



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

**SELECTIVE FISHING**  
**IN**  
**CANADA'S PACIFIC FISHERIES**

**A New Direction:**

**The Third in a Series of Papers from  
Fisheries and Oceans Canada**

**May 1999**

**Canada**

## Table of Contents

<i>CANADA'S PACIFIC FISHERIES</i> .....	1
<i>A New Direction:</i> .....	1
<i>The Third in a Series of Papers from Fisheries and Oceans Canada</i> .....	1
<b>1. INTRODUCTION</b> .....	4
<b>2. CURRENT ENVIRONMENT</b> .....	6
Global Perspective on Fish Stocks .....	6
Environmental Uncertainty .....	6
International Commitments .....	7
Canadian Commitments .....	7
<b>3. SELECTIVE FISHING</b> .....	9
Objective .....	9
Selective Fishing Strategies .....	10
Approach.....	14
<b>4. THE SALMON FISHERIES</b> .....	15
Mixed Stock Fishing.....	15
Minister's Announcement – May 1998.....	16
New Directions .....	16
Allocation Framework.....	16
Fishing Salmon Selectively .....	17
Experimental Stage .....	18
Operational Stage.....	20
Selective Fisheries Issues – Salmon.....	22
<b>5. NEXT STEPS</b> .....	24
<b>ANNEX 1</b> .....	25
<b>GLOSSARY</b> .....	25
<b>ANNEX 2</b> .....	26
<b>A NEW DIRECTION FOR CANADA'S PACIFIC SALMON FISHERIES</b> .....	26
<b>ANNEX 3</b> .....	28
<b>ALLOCATION FRAMEWORK FOR PACIFIC SALMON 1999 - 2005</b> .....	28

***ANNEX 4***..... **30**  
    **SELECTIVE FISHING IN 1998** .....**30**  
***ANNEX 5***..... **32**  
    **CRITERIA USED TO EVALUATE SELECTIVE FISHING PROPOSALS IN 1999** .....**32**

# 1. INTRODUCTION

*“The merits of a fisherman can no longer be measured solely by how much he catches, but also on what he does not.”*

*The Last of the Hunter Gatherers – Fisheries Crisis at Sea,  
Michael Wigan, 1998, Pg. 220*

Many fisheries throughout the world are facing the challenge of conducting directed fisheries while minimizing or eliminating the interception of incidentally caught non-target species and stocks. Increasing catching power of fishing fleets and growing concerns about decreasing abundance of fisheries resources, particularly weaker species and stocks, have initiated a strong movement towards implementing responsible fishing practices that ensure long-term sustainability of fisheries resources.

Conservation concerns on Canada’s Pacific coast require that fish harvesters and fish managers adopt more selective harvesting methods.

The ability of fishermen to fish selectively and avoid or release unharmed non-target species or stocks is emerging as a fundamental requirement in developing fishing plans. In a conservation-based fishery, catch limits are required for target species, and strict bycatch limits are needed. Both of these considerations will determine the nature, duration and location of all future fisheries.

Bycatch - the catch of non-target, sometimes threatened or endangered, species or stocks - is a prevalent characteristic of most mixed-stock fisheries, particularly those that pursue salmon, groundfish and shellfish. Fisheries and Oceans Canada will work with fish harvesters to dramatically reduce bycatches in these fisheries. The nature of mixed-stock fisheries is described in more detail later in this paper under the Salmon section.

Through the Canada Fisheries Adjustment and Restructuring Program (CFAR), Fisheries and Oceans Canada is currently providing funding incentives and technical support to accelerate development of selective fishing for salmon. This funding is available until the year 2001, after which the responsibility for continued

development of selective fishing gear and methods in all fisheries will reside with fish harvesters. Though the focus of selective harvest is currently on the salmon fisheries, the Department will increasingly turn attention to all fisheries.

Development of selective fishing practices has been underway in Canada for several years in some fisheries. For example, the Department has worked with the Deep Sea Trawlers Association of B.C., the B.C. Beam Trawlers' Association and the provincial government to test selectivity grids and separator panels in trawl nets. A 100 percent observer program in the groundfish trawl fishery is now providing complete and accurate information on catch and bycatch, as well as restricting wasteful dumping and high-grading practices. Salmon harvesters have demonstrated creativity and leadership in developing more selective fishing gear and methods.

These examples are a valuable start, but much more action is needed. The bycatch of eulachons and other species is still a major concern in the shrimp trawl fishery. Bycatch issues in groundfish fisheries exist for both trawl and hook and line gear types. More selective fishing practices are also required in the hook and line groundfish fisheries to address bycatch and dumping of non-target species, in addition to high-grading of target species.

This paper sets out the policy framework for selective fishing in Canada's Pacific fisheries. It will serve to provide a basis for discussion among First Nations and stakeholders in the Pacific fisheries between May and December of 1999. At that time, all comments and advice will be considered by Fisheries and Oceans Canada to develop a final policy paper on selective fisheries for release in January 2000. Realizing the creative and developing nature of selective fisheries, the final paper will be revisited in three years to ensure relevancy, knowledge and approaches at that time.

Section Two of this paper provides an overview of global and Canadian activities related to responsible fishing and provides the context for a selective fishing policy framework. In Section Three, objectives and strategies for selective fishing in all fisheries are presented. Section Four focuses on the salmon fishery and the development of selective fisheries. And Section Five anticipates next steps.

