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**RECREATIONAL FISHERY MONITORING AND
CATCH REPORTING
CONSULTATION DOCUMENT**

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1 INTRODUCTION

In January of 2002, Fisheries and Oceans Canada publicly released a "Fishery Monitoring and Reporting Framework" for its Pacific Region. This document contains a set of seven principles that reflect a statement of policy with respect to the department's fishery monitoring and catch reporting programs. These principles and their associated requirements are designed to guide a comprehensive review and where necessary future reform of established federal government monitoring and reporting programs in all regional fisheries.

For a variety of reasons, including escalating costs and growing questions, by outside observers and others, about the adequacy of current monitoring and reporting for the recreational fishery, a review of recreational fishery programs has been given a high priority. This report is intended to contribute to this review by:

- Identifying the information needed to manage the recreational fishery and the reasons why this information is needed;
- Providing a summary of existing federal government monitoring and reporting programs in the British Columbia recreational fishery;
- Providing an analysis of present adequacies and inadequacies of these programs in relation to the information needed for management;
- Providing some recommendations for change to these existing monitoring and reporting programs.

This information and analysis is intended to facilitate consultation with and input from recreational stakeholders about the future of monitoring and reporting in their fisheries. Following this consultation, appropriate action plans and time schedules for the implementation of necessary changes to current monitoring and reporting programs will be developed. These future changes will be intended to better meet the needs of the resource, governments, stakeholders, the general public and the international community.

The results of this review will also be factored into an overarching project to review fees paid by tidal sport anglers in Pacific Region. The goal of that exercise is to establish a stable source of funding to deliver programs in support of the recreational fishery, including fisheries monitoring programs. This provides additional impetus to proceed with a review of recreational fisheries monitoring programs in the region at this time as catch monitoring costs are a significant portion of the management costs for the recreational fishery.

**FISHERY MONITORING AND CATCH REPORTING
REVIEW:
GUIDING PRINCIPLES**

The following principles taken from the "Pacific Region Fishery Monitoring and Catch Reporting Framework" reflect a comprehensive statement of Fisheries and Oceans Canada's direction with respect to fishery monitoring and catch reporting programs. These provide general guidance to the review of all of the department's regional monitoring and reporting programs including those in recreational fisheries:

Principle 1

All fisheries must have fishery monitoring and catch 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 Nations treaties and other domestic agreements and arrangements.

Principle 3

Fishery monitoring and catch reporting programs must address all known significant ecosystem concerns including information on discards, by-catch and habitat impacts.

Principle 4

Fishery monitoring and reporting standards will be established for all fisheries and will be the basis for the selection of appropriate fishery monitoring and reporting tools and for establishing appropriate coverage requirements.

Principle 5

Data will be collected in the most cost-effective manner to meet the required Standards.

Principle 6

Harvesters are individually and collectively responsible for providing the necessary fishery monitoring information and catch data to the department.

Principle 7

All catch, effort and biological data will be owned and managed by the department who will report and release the data in such a fashion that confidentiality is respected in accordance with policies determined by the Privacy Act and Access to Information Act.

2 OVERVIEW OF THE RECREATIONAL FISHERY

British Columbia's coast and interior offer a wide variety of opportunities for recreational harvesters. The vastness of the fishing area and the diversity of the fisheries pose significant challenges to effective monitoring.

Governance

The federal government, through Fisheries and Oceans Canada, regulates the BC "tidal" sport fishery. This includes issuing licences and setting licence fees, establishing daily and possession limits, closed times by area and gear restrictions for anglers (GS Gislason 2003). Federal fishery officers are charged with enforcing these provisions. Within provincial non-tidal waters, responsibility for all of these matters has been delegated to the government of British Columbia with the notable exception of salmon.¹ Licences for non-tidal recreational fishing of salmon are issued by the Province, but daily limits, close times, size limits and gear restrictions are determined by the federal government. In addition, the federal government has taken responsibility for the monitoring and reporting the recreational harvest of salmon in non-tidal waters.

British Columbia stakeholders in the recreational fishery are represented in consultations with the Department through a Sport Fishing Advisory Board (SFAB). This Board is community-based with local committees throughout the province. Board and local committee membership is drawn from both individual anglers and related business interests.

The Participants in the Tidal Fishery

During the last decade, there have been, on average, approximately 360,000 licensed tidal anglers and shellfish harvesters each year. According to the 2000 National Survey of Sportfishing, 64% of these anglers are BC residents with the remainder from other parts of Canada, the US and other countries. It is estimated that, in 2000, \$228 million was spent on purchases and investments wholly attributable to the BC tidal fishery and \$259 million was spent on direct expenditures related to the fishery. There are also over 1,000 businesses in the province that earn 50% or more of their revenue from sport fishing activities supporting an associated 8,600 seasonal jobs. (J. Paul and Associates, 1998). These include most significantly about 125 specialized sports fishing lodges and about 500 sports fishing charter businesses (G.S. Gislason, 2003). In addition, numerous fishing gear stores, air charter companies, boat dealers and bait distributors are heavily or entirely reliant on recreational fishing activity for their revenues.

¹ Provincial monitoring and reporting programs for non-tidal recreational fisheries are not dealt with in this report.

Geographic Range of the Tidal Fishery

Tidal water recreational fishing can occur almost anywhere along the entire coast of British Columbia. One of the attractions of recreational fishing in this province is the opportunity to fish in remote, wilderness areas. Fishing may occur from boats, fishing piers, shorelines, on beaches and by diving using a variety of harvesting methods. Historically, Georgia Strait has been the major recreational salmon fishing area. During the last decade, there has been a geographic shift in activity away from the Strait towards the West Coast of Vancouver Island and north to Johnstone Strait and the North Coast.

The Resource

The 2003-2005 Tidal Water Recreational Fishing Guide identifies over 100 species of finfish and invertebrates that may be harvested recreationally. Salmon have traditionally been the primary target of anglers. However, in the 2000 National Survey of Sportfishing, one third of respondents indicated choosing to redirect their effort towards other species. Approximately half of respondents indicated fishing for halibut, rockfish and lingcod.

