Fisheries and Oceans Canada
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CANADA'S POLICY FOR CONSERVATION OF WILD PACIFIC SALMON

Canada

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CONTENTS

Figures and Table

MESSAGE FROM THE MINISTER

As Canada's Minister of Fisheries and Oceans, it is my pleasure to present *Canada's Policy for Conservation of Wild Pacific Salmon*.

This policy represents the culmination of five years of consultations with Canadians concerned about the protection of Pacific salmon. It will usher in a significant new approach to the conservation of one of Canada's most valuable and cherished resources – wild Pacific salmon. Its adoption represents Fisheries and Oceans Canada's commitment to maintain healthy and diverse populations of salmon that will support sustainable fisheries now, and meet the needs of future generations.

This new approach specifies clear objectives, establishes strategies to meet them, and presents a decision-making process to ensure that choices made about salmon conservation reflect societal values. The policy places conservation of salmon and their habitats as the first priority for resource management.

It gives tangible effect to this principle by committing to safeguard the genetic diversity of wild salmon, and maintain habitat and ecosystem integrity. The policy also considers the values that the harvesting of Pacific salmon provide to people. It reflects a management framework that will provide care and respect for the resource and its ecosystem, and for the people who rely on it for food and spiritual needs, for recreation, and for their livelihood.

I would like to thank the hundreds of dedicated Canadians who participated in our consultations and contributed to the completion of this policy. Their expertise, their dedication, and their passionate advocacy for the well-being of this precious resource have been of immeasurable value and have helped us to improve the policy as it was being developed.

While the adoption of this policy is a significant step, the work to secure the future of Pacific salmon is just beginning. My Department is fully committed to its implementation, but we know that full success in meeting its objectives will depend upon cooperation among all who have an interest in wild Pacific salmon. I am confident that with the sustained efforts of First Nations, fishers, environmental groups, and members of the public, we will together be able to make real and lasting change.

I look forward to working with all groups to implement this policy and secure a brighter future for salmon.

The Honourable Geoff Regan P.C. M.P.
Minister of Fisheries and Oceans

May 31, 2005

The Wild Salmon Policy – A Snapshot

- The goal of the Wild Salmon Policy is to restore and maintain healthy and diverse salmon populations and their habitats for the benefit and enjoyment of the people of Canada in perpetuity.
- This policy goal will be advanced by safeguarding the genetic diversity of wild salmon populations, maintaining habitat and ecosystem integrity, and managing fisheries for sustainable benefits.
- Conservation of wild salmon and their habitat is the highest priority for resource management decision-making.
- Resource management processes and decisions will honour Canada's obligations to First Nations.
- Implementation of this policy will involve an open and inclusive process aimed at making decisions about salmon stewardship that consider social, economic, and biological consequences. People throughout British Columbia and the Yukon will contribute to decisions that reflect society's values for wild salmon.
- Wild salmon will be maintained by identifying and managing "Conservation Units" (CUs) that reflect their geographic and genetic diversity. A CU is a group of wild salmon sufficiently isolated from other groups that, if lost, is very unlikely to recolonize naturally within an acceptable timeframe (e.g., a human lifetime or a specified number of salmon generations).
- The status of CUs will be monitored, assessed against selected benchmarks, and reported publicly. Where monitoring indicates low levels of abundance, or deterioration in the distribution of the spawning components of a CU, a full range of management actions to reverse declines – including habitat, enhancement, and harvest measures – will be considered and an appropriate response implemented.
- Measures for habitat protection and salmon enhancement will focus on sustaining wild salmon. An integrated approach to habitat management – involving assessment of habitat condition, identification of indicators and benchmarks, and monitoring of status – will be adopted that links fish production with watershed and coastal planning and stewardship initiatives.
- Ecosystem considerations will be incorporated into salmon management. Indicators will be developed to assess the status of freshwater ecosystems. Information from ocean climate studies of marine survival and of the biological condition of salmon will be integrated into the annual assessments of salmon abundance that guide salmon harvest planning.
- The policy aims to maintain CUs but recognizes there will be exceptional circumstances where it is not feasible or reasonable to fully address all risks. Where an assessment concludes that conservation measures will be ineffective or the social or economic costs to rebuild a CU are extreme, the Minister of Fisheries and Oceans may decide to limit the range of measures taken. Such a decision will be made openly and transparently.
- This policy will foster a healthy, diverse, and abundant salmon resource for future generations of Canadians. It will support sustainable fisheries to meet the needs of First Nations and contribute to the current and future prosperity of Canadians.

INTRODUCTION

Canadians on the West Coast have an enduring connection with Pacific salmon forged thousands of years ago with the arrival of the first peoples. Wild salmon serve as a vital source of food for First Nations and have a central place in their culture and spirituality; they provide jobs, income, and enjoyment for individuals, businesses, and coastal communities; and they play a key role in natural ecosystems, nourishing a complex web of interconnected species. The ties of Pacific salmon with west coast communities, people, and ecology have been eloquently described in the writings of the late Roderick Haig-Brown, who observed:

The salmon runs are a visible symbol of life, death and regeneration, plain for all to see and share ... The salmon are a test of a healthy environment, a lesson in environmental needs. Their abundant presence on the spawning beds is a lesson of hope, of deep importance for the future of man.[1]

During the past decade, the management of Pacific salmon has become progressively more challenging for various reasons. Supreme Court decisions, varying ocean productivity, conservation concerns, habitat loss, international agreements, new Canadian legislation governing species at risk, shifts in global markets, and altered public expectations have all contributed to this dynamic operating context. The Department of Fisheries and Oceans (DFO) has adapted to changing circumstances but policy and programs must continue to be reshaped to address contemporary challenges and secure a healthy future for Canada's Pacific salmon. This document provides a blueprint for meeting these challenges – it presents Canada's policy for conservation of wild Pacific salmon.

[1] Haig-Brown (1974), *The Salmon*.

What are Wild Pacific Salmon?

The Wild Salmon Policy (WSP) addresses five species of Pacific salmon found in British Columbia and the Yukon[2] *Oncorhynchus nerka* (sockeye), *O. kisutch* (coho), *O. tshawytscha* (chinook), *O. gorbuscha* (pink), and *O. keta* (chum). These species form part of the larger classification of Pacific salmonids, which include steelhead and cutthroat trout. DFO has authority under the federal *Fisheries Act* to manage Pacific salmon and their habitat. The management of steelhead and cutthroat trout has been delegated to the Province of British Columbia, though responsibility for protection of their habitat remains with the Department. The Department will co-operate with BC in the management and enhancement of these species, consistent with the WSP.

Salmon are considered "wild" if they have spent their entire life cycle in the wild and originate from parents that were also produced by natural spawning and continuously lived in the wild.

Salmon that originate directly from hatcheries and managed spawning channels are not considered wild in this policy, and are called "enhanced" salmon.

This term is sometimes also applied to salmon that originate from other enhancement activities, such as habitat restoration and lake enrichment, since their rate of production has been augmented. However, the reproduction of these fish has not been altered, and therefore they are deemed "wild" in this policy.

The requirement in the definition that a wild salmon must complete more than one full generation in the wild safeguards against potential adverse effects resulting from artificial culture.

[2] Wild Pacific salmon in the Northwest Territories are relatively uncommon, not actively managed, and are not included in this policy.

LEGAL CONTEXT FOR THE WILD SALMON POLICY (WSP)

Section 91 of the *Constitution Act*, 1867 assigns exclusive legislative authority over "Sea Coast and Inland Fisheries" to the federal government. The Minister of Fisheries and Oceans exercises this authority under the *Fisheries Act* and regulations. The Minister retains the authority and accountability for the protection and sustainable use of fisheries resources and their habitat. The Minister's authority includes the discretion and powers necessary to regulate access to the resource, impose conditions on harvesting, and enforce regulations. Provincial, Territorial and municipal governments have important authorities with respect to land, water and waste disposal that need to complement efforts to conserve fish and fish habitat.

The legal context for management of wild salmon is also defined by court decisions respecting Aboriginal and treaty rights. Existing Aboriginal and treaty rights are recognized and affirmed in section 35 of the *Constitution Act*, 1982. In its 1990 decision in *R. v. Sparrow*, the Supreme Court of Canada held that the recognition and affirmation of existing Aboriginal rights in the *Constitution Act*, 1982 means that any infringement of such rights must be justified. As described in more detail in Appendix 1, DFO seeks to manage fisheries in a manner consistent with the decision of the Supreme Court of Canada in *R. v. Sparrow* and subsequent court decisions such as the decision of the BC Court of Appeal in *R. v. Jack, John and John*. Specifically, DFO is committed to managing fisheries such that Aboriginal fishing for food, social and ceremonial purposes has priority over other fisheries.

In its 2004 decision in *Haida v. BC*, the Supreme Court of Canada concluded that the Crown has a legal duty to consult with Aboriginal groups and, depending on the strength of the claim of Aboriginal rights or Aboriginal title and the seriousness of the potential adverse effect of a decision on the claimed rights or title, accommodate their interests when the Crown has knowledge of the potential existence of an Aboriginal right or Aboriginal title and is making decisions that might adversely affect the Aboriginal right or Aboriginal title. The Court also concluded that the scope of the duty will vary depending on the circumstances.

The WSP will be implemented in accordance with the guidance provided by the courts with respect to governments' obligations to First Nations, including the guidance provided by the Supreme Court of Canada in *Haida v. BC*, and any guidance from courts in future. The WSP will also be implemented in accordance with the Nisga'a Final Agreement, the Yukon Final Agreements, and any other treaties or agreements entered into between the federal government and First Nations.

PACIFIC SALMON AND DIVERSITY

The health of Pacific salmon depends not only on their abundance but also on their biological diversity. That diversity includes the irreplaceable lineages of salmon evolved through time, the geographic distribution of these populations, the genetic differences and life history variations observed among them, and the habitats that support these differences. Diversity of Pacific salmon represents their legacy to-date and their potential for adaptation to future changes in climate, fishing, and habitat. Protecting diversity is the most prudent policy for the future continuance of wild salmon as well as the ecological processes that depend on them and the cultural, social, and economic benefits drawn from them.

Concern for diversity in Pacific salmon emerged as a significant issue during the 1990s, along with Canada's support for the 1992 UN Convention on Biological Diversity. By 1990 in southwestern BC, one-third of the spawning locations (a species in a stream) known since the 1950s had been lost or diminished to such low numbers that spawners were not consistently monitored at these sites.[3] This portion of BC is however the centre of urbanization and development and is not representative of the province as a whole. In 1996, a study for the American Fisheries Society identified 8,171 natural spawning locations throughout BC and the Yukon.[4] The study reported that salmon had been extirpated in 2 per cent of these locations and had a high chance of extinction in another 12 per cent, based on the current numbers of spawners and/or the rate of change in those numbers. These declines in diversity are one impetus for a new management approach for wild salmon.

THE IMPORTANCE OF HABITAT AND ECOSYSTEMS

To survive and prosper, wild salmon need appropriate freshwater and marine habitat: no habitat, no salmon. Productive habitat in the Pacific Region faces growing pressures from human activities that threaten the capacity to sustain salmon populations over the long term. The land and water that comprise habitat important for salmon productivity also have significant economic value to non-fishery uses, such as urban development, forestry, agriculture, and other industries. These competing uses may compromise the value of the habitat for salmon and associated species. An ongoing concern is that habitat productivity can deteriorate as the result of many small, incremental and often unidentified impacts accumulating over time. In addition, ocean and freshwater habitat can be affected by global-scale phenomena, such as climate change.

The roles that Pacific salmon play in marine (oceanic, coastal, and estuarine), freshwater (lake, stream, and wetland), and terrestrial ecosystems (adjacent to streams and rivers, the riparian zone) have also become a significant issue in salmon management. The acceptance of the influence of marine ecosystems on salmon survival and production has undoubtedly been one of the major advances in recent knowledge about Pacific salmonids. This policy includes actions to progressively account for ecosystem values in salmon management.

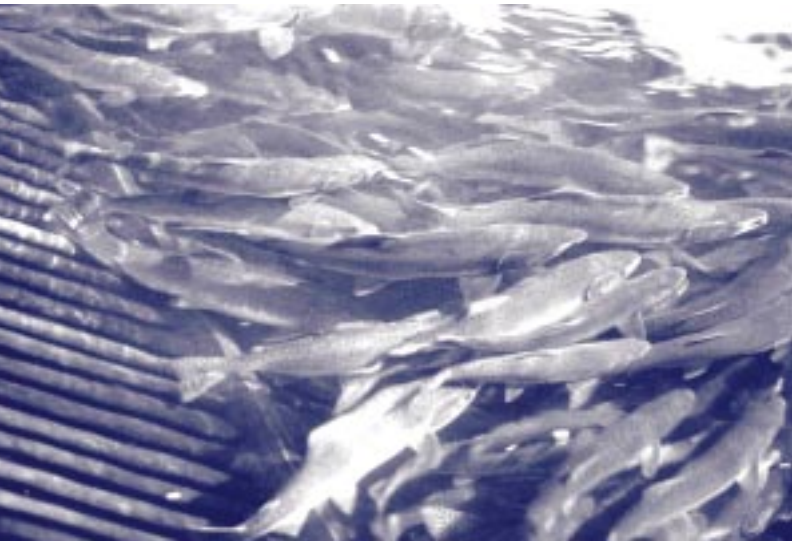
Habitat pressures will continue to grow as human populations increase and, with them, demands for space, food, and livelihood. The challenge for habitat managers is to regulate social and economic activities to avoid or mitigate adverse impacts on fish habitat, in cooperation with First Nations, Provincial, Territorial, and local governments. The new management approach needs to meet this challenge more effectively and maintain habitat and ecosystem integrity for the long-term health of Pacific salmon populations.

[3]Riddell (1993), "Spatial organization of Pacific salmon: What to conserve?"

[4]Slaney et al. (1996), "Status of anadromous salmon and trout in British Columbia and the Yukon." The numbers reported here exclude steelhead, which are not covered by this policy. The paper assessed trends in 4,906 combinations of species within streams (i.e., a stream with three species spawning would account for three spawning locations). The 4,906 spawning locations were 60 per cent of the total number of known locations, but the remaining 40 per cent did not have adequate data to support an assessment.

SALMON DIVERSITY AND BIODIVERSITY

The diversity in Pacific salmon described above refers to genetic variation and adaptations to different environments that have accumulated between populations of salmon. The abundance of spawning salmon is understood to be important for the future production of salmon, and it is also critical for the maintenance of genetic variation or diversity within populations, and for connectedness of populations that results from straying. A low level of straying between spawning groups provides an important source of genetic variation and allows for colonization of new habitats. In this policy, the term diversity, or salmon diversity, refers to genetic variation and adaptations within and between populations of wild Pacific salmon.



Pacific salmon are, however, part of a larger ecosystem and are components of the total biological diversity in these natural systems. In this policy, biodiversity (or biological diversity) is defined as the full range of variety and variability within and among living organisms and the ecological complexes in which they occur; and encompasses diversity at the ecosystem, community, species, and genetic levels and the interaction of these components.[5] The protection of biodiversity, and understanding the broader implications of this term, is also essential to implementation and success of this policy. The biodiversity associated with Pacific salmon populations will influence the quality and productivity of the salmon's ecosystems and local habitats, and determines the biological background influencing salmon diversity and their adaptability.

Canada's *Species at Risk Act* (SARA) recognizes the importance of the diversity within species by defining "wildlife species" to mean "a species, subspecies, variety or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and (a) is native to Canada; or (b) has extended its range into Canada without human intervention and has been present in Canada for at least 50 years".[6] This policy defines the geographic or genetically distinct populations of salmon and the habitats necessary to protect their biodiversity. These groupings of salmon fit the definition of "wildlife species" in SARA.

THE WILD SALMON POLICY – A NEW MANAGEMENT APPROACH

Within the last decade, various measures have been implemented to advance the conservation of Pacific salmon. For example, the commercial fishing fleet was reduced, Canada and the United States renewed the Pacific Salmon Treaty, and selective harvesting practices have been developed and adopted. There is now a greater recognition of the role of wild salmon in Pacific Northwest ecosystems. Each of these actions, in turn, has contributed to the growth of a more informed conservation ethic for Pacific salmon, one that recognizes the inherent value of salmon, the importance of diversity among and within populations, and the obvious and enduring cultural, social, and economic benefits.