## **2. CURRENT ENVIRONMENT**

### ***Global Perspective on Fish Stocks***

According to the Food and Agriculture Organization of the United Nations (FAO), 13 of the 17 major fisheries of the world are in serious trouble. The collapse of many traditional fisheries is proof that fisheries management must change. Further, the growth in public awareness of environmental issues has resulted in the launch of campaigns to protect global marine resources. Environmental groups have been able to influence international demand for targeted seafood products, and this has added significantly to pressures for improved fisheries conservation around the world. Canada will soon establish endangered species legislation, which will also highlight the urgency of these issues.

### ***Environmental Uncertainty***

Scientists advise that we may be facing a regime shift in the ocean - a change in ocean conditions resulting in lower productivity of fisheries resources and the food on which they depend. Recent research indicates there are connections between long-term shifts in ocean climate conditions and fish stock abundance, particularly of salmon, across the Pacific Rim. As water temperatures in major river systems such as the Fraser and Skeena increase, due to climate change, fish production could decrease. In 1998, for example, some important tributaries reached temperatures which were stressful or near lethal to fish.

Changes in the ocean and freshwater environment and greatly increased uncertainty making it difficult to predict future returns of salmon. With low salmon returns anticipated for the next five to eight years, a conservation-based, precautionary approach to fisheries management, as well as a re-evaluation of mixed stock fisheries, has been essential. It is anticipated, for example, that some stocks of coho salmon will remain at low survival until the years 2005 to 2007.

## *International Commitments*

### **United Nations Food and Agricultural Organization – Code of Conduct for Responsible Fishing**

In 1992, in response to growing concerns over global depletion of fish stocks, the United Nations Food and Agricultural Organization (FAO) was tasked by fishing nations to develop a Code of Conduct for Responsible Fisheries with the goal of conserving fish stocks and protecting the marine environment. Canada was a key supporter and contributor to this process.

The FAO Code of Conduct provides an important reference tool for the sound management and responsible prosecution of fisheries on a national and international basis. Eighty countries, including Canada, at the 28th Conference of the FAO in 1995, adopted this international code.

The Code of Conduct consists of a section on general principles, plus sections on the following specific topics: Fisheries Management; Fishing Operations; Aquaculture Development; Integration of Fisheries into Coastal Area Management; Post-harvest Practices and Trade Fisheries Research. The FAO Code of Conduct describes the basic requirements for sustainable fisheries in any country, regardless of the present state of its fishing industry and its resource management systems.

## *Canadian Commitments*

### **The Canadian Code of Conduct for Responsible Fishing Operations**

Canada played a key role in the development of FAO Code of Conduct for Responsible Fisheries. The Canadian fishing industry is committed to the achievement of sustainability in marine and freshwater fisheries. The Canadian industry has developed a Code of Conduct for Responsible Fishing Operations as an essential step in pursuit of this objective. This Canadian Code of Conduct is consistent with the FAO Code.

The Canadian Code of Conduct for Responsible Fishing Operations outlines nine general principles and 36 supporting guidelines for all commercial fishing operations that take place in Canadian waters. The Code is designed to be responsive to

individual and specific fisheries and will eventually be linked to harvesting activities through the Integrated Fisheries Management Plans.

Implementation of the Canadian Code will contribute directly to the conservation of stocks and the protection of the aquatic environment for present and future generations of Canadians. The development of the Code, and the process currently underway to have it ratified by fishing organizations across Canada, is industry led and driven. Fisheries and Oceans Canada supports the Canadian Code by providing Secretariat support.

The broad-based involvement of commercial fishing organizations across the country has contributed significantly to attitudinal and behavioural changes which are essential for securing the future of Canada's fisheries resource. Canadian fishermen are actively assuming a share of responsibility for the sustainability of an important resource.



### 3. SELECTIVE FISHING

#### *Objective*

**All Pacific fisheries, in which bycatch is an issue, will meet specified standards of selectivity. In fisheries where selective harvesting standards are not met, and bycatches remain a constraint to achievement of conservation objectives, fishing opportunities will be curtailed.**

Selective fishing is defined as the ability to avoid known, non-target species and stocks or, if encountered, to release them alive and unharmed.

There are two complementary elements to selective fishing: avoidance and release. Harvest management techniques to avoid non-target species or stocks are mainly carried out by establishing when and where harvesting is permitted, and implementing time and area restrictions.

Fishing selectively also requires modifications to existing gear and fishing methods, or the introduction of alternative fishing gear and technology.

By preventing or reducing bycatch of non-target species or stocks, or releasing them unharmed, selective fishing can address some of the concerns raised from issues affecting fisheries, including environmental uncertainty, international considerations and mixed-stock fishing. Further, selective fishing will help increase the benefits derived from a fishery by all sectors. Through selective fishing, non-target species and weaker stocks can be conserved while fishing opportunities on the more prevalent target species and stronger stocks are retained. This will help ensure long-term rebuilding.

While in most fisheries, selection by species can be relatively effective, selecting by stock is difficult, expensive, and in many cases impossible. Great advances in this area have been made using DNA sampling and analysis, but much work remains to apply these techniques on a large scale.

Examples of selective fishing initiatives currently underway include:

- use of square mesh and grids that allow smaller fish to escape in shrimp trawl gear;
- escape devices in snow crab traps to allow escape of crabs from lost traps;
- release grids to allow smaller fish escape from seine nets;
- changes to hook size and shape to allow a higher degree of selectivity in groundfish fisheries.

Initiatives currently being tested in the Pacific salmon fisheries are discussed later in this paper.

As a foundation for policy development and implementation of selective fishing in Canada's Pacific fisheries, general strategies are provided below.

