patrols	42	28	31	33	35
24-hour Effort Surveys	107	78	69*	0**	51
16-hour Effort Surveys	0	0	0	78	102
Interviews	1558	1345	1203	1483	2022
Vehicle Patrols	104	45	93	64	101
Foot Patrols	140	105	50	62	268

There were no overflights in 2003, 2004

* 24-hour Effort sites monitored in combined patrol due to budget constraints in 2003, 2004

**24-hour Effort Surveys adjusted to 16-hour Effort Surveys due to budget constraints

Recent Developments

198 In November 2009, DFO released its discussion paper entitled "First Nation FSC Catch Monitoring and Reporting: Preliminary Considerations, Standards and Recommendations."[366] This discussion paper was 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.[367] It appears that this document is to support a process of consultation with First Nations in respect of fishery monitoring and catch reporting.

199 In addition, specific informational tools are being improved or developed to support food, social and ceremonial fisheries monitoring. This includes the improvement of the creel survey data analysis program (CREST), the development of a food, social and ceremonial fishery database, and expanded

[365] CAN278134 at p. 21

[366] CAN077022

[367] CAN077022 at p. 1

use of fisheries and data management tools (following the A'Tlegay Fisheries Society model).[368]

200 Fisheries and data management tools may be customized to meet the particular needs of a First Nation. For example, catch calendars may be adapted in different communities to assist in the collection and forwarding of local food, social and ceremonial catch information.[369] Also, as explained in the 2009-2010 Southern Integrated Fisheries Management Plan for sockeye, DFO has been working with First Nations groups since 2000 to design and develop an electronic recording and reporting system specifically for food, social and ceremonial catches. This would be a personal computer based software program that accommodates the particular reporting requirements of a given community.[370]

201 To assist First Nations with fishery monitoring and catch reporting requirements, DFO has also recently created a "Data Management Advisor" position.[371] Data Management Advisors report to First Nations organizations and are tasked with assisting in determining information requirements and planning fishery monitoring programs, supporting local First Nations, developing monitoring and reporting capacity within a First Nation (including technical capacity) and providing feedback on the quality of monitoring and reporting data obtained. This position has been successfully piloted in the Central Coast and will be created for other Aboriginal organizations. The position is to be funded through the Aboriginal Fisheries Strategy and the Aboriginal Aquatic Resource and Oceans Management Program.

[368] CAN077023 at p. 3
[369] CAN285064 at p. 5
[370] CAN045971 at p. 96. Note however, that the creation of non-integrated data storage and information management systems has been criticised in several reports. See the Information Management section of this policy and practice report.
[371] CAN077022 at p. 22

202 Various First Nations fisheries organizations are also working to develop or improve their fishery monitoring and reporting programs. The First Nations Fisheries Council's Food, Social and Ceremonial Fisheries Working Group, for example, is working to gather and develop information to advance a common foundation for understanding information and data needs for food, social and ceremonial fisheries management.[372] DFO has expressed its support for the First Nations Fisheries Council and envisions this group "facilitating discussions between DFO and First Nations towards understanding and adopting enhanced catch monitoring and reporting standards" for food, social and ceremonial fisheries.[373]

Data Storage and Information Management

Reviews of DFO Fishery Monitoring and Catch Reporting Information Management Systems

203 Information obtained from fishery monitoring and catch reporting activities is only useful if it can be integrated with other data and can be accessed in a timely manner by those who need it.[374] In the past decade, however, reports on DFO's data storage and information management systems for fishery monitoring and catch reporting data have indicated the need for improvements.

204 Several reports suggest that DFO databases may contain incomplete and therefore inaccurate information. For example, in 2002, a DFO discussion paper entitled "Aboriginal Catch Data in the Pacific Region" stated that because Aboriginal fisheries catch data was often not forwarded to a regional datacentre, the regional database has "consistently been incomplete and inaccurate and summary reports produced from it are not useful."[375]

[372] First Nations Fisheries Council, FSC Working Group, Draft Workplan, October 29, 2010: http://www.fnfisheriescouncil.ca/index.php/more-info/search-documents/doc_download/695-fscdraftworkplan
[373] CAN069374 at p. 4
[374] CAN077022 at p. 7
[375] CAN163862 at p. 1

205 Other reports point to difficulties arising from DFO's use of numerous separate information management systems. A 2006 report by ESSA Technologies reviewing "Fraser River Catch Monitoring Software User Requirements"[376] notes that an efficient data management and analysis tool for all catch monitoring programs was required to address the "too many separate catch data management systems" that existed.[377] If possible, such a system should incorporate all catch estimates in one database. A 2006 national DFO "Audit of the Management Control Framework Supporting Statistical Information on Fisheries" similarly notes that numerous primary systems were used to collect, store and manage information on fisheries. These systems were overseen separately by Science, Fisheries and Aquaculture Management[378] and Corporate Services sectors.[379] In addition, several information management systems under the direction of DFO were maintained by private sector contractors, and an accurate inventory of all catch monitoring systems was required.[380]