[5] 1992 UN Convention on Biological Diversity, and Noss (1990), "Indicators for monitoring biodiversity."

[6] SARA, subsection 2.1., available at www.sararegistry.gc.ca/the_act/default_e.cfm.

Although progress has been made in salmon conservation, there are continuing challenges for some wild populations, their ecosystems, and the people that rely on them. For example, three distinct groups – Interior Fraser River coho, Cultus Lake sockeye in the Lower Fraser, and Sakinaw Lake sockeye in the Strait of Georgia – were designated as Endangered by COSEWIC. There has been an increasing awareness that past management of large fisheries and "stocks" has failed to adequately protect or recognize the value of diversity in Pacific salmon. A new approach to managing salmon production and diversity is needed to conserve salmon and protect and restore the full array of benefits they provide to Canadians.

The impetus for a new management approach also comes from the evolution in public attitudes, science, laws and decision-making over the past twenty years. Thousands of volunteer streamkeepers and many local watershed groups now actively protect and restore Pacific salmon and habitat. Biologists are learning more about the genetic diversity of wild salmon, the impact of climate on survival, and the relationship of salmon to their habitat and surrounding ecosystems. The *Species at Risk Act* mandates the protection of geographically or genetically distinct populations with a high probability of extinction, while the *Oceans Act* calls for integrated resource management and an ecosystem perspective. First Nations governments and non-governmental organizations are demanding more involvement in decisions about wild salmon.

Expectations for the management of Pacific salmon today require a more proactive, forward-looking approach that sets clear conservation goals and acknowledges the importance of protecting biodiversity for sustaining diverse healthy wild salmon populations, their habitats, and associated benefits. Together with the enjoyment wild salmon provide, their place in our cultural identity, and the expectations of Canadians for responsible stewardship, these factors make a compelling case for a new policy approach. The Wild Salmon Policy takes account of consultations with First Nations, user groups, and the general public on draft discussion papers released in 2000, 2004, and early 2005.[7]

The policy that follows will guide future decisions to conserve wild salmon and their habitat in BC and the Yukon. It neither amends nor overrides existing legislation or regulations, but will serve as the blueprint that will govern how these statutory authorities will be implemented.

This policy will facilitate an adaptive approach to salmon conservation in BC and the Yukon. By choice, decision-making is achieved through an inclusive process, rather than through the establishment of a set of predetermined rules. The policy defines objectives and describes conservation outcomes, but it does not prescribe decision rules that would restrict its application. This approach is well-suited to dealing with the circumstances that pertain to salmon. Choices about conservation will be made openly, with input

[7]DFO (2000), *The Wild Salmon Policy Discussion Paper*; Dovetail Consulting Inc. et al (2000), *Final Report on Consultations for the Wild Salmon Policy Discussion Paper and the Salmonid Enhancement Program: Analysis of Input from Provincial Stakeholder Group Meetings, Community Forums, Response Forms and Submissions*; and DFO (2004a), *A Policy Framework for Conservation of Wild Pacific Salmon* (Draft).

from First Nations, and local and region wide stakeholder groups, to ensure that decisions reflect societal values. Management of wild salmon and their habitat is complex, and the problems encountered are diverse. It is not feasible to design rules that anticipate and adequately address all eventualities that will be encountered. A deterministic approach is inflexible, can eliminate the exercise of judgement, and may result in the wrong solution, or impose significant unnecessary costs. The approach adopted in this policy avoids these problems, and offers increased opportunities for the consideration of alternatives, such as habitat initiatives, to assist in addressing protection and rebuilding of salmon. Finally, the approach selected is compatible with the *Fisheries Act*, and consistent with the principle of Ministerial discretion.

POLICY FOR THE CONSERVATION OF WILD PACIFIC SALMON

This policy describes how DFO will meet its responsibilities for the conservation of wild Pacific salmon. It stipulates an overall policy goal for wild salmon, identifies basic principles to guide resource management decision-making, and sets out objectives and strategies to achieve the goal (Figure 1).

The successful implementation of this policy will provide Canadians with:

- Healthy, diverse, and abundant wild salmon populations for future generations;
- Sustainable fisheries to meet the needs of First Nations and contribute to the current and future prosperity of all Canadians; and
- Improved accounting for ecosystem values in salmon and habitat management decisions.

Important Terminology: Conservation and Sustainable Use

The intent of this policy is to provide a framework for the conservation and sustainable use of wild Pacific salmon. These terms – "Conservation" and "Sustainable Use" mean different things to different people. Some definitions of conservation include sustainable use, implying that protection of the biological processes and use of resources are both components of conservation. Other definitions, such as in the Convention on Biological Diversity, separate the two concepts, and present them as related, but distinct considerations. In this policy, these terms are differentiated.

Conservation is the protection, maintenance, and rehabilitation of genetic diversity, species, and ecosystems to sustain biodiversity and the continuance of evolutionary and natural production processes.[8]

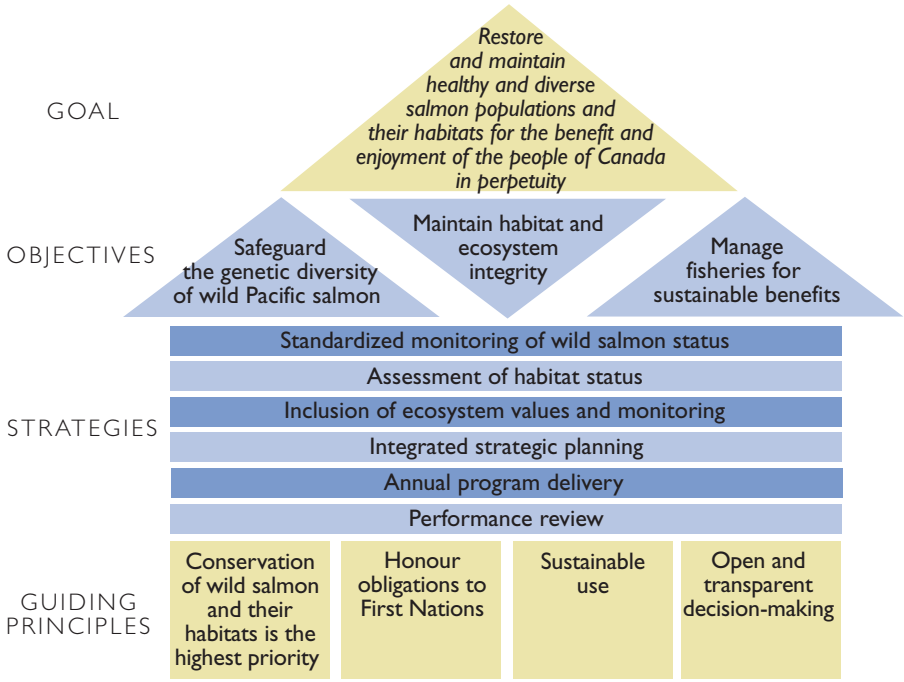
This definition identifies the primacy of conservation over use, and separates issues associated with constraints on use from allocation and priority amongst users.

Sustainable Use is the use of biological resources in a way and at a rate that does not lead to their long term decline, thereby maintaining the potential for future generations to meet their needs and aspirations.

As a resource management agency, DFO is committed to the sustainable use of wild salmon resources. The intent of this policy is to protect the biological foundation of wild Pacific salmon to provide the fullest benefits presently and for future generations. In the long term, protection of biodiversity will provide the greatest opportunity for maintaining sustainable benefits to Canadians.

[8]See Shuter et al. (1997), "Reply: Toward a definition of conservation principles for fisheries management;" Grumbine (1994), "What is ecosystem management?" Mangel et al. (1996), "Conservation of wild living resources;" and Olver et al. (1995), "Toward a definition of conservation principles for fisheries management."

Figure 1 **Overview of the Wild Pacific Salmon Policy**



GOAL AND GUIDING PRINCIPLES

The goal of the Wild Salmon Policy is to restore and maintain healthy and diverse salmon populations and their habitats for the benefit and enjoyment of the people of Canada in perpetuity.

All decisions and activities pertaining to the conservation of wild Pacific salmon will be guided by four principles:

➤ Principle 1 Conservation.

Conservation of wild Pacific salmon and their habitats is the highest priority in resource management decision-making.

The protection and restoration of wild Pacific salmon and their habitats will enable the long-term health and productivity of wild populations and continued provision of cultural, social and economic benefits. To safeguard the long-term viability of wild Pacific salmon in natural surroundings, the Department will strive to maintain healthy populations in diverse habitats.

➤ Principle 2 Honour obligations to First Nations.

Resource management processes and decisions will honour Canada's obligations to First Nations.

This includes Canada's legal duty to consult with First Nations and, depending on the strength of the claim of Aboriginal rights or Aboriginal title and the seriousness of the potential adverse effect of a decision on the

claimed rights or title, accommodate their interests when Canada has knowledge of the potential existence of an Aboriginal right or Aboriginal title and is making decisions that might adversely affect the right or title. Resource management processes and decisions will also be in accordance with the Nisga'a Final Agreement, the Yukon Final Agreements, and any other treaties or agreements entered into between Canada and First Nations.

➤ Principle 3 Sustainable Use.

Resource management decisions will consider biological, social, and economic consequences, reflect best science including Aboriginal Traditional Knowledge (ATK), and maintain the potential for future generations to meet their needs and aspirations.[9]

Social, economic, and biological considerations will inform decisions on salmon, their habitats, and their ecosystems consistent with the priorities assigned to Principles 1 and 2. Conservation decisions cannot be based solely on biological information. The maintenance of biodiversity and healthy ecosystems must be considered in the context of human needs for use now and in the future. Decisions will not be taken without regard to their cost or social consequences.

➤ Principle 4 Open Process.

Resource management decisions will be made in an open, transparent and inclusive manner.

To gain broad public support for decision-making, salmon management must accommodate a wide range of interests in the resource. Decisions about salmon protection and sustainable use will be based on meaningful public input to ensure they reflect society's values. Decision-making processes will be transparent and governed by clear and consistent rules and procedures.

OBJECTIVES

To achieve the outcome expressed in the policy goal for wild salmon, three objectives must be fulfilled:

1. Safeguard the genetic diversity of wild Pacific salmon;

2. Maintain habitat and ecosystem integrity; and

3. Manage fisheries for sustainable benefits.

Key considerations associated with each of these objectives are described below.

➤ Objective 1
Safeguard the genetic diversity of wild Pacific salmon

To sustain Pacific salmon and their associated benefits, it is necessary to safeguard their geographic and genetic diversity and their habitats. While maintaining diversity is broadly accepted as essential for the health of wild salmon, the significant scientific and policy issue is how much diversity? The genetic diversity of a species includes

[9]Brundtland (1987), *Our Common Future: The World Commission on Environment and Development*, and Environment Canada (1995), *Canadian Biodiversity Strategy: Canada's Response to the Convention on Biological Diversity*.

every individual fish. Preserving maximum genetic diversity would eliminate human harvesting of salmon and prohibit human activities that might harm salmon habitat. Conversely, to maintain a taxonomic species, such as sockeye salmon, but ignore within-species population structure would reduce diversity and contravene the intent of the UN Convention on Biological Diversity, SARA and the intent of this policy.

DFO intends to maintain diversity through the protection of "Conservation Units" (CUs). A CU is a group of wild salmon sufficiently isolated from other groups that, if extirpated is very unlikely to recolonize naturally within an acceptable timeframe, such as a human lifetime or a specified number of salmon generations.

There are important implications to this definition of a Conservation Unit. The persistence of salmon within the CU, and its associated production, demand responsible management of its population structure and habitats, as well as the ability of fish to move among habitat areas (connectivity). The loss of a CU for the length of a human lifetime would clearly have serious consequences for the people and other ecosystem components that benefit from or depend on it.

Over the geographic area of a CU, variations in habitat type and quality may result in differences in salmon productivity. Such differences in nature mean that not all populations within a CU are likely to be maintained at equal levels of production or chance of loss. Maintaining CUs requires protecting populations and demes, but not necessarily all of them, all of the time. As long as networks of connected demes and streams within CUs are maintained, any loss of a localized spawning group should be temporary. Maintaining healthy abundances within CUs requires sufficient spawning salmon to recolonize depleted spawning areas and protection of fish habitat to support production and provide connection between localized spawning groups. While salmon from neighboring demes or populations are unlikely to be genetically identical to those lost, they are likely to be most similar genetically and share many adaptive traits. Such localized losses, whether due to natural events or human activities, would not result in extirpation of the CU.

Total success in safeguarding the genetic diversity of wild Pacific salmon would imply preserving all populations and CUs. Action Steps in the WSP are prescribed to maintain CUs to the fullest extent possible, but there will likely be circumstances when losses of wild salmon are unavoidable. Catastrophic events are beyond human control and the Department may not be able to restore habitat or spawning demes damaged by such events. The rate of climate change in an area may exceed the ability of some salmon populations to adjust. While it is the clear intent of this policy to prevent losses resulting from management and use, it is unrealistic in natural environments to expect all losses can be avoided.

The Population Structure of Wild Salmon

Salmon have a complex hierarchical population structure extending from groups of salmon at individual spawning sites all the way up to taxonomic species. Their precise homing to natal streams and their death after spawning restrict gene flow among fish at different spawning locations. However, since some salmon stray, genetic exchange also occurs among fish from different persistent spawning sites (demes) in a geographic area. These interactions form a geographic network of demes and the basic level of genetic organization in Pacific salmon.

The likelihood of genetic exchange decreases with increased distance between streams, or with greater physical differences between streams. Fewer strays and less genetic mixing result in less genetic similarity between fish in these streams. Eventually, as distance or environmental differences grow to severely limit gene flow, the spawning groups will function as separate lineages. These independently functioning aggregates are defined as **Conservation Units** in this policy.

Between localized demes and the geographic boundary of a CU are usually intermediate groupings called **Populations**. A population is a group of interbreeding salmon that is sufficiently isolated (i.e., reduced genetic exchange) from other populations such that persistent adaptations to the local habitat can develop over time. Local adaptations and genetic differences between populations are an essential part of the diversity needed for long-term viability of Pacific salmon. A CU will contain one or more populations (see Figure 2).

Conservation Units and the Maintenance of Diversity

Diversity in Pacific salmon reflects genetic and habitat diversity and the evolution of lineages of salmon over thousands of years[10]. These precise lineages cannot be replaced once lost, and the more numerous they are the greater the chances for salmon to adjust to future environmental changes. Diversity is a kind of insurance that reduces the risk of loss by increasing the likelihood that species and populations will be able to adapt to changing circumstances and survive. Furthermore, maintaining the largest number of spawning populations that are adapted to their individual habitats will result in higher abundances of salmon.

Biologists still have much to learn about the importance of local adaptations at the stream level, the rate at which salmon adapt, and the value of biodiversity. However, since no one can foresee the future stresses on wild salmon, a responsible and precautionary approach recommends conserving a wide diversity of populations and habitats. Pacific salmon have been diverse and adaptable enough to survive floods and drought, disease, volcanic eruptions, and ice ages. Their survival strategies should continue to serve them in the future, unless human-caused pressures become insurmountable. We must ensure that these survival strategies are allowed to function and not destroyed by our growing human footprint.

Some CUs will encompass large areas and include many streams and localized spawning groups. Concerns have been expressed that for such large CUs, individual streams and spawning groups may not be adequately protected even if they are important to local communities. All local demes and streams have value. In practice, protecting entire CUs with their networks of spawning groups is the most effective way to protect individual spawning groups and the interests of local communities.

These networks provide the natural process for recolonizing streams and salmon habitat (with similar genetically related salmon) that may be lost through natural events or some human impact. For example, if attention is focused on a local stream and the overall well-being of the CU is not maintained, then the stream of interest may become isolated from other spawning groups, and at greater risk of loss, through habitat loss or reduced abundances in neighboring streams. The critical assumption underlying these processes, however, is the protection and maintenance of functioning habitat and ecosystems within the CU.