### *Selective Fishing Strategies*

The strategies outlined below affect all fisheries. A discussion of strategies specific to Pacific salmon fisheries is found later under section four.

#### **Strategy 1 – Setting and Meeting Targets**

**Fisheries and Oceans Canada will work with all affected fish harvesting sectors to develop selective fishing standards and techniques; and consult on target dates for meeting these standards on a fishery by fishery basis.**

Over time, the degree to which a fishery can meet the selectivity standards of a conservation-based fishery will determine where and when fishing will occur, and with what type of fishing gear.

The Department will work with all fish harvesters to ensure fisheries operations are based on conservation and sustainable use by employing selective fishing gear and methods to minimize or, where possible, eliminate the catch and mortality of non-target species and stocks. These measures will be described in the Integrated Fish Management Plans for each fishery, and implemented either voluntarily or through conditions of licence.

Working together, the Department and fish harvesters will quantify bycatches and determine the bycatch issues of most concern to meeting conservation objectives. Scientific research will be required to support these activities. Fishery managers will meet with representative organizations and advisory bodies to initiate and facilitate the process of setting selectivity standards and target compliance dates. Benchmarks for this work will be developed within the timelines identified in the Approach section below. A process for setting standards and target dates for each gear sector will be established during the consultation process and included in the final policy paper when it is released in January 2000.

Though selective harvesting methods have been incorporated to some degree in most Pacific fisheries, these efforts must increase significantly. Major steps have recently been taken in the salmon fishery. These will continue and expand, and fish harvesters will increase development and use of selective harvesting practices for other species as quickly as possible.

## **Strategy 2 – Avoiding Encounters**

### **Time and area restrictions will continue to be implemented to avoid the encounters and catch of non-target species or stocks.**

Avoiding species and stocks of concern is the first ‘line of defence’ in fishing selectively. The Department will work with fish harvesters to combine scientific knowledge and research with local knowledge to determine where and when species or stocks of concern are present and develop fishing plans to avoid incidental encounters of these stocks.

Opportunities may exist for management flexibility that allows in-season adjustments to fishing patterns. For example, through intensified catch reporting and communications a fleet may be able to avoid encounters of species or stocks of concern by moving quickly from an area where stocks of concern are encountered.

Fish harvesters will be responsible for the incremental costs, including any additional enforcement requirements, associated with highly monitored fisheries of this nature.

### **Strategy 3 – Avoidance Gear and Release of Non-target Species or Stocks**

**Fish harvesters will be encouraged to test and experiment with selective fishing gear and methods that minimize catch and facilitate live release of non-target species and stocks.**

Fisheries and Oceans Canada will encourage proposals and respond to proponents of projects that meaningfully increase the knowledge and applicable technology of selective fishing. Fishing more selectively is in the interest of fish harvesters, therefore the costs of testing, experimenting and purchasing of new gear, once proven as effective, in all fisheries will be entirely borne by fish harvesters. Salmon harvesters will assume full responsibility for the costs of experimenting and testing new gear after the CFAR-funded Selective Fisheries Program ends in 2001.

Experimental work on selective fishing technology must be conducted according to methodology consistent with international standards. The *'Methodology Manual: Measurement of Fishing Gear Selectivity (1995)'* and guidelines for conducting experiments on the selectivity of BC salmon gear, produced by the Department, meet these standards.

Technology and gear, and the resulting intellectual properties arising from experimental work involving the Department will remain in the public domain.

### **Strategy 4 - First Nations Fisheries**

**First Nations will be encouraged to use selective fishing methods in their fisheries.**

First Nations may choose to use selective harvesting methods and techniques to maintain or increase their opportunities to fish. Fisheries and Oceans Canada will continue to consult with First Nations on fishing gear and methods through the negotiation of fishing agreements, and will attempt to ensure that treaty arrangements include selective fishing methods. The Department will continue to provide technical and scientific support to First Nations in their efforts to adopt more selective fisheries.

## **Strategy 5 – Recreational Fisheries**

**The recreational sector will become more selective by minimizing encounters of species and stocks of concern, experimenting with alternative fishing gear, adopting modifications to existing fishing gear, employing new fishing methods, and by improving existing gear and practices that reduce fish mortality and injury when releasing sport-caught fish.**

To maintain fishing opportunities and thus achieve the full potential of economic benefits, the recreational sector has an interest in becoming more selective. Fisheries and Oceans Canada will work with the recreational sector to develop fishing plans that avoid stocks of concern through strategic time and area restrictions and the use of more selective gear. Efforts to reduce mortality of non-target species through proper species identification and handling will increase.

## **Strategy 6 – Commercial Fisheries**

**The commercial sector will become more selective by minimizing encounters of stocks of concern, experimenting with alternative fishing gear, adopting modifications to existing fishing gear, employing new fishing methods, and by improving existing gear and practices that reduce fish mortality and injury when releasing commercially-caught fish.**

Fisheries and Oceans Canada will work with commercial harvesting sector representative organizations to develop new technologies and fishing methods, such as selectivity grids that allow release of under-sized fish from nets and decelerated fisheries that allow better handling and release of non-target species. Time and area restrictions will continue as a significant management tool to avoid catching non-target species. In the salmon fisheries, harvesters are experimenting with alternative gear such as trap nets and fish wheels which, if proven successful, may be incorporated into the commercial fisheries.

Catch reporting and monitoring is an important and integral part of selective fisheries. Some selective fishing methods, such as flexible time and area closures, depend on a high degree of catch reporting. By 2002, all catch reporting and monitoring costs will be borne by fish harvesters. The

Department will work with fish harvesting representatives to develop a phased in approach.

