

**WATERSHED-BASED FISH
SUSTAINABILITY PLANNING**
*Conserving B.C. Fish Populations
and their Habitat*

A Guidebook for Participants

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Conserving B.C. Fish Populations and their Habitat

A Guidebook for Participants

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A Note from the WFSP Steering Committee

Thank you for your interest in Watershed-based Fish Sustainability Planning, a new initiative designed to coordinate and focus ongoing work in the conservation of fish and fish habitat, and to strengthen the voice of fish conservation interests.

WFSP reflects the formal government commitment – through the Canada-British Columbia Agreement on the Management of Pacific Salmon Issues – to work together and in collaboration with other partners to conserve, enhance and protect the fisheries resources of BC and their habitats. It also reflects the work of the many British Columbians who have joined with governments in partnership arrangements and through volunteer efforts to protect and restore watersheds that are the home for resident fish species, and the spawning and rearing habitats for ocean-going salmon.

Anglers, commercial fishers, First Nations and conservation groups are working with the federal government through initiatives such as the Habitat Restoration and Salmon Enhancement Program and the Habitat Conservation and Stewardship Program. They are working with the provincial government through initiatives such as Fisheries Renewal BC, the Urban Salmon Habitat Program and the Habitat Conservation Trust Fund.

On behalf of the Watershed-based Fish Sustainability Planning Steering Committee:

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About this Guide

This guide is designed for the use of federal and provincial agencies, First Nations, local governments, community stewardship groups, private companies and other stakeholders actively involved in the protection, restoration and conservation of fish populations and fish habitat in British Columbia.

It describes the origin, purpose and benefits of Watershed-based Fish Sustainability Planning (WFSP), how it is being implemented in BC, and steps for its ongoing improvement. It also describes in detail the four-stage WFSP sequence that governments, organizations, and individuals with an interest in fish conservation can use now to more effectively promote the long-term health of fish and habitat. It outlines the roles of governments, non-government organizations and other fish conservation interests in implementing this planning sequence.

The Introduction outlines why WFSP is needed, how it is different from other fish and habitat initiatives, how it works, and the value to fish conservation interests of adopting the WFSP approach. The Introduction also describes the nature of the government commitment to WFSP, the current status of WFSP in BC, ongoing work to improve the process, and ways in which stakeholders can get involved.

The Overview describes the broader biophysical, social, political, and economic factors that affect the status of fish and habitat in British Columbia and must be addressed in fish sustainability planning. It summarizes the four-stage sequence that WFSP

participants can use to develop detailed fish sustainability action plans and describes the roles and responsibilities of governments, First Nations, and stakeholders in WFSP.

If you intend to use the WFSP process to develop fish sustainability plans or want more detailed information about the process, please review the detailed descriptions of the four WFSP planning stages. These comprise the main part of this guide and are intended to be read in order.

We have tried to keep jargon to a minimum. If you come across unfamiliar terms or concepts, you may find it helpful to consult the Glossary that follows Stage IV.

The Appendices include detailed information on

- federal and provincial government legislation and policy concerning fish conservation
- existing sources of data and other information for WFSP
- the concept of productive capacity and how to measure it
- existing mechanisms for the implementation of WFSP
- guidelines to help WFSP participants work together and interact with non-fish interests, and
- names of participants in the development of WFSP.

Activities required for WFSP range from analysis and interpretation of fish and habitat data to the development of communications and participation plans. This version of the guide is not intended to provide detailed information about how to carry out these activities. It



assumes that participants collectively bring to WFSP a wide range of skills in planning, communicating and negotiating as well as hands-on knowledge of fish and habitat management, restoration and enhancement. As WFSP is an ongoing process that will be tested and improved through on-the-ground implementation, future versions of this guide are expected to include more detail about the technical tools required for WFSP.

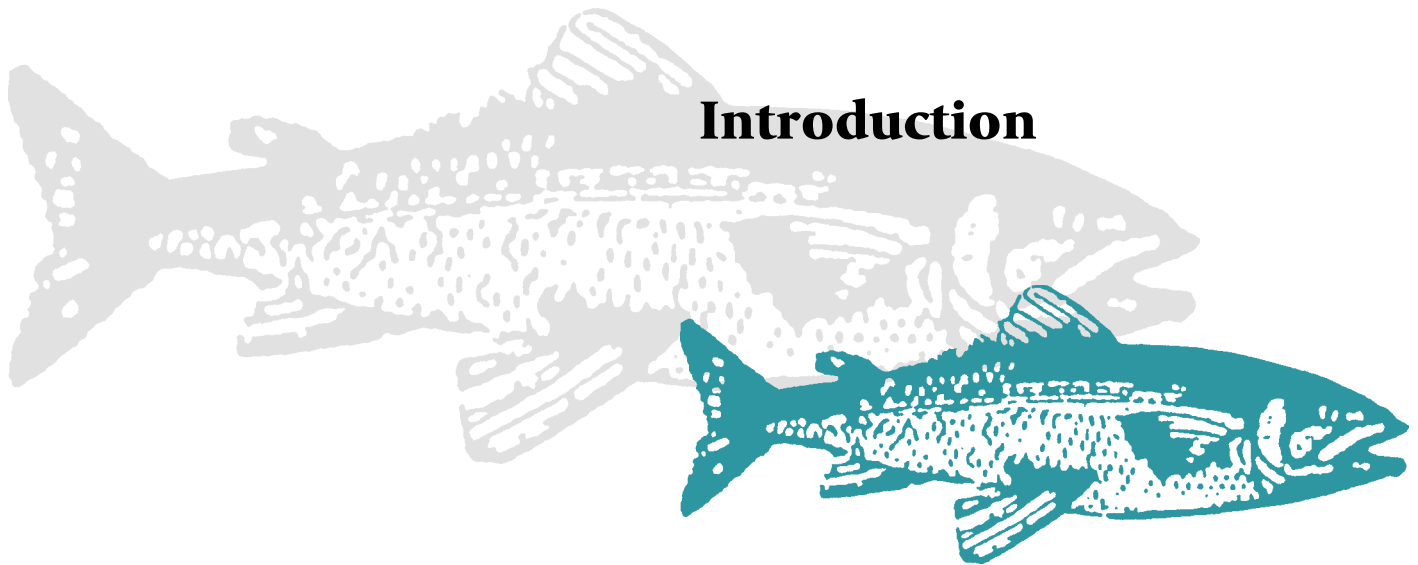
This guide was written on behalf of Fisheries and Oceans Canada, the British Columbia Ministry of Fisheries, and the British Columbia Ministry of

Environment, Lands and Parks. It is based on a framework developed in September 1999 at workshops attended by representatives of government agencies, non-government organizations, and other fish conservation interests. The current version of this guide incorporates further input from those representatives of agencies, First Nations, municipal governments, and community stewardship groups who participated in a June 2000 workshop. Appendix VI lists participants in these workshops as well as members of the federal and provincial government Steering Committee that undertook the development of this WFSP guide.

List of Abbreviations

BMP	best management practice
FISS	Fisheries Information Summary System
DFO	Fisheries and Oceans Canada
LRMP	Land and Resource Management Planning
LRP	limit reference point
MELP	Ministry of Environment, Lands and Parks
SEDS	Salmon Escapement Data System
WFSP	Watershed-based Fish Sustainability Planning

Introduction



What Is Watershed-based Fish Sustainability Planning?

Watershed-based Fish Sustainability Planning (WFSP) is a new approach to the management of fish populations 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. By using this planning sequence, a range of parties with an interest in fish conservation can work together more effectively for the benefit of fish and their habitat.

Why Is WFSP Needed?

An abundance of fish was once taken for granted in British Columbia. First Nations elders remember the days when salmon runs were so thick they could practically walk across a stream on the backs of the fish. Over the course of the last century, fish populations in many parts of the province have been devastated by overfishing, habitat destruction, climate change and numerous other factors.

Populations of all six species of Pacific salmon – coho, chinook, sockeye, chum, pink and steelhead – have been declining for several decades. Each species is made up of hundreds of separate, uniquely adapted, genetically distinct populations. A number of these populations are already extinct and many others are threatened or endangered. While the focus of attention in recent years



Urban development along coastlines and rivers is a major cause of damage to salmon migration routes. All but a few salmon-spawning streams in the Vancouver area have been destroyed or are severely degraded, and community stewardship groups are working hard to restore some of those that remain.



has been on salmon because of their tremendous economic and cultural value, other species of fish in BC watersheds are equally in need of conservation measures.

Of course, what happens to fish affects other elements of an ecosystem, including those human communities that depend on healthy salmon runs to keep their economies moving. In the 1980s and 1990s, as fish populations continued to decline generally, there were many conflicts as fisheries interests came under threat and different groups disagreed about causes of the problem and how to fix it. In the case of salmon, sports fishers pointed the finger at commercial fishers, and vice versa. First Nations fisheries commissions defended their right to traditional fisheries. Environmental groups went after forest companies for clear-cutting practices that they said silted up streams, disrupted natural flows, dumped debris in creeks and destroyed riparian vegetation. Communities that depended on fisheries saw their economies decline, and asked for more direct involvement in decisions affecting fish. And governments and non-government organizations alike desperately tried to come up with solutions to stabilize fish populations.

By the mid to late 1990s the federal and provincial governments had introduced a broad variety of conservation initiatives – programs such as the Salmonid Enhancement Program, Forest Renewal BC, Fisheries renewal BC, the Urban Salmon Habitat Program and the Habitat Conservation Trust Fund – to turn this trend around. They had also established a number of planning processes – including Land and Resource Management Planning, Water Use Plans and Landscape Unit Plans – that had the potential to influence fish and their habitats as well as other resources.

These initiatives have made some inroads into the protection and restoration of fish populations and habitats. They have also taught us a lot about what works and what could be improved. Specifically, we have learned that it's important to be more strategic about fish conservation and management, to identify priorities and to invest our resources wisely. It's important to work together, share resources, and coordinate our efforts to manage fish and habitat. And it's important to establish a strong, united voice for fish conservation.

Watershed-based Fish Sustainability Planning builds on the lessons of the past and is designed to help government agencies, First Nations, and a broad range of other fish conservation interests work more effectively together in the future. It will take a concerted effort to bring fish populations back and ensure they have the conditions they need to survive. If we don't make that effort now, fish populations will continue to decline. We owe it to ourselves, our children – and most of all, the fish – to take effective action now and to do it together.

What's New About WFSP?

WFSP is different from other fish and habitat management initiatives. WFSP ...

- reflects a joint federal-provincial government mandate

In 1997, the federal and BC governments signed the Canada-British Columbia Agreement on the Management of Pacific Salmon Fishery Issues. The overall purpose of this agreement was to create a partnership for conserving and managing west coast salmon populations and their habitat. The agreement included a commitment to “work jointly in watershed fish production planning processes” in consultation with stakeholders.

On the basis of this agreement, both governments have already made significant improvements to fish and habitat data sets, signed a habitat protection protocol, invested resources in the development of the WFSP process and guidebook, and identified funding for three or more formal WFSP lead projects. They have pledged to continue to participate in WFSP, to provide assistance to other parties to the extent that resources allow, to support the ongoing development of data sets and analytical models for WFSP, to support the implementation of formal lead WFSP projects, to ensure that the monitoring and assessment component of WFSP is carried out, and to support the continued improvement of the WFSP process and individual fish sustainability plans.