206 In 2008, a report entitled "Pacific Region Fisheries Data Systems – The Way Forward"[381] reiterates the problems caused by numerous separate data systems. It finds that the wide diversity of information systems makes data integration and summation difficult. External access to finalized data is typically unavailable and "certainly not timely" and the "net result is significant operational inefficiencies across sectors, distributed and rising costs to maintain many separate systems, reduced capacity to readily support new initiatives and DFO credibility issues."[382] In assessing the severity of the situation, the report suggests that the ability to make harvest management decisions was compromised by disintegrating data management systems:

[376] CAN146033
[377] CAN146033 at p. 11
[378] Now "Ecosystems and Fisheries Management"
[379] CAN024032 at p. 25
[380] CAN024032 at p. 25
[381] CAN004919
[382] CAN004919 at p. 3

> *The disintegration of data, and particularly harvest data, is a serious problem in Pacific Region. It impacts planning, decision making, quota management, stock assessment, compliance, and reporting functions as well as statistical analysis.*
>
> *...This extreme degree of data disintegration and distribution has resulted in a critical loss of ability to report, share or integrate data to make more effective use of it. The ability of the Region to use existing data for integrated management or cross fishery or species analysis has been severely compromised.*[383]

207 In particular, the "Way Forward" document suggests that unclear accountability and governance for data management, inconsistent data content and structure, and diverse and inadequate technology and tools has lead to a host of problems. These include difficulties in accessing and integrating data, missing or inadequate data control, unclear meaning of data, expensive maintenance of data systems, poor support for users, duplication of effort and lack of timely access to information.[384] To address these problems, the "Way Forward" document recommends the creation of a regional framework for the management of fisheries information with defined standards, guidelines, processes, accountabilities, governance, organization and technology.[385]

208 By 2009, several initiatives to improve data storage and information management were underway. However, reports suggest that "fragmentation of data" was still a serious problem that continued to impact DFO's ability to plan, make decisions, operate fisheries, analyze data and communicate results."[386] With over 125 programs run by 20 organizations collecting monitoring data, and with data being stored in over 70 locations in ten formats and under custodianship of nine organizations,[387] DFO staff continued to recommend the development of a comprehensive system for catch data under an integrated regional data system.[388]

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[383] CAN004919 at p. 4
[384] CAN004919 at p. 6-7
[385] CAN004919 at p. 12
[386] CAN004922 at p. 5
[387] CAN004922 at p. 5
[388] CAN077022 at p. 22

Fishery Monitoring and Catch Reporting Information Management Systems

209 As of 2009, there were 100-125 separate sources of fisheries monitoring data, in addition to multiple sources for other types of data such as quota, licences, fishing plans, stock assessments, biological data etc.[389] In some cases, data sets are stored locally by DFO and First Nations fisheries managers.[390] It is beyond the scope of this policy and practice report to describe all fishery monitoring and catch reporting databases. However a few of the major systems are listed below.

CREST

210 The Catch and Release Estimation Tool (CREST) was initially developed in 2009 as a creel survey raw data analysis tool.[391] Since then it has evolved into a catch database for recreational and food, social and ceremonial fisheries and is being implemented throughout the Fraser watershed.[392] CREST database development has been supported by PICFI.[393]

FOS

211 The Fishery Operations System (FOS) was piloted in 2001 with the goal of allowing for an improved regional database for commercial and Aboriginal fisheries (although not all Aboriginal fisheries were included at that time).[394] It is a web-based computer information system with a central data repository and software tools to input, output and manage fisheries data.[395] The types of information that FOS stores includes, *inter alia,* catch data, vessel activity and effort, fishery openings, notices and compliance incidences and inspections.[396] Over 700 people use FOS, including resource managers, stock assessment biologists, fishery officers and contractors (dockside monitors, at-sea-observers,

[389] CAN004919 at p. 4 and CAN004922 at p. 5
[390] CAN018785 at p. 12
[391] CAN006863 at p. 21
[392] CAN006863 at p. 21, CAN142418 at p. 1 and CAN046957 at p. 11
[393] CAN046957 at p. 11
[394] CAN163862 at p. 3
[395] CAN018785 at p. 9
[396] CAN018785 at p. 9

call centres etc.).[397] In March 2006, the Regional Management Committee recommended the extension of FOS capabilities to incorporate and distribute data from Aboriginal and recreational fisheries.[398] However, not all Aboriginal catch data has yet been incorporated into FOS.

PacHarv3

212 The PacHarv3 database was implemented in 1996[399] to store fishery slip data[400] and landed value data,[401] which is typically entered by contractors operating at landing sites.