## *Approach*

**The target dates for meeting the selective fishing objective will be the year 2001 for salmon fisheries, and the year 2005 for groundfish and shellfish fisheries.**

The implementation of the strategies will follow the approach currently underway in the Pacific salmon fisheries. There will be an interim experimental stage, when new practices, gear and modified existing gear are explored and tested. This period will extend for two to three years, depending on the fishery and the extent of the bycatch issues. After this time, the gear and practices that prove effective will become operational and, in some cases, a condition of licence and enforceable.

Education and training programs will be an important part of the experimental stage. Without awareness and training, development of the best selective practices will be for naught.

These programs will be coordinated with the Canadian Code of Conduct for Responsible Fishing Operations Board and other organizations with an interest in the training and professionalization of fishermen. Merging interests of conservation and the market exist in better fish handling where better post-release survival, and a higher quality product are the end result.

The objectives, strategies and approach discussed above apply to all species and all fisheries where bycatch constrains the meeting of conservation objectives. While work has been carried out in most fisheries, the strongest focus is currently on the salmon fisheries.

## **4. THE SALMON FISHERIES**

The objective of Fisheries and Oceans Canada is to ensure all fisheries are selective. In 1998, a significant program to increase selectivity of Pacific salmon fisheries was initiated. Why and how this work is being carried out with Pacific salmon, and the next steps in the process, are discussed below.

There are seven species of Pacific salmon native to British Columbia: sockeye, pink, chum, coho, chinook, cutthroat and steelhead. The management of Pacific salmon falls under the authority of Fisheries and Oceans Canada, and the province is responsible for cutthroat and steelhead management.

The first management priority of Fisheries and Oceans Canada is conservation. After conservation, the harvestable surpluses of salmon are allocated to three sectors: First Nations, recreational and commercial fisheries. Currently, conservation concerns exist primarily for certain stocks of coho, chinook and steelhead. These concerns are expected to prevail for the next five to eight years.

### ***Mixed Stock Fishing***

Each salmon species consists of hundreds of individual stocks. Each stock in turn is associated with an individual river or stream in which it spawns. As salmon stocks of all species migrate back to their natal streams to spawn, they mix together. In harvesting stocks of Pacific salmon, multiple species and stocks are often encountered simultaneously. Salmon fisheries are therefore commonly referred to as “mixed stock fisheries”.

Historically, Pacific salmon have been harvested in mixed stock fisheries. However, salmon stocks are not all equally productive - some are stronger (they reproduce faster and in larger numbers) than others. Since strong and weak stocks are harvested at the same rate in mixed stock fisheries, strong stocks can be under-harvested (resulting in surplus escapement and foregone harvest benefits with economic loss) at the same time that weak stocks are over-harvested (resulting in stock declines). Therefore, mixed stock fisheries can create conservation concerns

for weaker stocks. The problems associated with mixed stock fishing are aggravated by the uncertainty created by changing ocean and freshwater environments.

### ***Minister's Announcement – May 1998***

On May 21, 1998 the Honourable David Anderson, Minister of Fisheries and Oceans, announced that selective fishing would be the basis for managing the British Columbia salmon fishery in 1998 and beyond. Selective fishing, the Minister noted, would set a fundamental new direction for management of the Pacific salmon fisheries.

### ***New Directions***

The move to selective fishing was emphasised in a paper entitled *A New Direction for Canada's Pacific Salmon Fisheries*, released by the Minister on October 14, 1998. The New Direction paper outlines key principles that will guide fisheries management in achieving conservation, sustainable use and improved decision making.<sup>1</sup> One of the fundamental principles in the New Direction paper states: **“All sectors—First Nations, recreational and commercial—will use selective methods to harvest salmon.”**

### ***Allocation Framework***

In December 1998, the Minister released *An Allocation Framework for Pacific Salmon: 1999-2005*, the second in the series of *New Direction* papers.<sup>2</sup> As stated in the Framework, for the next two fishing seasons (1999-2000), up to five percent of the total available commercial catch will be made available to commercial licence holders who wish to test selective fishing techniques and alternative gears.

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<sup>1</sup> Annex 1 presents a complete list of principles presented in the New Directions document, which is also available on the Fisheries and Oceans Canada website.

<sup>2</sup> Annex 2 presents a complete list of principles presented in the Allocation Framework document which is also available on the Fisheries and Oceans Canada website.



The Allocation Framework clearly articulated that all participants in the commercial salmon fishery are required to adopt harvesting methods and practices that are more selective than those currently in use. It also stated that, over time, allocations by gear might be adjusted in favour of those who can demonstrate their ability to fish selectively.

### *Fishing Salmon Selectively*

The objective is to have all sectors use selective methods and meet selectivity standards in harvesting salmon.

To protect weaker, co-migrating salmon stocks or species from over-exploitation, fishing opportunities (time and area) in many locations along the coast of British Columbia have been adjusted. Over the past decade, the timing for certain salmon fisheries has been dramatically altered, some opening times have been significantly reduced and, in extreme cases, certain areas have remained closed to fishing to ensure weaker stocks are not over-harvested.

There are surpluses of salmon available to be caught by First Nations, recreational and commercial fishers throughout British Columbia. If harvesters are unable to fish selectively, the abundant salmon stocks may be unavailable for harvest because of the likelihood of damaging weaker, co-migrating species or stocks. In the absence of selective fishing techniques, the result is that salmon fishers of all sectors may be denied fishing opportunities despite an available surplus of fish from strong runs.