Policies and Legislation

A wide range of national and regional policies, strategies, agreements and legislation are relevant to and impact on the recreational fishery. Some of these include:

- *Licensing Policy*
Tidal waters sport fishing licences are required but unlike most commercial fishing licences these are issued without restriction on the number of licensees. In addition, there are no limitations or other constraints on how frequently a licensee can go fishing.
- *Recreational Fisheries in Canada – An Operational Policy Framework*
Five principles guide Fisheries and Oceans Canada in its task to develop and implement recreational fisheries policies, programs and initiatives. These principles recognize the importance of recreational fishing, emphasize partnership between jurisdictions and between citizens and government.
- *A Policy for Selective Fishing in Canada's Pacific Fisheries*
Selective fishing is defined as the ability to avoid non-target fish, invertebrates, seabirds, and marine mammals or, if encountered, to release them alive and unharmed. The objective is to ensure that selective fishing technology and practices are adopted where appropriate in all fisheries in the Pacific Region, and that there are continuing improvements in harvesting gear and related practices. Selective fishing is a requisite element of conservation-based fisheries. In order to meet conservation objectives, future fishing opportunities and resource allocations will be shaped by the ability of all harvesters - First Nations, commercial and recreational anglers - to fish selectively. As with other harvesters this provides recreational fishers with

strong incentives to find better ways of avoiding non-target species and better handling methods for those that are inadvertently encountered.

- **Allocation Policies**

An allocation policy for Pacific salmon provides a series of principles for sharing harvestable surpluses among First Nations, recreational and commercial users. After addressing First Nations fishing rights, this policy gives a recreational fishing priority to directed fishing for chinook and coho salmon. Also, by providing up to a 5% allocation of the combined recreational and commercial allowable catch of sockeye, pink and chum salmon, it provides predictable recreational fishing opportunities for these primarily commercial species. Recently, a similar recreational/commercial sharing arrangement of up to 12% has been established for Pacific halibut.

- ***Rockfish Conservation Strategy***

In May 2002, the Minister of Fisheries and Oceans announced a preliminary conservation strategy for rebuilding Pacific inshore rockfish stocks, particularly in the Strait of Georgia. The strategy developed encompassed the following four principles;

- Catch monitoring
- Harvest reduction
- Stock Assessment
- Establishment of Rockfish Conservation Areas

As a result of this strategy, catch monitoring programs within the recreational and commercial fisheries were increased and daily bag limits for the recreational fishers were reduced within the Strait of Georgia. A stock assessment framework is being established and 89 Rockfish Conservation Areas have been identified where fishing has been restricted to allow rockfish stocks to rebuild.

- ***Species at Risk Act (SARA)***

The Species at Risk Act provides for the assessment and legal listing of "species, subspecies, variety or geographically distinct populations" deemed to be endangered or threatened with extinction. As of June 1st, 2004 it is illegal to "kill, harm, harass, capture or take" such listed species. This new legal requirement to avoid listed populations will have dramatic impacts on all harvesting groups including recreational fishers. Most obviously it will directly affect the future monitoring needs in all fisheries.

3 THE IMPORTANCE OF RECREATIONAL FISHERY MONITORING AND CATCH REPORTING

There are a large number of reasons why recreational fishery monitoring and catch reporting are important and indeed increasingly essential.

Responsible Fisheries Management

Most fundamentally, comprehensive estimates of catch and total mortality to fisheries resources by all harvesting groups are necessary to maintain sustainable fisheries. Even where the recreational harvest appears to be small in relation to other harvesting groups and to overall resource abundance, the recreational harvest can often be concentrated in limited geographic areas and/or on smaller components of an aggregate population. Even very modest harvests if concentrated in these ways can pose significant conservation risks. Similarly, mortality rates to target species or to species caught incidentally to the fishing activity can be higher or of more significance than the actual target species harvest. Finally, the open ended nature of licensing and participation in the recreational fishery can prove challenging. Fishing effort may change dramatically from period to period and these changes cannot be anticipated with any precision.

Basic estimates of annual recreational catch and effort in all fisheries in order to establish trends and confirm assumptions on an ongoing basis are a minimum management requirement for all species. However, in many instances much more detailed, precise and timely information on the fish harvested, released and discarded is essential for responsible fisheries management.

Stock Assessment

In some specific fisheries, monitoring of the recreational harvest plays a central role in overall stock assessment because of the widely dispersed nature of the fishing activity. For example, stock identification and other biological data from coded wire tags and DNA analysis from salmon encountered in the recreational fishery are critical to estimating marine survival, exploitation rates and fishery impacts on different salmon populations.

Social and Economic Importance

The recreational fishery is increasingly a significant economic contributor both directly and indirectly through its linkages to tourism. The high level of direct participation, the large size of the expenditures involved and the significant number of individuals and businesses dependent on the fishery for their livelihood require serious attention from both government and private sector planners. Information on trends and detailed information on the participants in the recreational fishery are essential to dealing with the social and economic aspects and making appropriate policy and operational decisions with respect to the fishery.

International Obligations

A number of multi-lateral international agreements including the United Nations Convention on the "Conservation and Management of Straddling and Highly Migratory Stocks" contain broad-based binding obligations for data collection to assess the impact of fishing. In addition, specific bilateral sharing of salmon and halibut resources between the US and Canada are guided by a Pacific Salmon

Treaty and an International Pacific Halibut Convention respectively. Both of these latter agreements require detailed reporting and precise control over both harvesting and release by all user groups. None of these international obligations can be met without effective recreational fishery monitoring and encounter reporting.

Legal Obligations

In the legal context, First Nations fisheries for food, social and ceremonial purposes have been affirmed as a constitutionally protected right that cannot be infringed other than for conservation or other valid purposes. In practical terms this means that these First Nations fisheries have a priority second only to conservation and ahead of other users. In addition, the recent treaty with the Nisga'a First Nation establishes a specific sharing arrangement with respect to Nass River salmon. Other First Nations treaties are presently under negotiation and similar sharing arrangements for other fisheries resources could follow. Establishing and confirming that these legal priorities and legal obligations have been met requires detailed information on the harvest by all users including recreational fishers.

Domestic Policy Commitments

In addition to priority access to address First Nations rights, the establishment of specific harvest sharing arrangements between recreational and commercial fishers in various fisheries is a growing trend. As noted above (Section 2), detailed sharing arrangements are already in place for the Pacific salmon fishery (up to a 5% recreational share of the combined commercial and recreational harvest of sockeye, pink and chum salmon) and the Pacific halibut fishery (up to a 12% recreational share of the Canadian Allowable Catch established by the International Pacific Halibut Commission). Given the growing demands on available harvests, similar defined sharing arrangements between commercial and recreational sectors for other fisheries resources may follow. These types of domestic sharing arrangements cannot operate in the absence of comprehensive and accurate catch as well as release estimates from both commercial and recreational fisheries.