MERCI

213 The Management and Evaluation of River Catch Information (MERCI) database was implemented in 1998 to manage roving and access site catch monitoring data for select First Nations pink, chinook and sockeye salmon fisheries on the lower and mid-Fraser River.[402] It is a distributed, desktop approach with limited centralization of data, operating on an MS Access 97 platform. MERCI software facilitates the creation of weekly catch estimates using information from First Nations set and dip net fisheries when mandatory landing sites are not used for catch census.[403]

PacFish

214 In 2008, the Pacific Fisheries Data Initiative (PacFish) was launched to create a fisheries information management framework that will provide users of fisheries data with easy and secure access to complete and timely data of known quality.

[397] CAN018785 at p. 10
[398] CAN276891 at p. 2
[399] CAN197192 at p. 2
[400] CAN018785 at p. 13
[401] CAN024032 at p. 25
[402] CAN146033 at p. 2
[403] CAN146033 at p. 2

PacFish is also intended to ensure that the management of data and technology has clear accountabilities and is cost efficient.[404]

215 PacFish is intended to be a comprehensive and regional information management framework, including all operational fisheries information related to, *inter alia*, stock and ecosystem assessment, fishery planning and operations, evaluation and review and compliance and monitoring.[405] All DFO sectors, national headquarters and external experts have been involved in developing the technical and business elements of PacFish, although the Fisheries and Aquaculture Management sector[406] will assume overall responsibility.[407] As of early 2011, the PacFish system has been designed and is now in the implementation phase.[408]

216 The PacFish Initiative is supported through PICFI with funding amounting to approximately $500,000 per year over four years, or $2 million in total.[409]

217 Figure12 illustrates the central coordination of fisheries data to be achieved through the PacFish system. Figure13 illustrates the proposed PacFish database architecture.

[404] CAN004922 at p. 3
[405] CAN004922 at p. 4
[406] Now the Ecosystems and Fisheries Management sector
[407] CAN185531 at p. 8
[408] CAN046957 at p. 6. See also CAN252990 and CAN263254
[409] CAN006863 at p. 17 and CAN015080