By harvesting selectively, all sectors will realize increased fishing opportunities and the associated benefits. For First Nations, this may mean access to salmon for food and cultural fulfilment in situations where non-selective fishing methods would result in a fishery closure. Recreational anglers can enjoy an enhanced leisure activity as opportunity and expectation can be increased. By harvesting selectively, commercial fishing opportunities can continue to occur.

A number of tests of selective fishing techniques and harvesting gears have been conducted. To protect certain coho stocks in 1998, selective fishing was required in all salmon fisheries<sup>3</sup>.

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<sup>3</sup> Annex 3 presents a detailed description of the 1998 selective fisheries.

There are two stages in implementing selective harvesting – the experimental stage and the operational stage. The experimental stage occurs when new and alternative fishing gear and methods are tested to determine selectivity and feasibility. The operational stage begins when proven selective fishing methods are incorporated into the fisheries.

### ***Experimental Stage***

To encourage existing participants to adopt more selective salmon fishing practices, Fisheries and Oceans Canada is providing financial support for experiments with, and tests of, selective fishing gear and methods.

On June 19, 1998, the Minister of Fisheries and Oceans announced a commitment of \$400 million to rebuild the salmon resource, restructure the fishery and assist people and communities adjust to the changing fishery. For the next two years, some of these resources will be used to help First Nations and the recreational and commercial sectors to develop and adopt more selective fishing techniques.

Fisheries and Oceans Canada will provide scientific and technical advice. And the Department, in conjunction with salmon harvesters, has undertaken a number of research projects related to selective fishing practices. This includes the examination of post-release survival of fish caught by various methods in different locations.

Development of selective fishing gear and methods is expected to continue after the existing program expires, with the costs to be borne by the recreational and commercial fishing sectors for work in their respective fisheries.

### **First Nations**

First Nations' traditional harvesting methods for salmon have included many of the selective fishing gears now under consideration for the commercial fishery, such as traps, weirs, dip-nets and fences. The Department will continue to technically and scientifically support First Nations in their use of selective fishing methods, whether for food, social and ceremonial, pilot sales or commercial purposes. This includes limited financial assistance through the CFAR program for the next two years to test and purchase more selective gear.

## **Recreational**

The expansion of new approaches, such as a selective mark fishery for hatchery coho that would permit harvesting of enhanced coho while protecting wild stocks, is under consideration. In a selective mark fishery, adipose-fin-marked fish may be retained while unmarked fish must be released. This initiative is being developed primarily for the recreational fishery, but may have some lesser application to other sectors.

Selective mark fisheries can be effective when a high proportion of unmarked fish survive after being caught and released. If post-release survival rates of unmarked fish are not high enough, a mark fishery may not be a viable selective fishing option for the recreational sector. Therefore, it is vital to determine how best to reduce mortality and minimize injury when releasing sport-caught salmon.

Other approaches will also be tested. Fisheries and Oceans Canada will work with the recreational sector to test strategic time and area restrictions that may avoid non-target stocks, as may certain types of fishing gear and methods.

## **Commercial**

For the next two years, a specific salmon allocation of five percent has been set aside to test selective fishing methods and gear in the commercial sector. At the end of the two-year period, the adequacy of the allocation for experimental trials will be assessed and revised if necessary.

Pilot experiments and tests of selective fishing gear and methods will be carried out using the minimum catch, effort and costs possible while still effectively concluding the work. This will help ensure that the five-percent total allowable catch is applied on a basis of the most positive outcomes.

Some of the new gear and methods being tested for application to the commercial fishery, such as fish wheels, trap nets and beach seines, are controversial to some in the commercial sector. Other gear and methods are less so, including brailing or dipnetting fish aboard seine boats (instead of hauling the catch over the stern); mesh size and design for gillnets; release methods for trolliers; and revival boxes that provide a resting sanctuary for non-target species before being released. Some existing gear types appear to have the potential to be more effective at releasing

non-target fish alive and unharmed, while others may be better equipped to strategically avoid encountering non-target species.

Selective fishing opportunities for the commercial sector, either experimental or operational, **will be limited to existing holders of commercial salmon licences.**

There will not be a new selective commercial user group separate from existing participants, nor will new participants be permitted at the expense of current licence holders. The objective is to continue to reduce the size of the commercial salmon fleet.

During the two-year experimental stage, area licensing will remain a cornerstone of the B.C. commercial salmon fishery. Commercial fishermen will only be permitted to engage in selective fishing opportunities in the areas for which they are licensed. Salmon harvested selectively within a licence area will come from that licence area's share of the coast-wide catch.

Selective fishing opportunities within a specific licence area will involve commercial fishers licensed for that area. For example, a gillnetter licensed for Area D may only fish selectively in that licence area.

### ***Operational Stage***

The operational stage begins when a particular type of selective fishing gear or method is ready for implementation, or on a sector level when a critical number of selective fisheries gear and measures have proven effective and can be implemented. In some cases, fish harvesters will adopt the gear or practice voluntarily. In other cases, measures will be implemented as a condition of licence. In either situation, it is important to consult with all three sectors and develop appropriate educational and awareness programs to support the changes. As stated in the Allocation Framework, implementation of alternative gears such as fish traps and fish wheels will be considered after the 2000 fishing season.

### **First Nations**

The adoption of more selective gear and methods in First Nations fisheries will be encouraged through ongoing Aboriginal Fishing Strategy and treaty processes.

Changes to fishing practices in other fishing sectors that affect First Nations will also be subject to consultation.