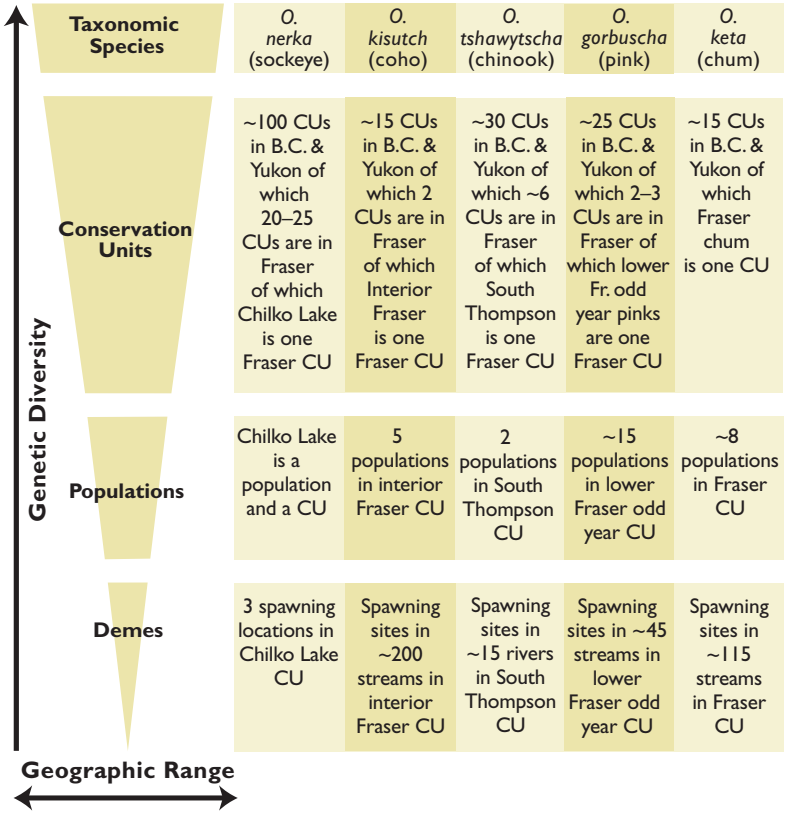
The desired number of spawners for a CU will be established to provide for an adequate abundance and distribution of salmon throughout its geographic range. The annual status of the CU in relation to these targets will guide the development of harvest management plans in the integrated planning process (Strategy 4).

[10]For further reading on biodiversity and Pacific salmon, see for example: Greer and Harvey (2004), *Blue Genes: Sharing and Conserving the World's Aquatic Biodiversity;* Gallaugher and Wood (2004), *The World Summit on Salmon: Proceedings*; Hilborn et al. (2003) "Biocomplexity and fisheries sustainability;" Harvey (2002), *Biodiversity and Fisheries: A Primer for Planners*; Wood (2002), *Managing biodiversity in Pacific salmon: The evolution of the Skeena River sockeye salmon fishery in British Columbia*; Harvey et al. (1998), *Action before extinction: an international conference on conservation of fish genetic diversity*; Wood and Holtby (1998), "Defining conservation units for Pacific salmon using genetic survey data;" and Levin and Schiewe (2001), "Preserving salmon biodiversity."

Species Differences in Conservation Units
(see Figure 2)

The number and sizes of CUs will vary among species. For instance, pink and chum salmon generally show fewer genetic differences between populations and demes than the other species. Consequently, their CUs will be relatively large. Similarly, coho rarely exhibit marked genetic boundaries, so their CUs will tend to be large and at times somewhat difficult to define. Coho show, however, substantial life history variation (e.g., lake rearing juveniles, fry migrants, run timing variation) within a region. Chinook salmon also show varied life histories, but the differences tend to be more geographically aligned, and so will probably have more CUs than coho. Sockeye CUs are probably easiest to identify and will be the most numerous. Genetic information strongly suggests that sockeye CUs will typically be at the level of an individual sockeye-rearing lake. In some cases though, it may turn out that several small sockeye lakes will constitute one CU, or that different timing components ("runs") within large lakes may represent separate CUs. The delineation of CUs in all species will be based on biological information including genetic variation, phenotypic traits (e.g., run timing, life history traits, ocean distribution, etc.), and aboriginal traditional knowledge (ATK) if available. Delineations of CUs are expected to change over time as more information and experience is gained.

Figure 2 **Schematic representation of genetic diversity and Conservation Unit structure**



➤ Objective 2
Maintain habitat and ecosystem integrity

The health and long-term well-being of wild Pacific salmon is inextricably linked to the availability of diverse and productive freshwater, coastal, and marine habitats. Moreover, Pacific salmon have a critical function in the aquatic and terrestrial ecosystems sustained by these habitats. Salmon play an important role in marine ecosystems, with their bodies and waste products providing nutrients for organisms from microbes to top predators, such as killer whales. In freshwater ecosystems, returning salmon transport marine-derived nutrients inland. Salmon carcasses sustain aquatic and terrestrial animals and provide nutrients to the entire ecosystem including subsequent generations of wild salmon.

Aquatic habitats and their adjacent terrestrial areas are also valued for a wide range of human requirements. The integrity of salmon habitat is challenged by human competition for accessible land and fresh water, for ocean spaces, and for the interconnecting estuarine and coastal areas. In both freshwater and marine areas, human activities affect water quality. In estuaries and the marine foreshore, development can affect wild salmon during critical rearing and migration periods. In the open ocean, activities such as commercial fishing, shipping, and waste disposal among others can potentially affect the marine habitat of salmon.

Identifying, protecting, restoring and rehabilitating aquatic habitats are critical to maintaining their integrity and sustaining ecosystems. Since 1986, DFO's Habitat Management Program has been guided by the "no net loss" principle for the protection of these habitats.[11] The first and preferred approach is prevention of habitat loss. DFO policy also stipulates that where a harmful alteration of habitat is authorized by the Minister, losses shall be compensated by habitat replacement.

The strategies for achieving "no net loss" have focused primarily on project-by-project review, mainly in freshwater environments. A modern, more effective approach to achieve "no net loss" must assess the importance of habitat on an ecosystem basis, and balance the degree and type of impact with the most effective remedy. In evolving to a more integrated approach, the Department will make greater use of indicators to assess and monitor the health of freshwater and marine habitat.

A new focus on the salmon habitat that is most productive, limiting, or at risk in a CU will clarify decision-making and better link habitat management strategies to harvest and salmon assessment (Strategy 4). Low risk activities, where measures to avoid or mitigate impacts are well understood, will be dealt with through other mechanisms such as guidelines and standards. This approach will ensure that all habitats are addressed and resources are focused where most required.

In order to effectively manage and protect aquatic systems where the productive capacity of habitat is at highest likelihood of loss, DFO must integrate its work with that of Provincial and other federal agencies, First Nations governments, stewardship groups, industry, and stakeholders. Environment Canada has primary responsibility for administering, on behalf of the Minister of Fisheries and Oceans, pollution prevention and control authorities contained in the *Fisheries Act.* However, the jurisdiction for many of the land and water uses that may be detrimental to salmon resides with Provincial, Territorial or local governments. Success in protecting and restoring habitat demands a cooperative and collaborative approach among the various levels of government so that land and water use activities and decisions better support the needs of salmon. One such coordinating structure is the Pacific Council of Fisheries and Aquaculture Ministers and its subsidiary work groups. The council and the work groups can provide an organizational arrangement within which information can be shared and cooperative work developed and coordinated. Collaborative approaches such as this optimize the use of our collective resources.

Linking Habitat to Wild Salmon CUs and Fish Harvest Planning

A key response of the regional Habitat Management Program to the WSP is an increased emphasis on integrated planning. Fish production and harvest objectives for wild salmon CUs will be linked to the conservation, restoration, and development of fish habitat.

At the resource planning level, better habitat protection priorities will be established by integrating habitat requirements with the fisheries resources they support and with fish management objectives. Habitat plans will incorporate knowledge of the current and future demands on the environment and the aquatic resources, and will be aligned with objectives for fisheries and watersheds for priority CUs.

[11]DFO (1986), *Policy for the Management of Fish Habitat.*

➤ Objective 3
Manage fisheries for sustainable benefits

The conservation of wild salmon and their habitat is the highest priority in this policy. However, a policy that failed to consider the values that the harvesting of Pacific salmon provide to people would be incomplete. While everyone supports conservation, many people depend on salmon for their social and economic needs and insist on a balanced policy that provides for sustainable use of wild salmon.

DFO has a responsibility to provide sustainable harvesting opportunities that will best meet its obligations to First Nations, contribute to social well-being, and provide employment and other economic benefits to individuals and fisheries-dependent communities. A significant challenge for this policy is to safeguard the genetic diversity of salmon while accounting for and realizing these benefits of the salmon catch. Since harvest restrictions necessary to conserve the wild salmon resource affect communities and individuals, cultural, social and economic impacts need to be considered.

Some critics will suggest that consideration of the social and economic benefits arising from salmon harvesting will compromise salmon conservation. Others will claim that a focus on maintaining diversity means the elimination of major salmon fisheries. In reality, the interests of both salmon and people need to be accounted for in a successful conservation program. This policy reflects a management framework that can provide care and respect for a resource and its ecosystem and for the people within it. Protecting the resource base provides the maximum potential for benefits to people. The full measure of the WSP's success will be the achievement of salmon conservation accompanied by human well-being.

Making the best decisions on salmon conservation cannot be done by scientists or other technical specialists alone. While choices must certainly be informed by scientific and technical information, the best decisions will ultimately reflect public values. This requires structured processes that: (1) establish specific objectives and priorities, and (2) allow the biological, social and economic consequences of different conservation measures and activities to be considered and weighed in an open and transparent way.

First Nations, harvesters, environmental groups, and community interests in the resource need to be engaged directly in these processes, and in the determination of the most appropriate management actions. Individual and community involvement in salmon management decision-making, in turn, will sustain the social and cultural ties between people and salmon. These ties will ultimately lead to the more successful implementation of conservation plans and the better protection of wild salmon.

STRATEGIES AND ACTION STEPS

This policy will be implemented through six strategies summarized in Table 1. Strategies 1 through 3 provide the information on wild salmon populations, their habitats, and ecosystems required as information for decision-making and planning. Strategy 4 requires the integration of biological, social, and economic information to produce long-term strategic plans for salmon and habitat management for each conservation unit. Strategy 5 is the translation of strategic plans into annual operational plans and Strategy 6 is a commitment to ongoing review of the implementation and success of the Policy.

The WSP and the Precautionary Approach

Article 6.2: "*States shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.*"

Article 6.2 of the UN Agreement (Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995)[12] builds from the original declaration of a precautionary approach (Principle 15, Rio Declaration on Environment and Development, 1992), and is also included in the United Nations Fisheries and Agriculture Organization Code of Conduct for Responsible Fisheries (1995).

Precautionary approaches are now widely applied in fisheries management and the protection of marine ecosystems. The approach identifies important considerations for management: acknowledgement of uncertainty in information and future impacts and the need for decision making in the absence of full information. It implies a reversal in the burden of proof and the need for longer term outlooks in conservation of resources.

The application of precaution in the WSP will follow the guidance provided to Federal Departments by the Privy Council Office publication[13] entitled "*A Framework for the Application of Precaution in Science-based Decision Making About Risk.*" (Canada, Privy Council Office 2003). That Framework includes five principles of precaution:

- The application of the precautionary approach is a legitimate and distinctive decision-making approach within a risk management framework.
- Decisions should be guided by society's chosen level of risk.
- Application of the precautionary approach should be based on sound scientific information.
- Mechanisms for re-evaluation and transparency should exist.
- A high degree of transparency, clear accountability, and meaningful public involvement are appropriate.

The WSP will adhere to the use of precaution and be consistent with the Privy Council Office framework and FAO[14] (1995, paragraph 6 (a-h)). For example, the introduction of a lower benchmark (Strategy 1) is a significant precautionary step in the conservation of Pacific salmon. In determining the value of the benchmark, all sources of uncertainty in assessment of the CU must be determined (for estimation of the buffer) and the Department and advisors must determine a risk tolerance to be applied in a risk management framework. Where assessment information is highly uncertain, more precautionary lower benchmarks will be defined.

[12]See www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm.

[13]Canada Privy Council Office (2003), *A Framework for the Application of Precaution in Science-based Decision-Making About Risk*.

[14]See FAO (1995), *Precautionary approach to fisheries; Part 1: Guidelines on the precautionary approach to capture fisheries and species introductions*.

Table 1 **WSP strategies and action steps**

1. Standardized monitoring of wild salmon status
• Identify Conservation Units
• Develop criteria to assess CUs and identify benchmarks to represent biological status
• Monitor and assess status of CUs
2. Assessment of habitat status
• Document habitat characteristics within CUs
• Select indicators and develop benchmarks for habitat assessment
• Monitor and assess habitat status
• Establish linkages to develop an integrated data system for watershed management
3. Inclusion of ecosystem values and monitoring
• Identify indicators to monitor status of freshwater ecosystems
• Integrate climate and ocean information into annual salmon management processes
4. Integrated strategic planning
• Implement an interim process for management of priority CUs
• Design and implement a fully integrated strategic planning process for salmon conservation
5. Annual program delivery
• Assess the status of Conservation Units and populations
• Plan and conduct annual fisheries
• Plan and implement annual habitat management activities
• Plan and implement annual enhancement activities
6. Performance review
• Conduct post-season review of annual workplans
• Conduct regular reviews of the success of the WSP

STRATEGY 1
STANDARDIZED MONITORING OF WILD SALMON STATUS

This policy requires a systematic process to organize all Pacific salmon streams and lakes into geographic units for conservation and specification of the means to monitor abundance and distribution of Pacific salmon within those units over time. The following Action Steps present how the Department will identify and assess wild salmon in BC and the Yukon in cooperation with First Nations and others.

➤ Action Step 1.1. Identify Conservation Units.

Based on science and local knowledge, the salmon that use particular freshwater habitats will be aggregated into Conservation Units. CUs will be delineated consisting of one or more genetically similar interbreeding populations and have a defined geographic distribution. A CU will include genetically similar lineages of fish, a spatial distribution of populations and demes, and be dependent on a set of habitats. This linkage recognizes the need for interconnected spawning populations for genetic processes, defines important habitat for these lineages and for future production, and identifies the groups of salmon whose status will be measured under this policy.

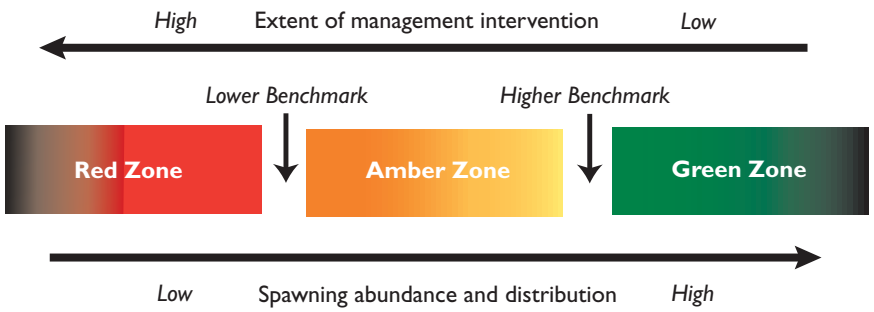
The delineation of CUs will be based on biological information, including genetic traits (e.g., DNA variants), polygenic traits (e.g., run timing, life history traits, ocean distribution, etc.), and ATK where available. Since the requirements and needs of First Nations and others may be at finer geographic scales than some CUs, management objectives to address these may be recognized in Strategic plans (Strategy 4). The number of CUs for each species will be a function of our knowledge base and is expected to change over time. DFO will consult with local First Nations in accordance with its consultation obligations during the process of defining Conservation Units. As this work proceeds, it will be assessed through peer review (via the Pacific Scientific Advice Review Committee, PSARC).[15] This review process facilitates participation by outside experts, First Nations, fisheries stakeholders, and the public; and will provide the means to modify the definition of CUs over time.

➤ Action Step 1.2. Develop criteria to assess CUs and identify benchmarks to represent biological status.