4 FISHERY MONITORING TOOLS

There are two main approaches that can be used to capture information on angler characteristics, catch and fishing effort in recreational fisheries. Off-site surveys include surveys conducted away from fishing sites, often based on sampling from a list of anglers and interviewing people by mail, telephone or door to door. Data may also be collected using fishing diaries, catch cards or logbooks filled out by anglers and submitted during or after the fishing season. These methods depend on self-reported data and suffer from the uncertainties related to the angler's memory, knowledge and truthfulness. On-site surveys include aerial surveys to count the number of active fishing vessels or fishers and on ground surveys based on sampling from a list of fishing places and times. Anglers are counted and/or interviewed while in the act of fishing or as they come

off the water. On ground methods allow more information to be verified by the interviewer. For example, catch can be inspected and samples can be taken by trained personnel who are less likely to make mistakes in identification of species or in biologically sampling fish.

On-Site Methods

Creel surveys:

Two main types of on ground "creel" surveys are commonly used in recreational fishery monitoring: i) access point, and ii) roving surveys.

The access point survey involves interviewers collecting fishing information from anglers at selected sites immediately after they have completed their fishing trip. At these chosen sites, interviewers directly count anglers coming off the water and record total harvest and collect biological data by direct examination. Anglers are also questioned regarding the details of their fishing trip (time, location, gear, released fish, etc.).

In the roving creel survey (either on-water or shore based) catch and effort data is captured while anglers are fishing and estimates are therefore based on incomplete fishing trips. Interviewers record total harvest and collect biological data by direct examination and anglers are questioned regarding the details of the fishing event up to the time of the interview.

Aerial surveys:

Aerial surveys are unique in that they can only be used to estimate fishing effort. The approach involves counting all actively fishing recreational boats along a prescribed flight route that encompasses all known fishing sites in the survey area. This boat count is a point estimate of effort and is commonly combined with a fishing activity profile obtained from access point surveys to estimate total effort. The fishing activity profile defines the proportion of actively fishing anglers by one-hour time block for each hour the fishery is active during the day.

Most recreational fishing surveys presently undertaken in British Columbia are a combination or hybrid of the types mentioned above. The Georgia Strait sports creel survey, for example, is a combined access point and aerial survey design. This means that fishing details from a random sample of boat trips regarding catch, effort, biological sampling, demographic information etc. are acquired through the interview process at landing ramps and marinas. The aerial survey and fishing activity profile are used to generate total fishing effort. Total effort and catch per boat trip are combined and catch and release statistics are determined by management area by month.

Hybrid surveys such as the Georgia Strait creel are generally accepted as a valid approach to estimating catch and effort in large regional recreational fisheries. With appropriate design, these surveys can provide accurate estimates of both catch and effort in a fishery. Any level of precision required for fisheries

management purposes can be attained by appropriately varying the level of the sampling effort and the temporal coverage of the fishery. In addition, the on-ground portion of these surveys can provide biological samples or collect coded wire tags when these are needed for stock assessment or other fisheries management purposes.

Off-Site Methods

Commonly used off-site methods in recreational fishery monitoring include mail surveys, diaries, catch cards and logbooks.

Mail surveys are typically conducted by sending out questionnaires to a random subset of the recreational fishing population from a defined geographic area. Most commonly this type of survey is used to sample opinions about fishing issues and to develop sociological and economic profiles of anglers. With proper precautions, mail surveys can also be used to obtain catch and effort information.

The most current example of this is the National Mail Survey conducted every five years across Canada. The survey is conducted to capture the previous year's information. This survey was undertaken most recently in 2001 to collect information on recreational fishing in year 2000.

Because of recall difficulties on the part of those surveyed, there is considerable debate over the reliability of both catch and effort estimates from mail surveys. However, it may be the only source of information for times and areas where no other surveys are in place.

Logbooks, diaries and catch cards generally have well defined questionnaire formats (paper or electronic) that fishers are asked to complete for one trip or fishing event (e.g. catch card) or multiple trips (e.g. logbooks) or as a summary of the entire seasons activities (e.g. diaries). Information regarding location, catch and effort statistics are recorded by individual fishers or can be compiled as a daily total for a lodge/resort.

A voluntary logbook program is currently used in British Columbia to obtain data from recreational fishing lodges in remote areas and from recreational fishing charter operators.

5 RECREATIONAL FISHERIES MONITORING IN OTHER JURISDICTIONS

Numerous jurisdictions around the world have implemented monitoring systems for recreational fisheries. A sample of the approaches taken in these other jurisdictions follows.

Alaska

Information on sport harvests is considered essential for sustained yield management of Alaska's sport fisheries. Over the past 20 years the Sport Fish Division of the Alaska Department of Fish and Game has developed an efficient, reliable system for producing this information. It is composed of two integrated parts: a state wide harvest survey and onsite creel surveys.

The state wide harvest survey is the core of the assessment program and collects data by annually mailing questionnaires throughout the world to a representative sample of 47,000 households containing anglers licensed to sport fish in Alaska. The survey produces harvest estimates for all recreational fisheries throughout the state.

Creel surveys collect data by interviewing anglers at the fishing site. They are more expensive than mail surveys, but are necessary for some fisheries where in season management is required to meet regulatory or treaty obligations, or where specific supplementary data such as fish ages, sizes, timing, and tagging are needed. They also serve to verify the accuracy of the mail survey estimates.

Washington State

Washington has been producing a sport catch report since 1967. The report initially provided only salmon catch estimates based on data from catch records (in the form of punch cards) submitted by recreational fishers. Since 1975 the sports fish catch report was expanded to include other marine fish harvest. In 1976 the report was further expanded to include shellfish sport harvest. Currently catch record card data are collected for salmon, sturgeon, steelhead, Dungeness crab and halibut. Estimates from card data are further supplemented and adjusted on the basis of information from field or creel surveys or telephone surveys where and when possible to improve the accuracy of the recreational harvest estimate.

Specific Example for Crab in Washington State

In-season estimates of the recreational fishery for crab are generated during the crabbing season using data collected from telephone surveys of randomly selected Catch Record Card (CRC) holders. Final harvest numbers for each season are generated after CRC's are mailed to the Washington Department of Fish and Wildlife. Information regarding CRC holders is collected at the time of license purchase.