- encourages partnerships between governments and other parties with an interest in fish conservation



Government agencies, First Nations, conservation groups, commercial fisheries interests, communities, and many other parties have a direct interest in the health of fish populations and habitat and can bring different perspectives, knowledge, and resources to their conservation and management. Over the past few years, therefore, people both inside and outside of government have expressed an interest in giving non-government stakeholders more opportunity to participate in decisions affecting fish and habitat. WFSP provides this opportunity.

While the participation of non-government parties in WFSP is voluntary, it is vital to the overall success of the process. The concept of partnership is fundamental to WFSP. First Nations, non-government organizations, and other fish conservation interests – as well as government agencies – can initiate and/or participate in leading the planning process. At the same time, government agencies will be there to support the process and to ensure that fish sustainability plans are consistent with legislation and policy. The WFSP process is based on consensus-building and ensures that all participants have a voice in developing these plans.

- **coordinates other ongoing fish and habitat conservation initiatives**

WFSP reflects the belief that by coordinating their efforts, governments, First Nations, and other fish conservation interests will better achieve benefits for fish and habitat. Fish and habitat conservation in British Columbia are delivered through a number of different government and non-government programs and initiatives. Watersheds, fish populations, and fish habitat can be managed for a variety of purposes, and even when parties share an interest in fish conservation their goals may not necessarily be compatible. For example, one stewardship group may be restoring rearing habitat and another may be restoring spawning habitat to help the same – or a different – fish population in the same stream. If the latter group creates spawning habitat by modifying an area that would otherwise provide good rearing habitat, the two groups might end up working at cross-purposes.

WFSP helps eliminate the chance of such a situation

occurring. It helps governments, First Nations, and other fish conservation interests within a watershed identify areas where their interests converge, establish common goals, and identify ways to promote these goals. It helps existing fish and habitat programs direct their resources towards shared watershed conservation goals and complementary activities.

- **introduces a consistent approach to planning**

In response to requests from stewardship and other non-government groups for guidance and support from government for fish and habitat conservation activities, WFSP introduces a consistent approach to fish sustainability planning. It also allows for final fish sustainability action plans to reflect the unique characteristics and needs of individual fish populations and watersheds.

How Does WFSP Work?

Watershed-based Fish Sustainability Planning is based on a standard four-stage planning sequence. Stage I of this sequence addresses planning and the identification of priorities at the regional level. Stages II to IV address priorities within smaller watershed planning units. Government agencies, First Nations, conservation and stewardship groups, private fisheries interests, communities, and others with an interest in fish conservation can use this sequence to identify those fish populations and fish habitats that most urgently require attention and those that are likely to benefit the most from such attention. They can use it to develop regional strategies and detailed fish sustainability action plans to protect or restore these populations and habitats. WFSP ...

- **focuses on fish sustainability**

“Sustainable” means “capable of being maintained indefinitely”. Fish populations can be considered to be sustainable when they are stable and able to survive on their own – without human intervention – indefinitely. WFSP recognizes the intrinsic value of wild fish populations and genetic diversity. With respect to salmon, it recognizes that production of wild salmon takes precedence over other production objectives. For this reason, WFSP applies equally to economically



valuable fish populations and to populations with little or no commercial or recreational value. It applies to healthy populations as well as populations at risk.

Fish sustainability refers equally to the long-term health of the natural habitat that fish rely on directly or indirectly to carry out their life processes, and to the ecosystem processes that maintain habitat in a condition suitable for fish. Fish habitat includes spawning grounds, and nursery, rearing, food supply, and migration areas. The overall goal of fish sustainability planning is to conserve both fish populations and fish habitat.

WFSP helps fish conservation interests develop and implement long-term plans for

- maintaining and restoring genetically diverse, stable, and self-sustaining wild fish populations
- maintaining and restoring the natural capability of habitats to produce genetically diverse, stable, and self-sustaining fish populations, and
- managing fish populations in a manner that makes full use of this natural habitat.

- **focuses on watersheds**

Aquatic ecosystems are interconnected. Water moves downhill from the headwaters of a stream and ultimately to the ocean. Many fish species travel within streams and rivers, and some species travel to the ocean and back again. What happens upstream can ultimately affect what happens downstream, and vice versa. What happens in riparian and upland ecosystems can affect instream



Many wildlife species, as well as trees and other plants, depend on the nutrients that fish provide

conditions. Within a watershed, there are complex interactions between different fish species and between fish and other watershed elements, including animals and plants.

WFSP recognizes these interconnections. It seeks to maintain and restore natural ecosystem processes. It focusses on watersheds in developing detailed fish sustainability action plans. These plans identify fish and habitat conservation goals within a watershed, identify exactly what needs to be done to promote these goals and what resources are available to do it, and get it done by coordinating the work of different agencies, people, and programs within the watershed.

- **takes a “fish first” approach**

In order to help fish conservation interests focus on effective strategies for fish and habitat conservation, WFSP initially places a stronger emphasis on the needs of fish than on those of other interests. Obviously fish aren't the only users of a watershed, and fish conservation interests aren't the only people who care about what happens within it. The support of these non-fish interests is ultimately needed in order to implement fish sustainability plans. For this reason, later stages of the WFSP process encourage participants to build bridges to other interest groups within a watershed and to identify implementation mechanisms that promote fish sustainability while addressing the needs of these groups.

- **identifies priorities**

Some fish populations and watersheds are in more urgent need of attention than others. Some conservation activities are more likely to achieve positive results than others. WFSP helps participants identify these priorities. One of its goals is to ensure that those protection and restoration activities that are likely to achieve the greatest benefits to fish and their habitat receive the resources they require.

WFSP identifies priorities at two different spatial levels – larger regions based on river basins or sub-basins like the Fraser or Skeena, and smaller watershed planning units of approximately 50,000 hectares. Planning at the regional level identifies those fish populations and watershed planning units that are the most suitable



candidates for the development of more detailed fish sustainability action plans. More detailed planning at the watershed level identifies the management goals and activities that are most likely to promote fish sustainability on the ground.

- **builds on existing initiatives**

In developing fish sustainability action plans, WFSP participants do not have to start from square one. Most of the programs needed to promote fish and habitat conservation in British Columbia are already in place. In some watersheds and for some fish populations, government agencies and communities have already carried out extensive studies. Forest Renewal BC has already identified priority watersheds in some forest areas for its Watershed Restoration Program. Land and Resource Management Planning has identified the different interests within many regions of BC. One of the advantages of WFSP is that it builds on and adds value to these and other existing initiatives.

- **uses the best information currently available**

WFSP takes into account existing information, including traditional ecological and local knowledge, land and resource development trends, and broader social, cultural, political and economic values. It is also based on the best available scientific information about fish populations, the habitat that supports these populations, and other ecosystem elements.

In many cases this information will be missing or incomplete. The federal and provincial governments recognize this and are committed to improving information on fish and habitat, and to making it more accessible. In addition, future versions of this guidebook are expected to identify tools and procedures that specialists and non-specialists can use to collect new information and to carry out analytical tasks.

At the same time, lack of information should not be a barrier to initiating WFSP. In fact, one of the important tasks of fish sustainability planning is to identify information gaps and ways to fill them, and to start the process of filling those gaps. Information is always imperfect, so WFSP is designed as an iterative process – participants revisit each stage at some point in the future

to revise and improve the fish sustainability plan. During the first iteration, participants will likely rely to a large extent on existing information. If the action plan includes research and inventory activities, at some time in the future new data about the planning area will be available.

- **incorporates adaptive implementation**

There is no defined point at which fish sustainability planning is considered to be completed. Both the WFSP process and the individual fish sustainability action plans developed through the process are designed to be improved over time as new information becomes available and as new government policies and programs – for example the proposed federal Species at Risk Act – are introduced and implemented. This approach is referred to as adaptive implementation.

Monitoring and assessment are built into the WFSP planning sequence and are an important part of completed fish sustainability plans. WFSP participants will monitor both their progress in implementing completed plans, and the effectiveness of their actions in conserving, restoring, and enhancing fish and habitat. They will use the results and other new information to improve the plans and ensure better long-term prospects for fish. Government will also use new information to improve the WFSP process and the WFSP Guide.

What Are the Benefits of WFSP?

WFSP is expected to have important benefits for participants in the process, for other fish conservation initiatives, and ultimately for fish and habitat. It will ...

- **enhance the capacity of participants to develop effective fish sustainability plans**

Government has coordinated the development of the WFSP guide in response to ongoing requests from stewardship and other groups for support and assistance from government with fish and habitat conservation work, and for guidance on how to develop effective fish sustainability plans. The WFSP Guide describes the elements of such a plan, including the steps that groups can take to establish common ground and identify effective goals and implementation mechanisms. The guide outlines the types of information that create a solid



foundation for fish sustainability planning and identifies the essential products of a comprehensive plan. These include, among other things, a detailed description of fish and fish habitat within the watershed, general strategic directions and specific management prescriptions.

Plans developed through the WFSP process are more likely to address priorities, be practical and doable, and promote effective investments in fish conservation. Such plans are therefore more likely to receive government approval and support, and funding for implementation from fish and habitat conservation programs.

- **strengthen the voice of fish conservation interests**

Among the goals of WFSP is to help the many different parties with an interest in fish conservation to work more closely together and to develop a strong, united position based on common ground and mutual interest. When they can speak with a common voice and identify clearly what is needed to ensure fish sustainability, and they can back up their recommendations with data and analysis, these parties will be in a much stronger position to influence broader resource use programs and processes and to gain broad support for fish and habitat initiatives.

- **guide traditional fisheries and habitat management activities**

WFSP can provide direction to more traditional fisheries and habitat management activities, including the determination of fish production capacity and catch levels, population enhancement, inventory, and research. It can help to coordinate existing fish and habitat conservation programs within a specific watershed, and to guide new management activities such as the development of Conservation/Recovery Plans under the proposed federal Species At Risk Act and the provincial *Fish Protection Act*.

- **guide other ongoing land and resource planning activities**

WFSP can also add value to ongoing provincial land, water, and resource planning processes, many of which guide land and water use activities that influence water

flow and quality and thus affect fish habitat. It can help government agencies and other parties evaluate the potential impacts of the planning directions established through these processes, and provide specific recommendations with respect to the conservation of fish populations and habitat.

WFSP focuses specifically on the protection and management of fish and habitat. It does not seek to recreate comprehensive processes such as Land and Resource Management Planning, although it may influence how such processes evolve and are implemented. It will not, for example, explicitly address all land and resource values or eliminate competition between fish and other interests in a watershed planning unit.

- **promote the development of publicly accessible data sets and analytical models**

The WFSP approach to fish sustainability planning will ultimately be based on more consistent ways of assessing the status of fish and habitat and of identifying appropriate conservation and restoration mechanisms. There are limitations, however, in many of the data sets and analytical methods that may be useful for WFSP, and the development of such tools is a government priority. WFSP tasks include identifying important information gaps at both the regional and the watershed levels, and starting to fill those gaps. The work of WFSP participants is thus expected to help promote and support the development of publicly accessible data sets and analytical models.

How Can We Promote Fish Sustainability?

Initiatives that promote fish sustainability can include protection, restoration and – occasionally – enhancement activities. Experience suggests, however, that in most cases it is simpler to prevent damage to fish populations and habitats in the first place than it is to restore them once damage has occurred. For this reason, WFSP places a strong emphasis on the protection of fish, fish habitat, and natural ecosystem processes. It promotes restoration of priority fish populations and/or habitat that have been adversely affected by past activities. It



promotes enhancement only to supplement these other approaches.