The biological status of a CU will normally be based on the abundance and distribution of spawners in the unit, or proxies thereof. When a CU contains more than one population, it will be necessary to determine how abundance is distributed among the populations. For each CU, higher and lower benchmarks will be defined that will delimit three status zones: Green, Amber, and Red (Figure 3). As spawner abundance decreases, a CU moves towards the lower status zone, and the extent of management intervention for conservation purposes will increase.

[15] See www-sci.pac.dfo-mpo.gc.ca/sci/psarc/default_e.htm .

Figure 3 **Benchmarks and biological status zones to be determined for each CU**



Benchmarks identify when the biological production status of a CU has changed significantly, but do not prescribe specific restrictions. Changes in status will initiate management actions (see sidebar). The specific responses will vary among species, geographic regions and cause of the decline and will be determined through the integrated planning process described in Strategy 4. The use of status zones and generic methods to determine benchmarks recognizes variability in data quality and quantity and is consistent with current management approaches adopted by other agencies.[16]

The lower benchmark between Amber and Red will be established at a level of abundance high enough to ensure there is a substantial buffer between it and any level of abundance that could lead to a CU being considered at risk of extinction by COSEWIC. The buffer will account for uncertainty in data and control of harvest management. There is no single rule to use for determination of the lower benchmark. Rather, it will be determined on a case-by-case basis, and depend on available information, and the risk tolerance applied. The determination of the risk tolerance to apply is a value judgement that requires consultation with First Nations and others affected by this choice.

Example criteria, depending on the species and types of information, may be:[17]

- The spawning escapement required to produce a percentage of the maximum juvenile abundance (say 10–25%);
- The spawning escapement estimated to permit recovery with an agreed probability within an acceptable period of time (e.g., 75% confidence within three salmon generations);

[16]Mace et al. (2003), *Report of the NMFS National Standard 1 Guidelines Working Group*, and DFO (2004b), *Proceedings of the National Meeting on Applying the Precautionary Approach in Fisheries Management*.

[17]The values presented in these example criteria are for explanation only and do not limit any consideration of other values or other criteria that may be determined for a specific CU.

Biological Status Zones and Management Response

A Conservation Unit in the Red zone is undesirable because of the risk of extirpation, and the loss of ecological benefits and salmon production. The presence of a CU in the Red zone will initiate an immediate consideration of ways to protect the fish, increase their abundance, and reduce the potential risk of loss. Biological considerations will be the primary drivers for the management of CUs with Red status.

Amber status implies caution in the management of the CU. While a CU in the Amber zone should be at a low risk of loss, there will be a degree of lost production. Still, this situation may result when CUs share risk factors with other more productive units. Decisions about the conservation of CUs in the Amber zone will involve broader consideration of biological, social, and economic issues. Assuming a CU is assessed to be safe in the Amber zone (consistent with Principle 1), then the use of this CU involves a comparison of the benefits from restoring production versus the costs arising from limitations imposed on the use of other CUs to achieve that restoration.

Social and economic considerations will tend to be the primary drivers for the management of CUs in the Green zone, though ecosystem or other non-consumptive use values could also be considered.

- The abundance and distribution of spawners within a CU sufficient to provide confidence that the CU does not have a high probability of extirpation (e.g., <5% chance of loss over 50 years); or
- A proportion of the number of spawners (S) estimated necessary to provide maximum sustained yield (MSY) on an average annual basis given existing environmental conditions (e.g., 25 per cent of S_{msy}).

Within the Red zone, there will be a level of abundance that cannot sustain further mortalities due to fishing or change to freshwater or marine habitats. Further mortality in such a CU will lead to continued decline in the spawner abundance and an increasing probability of extirpation. Determining this level in the zone is a continuing discussion in salmon assessment literature and is not specified in this policy. The Department will prepare and publish operational guidelines on the estimation of this level. The management response to this level will be determined on a case by case basis, in consultation with First Nations, and others affected by this determination.

The higher benchmark between Green and Amber will be established to identify whether harvests are greater or less than the level expected to provide, on an average annual basis, the maximum annual catch for a CU, given existing environmental conditions. This level will vary through time but there would not be a high probability of losing the CU. As with the lower benchmark, the upper benchmark will also be determined on a case-by-case basis depending on the species and types of information available, and may apply:

- A proportion of the number of spawners (S) estimated necessary to provide maximum sustainable yield (MSY) on an average annual basis given existing environmental conditions (e.g., S_{msy});
- An exploitation rate for the CU that would limit harvest based on a rate of fishing mortality rather than the number of fish killed;
- The number of smolts (or spawners) estimated to correspond with habitat capacity; or
- A proportion of the long term average spawning abundance.

➤ Action Step 1.3. Monitor and assess status of CUs.

Salmon assessment involves the use of various analyses to make quantitative predictions about the reaction of a population to alternative management plans.[18] Two important components of this statement are that assessments should be quantitative and are conducted to provide advice for management (including conservation when necessary). For wild salmon in the BC and Yukon, however, quantitative assessment is a complex and potentially costly task, involving numerous data sources and hundreds of populations. Consequently, the Department has utilized three levels of annual monitoring programs in the assessment of Pacific salmon:

i) **Indicator systems:** Comprehensive programs involving quantitative information on the spawning adults, juveniles produced, mature progeny produced (reported in the catch and spawning numbers) from the specific system. These programs are the most information rich and expensive but provide critical information for management such as productivity and sustainable rates of

[18]See Hilborn and Walters (1992), *Quantitative fisheries stock assessment.*

exploitation (population dynamic values), survival rates for major life history phases (e.g., freshwater and marine survival), and exploitation patterns and rates in fisheries.

ii) **Intensive monitoring**: Annual surveys of the numbers of salmon in specific subsets of streams or habitats within a geographic area. These surveys involve quantitative designs that can be replicated annually to provide consistent indices of spawners between years. The accuracy and precision of the estimates will vary with methodologies and habitats but the essential component is that there is a high degree of confidence that inter-annual trends are accurately assessed. For example, methods may involve in-river test fisheries, counting weirs, mark-recapture programs, area-under-the-curve estimators, and surveys of juvenile production in streams and lakes.

iii) **Extensive monitoring:** Surveys that are generally the least expensive but enable the broadest coverage of streams or other habitats within a geographic area. These surveys are useful for examining salmon distribution, consistency of patterns throughout the region, and checks on habitat changes. They are usually visually based, may be repeated within a year, and may include randomly selected samples of the streams or habitats in a large geographic area. Examples of these surveys are over-flights, stream walks or floats, and could involve only portions of a stream instead of the entire system.

For each CU, a statistically based and cost effective monitoring plan will be designed and will build on existing programs and local partnerships (e.g., First Nations agreements, local Streamkeeper or enhancement groups). Monitoring programs must assess the annual abundance of the CU and the distribution of spawners. The assessment procedures applied will vary between CUs but monitoring plans for each CU will be documented and information reported annually. The benchmarks specified for a CU must be stated in units consistent

with the monitoring program for that CU in order that the annual status of the CU can be assessed. A core program (i.e., an agreed minimum monitoring plan) will be established by the Department and partners and funded annually to maintain the long-term information fundamental to management of local salmon resources. Each monitoring plan will be peer reviewed to ensure application of appropriate designs and methods, best use of available resources for monitoring, and to ensure that information management systems have been developed. A key objective of these monitoring programs will be to make certain that data collected are utilized and timely for the provision of advice.

Assessment results for a CU compared to its two benchmarks will determine the biological status of the CU. This status determination will help to guide resource management planning and further stock assessment activities. When a CU is in the Green zone, a detailed analytical assessment of its biological status will not usually be needed. For a CU in the Amber zone, a detailed assessment may be necessary as input to Strategies 2 and 3 below. If the CU is classified as Red, a detailed assessment will normally be triggered to examine impacts on the CU of fishing, habitat degradation, and other human factors, and evaluate potential for restoration.

STRATEGY TWO
ASSESSMENT OF HABITAT STATUS

The maintenance of sound, productive salmon habitat in both fresh water and the marine environment depends on good scientific information, timely measures to prevent habitat disruption, and compliance with regulatory directives. Habitat management and protection require identification of the habitats necessary for the conservation of wild salmon and assessment of changes in their status over time. This will enable the evaluation of the effectiveness of regulatory, planning and public awareness measures, establishment of priorities, and guide regulatory and enforcement interventions. Strategy 2 will address these information needs, thereby complementing DFO regulatory and compliance programs and improving our capacity to proactively monitor and protect habitat.

An overview of important habitat and habitat issues within CUs will be developed and habitat status will be assessed using indicators that combine scientific and local knowledge and recognize sensitive life stages and habitats. Indicators will be selected to be reflective of overall habitat health then tracked to assist in habitat planning within DFO and other jurisdictions, including First Nations governments, the Province of BC and local governments. Habitat data gathered from many sources within and outside DFO will be linked and made more accessible for habitat planning. The assessment will highlight good quality habitat that needs to be maintained and protected, and degraded habitats that need to be restored or rehabilitated on the scale of watersheds and Conservation Units to inform strategic and annual planning for salmon conservation. Through integrated resource planning, DFO's Habitat Management Program will evolve to link habitat protection, resource assessment and stewardship with fish production.

These Action Steps represent a major change and will be implemented progressively to improve the effectiveness of DFO's program for protecting salmon habitat. The reshaping of the program will focus regulatory and enforcement responsiveness and effectiveness, strengthen linkages between habitat protection and fish production objectives, and provide guidance to watershed planning initiatives.

➤ Action Step 2.1.
Document habitat characteristics within CUs

Habitat requirements for Pacific salmon vary by species, life history characteristics and phase, and geography. CUs identified in Strategy 1 will include genetically similar lineages that are dependent on a set of habitats. The identification of the habitats that support or limit salmon production in watersheds and CUs will inform assessment, monitoring and protection priorities.

Information from multiple sources will be assembled by DFO at appropriate geographic scales to describe habitat conditions for individual CUs. Such sources include government agencies, First Nations, watershed-based fish sustainability plans, existing watershed processes, stewardship groups and oceans integrated management. An overview report will be prepared for each CU that will provide sufficient information on key habitats to identify initial priorities for protection, rehabilitation, and restoration. It will also identify information gaps and factors, such as water quality and quantity, that potentially threaten the future

health and productivity of habitats in the CU. This information will contribute to watershed planning with First Nations governments, industry, stewards and other jurisdictions and will serve as an effective initial guide for habitat protection and planning priorities in Strategies 4 and 5. This improved understanding of salmon habitats will also be valuable as an educational tool for stakeholders.

➤ Action Step 2.2. Select indicators and develop benchmarks for habitat assessment

A variety of quantitative and qualitative indicators of habitat status exist. In fresh water, examples include water quality, temperature, stream flow, fish and invertebrate densities, and features such as quantities of good quality gravel. In estuarine and marine environments, Marine Environmental Quality standards may be used along with physical habitat indicators.

Indicators for CU's on a watershed scale will be selected to assess the quantity and quality of the habitats identified in Action Step 2.1. Indicators may be general across CU's or specifically selected on a case-by-case basis for specific CU's and habitat types. Government agencies, First Nations governments, watershed planning processes and stewardship groups will be asked to provide advice on the development or selection of key indicators for their watersheds, based on local knowledge and information on the kinds of data that are available.

Benchmarks will be developed to reflect the desired values of each key indicator. For example benchmarks for water temperatures could reflect optimal temperature range for salmon and will vary by species. Similarly, for an indicator such as gravel quality, the proportion of fine sediment as substrate in spawning areas could be utilized. Biological status indicators may also be used to validate habitat benchmarks. Benchmarks will be set that reflect our intent to take action to protect and restore habitat on a preventative basis as required, before population abundance declines in response to degraded habitat.

The product of this Action Step will be a set of indicators for CUs and benchmarks for the indicators.

➤ Action Step 2.3. Monitor and assess habitat status

Based on the framework described in Action Steps 2.1 and 2.2, ongoing monitoring will be implemented to identify changes in habitat condition over time. This monitoring will be integrated with salmon assessments and ecosystem evaluations. The intent will be to better understand the relationship between changes in habitat condition and changes in salmon production and distribution within the CU. Monitoring will also be used to assess the effectiveness of regulatory decisions and rehabilitation measures. All monitoring results will inform both longer-term strategic planning and annual operations in habitat management. If a decline in habitat quality or quantity over time is detected, efforts will be made to identify the causes and response measures will be considered as part of an integrated management plan for the Conservation Unit.

The implementation of monitoring and assessment of habitat status will provide four key inputs to guide habitat management. These are:

- Important habitat in need of protection to maintain salmon productivity;
- Habitat risks and constraints that are adversely affecting that productivity;
- Areas where habitat restoration or rehabilitation would be desirable to restore or enhance productivity; and
- Investigations to fill information gaps.

These key inputs will also guide the integrated strategic plans (Strategy 4), where long term priorities for habitat protection and restoration will be established to complement fish production objectives and Strategy 5 where annual plans will be developed, including ongoing compliance and regulatory functions. These inputs will also be useful for other jurisdictions responsible for components of salmon habitat.

This information will allow DFO to recognize and protect the habitats required for the conservation of wild salmon using tools appropriate to the circumstances. Through risk assessment and planning, efforts will be focused where there are activities with a high likelihood of significant impacts and where there are sensitive and important habitats. Activities with a low likelihood of impact or those that impact other habitats will be dealt with through the use of guidelines and standards. All habitats will be addressed but protection and recovery efforts will vary depending on the habitat value.

➤ Action Step 2.4. Establish linkages to develop an integrated data system for watershed management

Together with the Province of British Columbia and other partners, DFO will promote the design, implementation, and maintenance of a linked, collaborative system to increase access to information on fish habitat status. A more unified salmon habitat data system can be achieved by improving common access to the extensive data holdings of DFO, Provincial and Territorial agencies, other levels of government, and stakeholders that describe watersheds and habitat conditions. Improved sharing of information will accelerate and strengthen assessment and reporting of habitat status for CUs. Over time, it will also allow cumulative changes in habitats and wild salmon status to be identified and appropriate actions taken.

STRATEGY 3 INCLUSION OF ECOSYSTEM VALUES AND MONITORING

Pacific salmon play important roles in marine (oceanic, coastal, and estuarine), freshwater (lake, stream, and wetland), and terrestrial ecosystems (adjacent to streams and rivers, the riparian zone). There is ample scientific evidence demonstrating that nutrients derived from salmon carcasses are important to freshwater and riparian ecosystems. However, few studies provide advice on the numbers of salmon necessary for healthy freshwater ecosystems, or link these ecosystems with the dramatic effect that changes in climate and marine conditions can have on the survival and production of Pacific salmon. For example, it is now known that the ocean's capacity for salmon production can be limited, is highly variable over time, and can have an enormous effect on the abundance and condition of adult salmon (e.g., body size, energy content). Survival rates from when salmon enter the sea until they return to coastal waters as adults have been measured to vary by more than a hundredfold (even a thousand fold in some cases).

A challenge for the Wild Salmon Policy is the need for development of an ecosystem objective that is widely appreciated but difficult to quantify. Coupled with this uncertainty is increasing concern for long-term climate change that will affect marine and freshwater ecosystems. Monitoring this variation and implementing appropriate management responses to address potential impacts will be increasingly important to future conservation efforts.

The Department's intent is to progressively consider ecosystem values in salmon management, but it acknowledges a limited ability to do so at the present time. The following steps will provide the scientific understanding and technical capacity to include ecosystem values over time.

➤ Action Step 3.1. Identify indicators to monitor status of freshwater ecosystems

The Department will use existing data and expert advice to identify key indicators (biological, physical, and chemical) of the current and potential state of lake and stream ecosystems (diversity of organisms, rates of biological production, etc.). Within two years, an ecosystem monitoring and assessment approach will be developed and integrated with ongoing assessments and reporting on the status of wild salmon. Implementation of this approach will be coordinated with the monitoring of CU status (Action Step 1.3), their habitats (Action Step 2.3), and marine conditions (Action Step 3.2). In the process, knowledge gaps and areas requiring further research will also be identified.