Many First Nations have a history of using selective fishing gear such as traps, dipnets and weirs, and are in the process of re-introducing these fishing methods. It is expected many of these fishing methods will become operational very quickly in the food, social and ceremonial fisheries.

### **Recreational**

As more is learned about selective fishing methods, the migration of target and non-target stocks and post-release mortality, many of these techniques will become operational. An increase in selective mark fisheries for coho may be possible in southern B.C. where hatchery coho have been mass-marked (adipose fins removed), starting with the 1996 brood year. Increased sampling costs resulting from mass-marking programs are expected to be about \$1.6 million annually. The Department will work with the recreational sector, and any other potential beneficiaries of selective mark fisheries, to explore future funding mechanisms for this initiative.

Implementing the selective mark fishery initiative and selective gear and methods in the recreational fisheries will be effected through consultation with the Sport Fishing Advisory Board and member organizations.

### **Commercial**

Selective fishing will be the foundation for a partnership arrangement between commercial harvesters and government. In the future, industry will take on a greater role in implementation and funding of catch monitoring programs. In addition, industry will begin to take on more of the responsibilities associated with planning and managing their fishery, including the preparation of fishing plans and improving the catch reporting system.

Over time, proven selective harvesting techniques will be identified and incorporated into the commercial fishery. As indicated in Strategy 3, any costs associated with changing gear will be the responsibility of fish harvesters.

The Allocation Framework outlines that coast-wide commercial salmon allocations by gear type will be translated, on an annual basis, into anticipated licence area allocations by gear and species. These anticipated licence area allocations will

guide allocations for each licence area. The degree to which a particular gear type is selective will be a significant factor in the development of future fishing plans and respective allocations. For example, a fishery may be designed by setting a bycatch ceiling, which would encourage a particular fishery to be more selective.

### ***Selective Fisheries Issues – Salmon***

The move to selective fishing raises questions regarding implementation of the experimental and operational phases. Listed below are some of those questions. It is anticipated that more questions will arise as more is learned about the gear, methods and technology associated with selective fishing. For these and other implementation issues, the Department will continue to consult and seek solutions with all fishing sectors and stakeholders.

#### **Experimental Phase**

- When is an experimental selective fishing method ready to become operational and be implemented into the regular fishery?
- Can one gear type use another to test selective fishing methods (i.e., gillnetters chartering a seiner)?

#### **Operational Phase**

- As certain selective harvesting methods are site-specific, how will fishing locations be determined amongst, and within, the three sectors (First Nations, recreational and commercial)?
- Should fishery openings be extended to compensate for a slower-paced fishery, such as the ‘team harvesting’ approach tested by the northcoast seine fleet in 1998? The sorting and proper handling of catch to maximize survival of released fish can significantly increase the amount of time required to deal with fish once they are caught. (It is worthwhile to note that better handling of catch may contribute to higher quality landings and consequently improved products and prices).
- The two remaining years of the Selective Fisheries Program will only begin to answer many of the questions, particularly those requiring post-release survival research. In what manner can experimentation and testing of selective gear and methods continue after two years?

- What performance measures can be introduced to set standards of selectivity for each type of gear? Can fishing plans be developed using a bycatch trigger?
- The ability to identify separate stocks within a fishery will enhance selective fishing capabilities. How will this be researched and funded?

## **4. NEXT STEPS**

### **This Paper**

Consultations on this paper will be undertaken between now and December 1999. The purpose will be to inform and seek input and comments from salmon harvesters, First Nations, stakeholders and the public on implementation issues related to selective fishing. Over the next several months, there will also be ongoing discussions with the Province of British Columbia

### **Salmon Fisheries**

Testing and experimentation of selective fisheries gear and methods will continue over the next two years. Research into the effects of catching and releasing fish, a key feature of selective fishing, will also continue over the same time period. After two years, the results of the experimental work carried out by fishermen and researchers will be evaluated, and decisions will be made about what can be made operational and whether more testing and research is required.

Funding through the CFAR program provides \$1.0 million for projects in 1999, and \$500,000 in 2000. A call for selective fisheries pilot experiment proposals went out on March 1, 1999, with an April 15<sup>th</sup>, 1999 deadline for submission. With advice from First Nation, recreational and commercial representative organizations, the proposals will be rated and ranked by a team of federal and provincial officials to determine which projects will proceed in the 1999 fishing season. The successful projects will be announced in May. Some proposals may be contingent on fishing plans. If so, they will be announced later.

At the same time, fishing plans will be under development. They will take into consideration the evaluation of selective fisheries measures, tests of selective fisheries gear and methods and research experiments carried out by the department.

### **Other Species**

Fisheries and Oceans Canada fishery managers will initiate discussions with groundfish and shellfish harvesters immediately to begin setting selectivity timelines and targets as discussed in this paper.



# ANNEX 1

## *GLOSSARY*

**Abundance** - Weight or number of fish which make up a stock or species.

**Brood year** - The year in which the eggs were spawned, usually the beginning of a life cycle.

**Bycatch** – The incidental catch of non-target species or stocks.

**Encounters** – numbers of a species that are caught by fishing gear but are released either voluntarily or by regulation.

**Escapement, returns** - The number of mature salmon that pass through (or escape) the fisheries and return to their rivers of origin to spawn.

**Harvest, Catch** - Fish that are caught and retained in a fishery (consumptive harvest).

**Mortality** - The number of fish killed through harvest or through the act of releasing species that cannot be retained in a fishery.