The most important step in sustaining fish habitat is to make sure all the essentials are there and will be maintained throughout a watershed. Where habitat remains in its natural state, keeping it sustainable means protecting it from future disruptions. Where in-stream habitat has been damaged or destroyed, working towards sustainability means restoring or rebuilding – replacing gravel that has been washed away, rebuilding channels, placing tree-stumps in streams to shelter fry, planting streamside trees to stop erosion and keep the water cool, and whatever else is needed to provide livable conditions for fish.

Sustaining fish populations means maintaining or restoring natural genetic and species diversity. It also means ensuring stable populations, recognizing that there may be natural cyclical variations in population size. Maintaining fish populations may require reducing pressures from fishing by setting catch limits. If populations fall below sustainable levels, it may occasionally be necessary to enhance them by supplementing natural populations with hatchery fish. Or populations may be able to recover on their own if temporary restrictions are placed on fishing.

While WFSP considers all elements of a watershed, many fish sustainability plans will likely focus on salmon. Salmon are what is known as a keystone species in a watershed ecosystem. A keystone is the central stone in an arch, the one that holds it together – pull it out



Salmon are a keystone species in watershed ecosystems – if their numbers drop, the whole ecosystem may suffer

and the arch falls apart. When salmon migrate into a watershed, they provide essential food for bears and eagles and many other animals. A recent Washington study found that more than 137 species of fish and wildlife depend on Pacific salmon for their survival. Adult salmon carcasses also contribute valuable nutrients to the next generation of fish fry, and to other ecosystem elements, including the soil and trees. Take the salmon away and the complex interrelationships that make up an ecosystem can be badly disrupted. For the same reason, what is good for salmon is very likely to be good for many other elements of the watershed ecosystem.

Building and restoring habitat, protecting fish populations from overfishing and other impacts, building up populations at risk – all of this requires work and cooperation among people in the community, landowners, industry, local, provincial, and federal governments, and First Nations. The payoff is the long-term benefit to everybody involved – and, most importantly, to fish populations.

Even with the fish-first emphasis of WFSP, it may be necessary to make difficult decisions about how to balance the needs of different fish species. If you decide to build up coho populations, and part of the reason for coho declines is predation by other fish species that are prized by fishing groups, compromises may be needed. Do you remove the other species so coho populations can have maximum opportunity to increase, or do you address other threats to coho populations but maintain other fish species as well? In an extreme example, the federal government decided to restore native bull trout to Moraine Lake, near Lake Louise, and doing so meant eradicating non-native species like cut-throat trout that were popular with fishermen. This was a difficult and controversial decision, but it was one or the other – save the bull trout or save the cut-throat. Fortunately, such extreme choices don't need to be made in most watersheds.

Ensuring fish sustainability requires effective action – and, more importantly, it takes a cooperative process to agree on the right actions and make them work. For effective results, participants in the process need to consider all perspectives, have access to good information, make a sincere commitment to finding



common ground, have a sincere interest in the long-term health of fish and habitats, and put fish first.

What Are the Stages of the WFSP Process?

The WFSP process moves through four stages, which are described in detail in later sections of this guide:

- Stage I produces a biophysical and sociopolitical profile of a region (major river basin or sub-basin) and identifies watersheds within the region that are the highest priorities for fish sustainability planning
- Stage II produces a biophysical and sociopolitical profile of each of the priority watershed planning units identified in Stage I and identifies objectives, strategies and targets that must be met to achieve fish sustainability within these watersheds.
- Stage III produces a detailed fish sustainability action plan that spells out how these objectives, strategies and targets will be met and by whom.
- Stage IV involves actual implementation of the plan and monitoring of its effectiveness. It also involves revisiting earlier stages of the planning process, and improving the fish sustainability plan based on new information.

One of the goals of WFSP is to ensure that resources are invested in a way that achieves maximum overall benefits for fish populations and habitats. Stage I is critically important with respect to this goal, because it is through the Stage I process that populations and watersheds that are priorities for protection and restoration are identified. For a number of reasons, however, including the availability of appropriate data, it will take time to complete Stage I for all areas of British Columbia. In the meantime, there is a clear need for some form of intervention in numerous watersheds. To facilitate quick action, WFSP can be initiated at the watershed planning unit level (Stage II) as well as at the regional level (Stage I).

Who Participates?

Ongoing leadership for WFSP is expected to come from a WFSP Committee that includes representatives of

federal and provincial agencies, First Nations, and key stakeholder groups.

Government has a legal responsibility to participate in WFSP. Under the Canadian *Constitution Act*, the federal government is responsible for managing fish and fish habitat. The federal government has delegated the responsibility for managing steelhead and all other resident freshwater fish species in British Columbia to the provincial government, while retaining the responsibility for managing anadromous fish and species at risk. The Constitution makes provincial governments responsible for land and resource management, including the management of water. These complex inter-jurisdictional responsibilities have resulted in a close working relationship between federal and provincial fisheries management agencies in British Columbia. Either or both agencies may participate in a specific WFSP.

The participation of other parties in WFSP is voluntary, and who participates will likely depend on the unique circumstances presented in the region or watershed planning unit. First Nations are likely to participate in WFSPs that are within their traditional territories or that focus on fish populations of cultural significance. Provincial conservation and stewardship organizations are likely to participate in WFSPs for areas that have high public significance, while local stewardship groups are likely to participate in WFSPs that



Restoring fish habitat includes placing stumps or branches to shelter juvenile fish from predators.



affect the watershed they work within, and so on. Although First Nations, fish conservation interests, and other parties are not obligated to participate in WFSP, their participation and support is vital to its long-term future success.

All of the parties with an interest in the long-term health of fish populations and habitats work together in WFSP. No one interest runs the show. The teams that manage the regional and the watershed planning unit processes will be open to membership from any group (government and non-government) with an interest in fish sustainability. The members of these teams are partners who identify areas of common ground, and aim for consensus on difficult decisions.

Government agencies (e.g., Fisheries and Oceans Canada, BC Fisheries) generally initiate and lead the Stage I regional process. Stage II processes can be initiated and led either by government or by any non-governmental organization with a strong interest in a specific watershed. Such organizations might include (but are not limited to) First Nations fisheries commissions, community watershed stewardship groups, environmental organizations such as the Sierra Club, etc.

When and How Does WFSP Start?

WFSP starts now. As well as promoting tangible benefits for fish and fish habitat, the first WFSPs will be lead projects where participants test the process, tools, and principles outlined in this guide. There are no hard and fast rules for the WFSP process. Because it's a new initiative, effective techniques for moving through the process need to be worked out through trial and error, otherwise known as adaptive implementation.

Lead WFSPs will take place in regions and watershed planning units selected as priorities by government and/or other parties. Some of them will be selected as formal lead projects by government to address specific WFSP development goals. A key government goal is to test and refine the four-stage process outlined in this guide and to identify best practices. Another is the development of a standard toolbox of data sets and analytical methods that WFSP participants can use to obtain accurate information about the status of fish and fish habitat at different stages of WFSP and in different types of

watersheds. Even where such tools are missing or incomplete, the work of WFSP participants in identifying and filling information gaps will be invaluable.

The federal and provincial governments will jointly initiate formal lead WFSPs as part of their ongoing commitment to WFSP. Federal and provincial agencies will provide appropriate resources to these formal lead projects and work closely with other parties in implementing them. The Steering Committee anticipates that implementation of the lead projects will generate broader interest in WFSP, and the resources to implement it more widely.

In selecting formal lead projects governments will place a high priority on projects that:

- are relatively simple to implement
- can take advantage of existing data
- are most likely to help define best practices for future WFSPs, and
- address planning at both the regional and watershed levels.

During this early period of adaptive implementation, agencies, First Nations, local governments, and/or fish conservation interests may choose to initiate informal lead WFSPs, in particular at the watershed planning unit level. These informal projects will also be able to provide valuable information about the WFSP process, tools, and principles, and to contribute to the overall improvement of the WFSP Guide.

Government will – to the full extent that resources allow – provide support to these informal lead projects and to those parties who apply the planning sequence outlined in this guide in setting priorities for fish and habitat management activities. This support may range from letters of endorsement to potential funding sources, to assistance with the detailed technical aspects of WFSP, to more extensive involvement.

In many cases, existing data sets and analytical models may not fully support the information needs of WFSP. Nevertheless, WFSP can and should proceed using the best information currently available. Fish sustainability planning and watershed-based coordination and planning are urgently required in many areas, and participants will be able to achieve tangible benefits



despite existing limitations. The identification of information gaps is expected to be an important part of WFSP at the regional and watershed levels.

How Do I Get Involved?

First Nations, conservation groups, local governments, community groups, private interests and other stakeholders can become involved immediately in WFSP by

- participating in a Stage I WFSP process at the regional level (in most cases, such projects will be initiated by government)
- initiating and/or leading a Stage II process for a local watershed planning unit (in many cases, such projects will be initiated by non-government interests)
- seeking appropriate professional expertise or the resources to obtain such expertise, in order to participate in the technical component of WFSP, or
- participating actively in planning, implementation, and/or monitoring in any WFSP project already underway.

The WFSP Steering Committee encourages WFSP participants in both formal and informal lead processes to document the challenges they face at each stage of the planning process, the tools they find most effective, the solutions they develop, and the outcomes that ensue. Participants are invited to fill in the “Notes from the Field” questionnaires at the end of section in this guide and to return them to the Steering Committee at the address below.

For Further Information

For more information about WFSP or about how to become involved in the WFSP process, please visit www.bcfisheries.gov.bc.ca or contact us by mail or phone:

Email: [wvsp.info@pac.dfo-mpo.gc.ca](mailto:wfsp.info@pac.dfo-mpo.gc.ca)

BC Ministry of Fisheries

Fisheries Management Branch
PO Box 8539 STN PROV GOVT
Victoria, BC V8W 9M2
Tel. (250) 387 9582

BC Ministry of Environment, Lands and Parks

Habitat Branch
PO Box 9339 STN PROV GOVT
Victoria, BC V8W 9M1
Tel. (250) 356 6831

Fisheries and Oceans Canada

Habitat and Enhancement Branch
360–555 West Hastings St.
Vancouver, BC V6B 5G3
Tel. (604) 666 2030



Overview of the WFSP Process

Watershed-based Fish Sustainability Planning begins at the regional level (a large river basin or sub-basin) and proceeds to the development of comprehensive plans for one or more selected watershed planning units (approximately 50,000 hectares) within the drainage. The WFSP process looks at ways of improving or maintaining the status of fish and habitat within these planning areas on a long-term basis.

THE WFSP CONTEXT

Global and Regional Influences on Watershed Planning

What happens in a region influences and is influenced by factors at the biosphere and watershed planning unit levels. WFSP recognizes that ecological, social, political, and economic factors influence the status of fish and habitat and must be addressed in fish sustainability planning.

Atmospheric and ocean warming, predator numbers, availability of prey and other food, and open-sea fishing may all affect the overall survival of fish populations. While WFSP may not necessarily be able to address these and other biosphere factors, it takes them into account

in identifying priorities and establishing conservation and management goals and objectives.

Regional factors such as downstream fishing, hydroelectric dams and other infrastructures that block waterways, changes in water flow, forest harvesting, and agricultural and urban development can all have an impact on fish populations, habitats, and ecological processes within the watershed planning unit.