➤ Action Step 3.2. Integrate climate and ocean information into annual salmon management processes

To understand changes in climate and oceans and their consequences for salmon production, the freshwater monitoring programs identified in Step 3.1 will be integrated with programs investigating variability in climate and ocean conditions. Canada is developing programs to monitor and study these conditions. To relate variations in freshwater and marine ecosystems, networks of freshwater indicator systems (see Action Step 1.3) are being discussed internationally to assess the magnitude and spatial scale of changes in climate and ocean conditions. Linking variations in salmon returns to changes in the marine ecosystems requires large-scale monitoring programs, extensive planning, and collaboration with domestic and international organizations.

Information on climate and marine conditions will continue to be provided through DFO's State of the Ocean reports, and will be linked with assessments of the marine survival of Pacific salmon. Coupled with results from Action Step 3.1 and ongoing assessment of salmon survival, research in this area should lead to improved understanding of production dynamics and better management of Pacific salmon. This step is also linked to Canada's Oceans Strategy, which recognizes the need to better understand ecosystem dynamics, including climate variability and impact of change on living marine resources.

A more comprehensive view of salmon production and its determinants, from egg to spawning adult, is necessary to direct management actions more accurately and effectively conserve Pacific salmon resources in an uncertain future.

Climate Change and Wild Salmon

There is increasing evidence and support that the world's climate is changing and, in particular, that "global warming" is taking place.[19]

The climate-related effects anticipated for wild salmon are difficult to predict. Common expectations include increased summer water temperatures, changes in seasonal flows, more extreme flow events, and changes to ecosystems. When and where change occurs will also be highly variable. So how can the Wild Salmon Policy possibly protect Pacific salmon against these events? The WSP will have limited ability to directly protect salmon from climate change, but the policy's premise – to protect diversity and their habitats – is critical to allowing Pacific salmon to adapt to future changes. By maintaining the genetic diversity of wild salmon and the integrity of their habitat and ecosystems, the WSP will help ensure viable wild salmon populations in the future. At the same time, while salmon adjust to these pressures, managers could expect productivity and allowable catches to decline.

The importance of protecting diversity and maintaining healthy diverse populations of fish was also recognized as an important strategy in a recent federal government report on climate change impacts and adaptation.[20]

[19]See the findings of the Intergovernmental Panel on Climate Change (www.ipcc.ch/) and British Columbia Ministry of Water, Land and Air Protection (2002), *Indicators of Climate Change in British Columbia.*

[20]Natural Resources Canada (2004), *Climate Change Impacts and Adaptation: A Canadian Perspective.*

Recent Progress Towards Integrated Management – the Integrated Salmon Harvest Planning Committee

Some early progress towards integrated management has already been achieved with salmon harvest planning in BC. For example, the recently formed Integrated Salmon Harvest Planning Committee includes elected representatives from all commercial gear and area groups, and representatives nominated by First Nations and the sports fishing community, non-governmental environmental organizations, and the Province of British Columbia. As operation of this committee evolves, it will help to provide inclusive and balanced information for the development of commercial and recreational fishing plans that respect First Nations food, social and ceremonial fisheries and other obligations to First Nations. This is a useful starting point, but much more needs to be done to link the work of the committee with other more localized watershed-based planning processes and interests, as well as with broader marine area planning initiatives.

STRATEGY 4
INTEGRATED STRATEGIC PLANNING

The life cycle of Pacific salmon necessitates a planning process that addresses salmon conservation from the eggs in the gravel in parental generations to the eggs in the gravel produced by their offspring (see Figure 4). Planning for Pacific salmon presently falls short of this need. Many different planning activities currently take place, each with its own role but operating in relative independence from others. A demanding challenge in implementing the Wild Salmon Policy will be the establishment of an effective planning process that fully addresses the conservation of Pacific salmon, meets the federal government's obligations to First Nations, considers the needs of other Canadians, and involves those affected by decisions. Strategy 4 is intended to address this challenge.

The purpose of Strategy 4 is to develop long-term strategic plans for CUs and groups of CUs and their habitat subject to common risk factors. These plans will account for their biological status and provide recommendations on salmon conservation that reflect the interests of people at local and regional levels. Strategies 1, 2 and 3 will provide information on the status of the CUs, their habitat and the ecosystem as inputs to the planning process. However, strategic plans need to integrate this information and:

- Specify long-term biological targets for CUs and groups of CUs that ensure conservation and sustainable use;
- Identify recommended resource management actions to protect or restore Pacific salmon, their habitats, and ecosystems in order to achieve these targets; and
- Establish timeframes and priorities for actions.

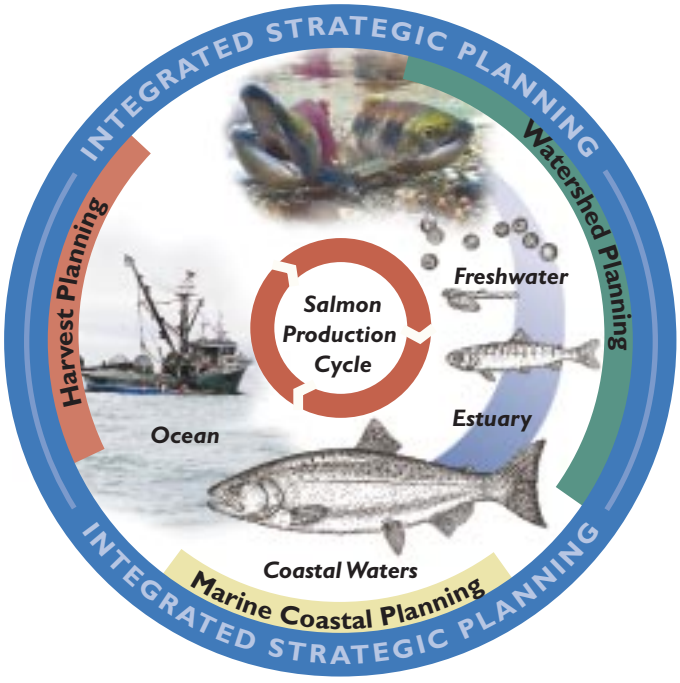
Consistent with the goal and objectives of the WSP, the plans must be designed to safeguard the genetic diversity of wild salmon, maintain the integrity of their habitat and ecosystem and result in fisheries that are managed for sustainable benefits. To do this, the plans will need to address the causes of any declines and identify the resource management actions necessary to remedy them where possible. The preferred long-term outcome of the plans will be healthy habitat and ecosystems and CUs above their higher benchmarks. But as a minimum, the plans must be capable of maintaining and restoring all CUs above their established lower benchmarks with an acceptable degree of certainty within a defined time frame. The development of these plans will require choices. The short and long term benefits as well as costs of decisions must be well documented and explicitly consider uncertainties in not only the scientific information, but also in the economic and social information that decision makers use.

Ultimately, these strategic plans will inform the development of annual fishery management, habitat, and enhancement plans and form the basis for ongoing dialogue with First Nations governments, Provincial, Territorial and local governments and other private parties whose support and cooperation is essential to sustain Pacific salmon in Canada.

Establishing an integrated process to achieve such plans will not be easy or immediate. Successful development and implementation will require extensive effort and cooperation between all levels of government and many different interests. Strategy 4 therefore includes two Action Steps to achieve the goal and objectives of the policy:

- The establishment of an interim process (Step 4.1) that provides for immediate progress; and
- The development of a new integrated planning structure that will better meet the needs of the resource over the longer term (Step 4.2).

Figure 4 **WSP integrated strategic planning will cover all stages of Pacific salmon life history**



Action Step 4.1: Implement an interim process for management of priority CUs

At present across BC and the Yukon, planning related to salmon occurs at various geographic scales and for a variety of purposes. Bi-lateral consultations take place with individual First Nations. Watershed-Based Fish Sustainability Planning (WFSP) initiatives are underway in local areas involving First Nations governments, the Province, local stewardship groups, and other community interests brought together to sustain fish habitat. More broadly, Integrated Fisheries Management Plans (IFMP) are developed for Northern British Columbia, Southern British Columbia, and the Yukon in consultation with individual harvesting groups and others interested in Pacific salmon. Marine use planning, a key component of Canada's Ocean Strategy and Action Plan, is proceeding on a pilot basis. At the broadest geographic scale, the Government of Canada with input from advisors engages in planning related to the Pacific Salmon Treaty and other international agreements such as the North Pacific Anadromous Fish Convention.

Linking CUs, Fisheries, and Watersheds for Planning Purposes

Salmon management is complex, involving five species divided into numerous Conservation Units in many watersheds that are exploited by various users in a myriad of fisheries. Considerations of biology and geography need to be brought together in an organized way with social and economic considerations for practical and efficient planning and fully informed decision-making.

In some cases a CU will encompass a relatively large geographic area that includes more than one population or watershed with a number of discrete fisheries targeted at sub-components of the CU. In these cases habitat, fisheries and marine area planning may need to proceed at a finer scale than the CU in its entirety (e.g., perhaps a watershed scale). In other cases there will be interdependencies and overlap between fisheries and among species within individual watersheds. In these cases planning for the conservation and sustainable use of an individual CU should not be done in isolation from other CUs within the watershed.

In these latter circumstances, CUs may need to be aggregated for planning purposes. For example, a wide range of user groups in numerous different fisheries harvest Skeena River sockeye salmon. Skeena River sockeye may include more than 20 CUs originating throughout the Skeena River drainage system. Habitat, fisheries, and marine area planning for any CU within the system must consider and account for potential impacts on all the others. As a result, the appropriate planning unit for Skeena sockeye will likely encompass all these associated sockeye CUs and the entire Skeena River watershed.

(CONTINUED ON PAGE 26)

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Linking CUs, Fisheries, and Watersheds for Planning Purposes

Although the resulting plan will be developed for the aggregate in these cases, the ultimate effect will be individual plans for each CU within the aggregate. Planning choices made at the aggregate level with respect to habitat, enhancement, and fisheries management measures will effectively translate into impacts on and targets for each of the individual CUs within the aggregate. However, the plan for each individual CU will reflect full consideration of the impacts on all other CUs within the aggregate.

It is anticipated that between 50 and 60 planning units (defined by fisheries, geographic location and watershed) will be needed to cover all CUs of Pacific salmon. Some planning units will encompass components of CUs and some will encompass groups of CUs subject to one or more common risk factors. The number and scale of these planning units will facilitate practical and efficient planning for wild salmon.

Ultimately, these diverse planning processes and the various interests involved need to be linked to provide inclusive and comprehensive input to integrated plans that encompass salmon, fisheries, watersheds, and marine areas throughout British Columbia and Yukon. In addition, broader and more direct linkages with First Nations governments, Provincial, Territorial and local governments need to be forged so that other land and water use activities and decisions better support the needs of salmon.

Until a fully integrated planning process can be established an interim approach is needed that will immediately improve integration between habitat, enhancement, fisheries, and marine area planning, and provide more inclusive input to resource management. This interim approach will meet the Department's obligations to consult First Nations and respect the process for salmon planning defined in the Nisga'a Final Agreement. In addition, advice from harvesters, stewardship groups and others will be gathered using existing processes.

Interim procedures will build on and expand the approach now used to develop IFMP's for salmon. The biological status of a CU or group of CUs vulnerable to fisheries in an area will be reviewed.[21] CUs in the Red zone and those that could significantly limit fishing and other activities will be identified as management priorities. The protection and restoration of these CUs will be primary drivers for harvest, habitat and enhancement planning. For these priority CUs, DFO will consult with First Nations and then bring together the various interests from existing processes to provide recommendations for protection and restoration. In collaboration with the Department, these "response teams" will collate and consider information from all sources and make recommendations using a five-step planning procedure outlined in Appendix 2. It is proposed that response teams would include representatives of First Nations and other local and regional interests. Their recommendations will inform regional planning and program delivery and will be subject to consultation with First Nations as required. In addition, during this interim period the Department will pay careful attention to identifying and responding to any other vulnerable CUs so they do not decline in status.

Resource management recommendations from response teams will be guided by precautionary approaches and will be consistent with the first principle of this policy. Specifically, recommendations will be expected to provide an acceptable degree of confidence that these priority CUs will rebuild beyond the lower benchmark within a defined time frame. The progress made towards achieving biological targets for priority CUs will be reviewed annually (as described in Strategy 6) and adjustments to plans made as appropriate. This interim process will be used until overall responsibilities for the development of long term strategic plans for all CUs can be assumed by a new planning structure (Action Step 4.2).

[21]The concept of planning units for Pacific salmon is described in the side bar "Linking CUs, Fisheries and Watersheds for Planning Purposes" and is an organizational construct that will be used to associate a group of CUs (CUs that are subject to common risk factors) with regional fisheries.

Action Step 4.2:
Design and implement a fully integrated strategic planning process for salmon conservation.

The Department will consult with First Nations, Provincial and Territorial governments, communities, and stakeholders to design an effective integrated planning process that respects people's interests in Pacific salmon, land and water uses, watersheds, fisheries, and marine areas. This policy does not dictate that process. Those affected need to be directly involved in the process design and implementation. It is however appropriate to describe what is envisioned. The planning process will ultimately consist of a new planning structure that will develop the plans through an organized procedure.

A New Planning Structure

The new planning structure will be tasked with developing long-term strategic plans for CUs that will guide fisheries and other activities in specific geographic areas affecting the CUs. These plans will need to determine long term biological targets for CUs and for habitat and ecosystem status and address significant conservation concerns by ensuring that all CUs will remain above their established lower benchmarks with an acceptable degree of certainty. The development of these plans will need to consider risks to wild salmon, as summarized in the status assessment of the CU, and weigh the biological, social and economic impacts of fishing and other activities (Principle 3).

Governments must operate in a manner consistent with the terms of treaties negotiated with First Nations such as the Nisga'a Final Agreement. Governments also have a legal obligation to consult with First Nations and depending on the strength of the claim of Aboriginal rights or Aboriginal title and the seriousness of the potential adverse effect of a decision on the claimed rights or title, accommodate their interests where Governments have knowledge of the potential existence of Aboriginal rights or Aboriginal title and are making decisions that might adversely affect these rights or title. Bilateral consultations between Governments and First Nations will be a foundation for the new integrated planning structure. In addition, measures taken by Federal, Provincial and Territorial governments to protect First Nation salmon fisheries will be a starting point for the development of long term strategic plans for wild salmon.

The results of these First Nations consultations will then need to be complemented by broader local and eventually region-wide input. It is suggested that local planning committees for sub-regions need to be established that can bring together all local First Nations governments, harvesters, community interests, local and regional government and other stakeholders to link with more localized projects important to local areas (like Watershed-based Fish Sustainability Planning processes) and assemble, assess and analyze information and seek local consensus. In addition, the various interests involved in local planning will need to be

Modern Treaties and the Planning Process

The Nisga'a Final Agreement is the first "modern" treaty entered into in British Columbia and applies to the management of salmon originating in the Nass Area, as defined in the Final Agreement. The Final Agreement provides that the Nisga'a Nation has the right to harvest chinook, chum, coho, sockeye and pink salmon originating in the Nass Area.

Under the Nisga'a Final Agreement, representatives of the federal government and the Nisga'a Lisims Government participate on a Joint Fisheries Management Committee (JFMC) to facilitate cooperative planning and conduct of Nisga'a fisheries and enhancement initiatives in the Nass Area. Various responsibilities are assigned to the JFMC, including providing advice concerning escapement goals and making recommendations to the Minister and Nisga'a Lisims Government in respect of other conservation requirements and the management of fish and aquatic plants.

Planning and implementation of the Wild Salmon Policy, as it applies to salmon originating in the Nass Area, will be in accordance with the Nisga'a Final Agreement. The JFMC will play a key role in this work. Similarly, the Department will act in accordance with the provisions of the Yukon Final Agreements when dealing with salmon conservation pertaining to the treaty settlement areas.

Key Attributes of an Effective Planning Process

An effective planning structure will require that the various interests involved build the mutual trust necessary to work together toward their goals. Key attributes of the new structure should be:

Inclusiveness
All parties that are affected by a planning outcome should have the opportunity to provide input to the articulation of objectives, the identification of management options, and the evaluation and selection of management alternatives. All parties should respect the others' opinions and processes, and work towards consensus.

Transparency
Responsibility for final decision-making and linkages between the various parts of the planning structure should be clearly described and agreed upon. Information considered in making recommendations should be publicly available and communicated in a timely manner. Recommendations and decisions should be carefully described and the reasons for them clearly explained.