Western Australia

Data for the estimation of recreational catch and effort is collected through a strategic program of surveys. An annual community phone survey provides broad information on trends in participation and fishing effort.

For specifically licensed species fisheries, an annual telephone or mail survey of license holders is also undertaken to directly estimate catches for management purposes.

In addition to these mainly telephone based annual surveys, detailed creel surveys are undertaken on each of the states marine bio-regions in turn. These surveys involve angler interviews at boat ramps over a 12-month period, with the four marine bio-regions being covered in rotation over a six year cycle. This comprehensive survey data series is used to validate and assess the level of bias in the annual telephone surveys.

New South Wales Australia

Two interesting programs implemented in the recreational fisheries in New South Wales are the Fishcare Volunteer Program and the Anglers Catch Research program.

Fishcare volunteers

Volunteers are asked to donate their time and effort to promote awareness of the public's responsibilities and departmental policies regarding recreational fishing, catch and release methods, distributing educational material at prominent fishing grounds, collecting management information etc.

Anglers Catch Research Program

This is a collaborative research program between NSW Fisheries and freshwater anglers. The aim of the program is to monitor status of freshwater fish populations using angler-generated data. Catch information is collected at organised freshwater angling events and competitions and is recorded on catch cards by freshwater fishers during their fishery outings. Information collected includes fish catch, fishing effort, species composition, and size of fish that can be used to determine fish populations and efficiency of a fishery. Completed catch cards are returned to Fisheries researchers and the data is entered into a data base.

Newfoundland

Within Canada, Fisheries and Oceans Newfoundland Region has conducted detailed monitoring of salmon angling since 1994. This involves voluntary reporting by licensed anglers of fish caught and released and their fishing effort in the salmon fishery by date and geographic location. The information can be submitted by licence holders electronically or by mail or by telephone. Most information is presently received through the mail but the electronic response is increasing each year.

A number of systems are used to enhance and maintain response rates and address issues of non-reporting. For example, licence information is cross referenced with catch and effort data and mail out reminders are sent at approximately 6 week intervals to non-respondents. Also, telephone surveys of non-respondents are conducted.

6 A HISTORY OF RECREATIONAL FISHERY MONITORING IN BRITISH COLUMBIA

In British Columbia monitoring of the recreational fishery by departmental Fishery Officers began in the 1950's. This was largely limited to monthly estimates of recreational salmon landings provided for major fishing areas. The major fishing areas were Georgia Strait, Rivers Inlet, Barkley Sound and Nootka Sound-Gold River. During the mid-1970's, it became apparent that statistics based on the Fishery Officer estimates were underestimating the catch. Increasing workload combined with changes in the character of the sport fishery prevented Officers from expending the amount of effort needed to adequately enumerate the fishery.

During the 1980's, several recreational surveys were introduced. For example, the Georgia Strait Creel survey was initiated in 1980 to obtain estimates of recreational chinook and coho harvest in Georgia Strait. A survey of the salmon fishery in Barkley Sound was initiated in 1984. Several mail surveys of BC resident and non-resident anglers were also conducted during this period. These latter surveys developed coast-wide estimates of catch for all species. A National Survey of Sportfishing was initiated in 1985 and this has been conducted every 5 years since that time. This mail survey obtains estimates of catch and effort as well as estimates of expenditures and economic benefits.

The Georgia Strait Creel Survey continued through the 1990's but, in recent years, coverage has been cut back from twelve months to only include the primary fishing season (April through October). The Barkley Sound creel survey has continued and other localized creel surveys have been introduced in various portions of the coast and for salmon in some fresh water systems. Voluntary Logbook programs for charter and lodge operations in several locations in the province were also implemented.

The BC Tidal Water Sport Fishing licence was introduced in 1981. Initially, the licence was not required for recreational shellfish harvesting. This was changed in 1995 when the requirement was expanded to shellfish as well. A Chinook conservation tag was implemented in 1998. In the following year, the tag was discontinued and replaced by a Chinook Conservation Stamp program. In 1994, this stamp was expanded to include all Pacific salmon. The Sport Fishing licence data base has been used as the source of information to develop samples of anglers for various mail surveys.

7 CURRENT PROGRAMS

Marine Fishery Monitoring Surveys

Georgia Strait

The Georgia Strait recreational fishery is a composite of fisheries that are diverse in terms of timing, area, target species, and angler characteristics. The high profile of this fishery and its associated survey stems primarily from the sheer magnitude of the fishing effort in a very large defined area where escapements of target species are declining. The basic design of this survey has remained essentially unchanged since its inception in 1980. Catch and biological information are collected and catch and effort estimates are generated over a large area according to a statistically valid methodology in monthly time steps. Currently, the survey is active between April and September each year. While this survey is designed to calculate more precise estimates for catch of the primary target species in the fishery, chinook and coho salmon, estimates for all other salmon and groundfish species are also calculated. The survey design to monitor this fishery is comprised of two independent surveys; angler interviews at key access points and aerial over flights.

West Coast of Vancouver Island

A number of coastal marine (inshore and offshore) and river salmon recreational fisheries occur along the west coast of Vancouver Island (Pt. Renfrew to Quatsino Sound) from April through to the end of September. Recreational fishing effort is low for the balance of the year due to adverse weather conditions and stock abundance in the area. Catch, effort and biological information from these fisheries is currently developed from a composite of sources including creel surveys, guide logbooks, and lodge records. Creel survey methodology is essentially the same as that used for Georgia Strait with catch information generated for all salmon and groundfish species. The only major difference is that lodge catch makes up a significant proportion of the total catch off WCVI since the bulk of the fishing effort comes from guided or lodge-based fishers. Creel survey and lodge logbook programs are operational from June to September.

Northeast Vancouver Island

The recreational fishery in the mainland inlets adjacent to north-east Vancouver Island, Queen Charlotte Strait, and Johnstone Strait have been surveyed (creel survey and lodge logbook) on an intermittent basis as funding was available. A structured creel survey was implemented in 1991-93, 1999-2000, complemented with a logbook program for remote lodges. From 2001 to 2003 less comprehensive surveys were conducted. Creel survey methodology is essentially the same as that used for Georgia Strait with catch information generated for all salmon and groundfish species. Under current funding levels, the creel survey in this area will likely continue to be conducted on an intermittent basis.