**Selective Fishery** - A conservation-oriented management approach which allows for the harvest of surplus target species or stocks while aiming to minimize or avoid the harvest of species or stocks of conservation concern.

**Stock** – An aggregate of populations of a single species that are grouped for management purposes. They generally have similar migration patterns and run timing.

**Population** – Generally, a population consists of fish of a single species that spawn in the same stream or reach within a stream. They exhibit similar life history traits and are adapted to the habitats they occupy.

## **ANNEX 2**

### ***A NEW DIRECTION FOR CANADA'S PACIFIC SALMON FISHERIES***

**OCTOBER 1998**

#### **Principle 1**

Conservation of Pacific salmon stocks is the primary objective and will take precedence in managing the resource.

#### **Principle 2**

A precautionary approach to fisheries management will continue to be adopted.

#### **Principle 3**

Continue to work toward a net gain in productive capacity for salmon habitat in British Columbia.

#### **Principle 4**

An ecological approach will guide fisheries and oceans management in the future.

#### **Principle 5**

The long term productivity of the resource will not be compromised because of short term factors or considerations – tradeoffs between current harvest benefits and long term stock well-being will be resolved in favour of the long term.

#### **Principle 6**

All sectors – First Nations, recreational and commercial – will use selective methods to harvest salmon.

### **Principle 7**

First Nations' requirements for food, social and ceremonial purposes will continue to have first priority after conservation requirements.

### **Principle 8**

Whenever possible, the recreational fishery will be provided with more reliable and stable fishing opportunities.

### **Principle 9**

The commercial fishery will be a more diversified (less dependent on salmon) and economically viable sector, better able to withstand fluctuations in the cycles of the resource and the market.

### **Principle 10**

Clear, objective and relevant information on major issues requiring decisions will be provided to the public with sufficient time and opportunity for review, comment and feedback. Periodic review of progress and achievements will be initiated to facilitate accountability for the sound management of the salmon resource and its habitat.

### **Principle 11**

Government and stakeholders will together be responsible and accountable for sustainable fisheries.

### **Principle 12**

Enhanced community, regional and sector wide input to decision making will be pursued through a structured management and advisory board system.

## **ANNEX 3**

### ***ALLOCATION FRAMEWORK FOR PACIFIC SALMON 1999 - 2005***

**DECEMBER 1998**

#### **Allocation Principle 1 - Conservation**

Conservation of Pacific salmon stocks is the primary objective and will take precedence in managing the resource -- conservation will not be compromised to achieve salmon allocation targets.

#### **Allocation Principle 2 - First Nations**

After conservation needs are met, First Nations' food, social and ceremonial requirements and treaty obligations to First Nations have first priority in salmon allocation.

#### **Allocation Principle 3 - Common Property Resource**

Salmon is a common property resource that is managed by the federal government on behalf of all Canadians, both present and future.

#### **Allocation Principle 4 – Recreational Allocation**

After conservation needs are met, and priority access for First Nations is addressed, recreational anglers will be provided:

- priority to directed fisheries on chinook and coho salmon; and,
- predictable and stable fishing opportunities for sockeye, pink and chum salmon.

### **Allocation Principle 5 – Commercial Allocation**

After conservation needs are met, and priority access for First Nations is addressed:

- the commercial sector will be allocated at least 95 per cent of combined commercial and recreational harvest of sockeye, pink and chum salmon; and,
- the commercial harvest of chinook and coho will occur when abundance permits.

### **Allocation Principle 6 – Selective Fishing**

To encourage selective fishing:

- a portion of the total available commercial catch will be set aside for existing commercial licence holders to test alternative, more selective harvesting gear and technology; and,
- over time, commercial allocations will favour those that can demonstrate their ability to fish selectively.

### **Allocation Principle 7 – Gear Allocations**

Target allocations for the commercial sector will be:

- established on a coast-wide basis by gear, with the catch of all species expressed on a sockeye equivalent basis; and,
- subject to adjustments over time to account for conservation needs, including selective fishing, and possible changes resulting from the Salmon Licence Retirement Program.

## ANNEX 4

### *SELECTIVE FISHING IN 1998*

A number of tests of selective fishing techniques and harvesting gears involving First Nations, recreational and commercial salmon fishers have been attempted. For example, in order to protect certain coho stocks in 1998 the coast was divided into areas where upper Skeena and Thompson River coho are prevalent (red zones) and not prevalent (yellow zones). The 1998 fishing plan had two principal objectives for coho salmon: (1) targeting for zero fishing mortality for critical upper Skeena and Thompson River coho stocks; and (2) in yellow zones, fisheries had to be selective and demonstrate that the risk of coho bycatch mortality on other stocks would be minimal. Non-retention and non-possession of coho during all fisheries was implemented in the 1998 fishing plan.

- In the First Nations fishery, DFO consulted with First Nations regarding food, social and ceremonial needs, and considered measures to avoid or minimize coho bycatch in First Nations' fisheries. Pilot sales fisheries took place in the lower Fraser River until coho were present in late August, and in the Somass River on the west coast of Vancouver Island. In the Skeena River, pilot sales fisheries took place in Babine Lake and the mainstem of the Skeena River. There was no expansion of Escapement Surplus to Spawning Requirements (ESSR) fisheries for sales purposes.
- In the recreational fishery, barbless hooks were required when fishing for salmon everywhere on the coast. In yellow zones, fishing was permitted. In red zones, salmon fishing was restricted to limited pilot selective fishing experiments, but fishing for other species of finfish and harvest of shellfish was permitted. Small nearshore areas were open to carefully monitor salmon fishing to determine if selective fishing for salmon other than coho could be conducted.