Effectiveness
Individual planning bodies within the planning structure should be small enough to provide for focused discussion and dialogue but large enough to represent the full range of interests in the matters under discussion.

Respect for Consultation Processes with First Nations
Governments have a legal obligation to consult with First Nations. Any new planning process will not compromise or undermine existing consultation processes with First Nations. Planning processes will be in accordance with any applicable provisions of the Nisga'a Final Agreement, the Yukon Final Agreements, and any other treaties entered into between the federal government and First Nations.

Respect for Other Existing Processes
The results of other planning processes must also be respected, particularly those that deal with legal requirements under SARA and other federal legislation and obligations under international treaties.

Accountability
Participants in the planning process must be accountable to the people they represent by defending the advice they have provided and to the process by defending the manner in which decisions were made.

brought together region-wide to confirm overall support and resolve any inconsistencies between local plans. The number and the geographic scale of local area planning committees and the relationship between First Nation consultation processes, local, and region-wide committees in this planning structure are key matters to be resolved through consultation.

There will be two keys to success for a new planning structure. First, given the central importance of First Nations salmon fisheries, there will ideally need to be a high degree of support and participation by First Nations at all levels of the planning structure. The role and the terms of reference for new multi-party committees within the structure will need to be carefully crafted in consultation with First Nations and other interests to meet this need. The Department recognizes that the provisions for participation of First Nations will need to respect their individual governance structures. Second, there will need to be a high degree of support and involvement of Provincial, Territorial and local government at both local and region-wide levels of the structure. Bringing the constitutional and administrative mandates of these other levels of government to manage land, water and waste to the table will dramatically enhance and improve the chances for success of strategic planning efforts. This will require strong efforts by the Department and others to build the necessary political will and commitment for these other levels of government to support and participate in the planning process.

A Planning Procedure

The development of strategic plans for CUs should follow a formal and open procedure that will result in informed decision-making.

This policy presents a five-step procedure for development of the strategic plans that breaks down decision-making into a logical and manageable sequence. This procedure is detailed in Appendix 2. It seeks to engage the various interests in Pacific salmon throughout the development of the plans – from the establishment of planning priorities through to the evaluation and selection of the preferred management alternative. This will explicitly encourage the pursuit of creative solutions and help to focus planning discussions on the relevant issues and considerations throughout the development of plans. This is intended to build consensus on the most appropriate management approach and facilitate public understanding of final management decisions.

The Minister of Fisheries and Oceans is accountable to Parliament for the conservation of fisheries resources. Accordingly, strategic plans for salmon conservation and sustainable use will be subject to final approval by the Minister of Fisheries and Oceans. The Minister may reject plans or elements of plans because they do not adequately conserve wild salmon. Alternatively, in exceptional circumstances, where recommended management actions are assessed to be ineffective, or the social and economic costs will be extreme, the Minister of Fisheries and Oceans may decide to limit the extent of active measures undertaken. The new planning process described above is expected to minimize the need for such decisions, but this possibility should be recognized. The rationale for such decisions will be clearly explained. In addition, any cumulative effect of these decisions will be closely monitored.

Enhancement and Wild Salmon

Enhancement of Pacific salmon has been largely delivered through the Salmonid Enhancement Program (SEP). SEP was launched in 1977 to augment production for harvest through a combination of natural and artificial enhancement techniques. The program was also designed to involve the public, raise awareness of the salmon resource, and generate jobs and economic development in coastal and First Nations communities. Its focus has since broadened to encompass rebuilding depleted stocks for conservation purposes with a greater emphasis on the integration of harvest and habitat management with stock rebuilding. The program uses a rebuilding strategy whereby a portion of the enhanced fish spawn naturally in the waters from which they originated in order to rebuild or maintain the population. This means that in river systems where there is a hatchery or spawning channel, fish spawning naturally in the river may consist of both wild and enhanced salmon. The probability of genetic changes to wild salmon is controlled by the use of native populations for broodstock and broodstock collection and spawning guidelines.

Enhancement activities have contributed a significant proportion of the salmon produced in British Columbia and the Yukon. The proportion varies by species, geographic area, and year, but since the 1980s, 10 to 20 per cent of the BC commercial catch has originated from SEP. Moreover, some recreational fisheries are dependent on enhanced salmon, such as mark-selective fisheries on coho salmon, and various freshwater fisheries. As part of integrated strategic plans, enhancement will continue to be used as a means of addressing social and biological objectives through the rebuilding of populations with an unacceptable chance of extirpation by providing harvest opportunities and fishery benefits.

SEP has developed many useful tools for producing and restoring Pacific salmon, and it enjoys substantial public support. Evaluations undertaken for enhancement also provide important data used for the assessment and management of wild salmon. However, enhancement, particularly hatcheries, poses some acknowledged risks to wild salmon. Wild populations harvested with more productive enhanced populations may be overexploited. Hatchery practices may alter genetic diversity. Wild salmon may have to compete with enhanced salmon for food and space in the marine and freshwater environments. SEP employs practices to minimize these risks including:

- guidelines to manage spawning and hatchery practices to maintain genetic diversity and minimize impacts on resident freshwater juveniles
- review and licencing of all fish movements under Section 55/56 of the Fishery (General) Regulations
- annual planning processes that link
  - hatchery production with planning of major fisheries targeting enhanced populations
  - hatchery assessment with stock assessment planning frameworks to ensure that enhanced indicator populations can be effectively used for both the assessment of enhancement programs and for wild salmon assessment and management

Aquaculture

Over the past decade, production from salmon aquaculture has expanded threefold, and the value of farmed salmon now exceeds that from commercial salmon fisheries. The industry's development has provided employment and income in coastal communities, where economic opportunities are often limited. This expansion has not been without controversy.

Jurisdiction for the regulation of aquaculture is shared between the Federal and Provincial governments. The provision of aquatic land tenures and the licencing of aquaculture operations in BC is the responsibility of the Provincial government. The Department's role, as the lead federal agency for aquaculture, is to manage aquaculture so that it is environmentally sustainable, socially responsible, and economically viable. In 2002 the Department released the Aquaculture Policy Framework (APF)[22] to guide the Department's actions with respect to aquaculture. The first principle of the APF directs the Department to support aquaculture development in a manner consistent with its commitments to ecosystem-based and integrated management, as set out in Departmental legislation, regulations and policies. This principle reflects the Department's mandate for the conservation of marine resources.

It is recognized that aquaculture operations, as with other human activities, pose risks to the natural environment. These potenial impacts to wild salmon include: the chance of disease and parasite transfer, competition and genetic effects of escapes, and physical disturbances in near-shore environments. Risks are addressed through mitigation measures such as Fish Health Management Plans, improved cage structures and proper farm siting.

All fish farm sites must undergo a review for potential habitat effects under Section 35 of the *Fisheries Act*. The review includes evaluation of information on the size of the farm combined with specific features of the site such as benthic habitat and water currents and is intended to minimize the effects on important habitat such as eelgrass beds. Subsequent monitoring is carried out in conjunction with Provincial agencies.

The vast majority of marine fish farm sites also require, through either a *Fisheries Act* authorization or *Navigable Waters Act* permit, a screening for a broad range of environmental effects under the *Canadian Environmental Assessment Act* (CEAA). The CEAA screening examines the potential environmental effects of the project, judges the effectiveness of mitigation measures and assesses any residual impacts on the environment. A screening for a fish farm site encompasses all the potential effects on the natural environment, including the impacts of disease and parasite transfers, escapes, waste discharges and impacts to wildlife. Impacts which are judged to be significant must be addressed through mitigation measures, set out in required management plans and through adherence to Provincial regulations for fish health, escape prevention, sea lice monitoring and waste discharge. The CEAA screening also considers the cumulative effects of other projects in the same area and only those projects that are unlikely to cause significant adverse environmental effects (post mitigation) are allowed to proceed.

The goal, principles, and objectives of the Wild Salmon Policy will guide the regulatory actions of the Department. Aquaculture operations will be regulated in a manner consistent with other human activities that may adversely affect salmon or their habitat and DFO will continue to invest in research to improve our understanding and management of this industry.

[22]DFO (2002a), *Aquaculture Policy Framework*.

WSP Implications: Science, Including Stock Assessment

- Scientific programs will be refocused to complement changes to fisheries management, the immediate need being identification and documentation of Conservation Units and benchmarks for each Pacific salmon species.
- Stock assessment programs will build on existing monitoring programs to assess wild salmon at appropriate geographic scales.
- Refocused programs will emphasize assessing the status of CUs, understanding changes to productivity and distribution, and developing risk assessment and management tools to guide decision-making.
- DFO scientists will work with habitat and fishery managers to develop approaches to integrate ecosystem considerations into assessment and management.
- Co-management will be promoted with First Nations, and more partnerships will be necessary with public and private groups to collect required data, given the expanded monitoring needs and constraints on available funding.

STRATEGY 5
ANNUAL PROGRAM DELIVERY

A strategic plan gives a longer-term context for annual operational and business planning cycles. The strategic plan described in Strategy 4 will establish overall objectives and the various approaches that will be followed to achieve them. It will be left to annual operating plans to detail the specific short-term actions that actually implement the long-term strategy. Annual plans will identify the particular activities to be undertaken, the short-term operational targets for these activities, and the linkages to longer-term goals and objectives.

➤ Action Step 5.1.
Assess the status of Conservation Units and populations

Under this policy, DFO will assume a leadership role in partnerships to develop monitoring programs and assessments of wild salmon. Assessment will include field activities, which will build on existing programs as much as possible, and detailed stock assessments, which will identify the reasons for changes in status. Annual priorities for detailed assessments will be determined through PSARC, and documents prepared by Departmental staff and technical experts in other organizations involved with a CU, particularly the First Nations. The assessment of CUs will be staged over time, cost-effectively using a range of approaches. CU status will influence the frequency and detailed assessments but monitoring of abundance and distribution of salmon in CUs must be an annual commitment to protect the information basis for all decisions.

Stock assessment work plans describing the assessment plan for each CU and related activities (e.g., research or habitat activities) will be updated annually for each region (e.g., North Coast, Yukon). They will be reported as part of a database that describes for each region major risk factors and changes to these factors, assessment strategies within the region, resource management objectives, enhancement activities, and benchmarks. DFO will also commit to providing an open database of information on catch and spawning escapement, with links to the habitat integrated data system, so that threats or impacts can be identified and monitored.

➤ Action Step 5.2.
Plan and conduct annual fisheries

The specific annual fisheries management measures required by the management strategies selected under Strategy 4 will be identified and documented in annual Integrated Fishery Management Plans. These plans will include arrangements for food, social and ceremonial and treaty fisheries by First Nations and selective harvesting and other regulatory measures that will be put in place, such as bag and possession limits and anticipated open and close times.

Another key element of annual fisheries planning will be the development of explicit agreed-upon rules for in-season decision-making. The uncertainties and variations in fish availability associated with natural

survival and the imprecision of in-season management cannot be eliminated, but they can be better accounted for. Management plans will incorporate estimates of uncertainty and provide an adequate degree of confidence that management objectives will be met. The management responses to be taken in different circumstances will be more transparently identified and documented in advance of the fishing season. Important input on these decision rules will be sought from First Nations and the Integrated Salmon Harvest Planning Committee.

➤ Action Step 5.3.
Plan and implement annual habitat management activities

Habitat program work will shift from being largely reactive, to being planned and strategically directed in order to protect habitat and to implement management measures that meet the long term objectives specified by Strategic Plans (Strategy 4).

Strategy two will identify habitats that underpin achievement of overall objectives for Conservation Units. These will include habitats that are intact and require protection or habitats that are degraded and require restoration or rehabilitation. Annual workplans will specify priorities for habitat rehabilitation or restoration work that will be undertaken by DFO or by DFO in partnership with others, and investigative work that may be undertaken to fill knowledge gaps. Plans will also recognize the need for protection of the key habitats identified in Strategy 2 using tools appropriate to the circumstances. Planning for restoration and habitat improvement will incorporate projects conducted by First Nations, volunteers and stakeholders and make use of more accessible data from a variety of sources.

On an annual basis, a report on regulatory functions related to key habitats and restoration and rehabilitation works will be prepared. Habitat assessment and monitoring will feed back into the Habitat Management Program to evaluate measures for habitat protection and compliance, and to guide future program improvements. This new strategic approach to program delivery should ensure that fish habitat protection objectives are better integrated with fish management objectives at the CU level, leading to improved habitat protection.

➤ Action Step 5.4.
Plan and implement annual enhancement activities

The long-term objectives for enhancement projects will be set as part of a planning or recovery process for a Conservation Unit. Enhancement programs will last more than a year, but annual production targets and strategies will be documented in IFMP's and will be consistent with objectives for CUs. Adult salmon production will be assessed for adherence to the rebuilding schedule and enhancement guidelines and practices. Priority projects will target CUs in the Red or Amber zone, where enhancement has been identified as a contributor to rebuilding. Secondary priority will be given to CUs where enhancement has been identified in planning processes as a means to maintain or develop fisheries.

WSP Implications: Harvest Management

- Harvest management will focus on the conservation of CUs.
- The practical implications of this change for harvest management will depend greatly on the extent to which the CUs identified under this policy differ from the salmon runs currently targeted by the different fisheries. This, in turn, will vary among salmon species.
- There will likely be relatively few impacts on the management of chum and pink salmon, as these fisheries currently target smaller population components than may be identified as CUs.
- More substantial impacts can be expected for the management of coho and chinook salmon, as the number of CUs will likely increase marginally from present management aggregates.
- Impacts on sockeye management will be significant, since these fisheries target runs that often encompass numerous CUs.
- The WSP will not preclude fisheries operating on population aggregates that include numerous CUs, but increased attention to all of the units within the aggregate will likely require significant changes to current management practices.

WSP Implications: Habitat Management

- The Habitat Management Program will change to better link watershed protection and stewardship initiatives with fish production objectives by integrating habitat monitoring, assessment, and program planning at the CU scale.
- Habitat condition will be assessed through the development of indicators and benchmarks, and monitoring will be conducted to identify changes in habitat status over time and assess the effectiveness of regulatory interventions.
- An integrated data system for the collection and dissemination of information on fish habitat status will be supported through improved access between existing systems.
- These new approaches will complement existing efforts to modernize the national Habitat Management Program, aimed at moving from a focus on single regulatory strategy to a more balanced approach with greater emphasis on program planning, stewardship, and monitoring the success of habitat management in sustaining fish production.
- If specific Conservation Units of wild salmon are threatened by development proposals or other human activities, corrective actions will be taken under Section 35 (fish habitat) of the *Fisheries Act*, or longer-term solutions will be pursued as part of integrated planning processes.

STRATEGY 6
PERFORMANCE REVIEW

A performance review determines what is and is not working to encourage continuous improvement over time. Performance review under the Wild Salmon Policy will borrow heavily from procedures that are being adopted more generally in fisheries management planning throughout Canada. These procedures involve two levels of evaluation that can provide comprehensive guidance on changes required over time. Action Step 6.1 provides annual feedback on the implementation of measures taken as part of annual plans specified for fisheries, habitat, enhancement and assessment. Further, it evaluates whether adequate progress is being made to achieve the objectives defined in the strategic plan for the CU. Action Step 6.2 provides for periodic reviews of the overall success of the WSP in meeting its goal and objectives.

➤ Action Step 6.1
Conduct post-season review of annual workplans

The Department in consultation with First Nations and others will conduct annual post-season reviews of work plan implementation for stock assessment, fishing, habitat, and enhancement that will provide the following:

- Evaluation of annual plan implementation. For example, if an annual fishing plan calls for a substantial reduction in fishing time, or an annual enhancement work plan calls for certain fry release levels in a given year, it is important to know whether these events took place.
- Evaluation of annual operational targets. For example, the operational targets may be exploitation rates in certain fisheries and lineal metres of habitat rehabilitation, both intended to increase the number of spawners. An evaluation will consider whether annual operational targets were achieved and whether they were effective in meeting the intent of the Strategic Plan.
- Recommendations for adjustments for the next season.