Central Coast

Much of the sport fishing effort in this fishery originates from lodge operations in Rivers Inlet, Hakai Pass, and in areas adjacent to Bella Bella. Lodges in this area collect catch and effort information in the form of logbooks which are used to estimate total lodge catch. Due to chinook conservation concerns in Rivers Inlet a structured creel survey was initiated in 2000 in order to assess independent fisher's catch and effort information as well as to determine stock identification for chinook caught in Rivers Inlet.

North Coast Surveys

Until recently a combined aerial-access point survey operated from mid-May to mid-September in Areas 3 and 4. Boats were counted by over flight and anglers were interviewed at access points in Prince Rupert, Port Edward and at the Lachmach River Launch. The objectives of these surveys were similar to those for other surveys described above: 1) monitor long term trends in the fishery, and 2) estimate the catch of Skeena River (local) coho and chinook caught in the fishery. Unfortunately, due to budgetary constraints this was recently discontinued. Structured surveys are now conducted only in Areas 1 and 2 (Haida Gwaii). The survey conducted by the Haida FN in Area 1 is a lodge survey which effectively constitutes a complete census of effort and catch for the fishery.

Terminal Marine Fishery Surveys

With the advent of selective hatchery only coho fisheries, well defined time and area terminal fisheries have been developed at the mouth of rivers where these hatchery fish can be harvested. Since the effort is primarily shore based and both the dockside interview process and aerial boat count survey are ineffective in these fisheries, roving creel surveys are used. Current coverage of these fisheries (Capilano, Big Qualicum, Porpoise Bay, Davis Bay) is incomplete.

Freshwater Fishery Monitoring Surveys:

Structured surveys are conducted on a number of major coastal rivers in which salmon are a target species. Annual surveys are conducted in some upper Fraser River tributaries and the mainstem Lower Fraser River in the lower mainland. Periodic surveys have been conducted on a number of other coastal river systems on which salmon are a target species including the Stamp, Kitimat, Skeena, Nass, Big Qualicum Rivers. These creel surveys also use roving survey methods.

Bella Coola/Atnarko Rivers

DFO Charter Patrol and the Nuxalk Fisheries Guardians check a proportion of the individual fishers to obtain catch details in the Bella Coola and Atnarko Rivers. The results are expanded to determine the number of angler days and the number of killed chinook for each week.

Dean River

The Ministry of Water, Land, and Air Protection hires two Dean River Guardians to collect creel information from private anglers and lodge guests. Catch information is collected for steelhead as well as chinook. Along with the creel information, the guardians, with help from the private anglers and lodges, have volunteered to collect biological samples from the chinook caught in the lower Dean River.

A full list of the current programs for recreational monitoring is included in Appendix 1.

8 ASSESSMENT OF CURRENT PROGRAMS

In order to assess the degree to which current monitoring programs are meeting management requirements, an analysis was completed for each fishery. For all known recreational fisheries in each tidal area and each non-tidal area for salmon species the following was identified:

- The specific reasons for monitoring the recreational harvest in the fishery (e.g. stock assessment, international obligations, inter-sectoral allocation etc.)
- The specific information required to manage the fishery (e.g. fish harvested and released by species, proportion of coded wire tags, average sizes, weights etc.)
- The reporting requirements (e.g. the required frequency of reporting, the required temporal and geographic resolution of the data, and the precision and accuracy required in the information reported)

As a final step, the various monitoring tools presently used for obtaining this information were assessed in terms of their ability to deliver to the required standards.

The following observations can be drawn from this detailed analysis of each fishery:

1. Current creel surveys likely provide good estimates of salmon catch and effort in the major tidal sports fisheries in British Columbia during key fishing times. For example, the Strait of Georgia creel survey is active from April to September. During this period, the estimated salmon harvest is accurate with an acceptable degree of precision. Based on information from periods when there was more comprehensive coverage, this harvest also likely encompasses about 90% of the annual effort directed towards salmon in the survey area. However, comprehensive coverage over the entire fishing season is required to ensure accurate and precise overall annual estimates of catch and effort in these major salmon fisheries.

2. Current creel surveys also provide adequate biological information and samples for salmon stock assessment and other fisheries management purposes during the periods for which they are in operation.
3. Logbook programs are used with most fishing lodges and some charter operators and likely provide reasonable catch estimates in a number of major recreational fisheries particularly in remote areas. However, participation in the logbook program is voluntary. Although co-operation from lodges has been fairly good, there has been lesser co-operation from charter operators. Without more complete participation in the logbook program, and without some system to independently verify the accuracy of the information reported, catch estimates derived from the logbook program will remain suspect.
4. Catch and effort information on more minor salmon tidal and non-tidal sports fisheries is less reliable. Creel survey monitoring of these fisheries is less frequent and more sporadic than for the major salmon fisheries and highly dependent on budget availability. Some smaller fisheries have not been monitored at all while others have been monitored infrequently with significant gaps in the data series. Although each of these fisheries may individually represent very limited resource use, the total harvest in all of these fisheries is still substantial. In addition, harvest in some instances is focused on a limited number of salmon populations. A more consistent and structured approach to the monitoring of minor recreational salmon fisheries is needed.
5. Present estimates of the recreational harvest of other species including groundfish, herring, shellfish and invertebrates are generally inadequate. Although the present tidal creel surveys do provide some information on harvest of non-salmon species during peak salmon fishing periods the overall coverage of these other fisheries is unknown and likely varies widely. For example, while the Strait of Georgia creel survey likely encompasses about 90% of the annual effort directed towards salmon the level of annual coverage for groundfish species is unknown and likely lower. Obtaining better estimates of groundfish harvest using current survey methods requires expanding the seasonal coverage and may require some shift in the geographic focus and/or the geographic coverage of survey efforts. Also, since the survey is presently based on dockside interviews some data are collected from shellfish trap fisheries but virtually no information is collected for beach fisheries (clams, etc). Comprehensive coverage of the shellfish and invertebrate fishery would require an entirely different survey design.
6. Current surveys are focussed on catch landed and effort in the fisheries and the level of precision achieved in the estimate can be calculated particularly for chinook and coho salmon. The degree of precision achieved in estimates of salmon released is uncertain. Because of conservation concerns, there is an increasing focus on total mortality due to both harvest and release.