Social, political, and economic factors can influence the status of fish and habitat in regions and watersheds. For example, they may influence the rate of urban and agricultural development or forest harvesting within a watershed, and any associated impacts on in-stream conditions. They can also affect the location, timing, and focus of fish sustainability planning. There will likely be strong interest in rehabilitating fish populations that have had a high economic or cultural value. In areas where other land, water, and resource use processes are already underway or in the implementation phase, there will likely be a greater urgency in developing a strong voice for fish conservation interests through WFSP. One of the major challenges for WFSP participants is to address provincial, regional, and local interests in a way that ensures maximum benefits to fish and their habitat.



Compliance with Laws and Policies

Fish sustainability plans must be compatible with government legislation concerning the conservation and management of fish and their habitat, including the federal *Fisheries Act* and the provincial *Fish Protection Act*, and with government policy, including the federal Policy for the Management of Fish Habitat, the proposed federal Wild Salmon Policy, and the provincial Fisheries Strategy. This legislative and policy context is described in more detail in Appendix I.

WFSP incorporates many important principles set out in government legislation and policy. These include:

- an ecosystem approach that emphasizes the protection of complex interactions between different species and moves away from single species management
- the use of standard measures to identify fish populations that are healthy, below optimal levels, or at risk
- conservation of wild fish that addresses the genetic diversity of populations as well as productive capacity
- the “no net loss” principle, which emphasizes maintaining long-term productive capacity of habitat so that when more fish are able to use the habitat, the productive capacity will be sufficient to support them
- the “net gain” principle that emphasizes the long term achievement of an overall increase in productive capacity through conservation of existing fish habitat, and restoration of damaged habitat, and
- a precautionary approach that takes uncertainties into account and emphasizes that the absence of scientific information should not be a reason for postponing or failing to take conservation and/or management measures

Other new policy initiatives – in particular federal legislation to protect species at risk – are expected to have an important influence on fish sustainability planning. As these initiatives are developed and implemented, it will become more clear exactly how and when they will affect WFSP. Future versions of the WFSP Guide and



Habitat restoration by community conservation groups can dramatically increase the productive capacity of a watershed.

future fish sustainability plans will take such new initiatives more fully into account.

The legislative and policy context also includes existing government programs and land, water and resource management processes designed to promote these policy objectives on the ground. Many of these programs and processes are described in more detail in Appendix IV.

THE WFSP SEQUENCE

WFSP creates living plans that are regularly reviewed and improved as new information becomes available. These plans will vary in size and complexity, depending on the condition of fish populations and fish habitat, the issues to be addressed, the vision of WFSP participants, and the resources and knowledge participants bring to the planning process. The development of all fish sustainability plans, however, is expected to follow the basic sequence illustrated in Figure 1. The following sections of this guide describe this sequence in greater detail.

WFSP takes into account the best available scientific information about fish populations and habitats, traditional ecological and local knowledge, information about land and resource development trends, and broader social, cultural, political, and economic values. It includes two parallel and interacting sets of tasks. The technical tasks involve the collection and analysis of information about fish populations, fish habitat and other biological aspects of the region or watershed

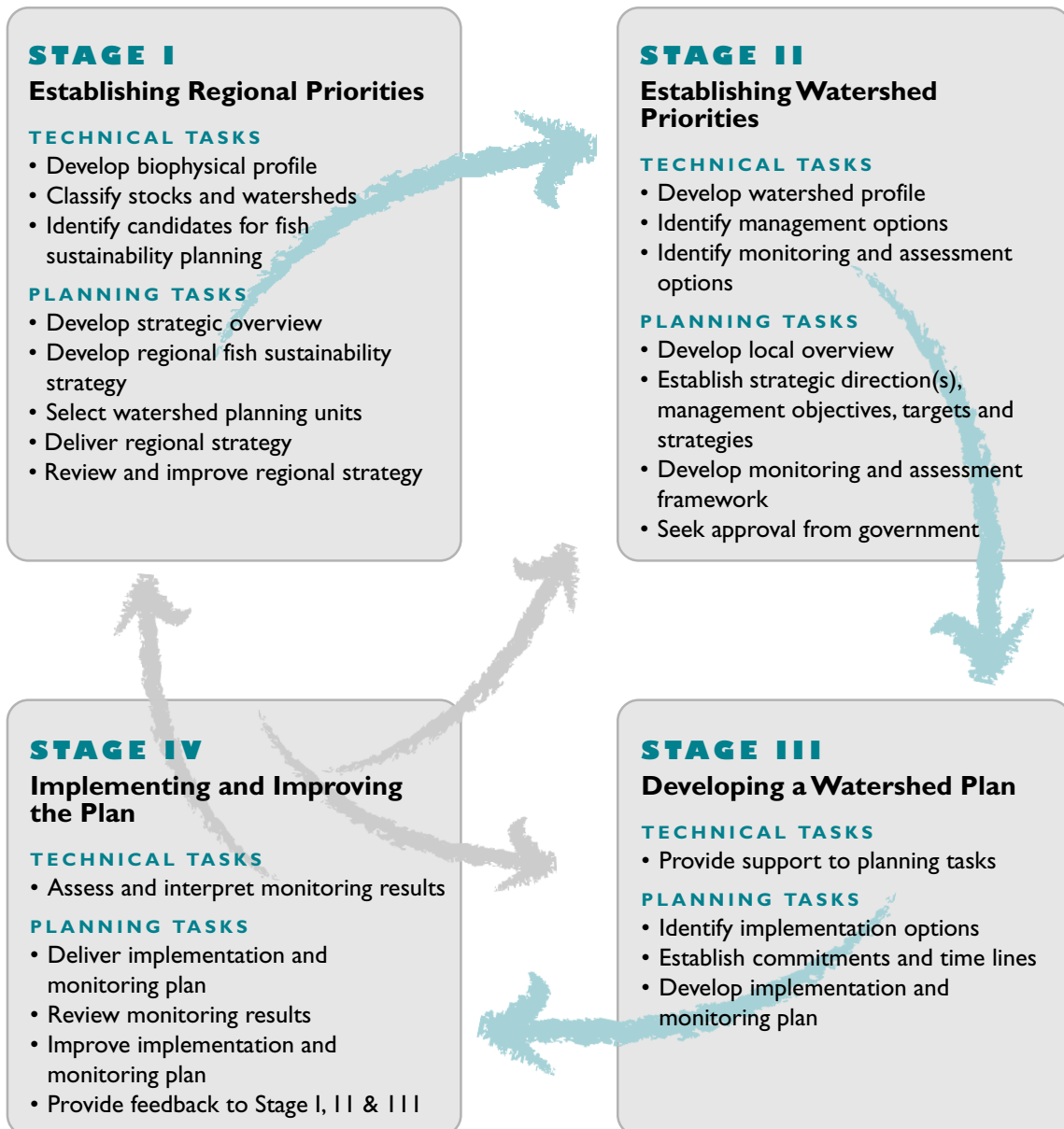


Figure 1. The WFSP Sequence

WFSP is a continuing process that may carry on as long as fish sustainability issues remain to be addressed. Following completion of Stage IV, the WFSP team may from time to time revisit earlier stages of the process as new information becomes available or new opportunities for restoration and protection in a watershed occur.



planning unit, and the identification of potential management options. The planning tasks involve the identification of social, cultural, economic, and political priorities within the region or watershed planning unit, the establishment of common ground between participants, and the development of a strategy or plan that promotes fish sustainability. The two types of activity can be undertaken at the same time, as they interact with and inform each other.

Stage I: Establishing Regional Priorities

Many fish populations and watersheds in BC are in need of protection and/or restoration. One of the goals of WFSP is to identify those needing the most urgent attention and those most likely to benefit from such attention. During Stage I, WFSP participants, led by government agencies, develop a broad profile of a major river basin or sub-basin (like the Skeena or North Thompson) that identifies regionally significant fish populations and habitats, and describes their past, present, and potential future status, the factors that may affect them, and their potential for conservation. They use this information to classify watersheds within the region and to identify the best candidates for further fish sustainability planning. They also develop a strategic overview that identifies potential stakeholders, their interests, and the resources available for fish and habitat conservation in the region. They consider this overview and the information in the regional profile in developing a regional fish sustainability strategy and in selecting one or more smaller watershed planning units from the region that will be the subject of more detailed planning in Stages II, III, and IV.

Stage II: Establishing Watershed Priorities

In Stage II, WFSP participants focus on the watershed planning units (such as the Lakelse in the Skeena basin, or the Lemieux in the North Thompson) selected in Stage I. They develop a detailed watershed profile that describes populations and habitats and identifies factors affecting their health and productivity. They identify management options that are feasible, likely to provide benefits to fish

and habitat within the watershed and consistent with government legislation and policy. They develop a strategic overview that identifies local interests with respect to fish and habitat, and the resources and support available for WFSP within the watershed planning unit. They consider this overview and the information in the watershed profile in establishing strategic directions for management of the watershed planning unit that reflect areas of common ground. They also establish management objectives, targets and strategies and a framework for monitoring and assessment. At the end of Stage II the federal and provincial governments review these decisions to ensure that they are consistent with legislation and policy and address priorities.

Stage III: Developing an Implementation Plan

In Stage III, WFSP participants identify ways to achieve the objectives, targets and strategies developed in Stage II. They also identify the agencies, organizations, and individuals in the best position to implement and/or promote these objectives. They identify ways to monitor the progress of the WFSP in improving the status of fish and habitat. To complete these tasks effectively, WFSP participants need to reach out to other interests in the watershed planning unit, hear their views, and gain their support. The final step in Stage III is to develop a detailed, multi-year implementation and monitoring plan that describes needed actions and identifies who will do them and when.

Stage IV. Implementing and Improving the Plan

In Stage IV, WFSP participants and other agencies, organizations, and individuals, as appropriate, carry out the actions identified in the implementation and monitoring plan. They assess and interpret the data collected through monitoring. They regularly review the strategic direction(s), objectives, targets and strategies established in Stage II, the implementation and monitoring plan produced in Stage III, and the results of monitoring and assessment. They improve these products on the basis of new information and issues. They regularly provide feedback to participants in



Stage I to help improve the regional planning process. Monitoring, assessment, and feedback are essential components of WFSP, and the process encourages investment in these activities.

Roles and Responsibilities in WFSP

WFSP is a collaborative process that depends on cooperation among all levels of government (federal, provincial, and local), First Nations, and stakeholders with a strong interest in fish sustainability and habitat protection. Appendix V describes principles and mechanisms that WFSP participants can use to encourage effective working relationships and include a range of interests in the process.

Because the federal and provincial governments have statutory responsibilities with respect to the management of fish and fish habitat, they play a significant role in both the planning and technical aspects of WFSP. At the regional level (Stage 1) the federal and provincial governments initiate the process and play a strong coordinating role.

First Nations, conservation organizations, community stewardship groups, and other non-government stakeholders with a strong interest in fish sustainability are partners in WFSP. They can initiate or lead Stages II to IV, and/or provide resources to WFSP development, implementation and/or monitoring. They can also seek resources through existing programs in order to implement WFSP activities. Without their skills, knowledge, and support, the process cannot be effective. While their participation is voluntary, it is vital to the long-term success of fish sustainability planning.

The roles and responsibilities of participants in a specific WFSP will depend largely on the unique circumstances of the region or watershed planning unit. Contributions that different participants can make to the process include the following:

All Parties (Government and Other Fish Conservation Interests)

- initiate, lead, and/or participate in the development, implementation, and/or monitoring of fish sustainability plans

- enter into partnerships with other fish conservation interests
- promote the recommendations of WFSP in other land and resource use processes.