Figure 12: PacFish Overview – Central Coordination of Fisheries Data

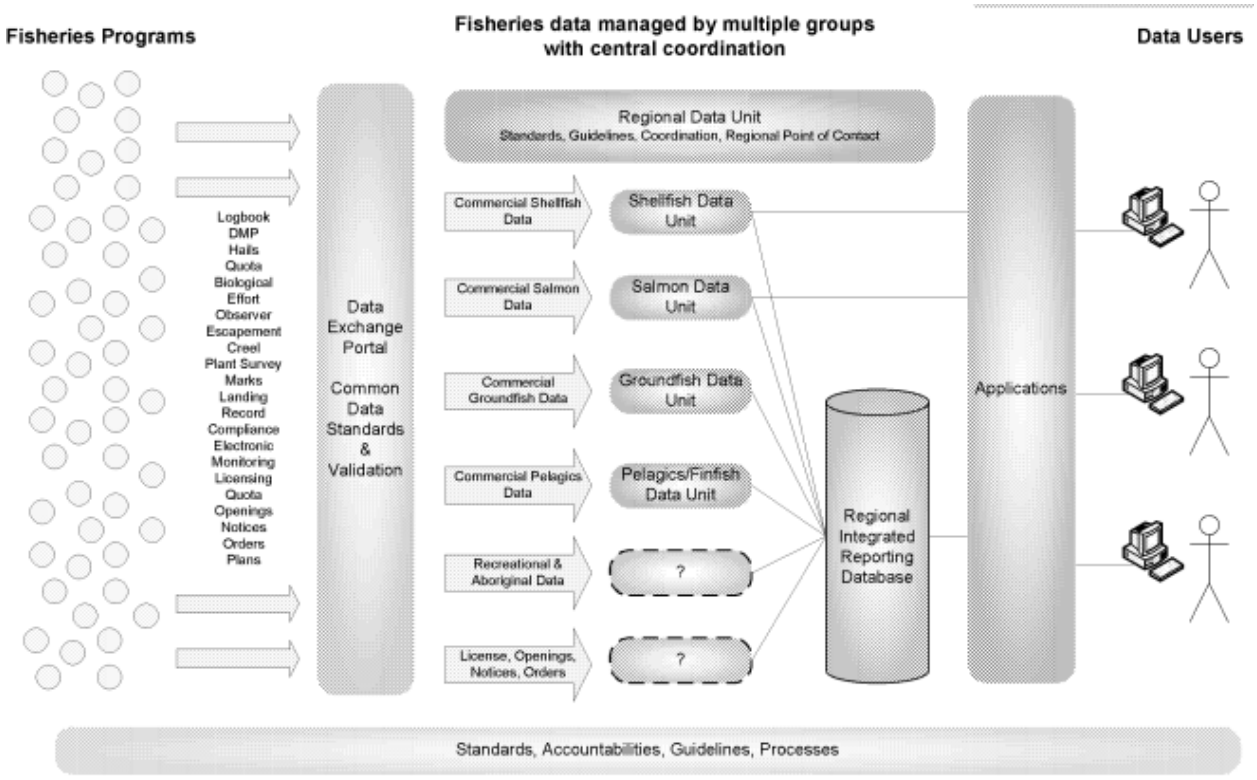
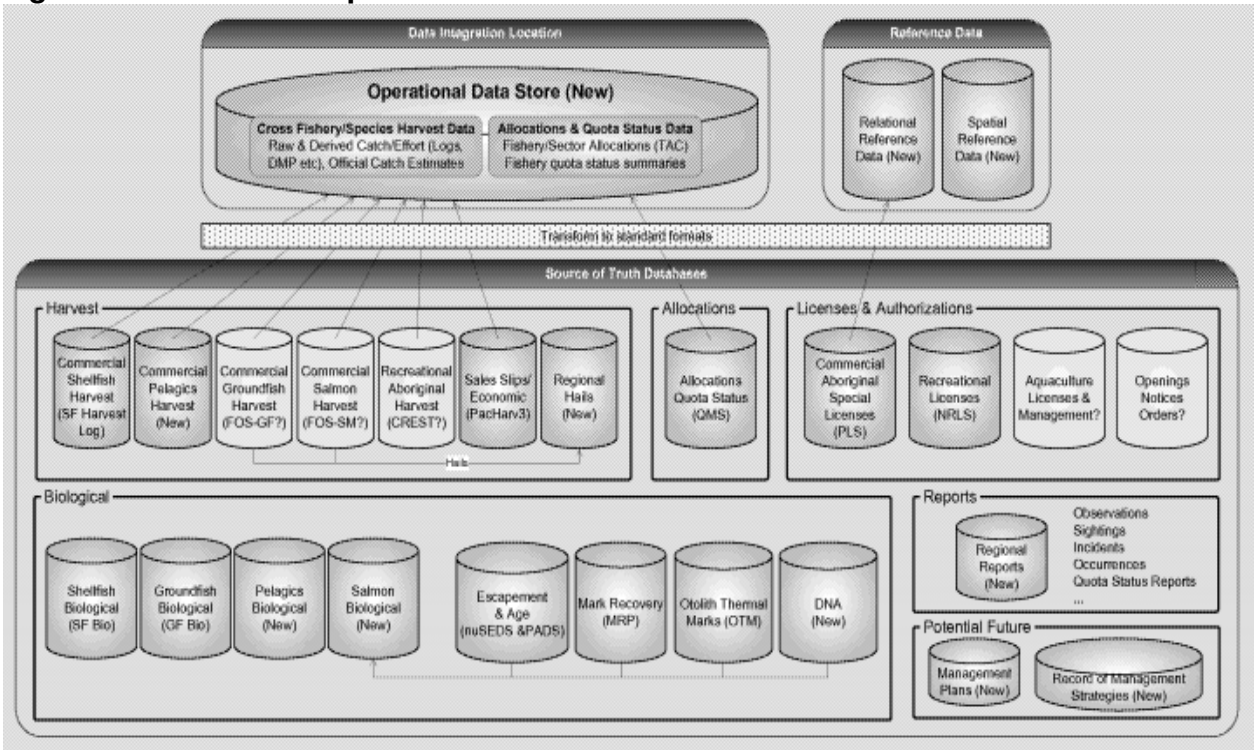


Figure 13: PacFish Proposed Database Architecture[410]



Other Information Management Developments

218 To assist with data collection and management for Aboriginal fisheries, a Data Management Advisor role was created in 2009 and piloted on the Central Coast. This role is funded through Aboriginal Fisheries Strategy and Aboriginal Aquatic Resource and Oceans Management Programs. Data Management Advisors report to First Nations organizations and assist with determining information requirements, planning fishery monitoring programs, supporting local First Nations, developing catch monitoring and data management capacity and tools, and providing feedback to First Nations on the quality of their catch monitoring information.[411]

[410] CAN046957 at p. 8
[411] CAN077022 at p. 22

Appendix 1: A Summary of Selected Recommendations from Previous Reports relating to Catch Monitoring and Fraser River Sockeye

1992 – Peter Pearse: Managing Salmon in the Fraser, Report to the Minister of Fisheries and Oceans on the Fraser River Salmon Investigation [412]