Achieving accurate and acceptably precise estimates of both harvest and release would require some further improvements to existing surveys.

In summary:

- Current recreational fishery monitoring programs provide good estimates of catch and effort in the highest priority salmon fisheries during times and areas where the majority of the catch and effort occur. However, there are substantial gaps in time and area coverage that throw into question the accuracy of overall annual catch estimates in these fisheries.
- Similarly, current monitoring programs provide adequate biological samples and other data from these high priority salmon fisheries for stock assessment purposes but only during peak times and areas.
- There are substantial coverage gaps for lower priority more minor salmon fisheries that need to be addressed.
- Current recreational fishery monitoring programs do provide some information on non-salmon harvest during the peak of the salmon fishing season in key salmon fishing areas. However, they do not provide a reliable comprehensive estimate of the overall annual catch and effort in herring, shellfish or groundfish fisheries even for the areas surveyed.
- Current monitoring programs provide no data for beach shellfish and invertebrate fisheries. Proper assessment and monitoring of these fisheries using present approaches would require supplementary surveys specifically designed for this sport activity.
- Current monitoring programs need improvement to more reliably estimate of salmon released so that total mortality related to these fisheries can be calculated.

9 A PROPOSAL FOR CHANGE

To address the need for improved recreational fishery monitoring, the following proposal is put forward to stakeholders for their consideration. This proposal represents a fundamental change in approach to monitoring and reporting for the recreational fishery in Pacific region. As a result, it would involve significant effort to fully implement and could involve a fairly extended transition period as specific new systems are tested and phased in and as required regulatory changes are approved. Before making a decision to embark on such an effort, input from and the involvement of fishery stakeholders in both the design and implementation of the new system is not only welcomed, but also essential.

Mandatory Reporting by All Recreational Fishers

As described in detail above, the current approach to recreational fishery monitoring relies on creel surveys and aerial over flights of the primary fishing areas and some voluntary logbook programs. Data from the surveys and the over flights are expanded and combined with the logbook information to provide aggregate estimates of catch and effort in various fisheries. This information is periodically supplemented through mail and telephone surveys including the National Survey of Sportfishing undertaken every five years.

As the recreational fishery has expanded geographically and as fishing effort has been re-directed to other (non-salmon) species, the creel survey approach to monitoring requires more and more resources to remain effective. With limited budgets, overall coverage levels for recreational fisheries have inevitably declined over time. In addition, the present approach requires Fisheries and Oceans Canada to determine where the fisheries are taking place, what species are caught and then design and implement appropriate surveys after the fact. As a result, in spite of best efforts, current surveys can easily become unsynchronized with the dynamic and changing fishery.

Many of these problems could be resolved through mandatory reporting by all recreational fishers whether fishing independently or using the services of fishing resorts or professional guides. Mandatory reporting of catch, effort and other essential data by all recreational fishers under conditions of full compliance would technically provide a full census (rather than a sample) of the recreational harvest and fishing effort throughout the province. Although as discussed below, this would not eliminate the need for sampling, with mandatory reporting the nature of sampling efforts in the recreational fishery would fundamentally change and become much more strategic and focussed.

Some additional advantages of a mandatory reporting system for recreational harvesters include the improved accountabilities and responsibilities involved. As noted in the Pacific Region Fishery Monitoring and Reporting Framework, "harvesters (should be) responsible for providing catch monitoring information and catch data" necessary for management of their fishery. Leaving the department responsible for obtaining this information is not only less effective but undermines needed co-operation between government and stakeholders in the management of these important resources. In addition, the mandatory approach is, and will be perceived to be, fair. All recreational fishers regardless of species or fishing location would be equally responsible and accountable for accurately reporting their harvest and harvesting activities. Significantly, this parallels the requirement that is already placed on commercial fishers in Pacific Region.

Some Specific Issues for Discussion

A decision to proceed to mandatory reporting by fishers in the recreational fishery will require a number of specific matters to be resolved. These include:

- **What specific information should be requested?**

The basic data needed from each fisher includes the number of fish caught by species. However, additional information on the number of fish released by species as well as the location of fishing, the time period and the gear type can also be essential for fisheries management purposes depending upon the fishery and the species caught. There will be tradeoffs involved in designing the specific information request. The more precise and detailed the information requested the greater the likelihood of non-compliance and/or inaccurate reporting. On the other hand, the more general the information request, the greater the requirement for the supplementary sampling activities described below.

- **How should the information be documented and transmitted?**

There are a variety of options for documenting and transmitting the information requested. Documentation could include punch cards, logbooks or fishing diaries. Logbooks or fishing diaries could be hard copy paper or electronic. Under all of these documentation options, the information can be transmitted electronically through the internet, by telephone, by mail or drop off (at drop boxes or DFO offices). Clearly for ease of data handling, electronic logbooks or diaries with electronic transmittal would be the preferred option. Unfortunately, there will always be a significant proportion of anglers who do not have access to appropriate computer facilities when they are needed. Transmittal via mail or drop off of hard copy paper has the advantage of universal accessibility but is the most cumbersome in terms of data handling. Telephone transmittal through a 1-800 number using the keypad to enter data or verbal reporting to a call centre are also options.

- **When and how frequently should the information be reported?**

The timeliness and frequency of reporting needed for management purposes varies from fishery to fishery and species to species. In instances where there are significant conservation concerns, weekly and even daily reporting may be required. In other instances where stocks are healthy and fishing activity is low in relation to biological availability, seasonal reporting may be fully adequate. However, confusion will likely arise if the timeliness and frequency of reporting is allowed to vary from fishery to fishery or species to species. In addition, more timely and frequent reporting in relation to the fishing activity will reduce the probability of recall problems.

More Strategic Sampling and Enhanced Enforcement Efforts

Mandatory reporting by fishers in the absence of other measures is insufficient to resolve the deficiencies of the present monitoring system. Reporting cannot provide all of the information required for fisheries management and stock

assessment purposes. In particular, biological samples and other more detailed information that can only be gathered physically will continue to be needed in some fisheries for stock assessment or other specific fisheries management purposes. In addition, audit of the data provided and estimated compliance levels would be essential to determine the accuracy and completeness of the raw data provided and facilitate any appropriate adjustments to reported catch levels. Finally, sufficient enforcement effort supported by appropriate enforcement tools to ensure adequate compliance levels would be essential to guarantee confidence in the mandatory reporting system.