Federal and Provincial Government Agencies (Fisheries and Oceans Canada, BC Ministry of Fisheries, BC Ministry of Environment, Lands and Parks)

- develop and improve the WFSP process, tools, and procedures
- establish standards and guidelines for data collection, monitoring and other WFSP activities
- develop and maintain publicly accessible databases on fish and habitat
- provide data, resources, and/or technical support to WFSPs
- review Stage II WFSPs to ensure that they address priorities, are based on sound information, and are consistent with federal and provincial legislation and policy, and
- establish a publicly accessible database of approved fish sustainability plans.

Related Agencies (Fisheries Renewal BC, Forest Renewal BC, Pacific Salmon Foundation, Habitat Conservation Trust and other agencies with fish and fish habitat programs)

- provide resources and/or technical support to WFSPs, and
- integrate WFSP recommendations, as appropriate, into internal program priorities and implementation plans.

First Nations

- provide and seek resources to facilitate WFSP development, implementation and monitoring, and
- provide traditional knowledge of fish and habitat.



WFSP works to sustain fish populations in First Nations traditional territories. The knowledge and experience of First Nations participants is important to WFSP success.

Stakeholders (including regional and local governments, non-government organizations, private enterprises and private sector organizations with an interest in fish and their habitats, including the commercial fishing industry and tourism enterprises, and the general public)

- provide and seek resources to facilitate WFSP development, implementation and monitoring, and
- provide local knowledge of fish and habitat.

Participants in Related Processes

(including Land and Resource Management Plans, Landscape Unit Plans, Regional Growth Strategies, Official Community Plans)

- integrate the recommendations of WFSPs into related processes.



Stage I: Establishing Regional Priorities

All fish populations and watersheds in BC need protection, many need restoration, and some can benefit from enhancement. One of the goals of WFSP is to identify those fish populations and watersheds that require the most urgent attention and are most likely to benefit from it. In Stage I of WFSP, government agencies, First Nations, and other parties with broad regional interests in fish conservation use the WFSP process to identify these regional priorities.

Regions of an appropriate size for Stage I planning may include major river basins, such as that of the Skeena; larger river sub-basins, such as that of the North Thompson; and groupings of smaller river basins, such as those that drain into the Pacific Ocean from the west coast of Vancouver Island. Figure 2 identifies regions that might be suitable for Stage I of WFSP. Government will determine the boundaries of WFSP planning regions, taking into account river drainage boundaries.

STAGE I TASKS

The focus of Stage I is the collection and analysis of information about the region in order to identify regional priorities, including those fish populations and watersheds that are the best candidates for WFSP

intervention. Stages II, III and IV then focus on these watershed planning units and the development and implementation of fish sustainability action plans for them.

At the beginning of Stage I, government and other parties establish a Regional Planning Team (planning team) and a Regional Technical Team (technical team) to carry out the regional planning and technical tasks of WFSP.

The Regional Technical Team:

- prepares a broad biophysical profile of the region, with an emphasis on significant fish populations and fish habitat
- identifies information gaps, and
- identifies populations and watersheds that are good candidates – from a biological perspective – for fish sustainability planning.

The Regional Planning Team:

- communicates with the broader public about the regional WFSP process and its expected outcomes
- prepares a strategic overview of social, cultural, economic, and political values in the region and resources available for WFSP



- consults with other fish conservation interests in the region in preparing this overview
- prepares a regional fish sustainability strategy that identifies broad management activities
- selects one or more watershed planning units that will be the subject of detailed fish sustainability planning in Stages II, III and IV of WFSP
- identifies a Watershed Planning Team for each watershed planning unit, and
- identifies local expertise in fish and fish habitat data collection and analysis

ESTABLISHING REGIONAL TECHNICAL AND PLANNING TEAMS

Any party with a regional interest in fish and habitat (including federal and provincial government agencies, First Nations fisheries commissions, commercial or recreational fisheries organizations, or provincial conservation organizations) can participate in WFSP at the regional level. Government initiates the process and begins by inviting other parties with a direct interest in fish and habitat conservation to form a Regional Planning



Figure 2. Potential WFSP Regions in British Columbia

*Some regions, such as the Fraser and South Coast, may contain more than one regional planning area for Stage I purposes. Examples are the North Thompson and West Coast Vancouver Island.

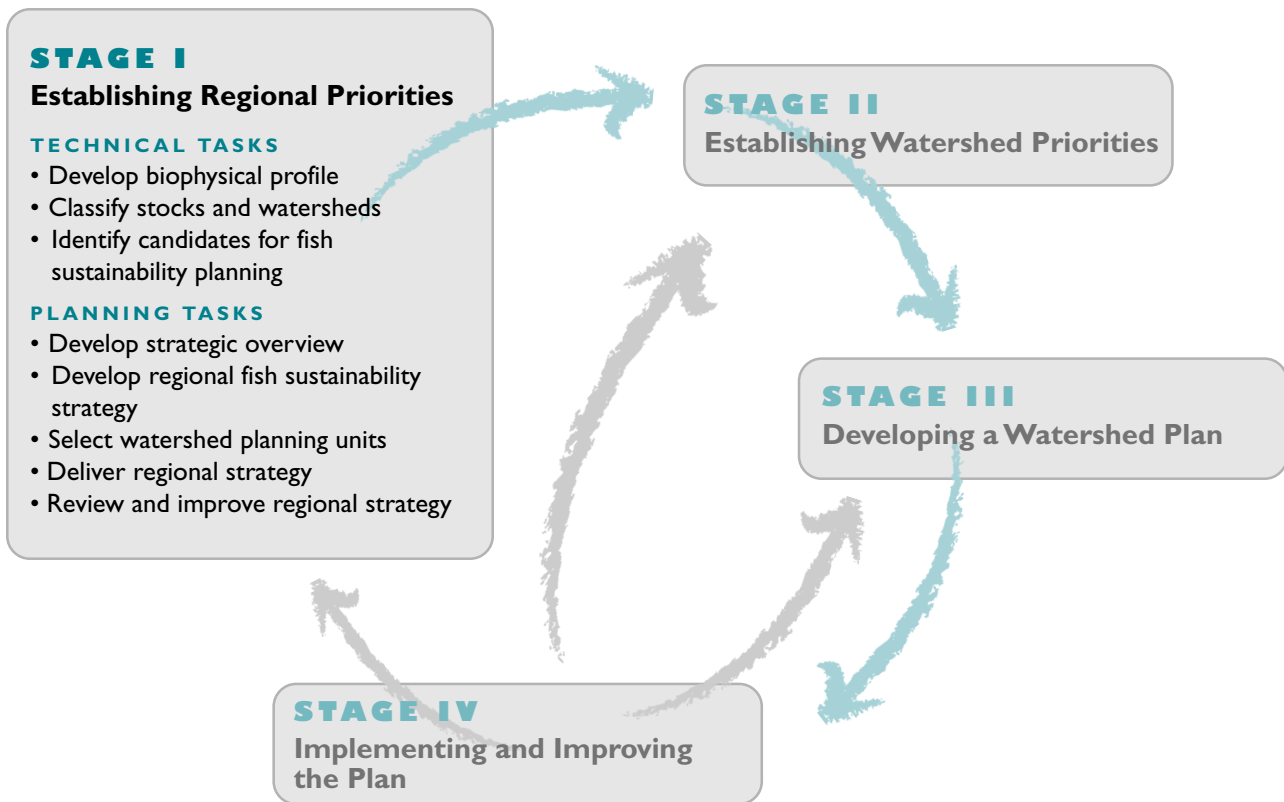


Figure 3. The WFSP Sequence: Stage I

Team (planning team) and a Regional Technical Team (technical team) to carry out the work required in Stage I. These fish conservation interests work collaboratively throughout the Stage I WFSP process.

The composition of the planning team will vary from one WFSP to another, but the team will include representatives from one or more federal and/or provincial government agencies (usually Fisheries and Oceans Canada and Fisheries BC and/or the BC Ministry of Environment, Lands and Parks) as well as those First Nations fisheries commissions, commercial and recreational fishing organizations, provincial conservation groups, and other regional stakeholder groups that choose to participate. In regions where fish conservation partnerships already exist, the WFSP teams incorporate or build upon such partnerships.

The planning team works closely with the technical team. The composition of the technical team may vary from one region to another. The team will include specialists from one or more federal or provincial government agencies (usually Fisheries and Oceans Canada and Fisheries BC and/or the BC Ministry of Environment, Lands and Parks) and may include specialists from First Nations fisheries commissions, commercial or recreational fishing organizations, provincial conservation organizations, resource companies and other regional stakeholder groups.



DEVELOPING A WORKING PROTOCOL

Fish sustainability planning requires considerable cooperation between different fish conservation interests. Everyone involved needs to understand who does what and how the participants will work together. The first task of the planning team is therefore to develop a working protocol that identifies the roles and responsibilities of each participant, including the type of support (in principle, in kind, joint action) that participant will provide to the WFSP process. In developing this protocol the planning team may wish to refer to Appendix V, which describes principles for collaboration and consensus-building.

DEVELOPING A BIOPHYSICAL PROFILE

The first important task of the technical team during Stage I is to develop a broad biophysical profile of the region. This biophysical profile describes in general:

- fish populations (e.g., species present, location, productive capacity, conservation status, long-term trends, life history information, habitat use)
- watersheds and habitat (e.g., general condition, productive capacity, conservation status, long-term trends)
- possible causes of any observed change in populations and/or habitats over time (e.g.,



A Stage I biophysical profile identifies possible causes of habitat degradation and/or population decline such as intensive past forest practices or agriculture.

- harvesting, logging, development, ocean warming)
- factors that may affect the future status of populations or habitat (e.g., land, water, and resource development trends, projected population growth, mitigation measures proposed in Water Use Plans for BC Hydro facilities), and
- any important “gaps” in the information available about populations and habitat in the region.

The biophysical profile also identifies the most significant fish populations and habitat units in the region, in terms of conservation status (in particular pristine habitat and populations at risk), contribution to biodiversity, aquatic diversity or other ecological values, cultural and/or economic importance, and productive capacity. For these populations and habitats, it describes in greater detail:

- their past, present, and potential future status
- the status of the watersheds and habitats that support these populations
- factors that may have affected, currently affect, or have the potential to affect the status of significant populations and habitats within the region
- factors that may limit the ability of degraded populations or habitats to recover on their own, and
- the potential to prevent future decline or reverse past decline in these populations and watersheds.

Development of the biophysical profile involves:

- description of the region based on existing knowledge
- identification of information gaps,
- analysis of data and/or other elements of the preliminary description.

Regional Description

In Stage I, the technical team starts by collating existing information about the region into a regional WFSP “narrative”. This regional narrative is based on current knowledge and opinion, and builds on past efforts to assess fish and habitat within the planning area. It incorporates existing information in data sets, maps, and aerial photographs, information based on past analysis,



community and traditional ecological knowledge, historical accounts, and informed opinion. In developing the regional narrative, the technical team may draw upon biological and geophysical information from a variety of existing databases and other previous work, including:

- the Fisheries Information Summary System (FISS)
- the BC Watershed Atlas, and
- the Fisheries Project Registry.

Appendix II describes these and many other sources of information that may be useful in developing the regional biophysical profile.

Analysis

In some regions – particularly in those where substantial data collection and analysis have already been carried out – WFSP participants will be able to complete the biophysical profile using existing information.