➤ Action Step 6.2.
Conduct regular reviews of the success of the WSP

An independent review of the success of the WSP in achieving its broad goals and objectives will be conducted within 5 years of its adoption. On the basis of the review, the implementation of the policy will be revised to address shortcomings that may be reducing its effectiveness.

IMPLEMENTATION "Making it all Work"

The adoption of a wild salmon policy is an important, long-awaited objective, but not an end in itself. Once it is adopted, attention must shift to implementation. The WSP requires acceptance of new ways of doing business and introduces a number of new program obligations. To ensure its commitments are met, an implementation plan will be prepared after the policy's finalization. This plan will stipulate what tasks are required, how they will be performed, and when they will be completed. On completion, the plan will constitute the Department's commitment to meeting its responsibilities for salmon conservation.

The six strategies proposed in the WSP represent a set of mutually dependent activities that must work together for the policy's goal and objectives to be achieved. Since the individual strategies are not autonomous, successful implementation of each one of them is necessary to ensure the overall success of salmon resource management.

This new approach to salmon conservation is complex, and the pace and effectiveness of implementation will be influenced by two key factors. First, implementation must be accomplished within DFO's existing resource capability and will be phased in over time. Second, it will depend on the effectiveness of our sharing of responsibilities with First Nations Governments, volunteers, stakeholders and other Governments.

Full implementation will not be achieved overnight. Establishing the management and consultation process, and allowing it to mature, will take time. The completion of scientific work to define Conservation Units,

WSP Implications: Species at Risk

- The WSP will facilitate taking management actions in advance of biological listing under COSEWIC and legal listing under the *Species at Risk Act*.
- This will directly contribute to meeting DFO's legal obligations under SARA, by helping to prevent aquatic species from being extirpated or becoming extinct.
- Proactive responses in advance of listing will help to manage and reduce any adverse social and economic impacts that might arise from conservation actions required under a SARA listing.

WSP Implications: Aquaculture

- Aquaculture operations will be regulated in a manner consistent with other human activities that may adversely affect salmon or their habitat.
- If specific Conservation Units of wild salmon are threatened by aquaculture operations, corrective actions will be taken under the *Fisheries Act,* or longer-term solutions will be pursued as part of an integrated planning process.

WSP Implications: Salmonid Enhancement Program

- The enhancement program will continue to evolve towards greater emphasis on community stewardship, habitat restoration, and rebuilding of priority CUs.
- Enhancement may be used to provide harvest opportunities and fishery benefits as part of an integrated strategic plan.
- The risks of hatchery production to wild salmon will be assessed through the development of a biological risk assessment framework.

establish benchmarks, and design new assessment systems will depend on the availability of data and scientific capacity. In addition, the policy introduces new challenges for the conduct of ongoing programs, and ultimate success depends on effective delivery of the Department's research, enforcement, and Aboriginal programs. All of these activities, ongoing and new, must be accomplished within the envelope of available funding. Accordingly, it must be emphasized that complete implementation will not be achieved instantaneously, but will be phased in gradually.

There is a second requirement for successful policy implementation. The Department must adopt better partnerships with First Nations Governments, volunteers, stakeholders and other levels of Government and share responsibility and accountability for program delivery. It is clear that DFO cannot and should not attempt to do it all. No matter how strong our commitment to implementing the WSP, success will demand better collaboration with all of the groups and individuals having an interest in wild Pacific salmon. All have important roles to play in achieving sustainable management of wild salmon and their habitat. These groups monitor and report catches, protect and restore habitat, and carry out biological assessment work. Too often, this work is not integrated effectively with Departmental activities, which can diminish its value or simply result in wasted effort and funds. More collaboration is required to develop data standards, agree on methodologies, and share responsibility if we are to get the full benefit from the financial and human resources that are collectively dedicated to salmon stewardship. Improved cooperation with partners will be an important ingredient for future success. The more transparent process for decision-making underlying this policy will ensure that we are better equipped to achieve this important outcome.

CONCLUSION

The Wild Salmon Policy will transform our approach to managing Pacific salmon, their habitat, and dependent ecosystems. It is intended to foster a more robust resource that supports sustainable fisheries and recognizes the intrinsic value of salmon to society and to ecosystem functioning. Key elements of the policy recognize that:

1. Protection of the genetic and geographic diversity of salmon is a prerequisite to their future evolutionary adaptation and long-term well-being.
2. Habitat requires effective protection and rehabilitation if salmon are to prosper.
3. Ecosystem integrity needs to be considered in management decision-making to foster the conservation of salmon in an increasingly uncertain future.
4. Management must be based on good scientific information and consider biological, social, and economic consequences.
5. Decisions have to be made using open and accountable public processes so that they reflect society's values.

The goal, objectives, principles, and strategies that underpin the WSP represent a new way of doing business. Moving ahead will require a redirection of the Department's energy and resources, along with a commitment to embrace and advance new practices. Success will also require the cooperation of all who have an interest in the conservation of Pacific salmon. We are confident that making these changes is a wise investment that will yield a brighter future for salmon and the Canadians who enjoy them.

GLOSSARY

Aboriginal Traditional Knowledge (ATK). Includes, but is not limited to, the knowledge Aboriginal peoples have accumulated about wildlife species and their environment. Much of this knowledge has accumulated over many generations.

Aquaculture. The farming of aquatic organisms in the marine environment or freshwater.

Biodiversity or biological diversity. The full range of variety and variability within and among living organisms and the ecological complexes in which they occur; and encompasses diversity at the ecosystem, community, species, and genetic levels and the interaction of these components.

Broodstock. Mature salmon from which milt and roe are extracted to produce the next generation of cultivated fish.

Conservation. The protection, maintenance, and rehabilitation of genetic diversity, species, and ecosystems to sustain biodiversity and the continuance of evolutionary and natural production processes.[23]

Conservation Unit (CU). A group of wild salmon sufficiently isolated from other groups that, if extirpated, is very unlikely to recolonize naturally within an acceptable timeframe.

Deme. A group of salmon at a persistent spawning site or within a stream comprised of individuals that are likely to breed with each other (i.e., well mixed). A single population may include more than one deme.

Ecosystem. A community of organisms and their physical environment interacting as an ecological unit.

Enhancement. The application of biological and technical knowledge and capabilities to increase the productivity of fish stocks. It may be achieved by altering habitat attributes (e.g., habitat restoration) or by using fish culture techniques (e.g., hatcheries, spawning channels). In the context of this policy, only salmon originating from hatcheries and managed spawning channels will be considered enhanced.

Escapement. The number of mature salmon that pass through (or escape) fisheries and return to fresh water to spawn.

Extirpation. The local extinction of a species.

Fish habitat. Spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly to carry out their life processes.

Fry. Salmon that have emerged from gravel, completed yolk absorption, remained in freshwater streams, and are less than a few months old.

Genetic diversity. The variation at the level of individual genes, and provides a mechanism for populations to adapt to their ever-changing environment. It refers to the differences in genetic make-up between distinct species and to genetic variations within a single species.

[23]For further details see Shuter et al. (1997), "Reply: Toward a definition of conservation principles for fisheries management;" Grumbine (1994), "What is ecosystem management?;" Mangel et al. (1996), "Conservation of wild living resources;" and Olver et al. (1995), "Toward a definition of conservation principles for fisheries management."

Geographic diversity. Spatial variability observed within a species. This variation may have a genetic basis and/or may reflect habitat and developmental differences expressed by the species.

Habitat restoration. The treatment or cleanup of fish habitat that has been altered, disrupted, or degraded for the purpose of increasing its capability to sustain fish production.

Indicator system (IS). Comprised of fish from one or more persistent spawning locations or populations (perhaps enhanced) that are assumed to be representative of some aspect of a Conservation Unit. An IS may be an index site or stream selected to detect annual changes in abundance and/or survival, or an extensive site or stream selected to monitor species distribution and general habitat status. The status of the surrounding CU is inferred, in part, by comparing measures of abundance gathered by monitoring the IS to benchmarks.

Integrated resource management (IRM). Can be defined as a way of using and managing the environment and natural resources to achieve sustainable development. Using an IRM approach means that environmental, social, and economic issues are considered, while finding ways for all uses to exist together with less conflict.

Managed spawning channels. Spawning channels where the entry of spawners and spawning density is controlled.

Maximum sustainable yield (MSY). The largest catch (yield) that can be taken on average from a population under existing environmental conditions. Catch will vary annually due to variation in a populations survival rate.

Pacific salmon. Salmon of the Pacific Ocean regions, of which there are currently eleven species recognized in the Genus *Oncorhynchus*. The five species addressed in this policy are sockeye (*Oncorhynchus nerka*), pink (*O. gorbuscha*), chum (*O. keta*), coho (*O. kisutch*) and chinook (*O. tshawytscha*). Also in BC are steelhead (*O. mykiss*) and cutthroat trout (*O. clarki*). The remaining species include the masu (Asian distribution, *O. masou*), Mexican golden trout (*O. chrysogaster*), apache trout (*O. apache*), and gila trout (*O. gilae*). These latter three species have limited distributions in the western U.S. and northern Mexico.

Population. A group of interbreeding organisms that is relatively isolated (i.e. demographically uncoupled) from other such groups and is likely adapted to the local habitat.

Precautionary approach. When used in an advisory context in support of decision-making by the Government of Canada, this term conveys the sense that the advice is provided in situations of high scientific uncertainty. It is intended to promote actions that would result in a low probability of harm that is serious or difficult to reverse.

Productive capacity. The maximum natural capability of habitats to produce healthy fish, safe for human consumption, or to support or produce aquatic organisms on which fish depend.

Resource management. Departmental actions, policies and programs affecting wild Pacific salmon directly or indirectly through their habitats and ecosystems.

Riparian zone and functions. The area of vegetation near streams is known as the riparian zone. Riparian function includes the interaction of hydrologic, geomorphic, and biotic processes within the riparian environment that determine the character of the riparian zone and the influences exerted on the adjacent aquatic and terrestrial environments (e.g., temperature controls, shading, large woody debris).

Salmonid. A group of fish that includes salmon, trout, and char, belonging to the taxonomic Family Salmonidae.

Selective harvesting. A conservation-based management approach that allows for the harvest of surplus target species or Conservation Units while aiming to minimize or avoid the harvest of species or stocks of conservation concern, or to release bycatch unharmed.

Smolt. A juvenile salmon that has completed rearing in freshwater and migrates into the marine environment. A smolt becomes physiologically capable of balancing salt and water in the estuary and ocean waters. Smolts vary in size and age depending on the species of salmon.

Species. The fundamental category of taxonomic classification consisting of organisms grouped by virtue of their common attributes and capable of interbreeding. A taxonomic species is equivalent to the term "species" but the phrase may be used to indicate the collective species throughout its distribution.

Stewardship. Acting responsibly to conserve fish and their habitat for present and future generations.

Stock assessment. The use of various statistical and mathematical calculations to make quantitative predictions about the reactions of fish populations to alternative management choices.

Straying. The migration of a mature salmon into a stream other than that in which it was born (i.e., its "home" stream). Straying is not equivalent to gene flow (the exchange of genetic material) unless the straying fish successfully reproduces in the receiving stream.

Sustainable Development. Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[24]

Sustainable Use and Benefit. The use of resources in a way and at a rate that does not lead to their long-term decline, thereby maintaining the potential for future generations to meet their needs and aspirations. Sustainable use refers to consumptive uses of biological resources.[25] Sustainable benefits, on the other hand, derive from a broader range of consumptive and non-consumptive resource uses.

Watershed-based Fish Sustainability Planning (WFSP). A new approach to the management of fish stocks and fish habitat in British Columbia. Its overall goal is to ensure effective long-term conservation of fish and fish habitat – including spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly. WFSP is based on a standard planning sequence that can be applied to regions and watersheds across the province.[26]

Wild salmon. Salmon are considered "wild" if they have spent their entire life cycle in the wild and originate from parents that were also produced by natural spawning and continuously lived in the wild.

[24]Brundtland (1987), *Our Common Future: The World Commission on Environment and Development.*

[25]Environment Canada (1995), *Canadian Biodiversity Strategy: Canada's Response to the Convention on Biological Diversity.*

[26]See www-heb.pac.dfo-mpo.gc.ca/publications/pdf/sustainability_planning_e.pdf .

APPENDIX 1: LEGAL AND POLICY BACKGROUND

DFO exercises the following mandate with respect to fisheries and other responsibilities:

"Fisheries and Oceans Canada is responsible for policies and programs in support of Canada's economic, ecological and scientific interests in oceans and inland waters; for the conservation and sustainable utilization of Canada's fisheries resources in marine and inland waters; for leading and facilitating federal policies and program on oceans; and for safe effective and environmentally sound marine services responsive to the needs of Canadians in a global economy." [27]

This appendix outlines some of the key legislation, national and international agreements, and programs and policies with particular implications for the conservation and management of Pacific salmon.

➤ Legislation

The ***Fisheries Act*** is the primary legislative basis for fisheries management in Canada. It authorizes the Minister of Fisheries and Oceans to make decisions about the conservation of fisheries resources and habitat, to establish and enforce standards for conservation, and to determine access to and allocation of the resource. Sections 35 (prohibiting the harmful alternation, disruption, and destruction, or HADD, of fish habitat) and 36 (prohibiting the deposit of deleterious substances into waters frequented by fish) confer strong powers to protect fish habitat. The ***Fisheries Development Act*** of 1985 further authorizes the Minister to undertake projects and develop partnerships to improve or develop commercial fisheries.

The ***Canadian Environmental Assessment Act*** (CEAA) came into force in 1995 and was updated through amendments in November 2003. Federal agencies must conduct environmental assessments of development proposals requiring decisions under federal legislation (e.g., decisions under section 35 of the *Fisheries Act* or prior to issuing permits under the *Navigable Waters Protection Act* or the *National Energy Board Act*). The CEAA process requires the advice of relevant federal agencies to assess significant environmental effects in the planning of a project. Smaller and routine projects typically undergo a "screening" assessment, while larger and environmentally sensitive projects undergo a more intensive "comprehensive study".

In 1997, the ***Ocean's Act*** extended the Department's role in managing the use of marine resources and habitats. It called for the development of a national oceans management strategy guided by the principles of sustainable development, integrated management and an ecosystem perspective. Integrated management is a collaborative approach to decision-making that aims to balance the various interests in the marine and coastal environment, while incorporating conservation requirements. Ecosystem-based fisheries management considers the interactions between species and their environment, as well as the impact of fishing on the ecosystem. ***Canada's Oceans Strategy*** [28] released in 2002 defines an oceans-centred planning framework that combines these principles.

The ***Species at Risk Act*** (SARA) was proclaimed in June 2003, fulfilling a key national commitment under the United Nations Convention on Biological Diversity (see below). As one of two federal departments charged with SARA's implementation, DFO is responsible for protecting aquatic species at risk and their habitat. This responsibility includes the legal requirements to implement automatic prohibitions, develop recovery and action plans, plan and implement critical habitat protection, and conduct consultations within specified timelines.

➤ Guidance from the Courts Regarding Aboriginal Fishing Issues

DFO seeks to manage fisheries, including Aboriginal fisheries, in a manner consistent with *R. v. Sparrow* and subsequent decisions of the courts.

[27] DFO (2001a), *Building Awareness and Capacity: An Action Plan for Continued Sustainable Development 2001–2003.*

[28] DFO (2002b), *Canada's Oceans Strategy: Our Oceans, Our Future.*

As the Supreme Court of Canada stated in its 1996 decision in *R. v. Van der Peet*, an Aboriginal right is a practice, custom or tradition that was integral to the distinctive culture of an Aboriginal group at the time of contact between that group and Europeans. Accordingly, Aboriginal rights, by their very nature, have existed for a very long time. Rights under "historic treaties", such as the Douglas Treaties, have also existed for a very long time in Canada. The only "modern treaty" in BC is the Nisga'a Final Agreement that applies to part of the northwestern part of BC. Other modern treaties are under negotiation in the British Columbia Treaty Commission process.

Although Aboriginal and treaty rights have existed in Canada for a very long time, those rights were not protected by the Constitution of Canada until 1982. In that year, section 35 was added to the Constitution. Section 35 states that existing Aboriginal and treaty rights are "recognized and affirmed".