Page number	Recommendation
32-33	*Essential Conditions for success - Strict Enforcement* Any new agreements must have strong enforcement designed to generate the support and cooperation of the native signatories through joint programs, monitoring and surveillance. But since these agreements are made under the authority of the *Fisheries Act*, the Department must accept the ultimate responsibility for enforcement.
35	*Consultative Structures - Inter-agency liaison* One such question relates to the responsibility for collecting and analyzing data about fish stocks and catches. At present this responsibility is divided between the [Pacific Salmon] Commission [and its Fraser River Panel] and the Department, although the agencies depend on each other's information. If the river fishery is to be developed in ways which will be much more demanding of information about migrating stocks (to forestall problems of the kind that gave rise to this inquiry) the responsibilities of these agencies will have to be re-examined to ensure the system as a whole produces the most timely and useful information.
35	*Consultative Structures - Inter-agency liaison* The regulation of fish buyers is another issue. As noted earlier, provincial regulations governing fish buyers on the Fraser last summer were not rigorously enforced, ostensibly because of short notice of the authorization of commercial sales in the Indian fishery. Better arrangements will be needed to ensure the quality of fish is protected, health standards are maintained and records of sales are reliable. Provincial authorities should be encouraged to strictly enforce applicable regulations. Since federal agencies already license the processing plants that handle fish for export, an alternative arrangement would be to assign these responsibilities to the federal government.
36	*Agreements – Guardians* The Agreements provide for native guardians to assist with surveillance of the fisheries and some enforcement functions (excluding the laying of charges.) These arrangements were frequently criticized on several grounds. One was that the guardians were inadequately trained, which is a reflection of the

[412] CAN002473

	general problem of insufficient advance preparation last year. Another was that some guardians were fishermen themselves and therefore had an obvious conflict of interest. A third was that guardians were often stationed where they were expected to enforce regulations against family members and relatives. These problems must be avoided in future.
36	*Agreements – Landing sites* The Musqueam and Tsawwassen group, which fishes from boats with nets, designated particular sites for landing fish under their Agreement, thus facilitating the recording of catches. Upriver, Sto:lo fishermen fish mainly from the shore with set gillnets; the designated landing sites were not enforced. Last summer's experience suggests that in order to maintain accurate records of catches it will be necessary to identify certain sites to which catches must be brought for that purpose.

1992 - P.A. Larkin: Analysis of Possible Causes of the Shortfall in Sockeye Spawners in the Fraser River a Technical Appendix to Managing Salmon in the Fraser[413]

Page number	Recommendation
32	Monitoring of catch and effort is a useful adjunct of enforcement and provides insight into what proportion of the fish in the river may be caught during an opening of some specified length. Sales slips are a further check on catch and are essential for subsequent analysis for future management. The absence, in 1992, of current monitoring information in the region above Sawmill Creek, and of virtually any information on sales of unauthorized catches along the length of the river, has made it difficult to anticipate how best to regulate the fishery in 1993. An opportunity to find out how best to manage the river fisheries was largely lost in 1992. That loss must be made up quickly.

[413] CAN000307

1995 – Hon. John Fraser: Public Review Board, Fraser River Sockeye 1994, Problems and Discrepancies[414]

Rec. number	Recommendation
4	We recommend that DFO, in conjunction with provincial authorities, First Nations, commercial and recreational fishery groups, implement (both in marine and in-river areas) a revised system to ensure that catch information is timely and reliable, given that accurate counting and timely reporting of catch are fundamental to conservation. The system must also include a more stringent paper trail wherein there must be stricter control of landing and sales slips and a mandatory retention of sales slips with fish through to retail sale or export.
25	We recommend that, in First Nations territories where there are no AFS agreements, DFO implement plans to improve the quality of catch estimates.

1996 – Art May: Altering Course, A Report to the Minister of Fisheries and Oceans on the Intersecoral Allocation of Salmon in British Columbia[415]

Page number	Recommendation
xii	"I believe very strongly that the time has come to place more responsibility for access to the resource, and its utilization, with the people who enjoy such access."

1999 – Auditor General of Canada: Chapter 20, Fisheries and Oceans, Pacific Salmon: Sustainability of the Fisheries[416]

Page number	Recommendation
20-17	The Department should assess its information requirements in the areas of data collection, analysis and management, in order to meet its long-term needs and identify priorities under the New Direction policy.
20-18	The Department should evaluate the comprehensiveness and quality of data collected under the Aboriginal Fisheries Strategy (AFS) and the adequacy of the standards and procedures that guide data collection, compilation and reporting, with a view to improving and expanding the role of the AFS in this area.

[414] CAN032201
[415] CAN000280
[416] CAN002511

2000 - Pacific Fisheries Resource Conservation Council, Annual Report, 1999-2000[417]

Page number	Recommendation
25	A more effective process is required to identify and respond to stocks in decline and at risk. This requires meeting basic assessment needs with consistent information about the stocks and their habitats at all life stages. The Council recommends: ... (c) comprehensive monitoring of potentially depressed stocks...

2003 – Tom Wappel: The 2001 Fraser River Salmon Fishery, Report of the Standing Committee on Fisheries and Oceans[418]

Rec. number	Recommendation
4	The Committee recommends that DFO establish realistic Aboriginal food fisheries and that the Department follow through on the commitment of the previous Minister to the Standing Committee on Fisheries and Oceans to ensure that food fishery access is not abused. (p.34)
6	The Committee recommends...that the monitoring and enforcement component be separated out of the AFS agreements and that the guardian program be funded directly to ensure stability of the program and to provide autonomy to Aboriginal fishery officers and guardians.