The need for biological samples and other physical data in some fisheries and more general accuracy and compliance auditing will require continued on-site creel and other surveys in the recreational fishery. However, these survey efforts could be much more directed than at present in terms of where and when they are needed. As a result, overall creel survey coverage in presently surveyed fisheries could be substantially reduced.²

Other mail or telephone survey efforts in recreational fisheries could also become much more focussed and useful. For example, if additional information is required on the harvest of a specific species of shellfish in a particular area, mail or telephone surveys could be directed towards all or a sample of the specific participants in these fisheries. Under present monitoring systems more comprehensive mail surveys are the only option at much greater expense and effort.

In contrast to survey efforts, enforcement in a mandatory reporting system would need to be enhanced. Current enforcement efforts are focused on the possession of valid licences and conformity with the established gear and fishing area restrictions and daily bag and possession limits. Compliance with mandatory reporting would add a significant new priority to the enforcement work load. New enforcement tools and new enforcement systems would likely be required to effectively address this need.

Some Specific Issues for Discussion

As with a decision to proceed to mandatory reporting, moving towards more strategic sampling and enhanced enforcement in the recreational fishery will require a number of specific matters to be resolved. These include:

² The focus of the sampling effort under the present creel survey approach is to obtain a global estimate of the recreational catch in the specific fishery sampled. Sampling in order to obtain a global estimate of catch requires that sampling activity be much broader based and extensive in terms of both time and coverage levels than would be necessary for biological or other management purposes alone. This need for such broad sampling would be eliminated by a shift towards mandatory reporting by all recreational fishers.

- **How should reporting be audited?**

Given the self-reported nature of the information under mandatory reporting, a comprehensive approach will be needed to identify compliance levels and verify the accuracy of the information reported by recreational fishers. This will facilitate adjustments to the reported data where these are necessary. This would inevitably become one of the key tasks of continued dockside creel surveys in recreational fisheries. However, compliance and accuracy surveys could likely be rotated from area to area on a regular schedule and/or focussed on areas where compliance problems were apparent. Creel survey coverage levels could also be enhanced in areas where compliance levels or reporting accuracy were problematic.

Even with a strong enforcement program, it is very unlikely that 100% compliance would be realized. Supplementary surveys (e.g. telephone surveys) could be used to measure the potential effects of bias related to non-response.

- **How should compliance be encouraged and ultimately enforced?**

High levels of compliance with the reporting requirement will be needed to ensure confidence in the reporting system and the information provided. Initially, this may require a considerable public education effort and up-front consultation with recreational stakeholders to assist in achieving compliance. In addition, mandatory reporting would need to be enforced with sufficient penalties for non-compliance. Given the unique nature of the recreational fishery, designing an appropriate system will not be easy and will likely need some creative approaches. However, such a system will be essential to ensure that the information provided is comprehensive and accurate.

10 COMPARATIVE COSTS

The department has recently spent approximately \$1.3 million per year on recreational creel surveys excluding in-kind costs in terms of staff time and other internal support. However, as noted above, these present surveys are insufficiently comprehensive and leave significant information gaps.

If a decision is made to continue with the present monitoring approach, a number of changes would be essential in order to address the identified coverage gaps. This would generally involve the extension of current creel surveys to encompass months, times and geographic areas not presently covered or covered on a sporadic basis. In addition, changes to current survey methodologies and

practices would be required to better encompass non-salmon species. Finally, additional specific purpose designed surveys should be added to cover fisheries missed by present survey efforts e.g. beach shellfish harvest.

A general appreciation of the extent of the changes that would be required to existing creel surveys in different areas of the coast and different river systems can be gathered from Annex 1. This Annex summarizes in spreadsheet form the temporal and geographic coverage of present monitoring efforts. It is estimated by program staff that the total cost of enhanced surveys to address current deficiencies in the recreational monitoring system could be in the range of \$3 to \$4 million per annum (i.e. an additional \$1.7 to \$2.7 million).

To generate an estimate of the comparative costs of the mandatory reporting system proposed above, information from the 2000 National Survey was used. The BC tidal water effort estimate for 2000 was approximately 2 million angler days. With complete compliance, this is the approximate maximum number of reports that would be recorded and transmitted to DFO. Providing that all of the previously discussed transmission options are available (i.e. internet, telephone, paper) and allowing for a survey to measure non-response, estimated annual costs do not exceed \$1 million. This \$1 million cost estimate is also in line with an independent estimate derived from cost information for administering the Washington State punch card system. A stakeholder focus group will be invaluable in prototyping this approach and refining this cost estimate.

Additional enforcement costs would also be required under the new system. However, even accounting for this, the overall annual cost of a mandatory monitoring system is likely to be well below the costs of enhancing present creel surveys to address current deficiencies.

11 FUNDING STRATEGY

Under present arrangements, Fisheries and Oceans Canada bears all of the financial responsibility for monitoring tidal water and salmon recreational harvesting and for estimating the catch and effort in these fisheries. As the fisheries have expanded geographically and as attention has shifted to species other than salmon, the cost of monitoring has escalated dramatically over time. In spite of the fact that additional creel surveys have been added and that logbook programs have been implemented for fishing lodges and fishing guides, overall confidence in the monitoring program and the accuracy of the overall catch estimates has declined.

In the longer run, recreational harvesters need to become both individually and collectively responsible for providing the catch monitoring information and the catch data needed by the Department to manage the fisheries. In the interests of developing accountability and responsibility for this, recreational harvesters need to bear the cost of gathering and providing the information to the Department.

Only in this way can an effective incentive be created to provide this necessary management information in a cost-effective manner.

For this reason, as part of fishery monitoring reform in the recreational fishery, the Department intends to move towards cost-recovery or stakeholder self-funding of fishery monitoring requirements. This shift has already occurred in most commercial fisheries on the Pacific coast and is being extended generally to all commercial fisheries. As a result, this change will bring recreational fisheries into line with these other fisheries. This policy shift has also been signaled for some time. For example, the "Allocation Policy for Pacific Salmon" released in October 1999 indicated that "over the longer term, the costs of catch reporting and (fisheries) monitoring will be the responsibility of each harvesting group."