Starting with its 1990 decision in *R. v. Sparrow*, the Supreme Court of Canada has described a framework for the analysis of Aboriginal and treaty rights issues. The first step in the analysis is to determine whether an Aboriginal or treaty right can be established. If a right is established, the next step is to determine whether it has been infringed. If the right has been infringed, the court will consider whether the infringement can be justified. Courts continue to emphasize that analysis of Aboriginal and treaty rights issues must be done on a case by case basis.

With respect to the establishment of Aboriginal rights, the most important decision to date is the 1996 decision of the Supreme Court of Canada in *R. v. Van der Peet*. The Court held in that decision that an Aboriginal right is a practice, custom or tradition that was integral to the distinctive culture of an Aboriginal group claiming the right at the time of contact between that group and Europeans. In its 1997 decision in *Delgamuukw v. BC*, the Supreme Court of Canada clarified that Aboriginal title, i.e., a right of exclusive use and occupation, is a type of Aboriginal right and set out the test for establishing Aboriginal title.

In its decision in *R. v. Sparrow*, the Supreme Court of Canada held that the following factors should be considered in assessing whether or not a limitation (such as an action or decision) infringes an Aboriginal or treaty right:

- Does the limitation impose "undue hardship"?
- Is the limitation unreasonable?
- Does the limitation deny the holder of the right the "preferred means" of exercising the right?

If an Aboriginal group establishes a right, and that it has been infringed, the onus shifts to the Crown to justify the infringement. In *R. v. Sparrow*, the Supreme Court of Canada stated that "federal power must be reconciled with federal duty and the best way to achieve that reconciliation is to demand the justification of any government regulation that infringes upon or denies aboriginal rights".

With respect to justifying infringements of rights to fish for food, social and ceremonial purposes, the Supreme Court of Canada held in *R. v. Sparrow* that the following factors should be considered:

1. Is there a "valid legislative objective" (e.g., conservation)?
2. Has the honour of the Crown been upheld?
   – Priority after conservation?
   – Adequate consultation?
   – As little infringement as possible?
   – Fair compensation (in a "situation of expropriation")?

In its decision in *R. v. Sparrow*, the Supreme Court of Canada described a "valid legislative objective" as follows: "An objective aimed at preserving s. 35(1) rights by conserving and managing a natural resource, for example, would be valid. Also valid would be objectives purporting to prevent the exercise of s. 35(1) rights that would cause harm to the general populace or to aboriginal peoples themselves, or other objectives found to be compelling and substantial." In its 1996 decision in *R. v. Nikal*, the Court acknowledged that "conservation" can include measures to reasonably increase fish stocks.

In its 1995 decisions in *R. v. Jack, John* and *John, R. v. Sampson and Elliot*, and *R. v. Little* (sometimes referred to as the "interception cases"), the BC Court of Appeal considered situations in which fish were harvested in mixed

stock interception fisheries while Aboriginal fisheries in terminal areas were limited. In its decision in *R. v. Sampson and Elliot*, the Court provided the following guidance: "We do not suggest that the DFO should prohibit all commercial and recreational fishing in the area of the interception fishery in Johnstone Strait. However, it is the responsibility of the DFO to implement a system which will conform to the priorities set forth in Sparrow."

In all of the decisions in which the issue of priority has been considered, courts have carefully assessed the often complex facts relating to the how the Aboriginal, commercial and recreational fisheries were managed in the circumstances. It is clear that consideration of the issue of priority will always involve a detailed "case by case" analysis of the relevant facts.

With respect to consultation issues, significant guidance was provided by the Supreme Court of Canada in late 2004 in its decision in *Haida v. BC*. In that decision, the Court ruled that the Crown has a legal duty to consult with First Nations and, depending on the strength of the claim of Aboriginal rights or Aboriginal title and the seriousness of the potential adverse effect of a decision on the claimed rights or title, accommodate their interests when the Crown has knowledge of the potential existence of an Aboriginal right or Aboriginal title and is making decisions that might adversely affect the right or title. The Court held that scope of the duty will vary depending on the circumstances, including the strength of a First Nation's claim respecting the Aboriginal right or Aboriginal title and the potential impact of the government's decision on the claimed right or title. It is significant that, in its decision in *Haida v. BC*, the Supreme Court of Canada held that the Crown's legal duty to consult with an Aboriginal group can arise *even before* the group establishes any Aboriginal rights or Aboriginal title.

➤ Agreements

In 1985, Canada and the United States signed the **Pacific Salmon Treaty** requiring the conduct of fisheries so as to provide for optimum production and equitable exploitation of salmon stocks. Under the Treaty, each party is to receive benefits equivalent to the production of salmon originating in its waters, and each is to avoid undue disruption to the other's fisheries. Bilateral agreements must be periodically developed to implement the Treaty's principles for long-term conservation and harvest sharing. In addition, the Pacific Salmon Commission was established to advise both countries on the implementation of Treaty provisions.

Canada was the first industrialized nation to ratify the **UN Convention on Biological Diversity** signed by more than 150 countries at the 1992 Earth Summit in Rio de Janeiro. The Convention has three main goals: (1) the conservation of biodiversity; (2) sustainable use of the components of biodiversity; and (3) fair and equitable sharing of the benefits arising from the commercial and other use of genetic resources. In terms of defining at what level biodiversity should be conserved, it advocates the conservation of genes, species and ecosystems, without providing guidance on which one should receive priority.

In 1996, the federal, Provincial and Territorial governments signed the **Accord for the Protection of Species at Risk in Canada**. Under this agreement, the Canadian Endangered Species Conservation Council was created to determine responses to assessments made by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the independent body of scientists responsible for designating the status of species.

After years of dispute over the conservation and harvest provisions of the Pacific Salmon Treaty, Canada and the US signed the **Pacific Salmon Agreement** in 1999. This agreement established abundance-based fishing regimes for the salmon fisheries under its jurisdiction. Two bilaterally managed regional funds were created to promote cooperation, improve fisheries management, and assist salmon and habitat enhancement efforts. The Agreement also included a commitment by the two countries to improve how scientific information is obtained, shared and applied to salmon management decisions.

The **North Pacific Anadromous Fish Commission** (NPAFC) was established by the **Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean** (the Convention) which became effective in 1993. The NPAFC includes Canada, Japan, the Republic of Korea, Russia, and the U.S., the primary states of origin for salmon stocks in the North Pacific. The Convention prohibits directed fishing for salmonids on the high seas of the North Pacific and includes provisions to minimize the number of salmonids taken in

other fisheries. The NPAFC promotes the conservation of salmonids in the North Pacific and its adjacent seas and serves as a venue for cooperation in and coordination of enforcement activities and scientific research.

On May 29, 1993, Yukon First Nations, Canada and Yukon signed the "**Umbrella Final Agreement**" under which treaties with individual Yukon First Nations would be negotiated. Since then, a number of such treaties (the "Yukon Final Agreements") have been entered into between individual Yukon First Nations, Canada and Yukon. Some of the provisions of those treaties apply to the management of wild Pacific salmon.

The **Nisga'a Final Agreement**, the first "modern" treaty in British Columbia, took effect on May 11, 2000 after ratification of the Final Agreement by the Nisga'a Nation and the enactment of federal and Provincial settlement legislation. The Nisga'a Final Agreement applies to the management of salmon originating in the Nass Area, as defined in the Final Agreement. Other "modern" treaties are being negotiated between First Nations, Canada and British Columbia in the British Columbia Treaty Commission process.

Policies and Programs

In 1986, DFO introduced the ***Policy for the Management of Fish Habitat***[29] to provide guidance to Departmental staff, developers and the public on habitat conservation, restoration and development. The policy's overall objective is a net gain in the productive capacity of fish habitat, using the guiding principle of "no net loss" to ensure that habitat is conserved.

The **Aboriginal Fisheries Strategy** (AFS) was launched in 1992 in response to the Supreme Court of Canada's Sparrow decision on the Aboriginal food fishery.[30] The AFS program is applicable where DFO manages the fishery and where land claims settlements have not already put a fisheries management regime in place. It seeks to provide for the effective management and regulation of fishing by Aboriginal communities through negotiation of mutually acceptable and time-limited agreements between the Department and Aboriginal groups.

In 1998, ***A New Direction for Canada's Pacific Salmon Fisheries***[31] established conservation as the primary objective for managing the wild salmon resource. The new policy set out 12 broad principles in the areas of conservation, sustainable use and improved decision-making. It stated that conservation should take precedence over other uses and that a precautionary approach to fisheries management should be adopted.

New Directions called for more detailed policies to put its principles into operation. ***An Allocation Policy for Pacific Salmon***[32] confirmed the precedence of conservation and described a balanced allocation among the commercial, recreational and aboriginal fisheries once conservation requirements have been met. ***A Policy for Selective Fishing in Canada's Pacific Fisheries***[33] outlined principles and an implementation framework for selective harvest practices, as part of a long-term conservation and sustainable use strategy. For improved decision-making, there is work underway to create stakeholder committees that will help develop salmon harvest plans, as well as a formal public policy advisory process.

The **Aboriginal Aquatic Resource and Oceans Management Program** (AAROM) announced in October 2003 will help Aboriginal groups acquire expertise to participate more effectively in processes for aquatic resources and oceans management.[34] A major objective of AAROM is to provide these groups with the capacity to contribute to technical and advisory committees in areas of DFO responsibility, including fisheries and habitat management and oceans planning and management.

[29]DFO (1986), *Policy for the Management of Fish Habitat.*

[30]See www.dfo-mpo.gc.ca/communic/fish_man/afs_e.htm .

[31]DFO (1998), *A New Direction for Canada's Pacific Salmon Fisheries.*

[32]DFO (1999), *An Allocation Policy for Pacific Salmon.*

[33]DFO (2001b), *A Policy for Selective Fishing in Canada's Pacific Fisheries.*

[34]See www.dfo-mpo.gc.ca/media/backgrou/2003/hq-ac99a_e.htm .

APPENDIX 2. A STRUCTURED FIVE-STEP PLANNING PROCEDURE

Developing integrated strategic plans for individual CUs and groups of CUs will need extensive detailed information on the status of wild salmon, their habitat and ecosystem to be brought together and collated with information on fisheries and watershed activities. In addition, broad based input on possible management actions and their potential impacts will need to be received, considered and discussed in an organised way to arrive at reasoned and informed management decisions. The range of information that will need to be processed and the complex and sometimes controversial nature of the issues involved calls for a formal, structured and open procedure to be used in developing strategic plans.

The five-step planning procedure outlined below is proposed in this policy to assist in strategic planning. This procedure breaks down decision-making into a logical and manageable sequence that reflects standard decision-making practices in many private and public agencies.[35] In addition, it is designed to enhance integration and open up current salmon planning processes to greater public involvement. It provides for improved dialogue among the affected parties and enables them to participate throughout the development of plans from the establishment of planning priorities to the identification of management alternatives, their evaluation and the selection of a preferred management alternative.

In the longer term, the application of the planning procedure and the development of integrated salmon plans will be the primary responsibility of appropriate representative planning bodies within a new integrated planning structure (Action Step 4.2). In the interim, the Department will bring together First Nations and various interests from existing planning processes, as needed, to provide focused recommendations for conservation and re-building conservation units that are in low abundance (Action Step 4.1).

➤ Step 1
Identify planning priorities

As a starting point for planning, DFO staff will provide an overview report that identifies the CUs exploited by fisheries within each planning unit and gives summary information on their biological status (Red, Amber or Green). Key habitat and ecosystem constraints or threats to individual CUs will also be summarised by watershed. For CUs in the Red zone more detailed reports will also be provided as they become available. These detailed reports will consider and incorporate ATK, where available, and be subject to peer review through PSARC.

Based on this information and their knowledge of local circumstances, First Nations and other participants in the planning process will be asked to develop key priorities for the each planning unit. These priorities will be established consistent with the WSP objectives and principles, and will include the re-building of CUs where these fall below their established lower benchmarks. However, priorities may also include rebuilding or enhancing returns of wild salmon where these are below their sustainable production potential, or maintaining harvest levels in First Nations or other fisheries.

For every planning unit, Step 1 will provide a list of specific key priorities that are to be addressed in the development of integrated salmon management plans.

➤ Step 2
Identify resource management options and alternative management strategies

At Step 2, several alternative management strategies will be developed in consultation with First Nations and other participants in the planning process. Specific management options proposed may include fisheries management measures such as fishing time and area restrictions or habitat restoration activities or watershed

[35] See for example Schlenker-Goodrich (2003), *A Conservationist's Guide to BLM Planning and Decision-Making: Using FLPMA and NEPA to Protect Public Lands.*

development constraints or enhancement initiatives. At this stage in the planning process it will be important that no realistic management option is eliminated from consideration. The specific options identified through these consultations will be used either singly or in combination to develop two or more alternative strategies for addressing the management priorities for the planning unit.

For every planning unit, Step 2 will provide a number of alternative strategies that reflect a realistic range of different approaches to addressing the management priorities for each planning unit.

➤ Step 3
Establish biological, social, and economic performance indicators

At Step 3, input from First Nations and other participants in the planning process will be used to develop an evaluation framework for comparing the management alternatives developed in Step 2. This will require First Nations and others to identify explicit, measurable performance indicators applicable to the planning unit, its component CUs and their underlying local populations. These indicators should be suitable both to rate and rank the likely performance of each management alternative before making decisions, and to assess performance over time following decision-making and implementation. The indicators should directly relate to the biological objectives (safeguard the genetic diversity of wild salmon and maintain the integrity of their habitat and ecosystem) and the social and economic objectives (manage fisheries for sustainable benefits) of the WSP. To be useful, the indicators collectively will need to fully reflect the concerns and interests of First Nations and other participants in the planning process.

For each planning unit, Step 3 will provide a credible, broadly accepted management assessment framework that captures and reflects all significant biological, social, and economic considerations.

➤ Step 4
Assess the likely impacts of management alternatives

At Step 4, the alternative management strategies identified in Step 2 will be evaluated using the performance indicators developed in Step 3. The evaluation process will be forward-looking and focused on estimating the "future" impacts (both positive and negative) of each strategy on each of the indicators for the planning unit. These predictions will need to reflect the uncertainties and risks associated with each management alternative.

Under the Wild Salmon Policy, DFO will play a lead role in providing or obtaining these predictions from appropriate technical experts. For some planning units, computer simulation models may be available to assist, but in other cases it will be necessary to rely on expert opinion. To facilitate comparison between management alternatives the likely "net effect" of each management alternative relative to a common base case (e.g. status quo management) on all of the selected indicators for the planning unit will be projected for appropriate time periods.

Step 4 will provide a set of predicted outcomes for each alternative management strategy.

➤ Step 5
Select the preferred management alternative

The predicted outcomes from Step 4 will help in selecting a preferred management strategy. In many cases, tradeoffs will be apparent among different biological, social, and economic indicators. It is anticipated that differences of opinion will occur between individuals and interest groups about the "best" alternative because of their different priorities and tolerances to risks.

The goal will be to use constructive dialogue among First Nations and others involved in the planning process to resolve these differences, find compromise solutions and to develop consensus recommendations wherever possible for each planning unit. In the absence of consensus, differences of view will be fully

documented to inform final decision-making. The Minister of Fisheries and Oceans will consider the input received and will make the final decisions. Records of all decisions will be made available to the public.

The decisions made for each planning unit will collectively form the regional strategic plan for the management of fisheries and watersheds. The plan will include activities and management actions to be undertaken over a medium- to long-term timeframe. It will also stipulate explicit biological targets to be achieved for individual Conservation Units and groups of CUs and, where appropriate, anticipated timeframes for rebuilding. All of this information will be documented in an Integrated Management Plan for Pacific salmon.

One of the challenges in successfully managing wild salmon is to achieve consensus on how to address conservation concerns while accounting for the social and economic impacts of alternative management actions. In the planning process described here, the interested parties will be directly engaged throughout the development of management plans from the establishment of planning priorities through to the evaluation and selection of the preferred management alternative. The deliberations will be guided by the principles and objectives expressed the WSP, and the acceptability of the recommended management actions will be determined by the degree to which they advance the overall policy goal of restoring and maintaining healthy and diverse salmon populations for the benefit and enjoyment of the people of Canada in perpetuity.

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