2003 – Patrick Chamut: Review of the 2002 Fraser River Sockeye Fishery – Report by the External Steering Committee[419]

Rec. number	Recommendation
8	Enforcement: It is recommended that the Department consult with First Nations and stakeholders on enforcement issues: • There will be pre-season meetings involving Conservation and Protection staff from Area offices to address anticipated monitoring enforcement issues, coordinated strategies, and priorities. • There will be pre-season meetings involving Conservation and Protection staff from Area offices to address anticipated monitoring enforcement issues, coordinated strategies, and priorities. • Partnership arrangements and protocols with First Nations and

[417] CAN002574
[418] CAN002446
[419] CAN002450

	stakeholders should be developed or improved, wherever possible. These would formalize the shared roles and responsibilities, and could include improved monitoring and catch reporting, co-management issues, or on-ground interactions between the parties. As well, external members of the Steering Committee advocate more funding to support enforcement activities related to the conduct of Fraser River sockeye fisheries.
10	In-Season Estimates and Data: It is also recommended that the Department work with all harvesting groups to improve the accuracy and timeliness of catch reporting, including adoption of a catch monitoring system to provide information on landings.

2005 – Bryan Williams: The 2004 Southern Salmon Fishery Post-Season Review – Part 1: Fraser River Sockeye Report[420]

Rec. number	Recommendation
3	That sufficient funding needs to be ensured to keep and expand on existing assessment programs. A continuation of "real-time monitoring" (12-hour turnaround) is needed to give PSC and DFO faster and accurate data of the migrating stocks. The continuation of funding from both Canada and the U.S. is needed to pay for the above.
5	The use of the First Nations FSC harvest in marine waters should be incorporated as part of the test fishing program on a long-term basis. This requires secure long-term funding for the catch monitoring carried out during the First Nations Marine Society FSC fishery.
6	That DFO convene a meeting with First Nations, fisheries stakeholders, and Conservation and Protection staff to assess the province-wide state of catch monitoring. The participants should examine budgets, personnel needs, transparency, accuracy (bias), problem areas, and ways to improve monitoring programs in all sectors.
7	That DFO, First Nations and stakeholders establish a semi-regular (perhaps annual) review of the status and adequacy of the province-wide catch monitoring program.
10	That resources for catch monitoring be restored to an adequate level in commercial, recreational, and First Nations fisheries as determined through the process in recommendation 6.

[420] CAN002496

11	That DFO retain the ultimate authority and responsibility for auditing catch monitoring reports and performance.
30	Enforcement must also include adequate presence to deter the concealing of over harvesting of fish by participants from all sectors.
39	A higher level of traceability needs to be in place. DFO should work with stakeholders to identify their harvest.

2006 - Pacific Fisheries Resource Conservation Council, Annual Report, 2005[421]

Page number	Recommendation
10	...unaccounted-for catch, owing to reporting gaps and insufficient monitoring, is another issue that the PFRCC emphasizes should be addressed. If no one can trust the measurement basis for overall catch figures in ocean or freshwater fisheries, the problem of differing estimates will persist and accusations will continue. While there are rough estimates of fish caught, dockside monitoring does not occur in a fully-inclusive way. The documentation of the actual numbers of fish reaching commercial storage facilities is inconsistent even though it should be relatively easy to obtain accurate numbers. There is also little information on what happens to fish leaving commercial facilities; as an example, fish caught in fulfillment of legitimate First Nations aboriginal rights can be stored in commercial facilities, but there is no consistent documentation about what goes back to the First Nations community or into the market place. River enforcement alone could miss situations in which salmon is legally caught but illegally sold. Currently, there is no comprehensive process in place to track salmon from catch to marketplace. The general lack of reporting and inconsistency of data make it impossible to trace the sources, volumes or disposition of the salmon in most instances. It is important for everyone across the fishing, processing and handling system to assume a fair obligation to measure and report as the salmon proceed through the processing, marketing and sales stages. This would deter illegal fishing and sales of fish, and would clearly define the basis for tracing, rather than operating with the hazy definitions of what now constitutes "illegal" or "unreported" catch. Applying such an approach would create consistency without compromising the existing regime of rights, privileges and responsibilities of participants in the salmon fishery. (p.10) Creating traceability of Fraser River sockeye in this way could have a long-term conservation benefit in reducing exploitation of at-risk stocks, as well as

[421] CAN002580

	creating a more reliable and credible basis for management decisions on overall catch levels and allocations. The establishment of reliable traceability through comprehensive catch reporting would provide the model for a comprehensive solution if it were coupled with a more focused monitoring and enforcement regime for illegal fishing and on-going efforts to estimate the strength of salmon runs, natural mortality and numbers reaching the spawning grounds. This approach would most fundamentally be valuable in creating conditions where trust could be rebuilt among all of the harvesters in the Fraser River salmon fishery. It would set the stage for cooperation and trust based on confidence in the reliability of reporting and the resulting numbers. It would help to reinforce the recent collaboration between the commercial and First Nations fisheries related to Cultus Lake. This should be a subject for the entire fisheries community to address and demonstrate a resolve to restore credibility to the catch reporting system.