In many regions, however, data about fish populations and habitat will be incomplete or unavailable, or analysis of existing data will be inadequate. One of the tasks of the technical team will be to identify such information gaps.

WFSP is an iterative process that makes use of the best information available at a specific time. It is likely that in many regions – even where information is missing – WFSP participants will be able to produce an adequate biophysical profile and to identify preliminary strategies and priorities. In some regions, however, the missing information will be critical information – that is, information that must be obtained before planning can realistically proceed any further. In this case the technical team will carry out appropriate data collection and/or analysis to obtain critical information or verify details of the WFSP narrative.

A Stage I analysis is likely to be relatively simple, focusing on major factors that can help identify:

- the conservation status of populations and/or habitats, particularly those that are at risk
- whether habitat quality is deteriorating, improving, or remaining constant
- whether productive capacity is increasing, decreasing, or variable but constant throughout the historical record, and

- the known and probable major influences on population and habitat productive capacity trends in the region (e.g., determining whether regional declines in fish production are driven by habitat factors such as logging or by non-habitat factors such as climate change or overfishing).

In Stage I the technical team might, for example, use time series data to identify the mean and range of historic fish production within a watershed, and link these to trends in resource exploitation or habitat alteration. If the record shows a long-term change in fish abundance and describes habitat change from one or more causes, the team may conclude that productive capacity has probably changed. It may recommend further analysis of the watershed in Stage II to identify likely rather than possible causes of this change.

WFSP is designed to be reviewed and improved over time – a process referred to as adaptive implementation. The earliest WFSPs will serve as lead projects where the process, the data, and the analytical methods for WFSP can be tested and refined. Important tasks during the adaptive implementation phase of WFSP will be to identify the key elements of the Stage I biophysical profile, and the data and analytical methods that will best help participants prepare such a profile. Further information on one technical task – the assessment of productive capacity – is included in Appendix III.

IDENTIFYING CANDIDATES FOR FISH SUSTAINABILITY PLANNING

The second important technical task in Stage I of WFSP is to identify populations and watersheds that are good candidates – from an ecological perspective – for fish sustainability planning. In most cases, the technical team will identify these candidates from among the larger list of regionally significant populations and watersheds described in the Stage I biophysical profile. To do this, they will look at specific characteristics of these populations and watersheds, and classify them according to these characteristics – or filters.



Classification

Many different filters can be applied to classification. The list of filters used by the technical team will reflect important ecological aspects of fish sustainability. For example, the health of a watershed is an important factor in any decision about protection or restoration. Classification will also reflect current law and policy. For example, current government policy promoting the health of wild salmon populations means that the conservation status of a fish population is certain to be of interest.

Classification filters that are likely to be useful in Stage I include:

- population conservation status (e.g., extinct, endangered, at risk, of special concern, not at risk)
- ecosystem integrity (e.g., intact, at risk, unhealthy)
- trends in productive capacity (e.g., increasing, decreasing, variable but constant)
- genetic uniqueness of a population as compared to others of the same species (e.g., high, medium, low)
- species distribution (e.g., widespread, local)
- potential for successful restoration (e.g., high, medium, low)
- urgency of the need for intervention (e.g., high, medium, low)
- amount of intervention required (e.g., large, medium, small), and
- complexity of the issues to be addressed (e.g., complex, medium, simple).

The technical team will weigh these filters in identifying the most suitable candidates for fish sustainability planning. These candidates will typically include populations and watersheds where the risk of decline and/or the potential for improvement are high, and those where action now is likely to minimize declines and maximize gains for fish and habitat.

In classifying populations and watersheds, the technical team may find it helpful to incorporate previous work. The Watershed Restoration Program of Forest Renewal BC, for example, has developed a system for identifying restoration priorities among watersheds affected by past logging.

Population Conservation Status of Steelhead Trout Populations on the East Coast of Vancouver Island

Beginning in the early 1990s, both wild and hatchery steelhead returned in smaller numbers to streams on the east coast of Vancouver Island, leading to conservation concerns. In general, for a specific species and population, there is a threshold population size below which the probability of extinction increases dramatically. Fisheries researchers used a threshold of 200 spawners as a rough measure of conservation status for steelhead. They developed the following classification system based on this standard:

Extinct: populations known in the past but for which no returns have been observed in more than a decade

At high risk of extinction: populations that are declining (below replacement levels) or have escapements of less than 200 fish. (populations that have persisted for decades with small populations were considered to be at high risk when the mean population in the current decade was less than 200 fish and less than 20% of the long-term mean.)

At moderate risk of extinction: populations that exhibit serious declines but have escapements of 200 or more and are not immediately threatened

Of special concern: populations: (1) that could be threatened by relatively minor disturbances; (2) for which available data suggest depletion; (3) that may interbreed with introduced, non-native fish; or (4) that require attention because of unique characteristics.

Unthreatened: populations averaging more than 1,000 fish or greater than 20% of their long-term mean abundance.

This ballpark method for assessing the conservation status of steelhead may be relevant for many other populations in BC. More rigorous work in classifying steelhead populations appears to confirm the general effectiveness of this method.



As mentioned earlier, WFSP is designed to be reviewed and improved over time through on-the-ground testing. One of the tasks during the earliest WFSPs is to identify those classification filters that are most likely to help the technical team identify watersheds that are good candidates for further fish sustainability planning. Another task will be to explore the development of a weighting system for the various filters – that is, how to combine them, and what weight to give specific filters in ranking options for future WFSP consideration. For example, all else being equal and in order to realize conservation benefits, should a population that is genetically unique and stable be a higher or lower priority for intervention than a population that is more widespread but decreasing rapidly in size? Is the restoration of an estuary a higher or lower priority than the restoration of upstream habitat for the same fish population – or does it only make sense if they are equal priorities?

DEVELOPING A STRATEGIC OVERVIEW

From an ecological perspective, two fish populations or watersheds may be equally strong candidates for Stage II fish sustainability planning. Ideally, both would receive appropriate attention. Where resources are limited, however, WFSP participants may need to select one population or watershed over another as the initial focus of fish sustainability planning. In making such a selection, they will need to consider social, cultural, economic, and political – as well as ecological – values.

To obtain the additional information WFSP participants need to make such decisions, the Regional Planning Team develops a strategic overview. This overview identifies the key social, cultural, economic, and political values in the region. It also identifies the resources potentially available for WFSP within specific watersheds, in particular those watersheds identified as good Stage II candidates by the technical team.

The information contained in the strategic overview will help guide the planning team in the selection of watershed planning units at the end of Stage I. To develop the overview, the planning team needs to obtain input from fish conservation interests within the region that

are not already actively involved in the WFSP process.

The strategic overview includes information about

- the cultural and/or social value of fish populations (e.g., to First Nations, local communities, the recreational fishing community)
- the economic value of past, present, or potential fisheries (i.e., commercial, recreational, sport/tourist)
- the priorities and concerns of First Nations and stakeholders
- the level of interest in and support for WFSP within specific watersheds
- groups that are potential partners for WFSP within specific watersheds
- the potential costs and benefits of WFSP within specific watersheds
- the resources (e.g., expertise, time and money) available for WFSP within the region and within specific watersheds
- the capacity of government and other specialists to support WFSP in the region
- the amount of data and other information available about specific watersheds
- the priorities of existing programs and processes
- the potential for implementing WFSP through existing and future programs and processes
- the priorities of governments with respect to fish populations and habitats within the region (e.g., populations that are priorities for the development of Recovery Plans under the proposed federal Species At Risk Act or the provincial *Fish Protection Act*), and
- issues that might restrict or delay the implementation of WFSP in specific watersheds.

DEVELOPING A REGIONAL STRATEGY

The planning team considers the information in the biophysical profile and the strategic overview in developing a regional strategy for fish sustainability. This strategy will guide continuing work at the regional level. It will:



- identify information gaps and ways to fill those information gaps (e.g., through development of regional data sets, further inventory work, and analysis), and
- identify important regional trends (e.g., major declines in fish production across the region due to over-fishing or development) and make broad recommendations for addressing these trends (e.g., reducing the rate of resource exploitation or establishing development restrictions).

IDENTIFYING PRIORITY WATERSHEDS

As its name implies, WFSP is implemented primarily at the watershed level. Stages II to IV of WFSP focus on the development and implementation of fish sustainability plans for watershed planning units of approximately 50,000 hectares. One of the key tasks of the planning team in Stage I is to select from within the region one or more watershed planning units that will be the focus of initial Stage II, III and IV work in fish sustainability planning.

In selecting these watershed planning units, the planning team considers:

- the information in the biophysical profile

- the WFSP candidates identified by the technical team, and
- the values, interests, and resources identified in the strategic overview.

It keeps in mind the fish-first focus of WFSP and its emphasis on maintaining healthy watersheds and restoring others to a healthy condition. It keeps in mind current law and policy regarding fish and habitat, including the need for conservation. It also keeps in mind practical considerations; for example, WFSP is more likely to achieve successful outcomes for fish and habitat in a watershed for which there is adequate existing information, or a watershed that has been adopted by an active and informed stewardship group.

Once the planning team has selected watershed planning units for Stage II, it needs to make sure that the reasons for its choices are explained to and easily understood by all stakeholders. The WFSP process must be transparent to anyone who is interested.

The Stage I selection process is important because it establishes regional priorities. In providing support to Stages II, III, and IV of WFSP, the federal and provincial governments will direct specific resources towards those watershed planning units that are selected through the Stage I process. As WFSP is an iterative process, other watershed planning units from the same region may be selected for Stage II in later years. And many local groups will likely continue to work in watersheds of their choice, whether or not those watersheds are selected through the WFSP process as regional priorities.

IDENTIFYING STAGE II PARTICIPANTS

Once it has selected one or more watershed planning units, the Regional Planning Team invites local participation on a Watershed Planning Team for each such planning unit. The task of the Watershed Planning Team is to coordinate the development and implementation of a detailed fish sustainability action plan for the watershed (Stages II, III, and IV of the process). Although the composition of these watershed teams will vary from one WFSP to another, they will likely include representatives from federal and provincial

WFSP is designed to benefit all fish populations, whether or not they have commercial value.





governments, First Nations, and local stakeholder groups. In many cases, the planning team will already exist as a specific interest group or coalition of such groups.

The Regional Planning Team also consults with agencies and local communities to identify individuals and organizations with the expertise to carry out the technical tasks needed for Stages II, III, and IV and to advise the Watershed Planning Team.

REVIEWING AND IMPROVING THE WFSP

The end of Stage I and the start of planning at the watershed level does not mark the end of WFSP at the regional level. WFSP is an iterative process that revisits planning regions and watersheds on a regular basis.

The regional teams will continue to coordinate activities outlined in the regional strategy. They will review new information about fish populations and fish habitat within the region. They will respond to new policy directions or emerging socio-economic priorities. Every three to five years, as new information about the region becomes available, they will review their earlier work and use it as the basis of a new, second-generation regional strategy. The work of regional WFSP is therefore ongoing.

PUBLIC OUTREACH

To obtain the information needed for completion of Stage I and to prepare for subsequent stages of the WFSP process, the Regional Planning Team needs to make contact with communities, interest groups, and members of the public in the region.

Groups and individuals with an interest in fish sustainability will have opinions about which watersheds will receive priority attention, and the planning team needs to ensure that they have an opportunity to make their views known. Stage I requires ongoing discussion between members of the Regional Planning Team and other federal and provincial government agencies, First Nations, and stakeholders in the region in order to identify key interests and objectives in the management of fish populations and habitats, potential resources for WFSP, and opportunities to create partnerships.