Monitoring by independent observers was employed to evaluate the ability of recreational fishermen to avoid encounters with coho. If coho were encountered to any significant degree in these small experimental fisheries, they were moved or closed. Terminal fisheries on enhanced coho were permitted at a number of

enhancement facilities including: Capilano; Chilliwack; Chehalis; Pallant; Stave; Norrish; Deroche; Porpoise Bay and Big Qualicum.

- In the commercial fishery, limited experimental fishing using modified gear or methods, fish traps and fish wheels were considered in red zones. In yellow zones, use of modified gear was permitted but coho bycatch had to be minimized. All fisheries were subject to more catch monitoring than in the past, and fishing times and areas were adjusted based on coho bycatch concerns. Revival boxes were required and all coho captured accidentally had to be released to the water with the least possible harm. Seines were required to brail (dipnet) their catches out of their nets. Some traditional fishing areas were closed.

## ANNEX 5

### ***CRITERIA USED TO EVALUATE SELECTIVE FISHING PROPOSALS IN 1999***

#### **Commercial and First Nation Project Selection Criteria**

##### **Conservation**

1. Does the gear or method, avoid non-target stocks or species?
2. Does the gear or method allow for live release of non-target stocks or species?
3. To what extent does the gear or method reduce post-release mortality?
4. To what extent does the gear or method reduce ecosystem impacts?

##### **Project Design**

1. Does the proposal have clear goals and objectives (Is a specific and clear question being asked?)
2. Does the proposal clearly describe the methods for answering the question/s asked?
3. Does the proposal clearly describe how information and data will be recorded? (DFO will assist the proponent regarding data recording requirements)
4. Does the proposal describe how the results will be assessed and evaluated?
5. Can the proponent complete the work and meet the objectives within the fiscal year?
6. Does the proponent have an effective 'track record' of producing results and timely and comprehensive reporting or is the production of a final report included in the proposal?
7. Is the proposed work a priority area of study for the gear type or licence area?
8. Does the project have scientific support?
9. Does the proposal contain financial, or in-kind, contributions from the proponent?

##### **General Manageability of the Project**

1. To what extent can the project be easily monitored?
2. Can it be easily determined that this project is proceeding as approved?
3. Can the catch levels be easily monitored and verified?
4. Is the time frame and size of the project manageable?



### **General Manageability of the Gear or Method if Adopted for Future Fisheries**

1. To what extent can it be determined that fishing is proceeding as approved (enforceable) if this gear or method is used in the future?
2. To what extent can the catch levels be easily monitored and verified if adopted?

### **Future Applicability**

1. To what extent will the project result in information that can be broadly applied to First Nations or commercial fisheries?
2. To what extent does the gear or method depend on a unique site or circumstances?
3. How much investment in new infrastructure is required?
4. Does the gear or method have the potential to be economically viable?
5. Does the gear or method provide for sustainable employment opportunities?

### **Additional Benefits**

1. Does the project provide useful new information for stock assessment or fishery management?
2. Does the project provide for increased catch quality?
3. Does the project provide possible tourism, educational or other indirect benefits?

### **Support Required**

1. To what degree is this project self-supporting (money, people, logistics, etc.)?
2. Does this project have other financial contributions?

## **Recreational Project Selection Criteria**

### **Conservation**

1. Does the gear or method avoid non-target stocks or species?
2. Does the gear or method allow for live release of non-target stocks or species?
3. To what extent does the gear or method reduce post-release mortality?

### **Project Design**

1. Does the proposal have clear goals and objectives (Is a specific and clear question being asked?)
2. Does the proposal clearly describe the methods for answering the question/s asked?
3. Does the proposal clearly describe how information and data will be recorded? (DFO will assist the proponent regarding data recording requirements)
4. Does the proposal describe how the results will be assessed and evaluated?
5. Can the proponent complete the work and meet the objectives within the fiscal year?

6. Does the proponent have an effective 'track record' of producing results and timely and comprehensive reporting or is the production of a final report included in the proposal?
7. Is the proposed work a priority area of study for the recreational fishery?
8. Does the project have scientific support?
9. Does the proposal contain financial, or in-kind, contributions from the proponent?

#### **General Manageability of the Project**

1. To what extent can the project be easily monitored?
2. Can it be easily determined that this project is proceeding as approved?
3. Can the catch levels be easily monitored and verified?
4. Is the time frame and size of the project manageable?

#### **General Manageability of the Gear or Method if Adopted for Future Fisheries**

1. To what extent can it be determined that fishing is proceeding as approved (enforceable) if this gear or method is used in the future?
2. To what extent can the catch levels be easily monitored and verified, if adopted?

#### **Future Applicability**

1. To what extent will the project result in information that can be broadly applied to the recreational fishery?
2. To what extent does the gear or method depend on a unique site or circumstances?
3. How much investment in new infrastructure is required?
4. Does the gear or method have the potential to be incorporated into the recreational fishery and be economically viable?
5. Does the gear or method provide for sustainable employment opportunities?

#### **Additional Benefits**

1. Does the project provide useful new information for stock assessment or fishery management?
2. Does the project provide possible tourism, educational or other indirect benefits?
3. Will the project maintain opportunity for fishing with an expectation of catch, for recreational fishermen, in a fishing area where such 'opportunity and expectation' may be lost due to impacts on non target stocks or species?

#### **Support Required**

1. To what degree is this project self-supporting (money, people, logistics, etc.)?
2. Does this project have other financial contributions?