Appendix 2: List of Documents Referenced in this Policy and Practice Report

TITLE	DOCUMENT IDENTIFIER OR SOURCE
Guidelines Respecting the Issuance of Licences under the *Aboriginal Communal Fishing Licences Regulations (ACFLR)*	CAN000059
Timely Information System of Fish Catches for Fisheries Management, J.O. Thomas and Associates Ltd, Draft, March 1996	CAN000283
Discussion Paper: A New Direction for Canada's Pacific Salmon Fisheries, October 14, 1998	CAN000323
An Allocation Policy for Pacific Salmon, October 1999	CAN000543
Pacific Region 1999 Salmon Net Management Plan, Areas B, D & E, South Coast and Fraser River	CAN000912
Fishery Monitoring and Catch Reporting Standards for Commercial Salmon Fisheries, January 11, 2007, Draft 12	CAN000964
Interim Fishery Monitoring and Catch Reporting Standards for Commercial Salmon Fisheries, January 2008	CAN001120
Catch Monitoring Discussion Paper, Draft for Review, 20 March 2000	CAN001689
DFO, Backgrounder, Catch Monitoring and Fishery Management Practices Intensified, March 26, 1993	CAN002323
Pacific Integrated Commercial Fisheries Initiative (PICFI), July 17, 2007	CAN002480
Pacific Integrated Commercial Fisheries Initiative (PICFI) Enhanced Fisheries Accountability Measures, February 5, 2008	CAN004913
Pacific Region Fisheries Data System - The Way Forward, DFO, Draft, L. Collicutt, C. Masson, W. Luedke, 2008	CAN004919
Pacific Region Fisheries Monitoring and Catch Reporting Framework for Improvements February 2009	CAN004920

PacFish Overview, February 10, 2009	CAN004922
PICFI Year 2 Report, PICFI Steering Committee, July 24, 2009	CAN004925
Integrated Salmon Dialogue Forum - 2009/2010 Workplan, Draft, January 1, 2009	CAN004999
Monitoring and Compliance Panel, March 23, 2009 Meeting - Pre-Session Backgrounder	CAN005002
Monitoring and Compliance Working Group: M&C Panel Implementation Meeting February 18, 2009	CAN005003
Integrated Salmon Dialogue Forum Meeting Summary February 2, 2009	CAN005009
Regional Management Committee Meeting, December 17, 2009 Record of Decisions	CAN005437
Regional Management Committee Meeting, March 21, 2006 Record of Decisions	CAN005447
Proposed Structure for Strategic Discussion on "Fisheries Monitoring and Catch Reporting (FM&CR), Strategic Directions Committee, April 21, 2005	CAN005671
DFO Catch Monitoring "Roadmap Strategy", Salmon Working Group, November 2009	CAN006863
PICFI Working Session - December 6, 2007 Session Notes	CAN007400
Backgrounder 2007 Planned Initiatives to Strengthen Accountability on the Fraser River Catch Monitoring & Reporting, Enforcement and Traceability	CAN008822
Pacific Integrated Commercial Fisheries Initiative (PICFI) Enhanced Accountability Measures	CAN008829
Email from Matthew Parslow re 2009 Cheam Catch Projection Comparison, August 25, 2009	CAN017150
Department of Fisheries and Oceans National Dockside Monitoring Program Policy and Procedures, June 2009	CAN017655
PICFI Update and Overview of Year 3 Workplan, Operations	CAN018478

Committee, July 21, 2009, Enhanced Accountability Element	
Defined shares for salmon management: Building a strategy, Operations Committee, July 21, 2009	CAN018488
Memorandum to Resource Managers from Regional FNs Monitoring and Catch Reporting Team, May 25, 2005	CAN018552
Regional Management Committee Decision Paper December 19, 2005	CAN018691
Fishery Monitoring and Catch Reporting Accountability Framework and Status Update, Deck for Regional Management Committee Meeting, December 19, 2005	CAN018693
Fisheries Monitoring and Catch Reporting RMC Update, July 25, 2006	CAN018785
Regional Management Committee Meeting December 19, 2005, Draft Record of Decisions	CAN018834
Summary of Catch Monitoring Programs for Commercial Salmon Fisheries in Southern BC 1998-2002, B. Beaith, L. Hop Wo, L. Kearey, W.R. Bennett, A Fedorenko, DFO, 2004	CAN019027
DFO 2004 Catch Monitoring Program Post Season Review February 23, 2005	CAN021998
Pacific Region Catch Monitoring Strategy Presentation to RMC December 17, 2009	CAN022442
Regional Management Committee Decision Paper, December 17, 2009	CAN022443
Audit of Management Control Framework Supporting Statistical Information on Fisheries, December 19, 2006	CAN024032
Email from Colin Masson re Need to Review and Confirm “ratings” for Monitoring Programs in your Area, September 30, 2009	CAN029788
Criteria for Monitoring Regimes	CAN029789
First Nations Fisheries Monitoring and Catch Reporting: Development of Standards and Identification of Issues for FSC Fisheries: Workshop Report, Dovetail Consulting Inc., October 30,	CAN038596