The planning team also needs to take steps to let the general public know that the process is underway, make them aware of opportunities for participation in subsequent stages of the WFSP process, and inform them which watershed planning units have been selected at the conclusion of Stage I. Public outreach will also help ensure that the planning team is aware of current or anticipated factors (such as proposed urban or industrial development) that may influence the selection of priority watersheds, and will also help the planning team identify people and groups who need to be involved in the Strategic Overview process.

Opportunities for informing the public of WFSP activities may include community meetings, open houses, public presentations on WFSP and on the regional process, and small group discussion of WFSP interests and objectives. The team can get people involved by directly contacting potential participants, placing ads and public notices, and providing information through a Web site.

PRODUCTS OF STAGE I

- a working protocol for WFSP participants
- a biophysical profile of the region
- a list of populations and watersheds that are candidates for watershed planning
- a strategic overview that identifies regional values and resources
- a regional action strategy, and
- a list of one or more priority watershed planning units.



Notes From the Field: Stage I

WFSP is designed to be revised and improved as new information becomes available. Feedback from participants is therefore important. The WFSP Steering Committee invites users of this guide – as they work through the Stage I process – to fill out the following questionnaire as an aid to memory. They invite guide users to send in their answers to the address on page 85, or to provide their comments through workshops or other future WFSP events, or use the form on the WFSP Web site at www.bcfisheries.gov.bc.ca.

Who do you represent?

- federal or provincial government agency
- First Nation
- local government
- conservation or stewardship group
- resource-dependent business
- other (please specify) _____

What Stage I activities did you participate in?

- development of biophysical profile
- data collection and/or analysis
- identification of priority watersheds
- strategic overview process
- selection of watershed planning units
- other (please specify) _____

Regional Planning Team

Please comment on the way in which participants in the Regional Planning Team worked together. How often did the participants meet? How else did they communicate with each other? What worked? What was challenging?

Regional Technical Team

Please comment on the way in which participants in the Regional Technical Team worked together. How often did the participants meet? How else did they communicate with each other? What worked? What was challenging?

Biophysical Profile

How much time did it take to put together the regional profile? What elements of the profile were the easiest and the most difficult to obtain? Were there important elements not identified in the guide?

Candidate Watersheds

What criteria did you use to classify watersheds and to identify them as candidates for further WFSP consideration? What was challenging about this process? How could this guide provide more help with classifying watersheds?

**Strategic Overview**

What mechanisms did you use to communicate with and hear the views of the people in your region? What worked? What was challenging? What resources were most helpful in developing a regional strategic overview for fish sustainability? What further information could this guide provide to help in developing such an overview?

Public Outreach

How did you communicate with other fish conservation interests in the region? What worked? What was challenging?

Regional Strategy

What were the most important elements of the regional strategy? What was challenging about developing such a strategy?

General Comments

Please comment on any other aspects of Stage I.

Watershed Planning Units

What criteria did you use in selecting watershed planning units? What weight did you place on these criteria? What was challenging about this selection process? What further information could this guide provide to help in the selection process?



Stage II: Establishing Watershed Priorities

Stage I of WFSP sets regional priorities for fish sustainability planning. Stage II lays the foundation for the development of detailed WFSP action plans to maintain or restore the productive capacity of watershed planning units that have been identified as priorities in Stage I.

In most cases these planning units will be smaller than 50,000 hectares. Typical examples of watershed planning units might include the Kennedy River watershed in Clayoquot Sound, the Lemieux River watershed in the North Thompson sub-basin, and the Babine River watershed in the Skeena basin.

It will take time to complete Stage I for all areas of British Columbia. In the meantime, there is a clear need for some intervention in any number of watersheds across the province, and in many of them, stewardship groups are already active. The WFSP approach outlined in Stages II to IV can help these groups develop fish sustainability plans that address priorities, are consistent with government policy and legislation, promote effective investments in fish conservation, and are more likely to receive government approval and support.

For this reason, although WFSP is designed to be initiated at the regional level (Stage I), it can also be started at the watershed planning unit level (Stage II).

Stewardship groups, First Nations agencies, or local stakeholders can initiate a Stage II WFSP in a watershed planning unit of their choice before the Stage I process is initiated or completed in their region.

STAGE II TASKS

Stage II focuses on collection and analysis of information about a watershed planning unit and the identification of appropriate management directions, goals, strategies, and objectives. At the beginning of Stage II, parties with an interest in the watershed planning unit form a Watershed Planning Team and a Watershed Technical Committee to carry out the planning and technical tasks of WFSP.

The Watershed Planning Team

- develops a working protocol that describes the roles and responsibilities of WFSP participants
- works closely with other parties with an interest in fish sustainability
- develops a strategic overview of local values and resources
- establishes the overall strategic direction(s) for management

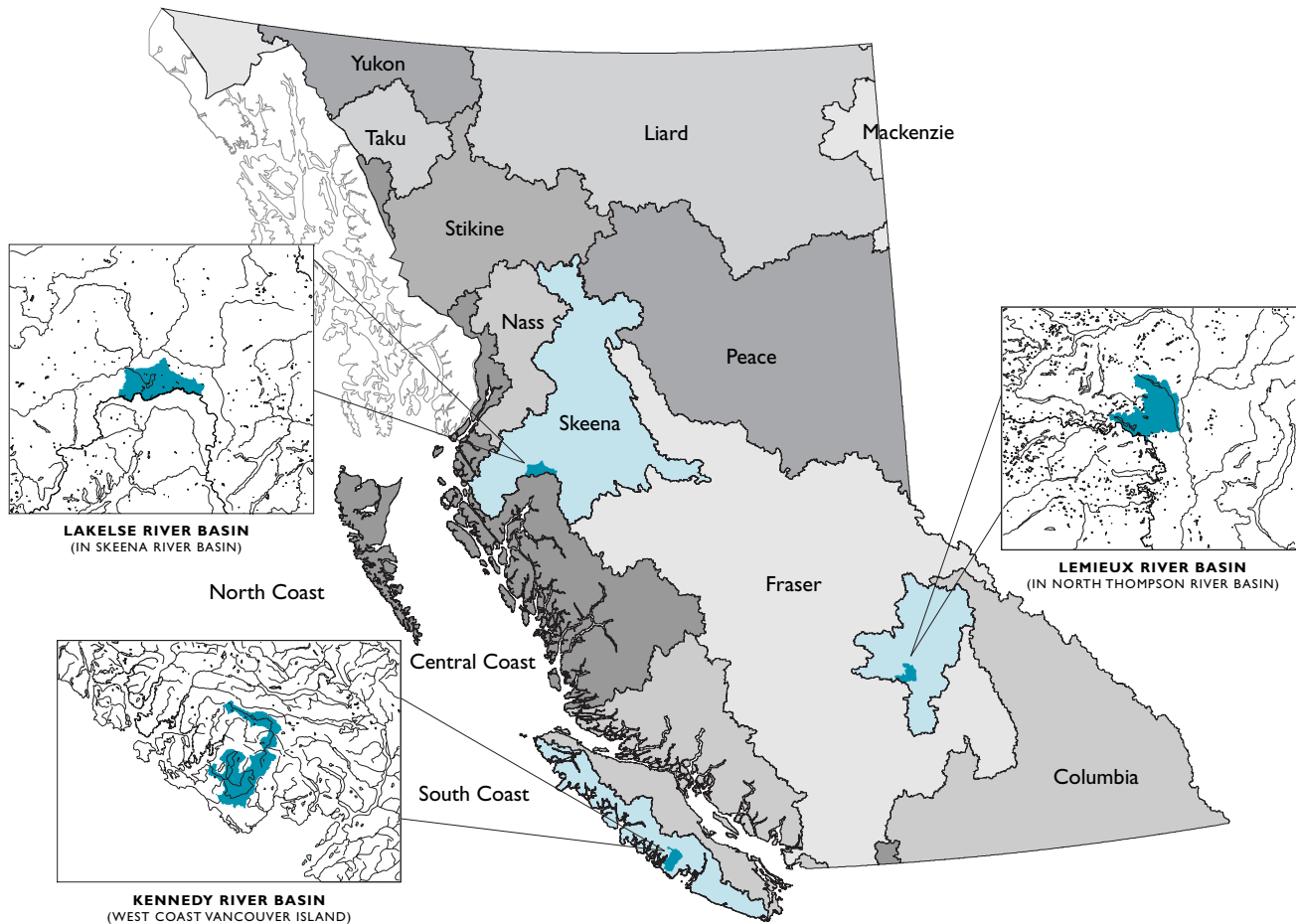


Figure 4. Potential WFSP Watershed Planning Units in British Columbia

Stages II to IV focus on watershed planning units typically less than 50,000 hectares in size.

Figure 4 illustrates three potential examples.

- establishes specific management objectives, targets, and strategies
- develops a monitoring and assessment framework, and
- brings the resulting Stage II plan to government for review and approval.

The Watershed Technical Committee

- coordinates the collection and analysis of data about the watershed
- develops a watershed profile
- identifies strategic management options consistent with fish sustainability, and
- identifies appropriate indicators of effectiveness.

Figure 5 illustrates the sequence of events in Stage II.

THE WATERSHED PLANNING TEAM AND WATERSHED TECHNICAL COMMITTEE

The Watershed Planning Team (planning team) is likely to come together in one of two ways. If the watershed planning unit is selected through a Stage I process, the Regional Planning Team identifies local parties at the end of Stage I and invites them to form a Watershed Planning Team. Alternatively, if a stewardship group, First Nation agency, or local stakeholder initiates a Stage II WFSP before a Stage I process has been completed, that party invites other stakeholders – including the federal and provincial governments – to form a Watershed Planning Team. In both cases, the Watershed Planning Team