It is recognized that designing and implementing a cost recovery system for the recreational fishery is particularly challenging because of the large numbers and diversity of the recreational fishing population. However, there are at least two options both with respect to the source of funds and responsibility for running programs that could be considered by stakeholders. To facilitate discussion, these options are outlined below:

Funding Source

OPTION 1: License Fee Increase

Recreational licence fees could be increased from present levels. The forecast incremental revenues could then be directed, subject to Treasury Board approval, towards funding recreational fisheries monitoring and catch reporting programs.

OPTION 2: Fishery Monitoring Stamp

A separate and identifiable surcharge could be applied to recreational licences similar to the existing salmon conservation stamp. The forecast stamp revenues could then be directed, subject to Treasury Board approval, towards funding recreational fisheries monitoring and catch reporting programs. Under this option, a clear advantage would be that monitoring and reporting revenues would be distinguishable from and could be separately tracked over time from licence fee revenues.

Program Responsibility

OPTION 1: Remains with the Department

Either the forecast incremental licence fee revenues or the forecast stamp revenues could be channeled, subject to Treasury Board approval, into Fisheries and Oceans Canada reference levels and used to fund recreational monitoring

and catch reporting programs. Under this option, the Department would retain responsibility for operating appropriate monitoring and reporting programs for the recreational fishery although indirectly funded by recreational fishers.

OPTION 2: Delegated to an Appropriate External Agency

Either the forecast incremental licence fee revenues or the forecast stamp revenues could be channeled, subject to Treasury Board approval, to a representative non-profit society established by recreational fishers. The non-profit society could then be tasked with operating a recreational monitoring system that meets standards established by the Department. The advantage with this approach is that greater control over the monitoring program and related costs would lie directly with recreational interest groups on condition that they met the Department's management requirements.

Any appropriate combination of any of these approaches would result in a universal and equitable charging of monitoring costs directly to the recreational fishers who benefit from the services provided. Any combination is also logistically viable. The Department is also willing to consider any other options that may be tabled by stakeholders as well as the time period over which full funding of monitoring costs will be achieved.

12 NEXT STEPS

As indicated in the introduction, the information and analysis contained in this report is intended to facilitate consultation with and input from recreational stakeholders about the future of monitoring and reporting in their fisheries. It is hoped that this consultation will lead to a consensus vision for future recreational fisheries monitoring and reporting programs. It is specifically hoped that consensus on this vision can be achieved quickly. Improvements to the present monitoring and reporting system in the recreational fishery are increasingly essential to better meet the needs of the resource, federal and provincial governments, stakeholders, the general public and the international community. Inevitably, the changes required will take some time to fully implement and an early start to the process of change is urgently needed. An agreed upon direction for change is necessary before starting on this journey.

Additionally, early discussions with the Province of British Columbia will be required before moving forward in this area. Given the important role of the Province in non-tidal recreational fisheries licensing and the overall significance of recreational fishing to residents and businesses in the province, overall provincial support as well as some specific supporting measures will be essential to facilitate the types of changes proposed in this paper.

Following this consultation, appropriate action plans for the implementation of changes to current monitoring and reporting programs will need to be developed.

These action plans will lay out in detail the steps required in order to achieve the agreed upon vision of the future and the appropriate time schedules for their implementation. If a decision is made to proceed with some of the dramatic changes proposed in this paper, a number of transitional steps phased in over an appropriate time period will likely be both necessary and desirable. As with the vision for future monitoring in the recreational fishery, input and advice from stakeholders will be solicited and will be essential in developing a practical transition plan.

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APPENDIX 1

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Recreational Fishery Monitoring and Catch Reporting Consultation Document

Current Marine Recreational Fishery Monitoring Coverage

 No coverage
  Partial coverage
  Full coverage

NOTE: Survey design is focussed on salmon and groundfish species with minimal shellfish information collected

Stat	Type and frequency	Time Coverage (Month)												CURRENT FISHERY COVERAGE LEVEL (%)
Area	of survey	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Logbook, Creel survey, intermittent													90%
2W	Logbook, Creel survey, intermittent													90%
3	Lodge/charter logbooks													20%
4	Lodge/charter logbooks													20%
5	Lodge/charter logbooks													20%
6	Lodge/charter logbooks													20%
7	Logbook - No Creel													85%
8	Logbook - No Creel													85%
9	Logbook, Creel survey, intermittent													65%
10	No surveys													0
11	No surveys													0
12	Creel, logbook, intermittent													65%
13	Creel, logbook, annually since 1980													85%
14	Same as 13													85%
15	Same as 13													85%
16	Same as 13													85%
17	Same as 13													85%
18	Same as 13													85%
19	Same as 13													85%
20-1	Creel, logbook, annually since 1997													90%
21	Creel, logbook, annually since 1993													90%
22	Creel, logbook, annually since 1993													90%
23	Creel, logbook, annually since 1984													90%
24	Creel, logbook, annually since 1992													90%
25	Creel, logbook, annually since 1994													90%
26	Creel, logbook, annually since 1998													90%
27	Creel, logbook, intermittent since 2001													90%
28	Same as 13													85%
29	Same as 13													85%

Recreational Fishery Monitoring and Catch Reporting Consultation Document

Current Freshwater Fishery Monitoring Coverage														CURRENT FISHERY COVERAGE LEVEL (%)
	Type of survey	No coverage			Partial coverage					Full coverage				
Watershed		Jan	Feb	Mar	Time Coverage (Month)									
Skeena R.	creel survey				Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Kispiox R.	creel survey													
Kasiks R.	creel survey													
Big Qualicum R.	hybrid creel survey													85%
Puntledge R.	hybrid creel survey													85%
Nanaimo R.														0%
Cowichan R.	hybrid creel survey													80%
Somass R.	hybrid creel survey													80%
Chemainus R.														0%
Nitinat R.														0%
San Juan R.														0%
Lower Shushwap	hybrid creel survey													
Mabel Lake	hybrid creel survey													
South Thompson	hybrid creel survey													
Thompson (Spences Bridge)	census													
Bridge R.	census													
Fraser (Seton)	hybrid creel survey													
Bowron R.														0%
Chilko R.														0%
Quesnel Lake														0%
Clearwater / North Thompson R.														0%
Thompson R.														0%
Middle Shuswap R.														0%
Thompson (Bonaparte)														0%
Lower Fraser R.	hybrid creel survey													
Chilliwack R.	hybrid creel survey													
Burrard Inlet														0%
Fraser (Eulachon)														0%
Nicomen Slough														0%
Stave R.														0%
Chehalis R.														0%

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