2005	
Pacific Region Fisheries Monitoring and Catch Reporting Initiative Project Plan, April 29, 2005	CAN042895
Pacific Integrated Commercial Fisheries Initiative (PICFI) 5-Year Plans, PICFI Steering Committee, December 12, 2008	CAN043586
Catch Monitoring Program Summary, J. Meyer, February 2000	CAN043852
Catch Monitoring in First Nation Fisheries in the Lower Fraser River, November 2007	CAN044321
Pacific Region Integrated Fisheries Management Plan Salmon Southern B.C. June 1, 2009 to May 31, 2010	CAN045971
Catch Estimation Programs in the 1993 Fraser River Indian Fishery: Status and Recommendations, A.J. Cass and A.R. Kronlund Protected Draft Only	CAN046940
PICFI Enhanced Accountability 2010/2011 Year 4	CAN046957
Fishery Monitoring Plan 2009 Lower Fraser River Area E Gillnet Salmon Fishery, Version 1, May 25, 2009	CAN047791
2009 Lower Fraser Enhanced Commercial Monitoring Project, Project Status Meeting Notes, May 12, 2009	CAN047792
Harvest Document for Tsawwassen First Nation for Salmon, July 17, 2009	CAN050557
Traceability Working Group Pacific Region Tracking and Traceability Workshop Ottawa, June 10, 2008	CAN053265
Lower Fraser First Nations Fisheries Pilot Sales and Economic Opportunity 1992-2008, by Bert Ionson, November 2009	CAN056469
Regional Management Committee Meeting, Tuesday, April 20, 2004, Record of Decisions	CAN063122
Pacific Integrated Commercial Fisheries Initiative (PICFI) Enhanced Accountability 2009/2010 up to October	CAN063237
Memorandum for the Regional Director General, 2009 Plan for Improving Commercial Salmon Fishery Monitoring, 2009	CAN065903

Memorandum to the Regional Director General re: Upcoming meeting with the FNFC, June 17, 2009	CAN069374
Tsawwassen Fisheries Operational Guidelines, Effective Date April 3, 2009	CAN070649
First Nation FSC Catch Monitoring and Reporting: Preliminary Considerations, Standards and Recommendations, by David Lightly and Colin Masson, November 2009	CAN077022
Memorandum for the Regional Director General: Release of Discussion Paper on First Nation FSC Catch Monitoring and Reporting, undated (est November 2009)	CAN077023
Email from Herb Redekopp re Traceability Discussion, February 20, 2007	CAN085713
Email from Paul Cottrell re Cheam Catch Monitoring, July 15, 2005	CAN087543
Email from Janet Gagne re Non-reporting groups, November 13, 2009	CAN088195
Email from Jamie Scroggie re Catch Report Matrix (All Areas) - Final Draft, April 14, 2010	CAN095117
FRIMT WG on Catch Accounting Description and Implications, undated (est April 2010)	CAN095119
Email from Andrea Goruk re Dockside validation services RFP, July 11, 2008	CAN114126
CGSB Qualification Listing Program for Dockside Monitoring Companies, April 2002	CAN115630
Email from Heather James re Catch Monitoring, June 18, 2007	CAN130453
Email from Janet Gagne re 2010 PICFI Enhanced Accountability Planning, January 27, 2010	CAN139848
Data & Regulatory Requirements for a "Defined Shares" Approach in the Pacific Salmon Fishery: Lower Fraser focus for 2007	CAN141765
Background Info: 2009 November FRIMT Meeting Agenda Item	CAN142418

1.2(f) - Catch Reporting, undated	
Conditions of 2009/2010 Salmon Area E Licence	CAN143056
Fraser River Catch Monitoring Software User Requirements Review Draft by ESSA Technologies Ltd, March 31, 2006	CAN146033
DFO 2007 Integrated Fisheries - Lower Fraser River Project Status Report, undated	CAN146292
2004/05 Accountability/Impact Statement Area/Program: BC Interior - Catch Monitoring Program, June 8, 2004	CAN150339
DFO, Impact Statement, BCI Resource Management – Catch Monitoring Program 2007/08, undated	CAN153467
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Appendix 3: List of Figures and Tables in this Policy and Practice Report

Figures

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