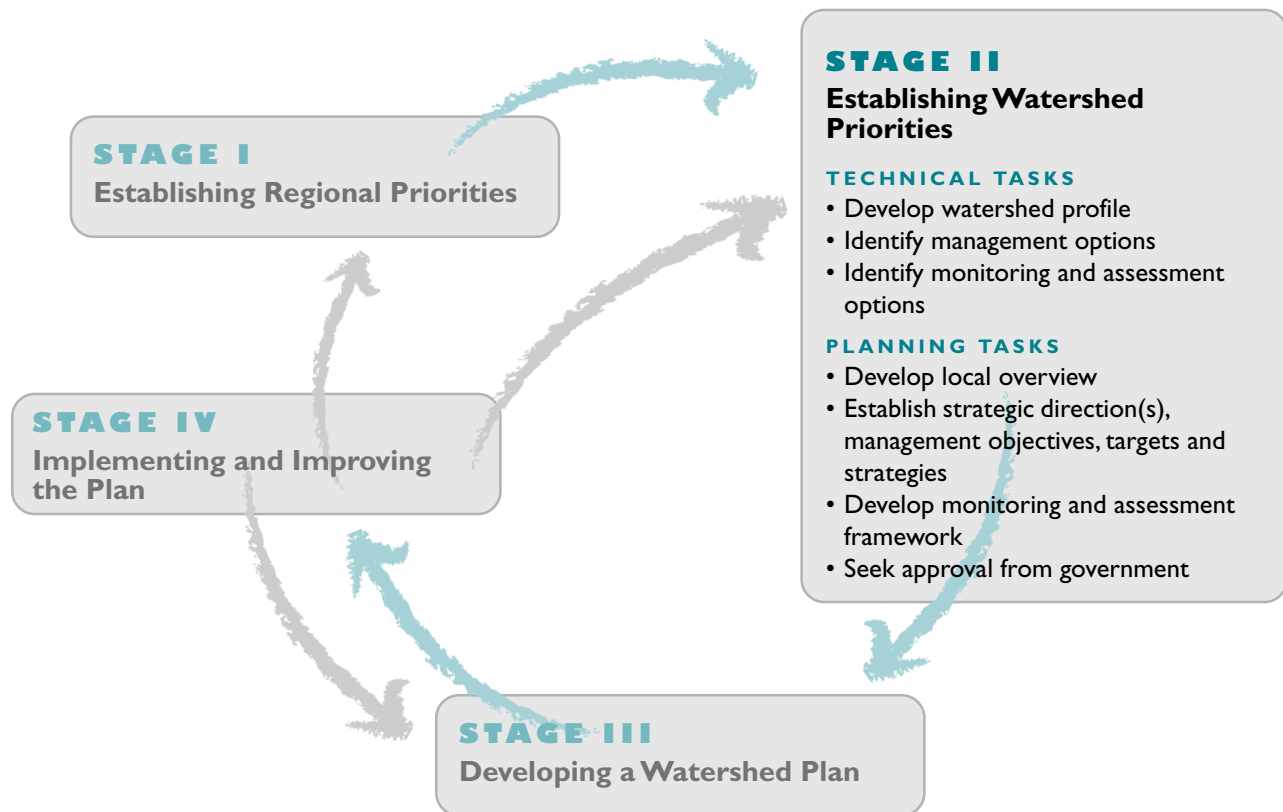


Figure 5. The WFSP Sequence: Stage II

follows the process described for Stages II, III, and IV of WFSP in developing and implementing a detailed fish sustainability plan for the watershed planning unit.

Fish sustainability planning at the watershed level calls for a number of technical tasks. Some of these tasks – for example, collation of existing information, documentation of local and traditional knowledge, inventory work, and mapping – can be carried out by non-specialists. Other tasks require the participation of specialists. Expertise for WFSP may come from government agencies, utility and forest companies, consultants, or others. Some WFSP participants may have the resources to hire specialists to work on their behalf.

It is up to the Watershed Planning Team to decide how to coordinate the technical tasks required for WFSP.

One option is to form a Watershed Technical Committee (technical committee) to carry out these tasks. Such a committee might include non-specialists as well as specialists to assist in communication with the planning team and to promote the dissemination of technical knowledge into the wider community. To help distinguish between the technical and planning tasks, this guide is written in a way that assumes the existence of a separate technical committee.

The level of participation by the federal and provincial governments in Stages II, III, and IV will vary from one watershed planning unit to another. In some – particularly in those selected as priority watersheds through the Stage I process – government representatives will participate in the planning team and the technical committee. In others, they may provide advice and input



to these teams as required and review fish sustainability plans as they progress.

Both governments have made a commitment to provide technical support to local groups that are using the WFSP process to develop watershed-level fish sustainability plans. In some watershed planning units, government specialists may carry out the technical tasks. In others, they may provide guidance. Where government resources are limited, WFSP participants may be able to provide resources for carrying out the technical tasks, or obtain additional resources from one of the funding sources identified in Appendix IV.

DEVELOPING A WORKING PROTOCOL

Developing watershed plans is complex and requires considerable work and cooperation. For the process to be as efficient as possible, everyone involved needs to clearly understand who does what and how the participants will work together. The first task of the planning team is to develop a formal working protocol that identifies the roles and responsibilities of each participant, including the type of support (in principle, in kind, joint action) that the participant will provide to the WFSP process.

Because Stage II involves difficult decisions about options and strategic directions for watershed management, working towards consensus among potentially conflicting interests is extremely important. Appendix V describes principles for collaboration and consensus-building. Members of the planning team may wish to refer to these principles in the working protocol.

DEVELOPING A WATERSHED PROFILE

The first important task of the technical committee in Stage II is to develop a detailed profile of the watershed planning unit. The watershed profile produced in Stage II of WFSP will typically be more detailed than the regional profile produced in Stage I. The information in this profile will help WFSP participants identify strategic

management options for the watershed planning unit, and the best ways to maintain or restore populations and habitats.

The watershed profile includes information about

- fish populations (e.g., species mix, genetic distinctness, abundance, productive capacity, conservation status, long term trends, life history information, habitat use information)
- fish habitat (e.g., amount, condition, water quality, stream flow, health, productive capacity, long-term trends)
- the impacts of development on the watershed (e.g., the proportion of the watershed affected by logging, mining, urban and/or agricultural development)
- the cumulative effects of past, present, and potential future activities, and
- important gaps in information about fish populations and habitat.

It also identifies:

- causes of any observed change in populations and/or habitats over time (e.g., harvesting, dams and other in-stream structures, logging, agriculture, urban development, mitigation measures)
- factors that are likely to cause future changes in the status of populations and habitat (e.g., land, water, and resource development trends, projected population growth, existing or proposed mitigation measures).
- the potential for maintaining or restoring productive capacity, and
- factors that limit the degree to which populations or habitat can recover on their own.

Development of the watershed profile involves:

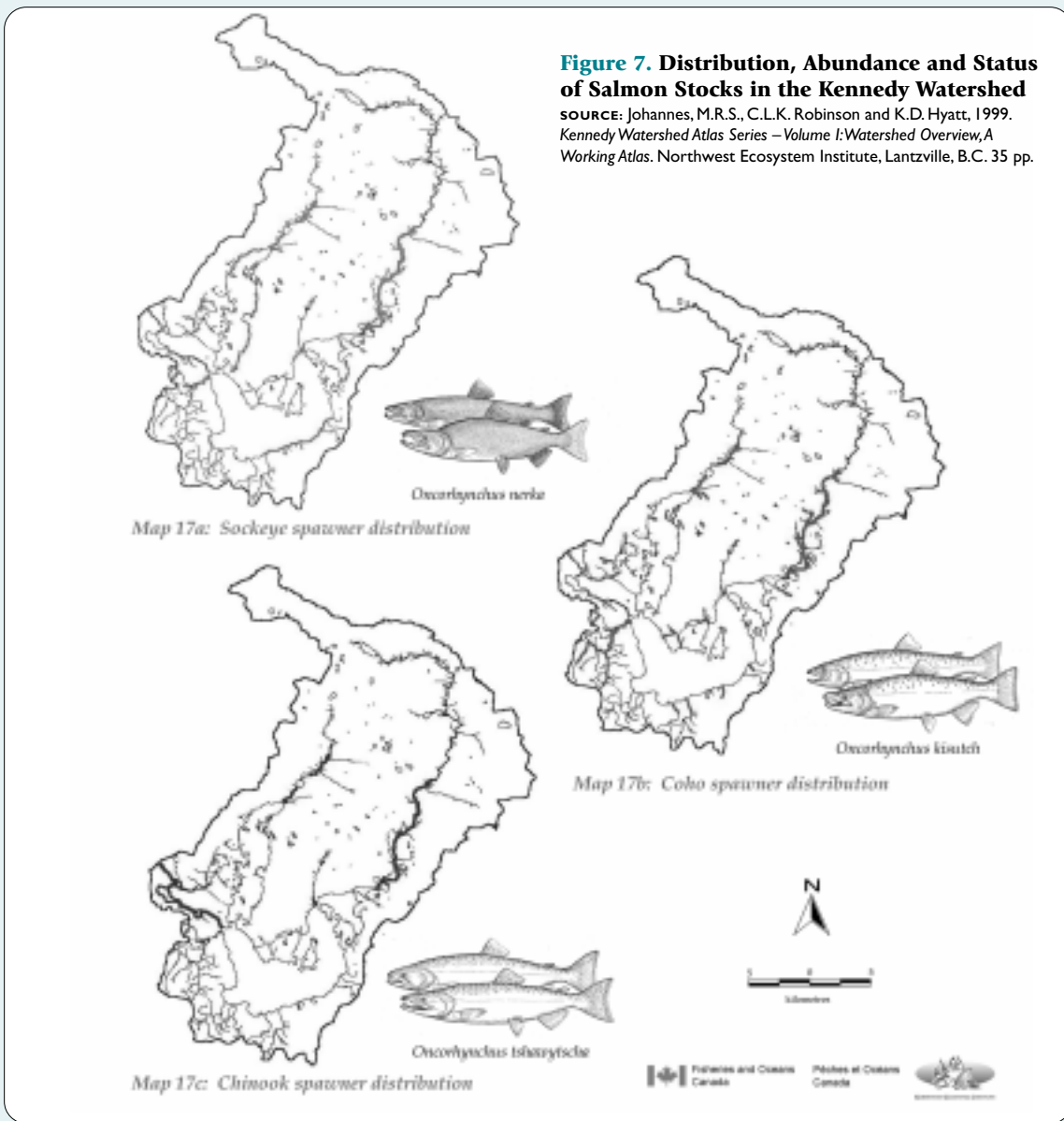
- description of the watershed planning unit based on existing knowledge
- identification of gaps in information about fish populations and habitat, and
- analysis of data and/or other elements of the preliminary description.



Integrating Traditional and Scientific Knowledge in Watershed Mapping

Traditional ecological knowledge and the input of local communities can make a significant contribution to the development of a watershed narrative. One effective method of synthesizing such information during Stage II is through a visual narrative, as illustrated by Figure 6 (page 32). This narrative incorporates the knowledge of local people about special features of the Upper Clayoquot watershed in Clayoquot Sound.

Other elements of the watershed profile will require input from specialists, who can, for example, assist in locating and collating information about watershed hydrology, forest cover, and distribution, abundance and status of fish populations from existing databases. This information can be presented in a variety of formats, including maps and graphs, as illustrated by Figure 7.





Description

In Stage II, as in Stage I, the technical committee develops an initial WFSP narrative that incorporates existing data, information based on past analysis, community and traditional ecological knowledge, and the views of various specialists. In developing the watershed narrative, the technical committee may be able to draw upon other previous work, including any information collected in Stage I. To find out what information about the watershed planning unit is already available, and to locate that information, the technical committee can consult

- the Fisheries Projects Registry, a joint federal-provincial initiative that lists more than 2,000 projects across British Columbia, and
- the Fisheries Information Summary System (FISS), which includes salmon distribution and other summary information about fish and fish habitat.

Appendix II describes these initiatives and other sources of information that may be useful to the technical committee in developing the Stage II watershed profile.

Analysis

In some watershed planning units – particularly in those where substantial data collection and analysis have already been carried out – WFSP participants will be able to complete the watershed profile using existing information. However, in watershed planning units where data about fish populations and habitat are incomplete or unavailable or analysis of existing data is inadequate, the technical committee will need to identify information gaps.

WFSP is designed as an iterative process – that is, participants revisit each stage at some point in the future to revise and improve the watershed management plan. Each generation of the plan makes use of the best information available at the time. It is likely that in many watershed planning units – even in those where information is missing – the technical committee will be able to produce a first-generation watershed profile. This profile, while incomplete, will contain enough detail to allow the planning team to develop a first-generation fish sustainability plan. If the plan includes inventory, data collection, and other research activities, new

information about the watershed planning unit will be available in the future. WFSP participants will be able to draw upon this new information in drawing up future generations of the plan.

In some watershed planning units, however, critical missing information must be obtained before planning can realistically proceed any further. In this case the technical committee will carry out appropriate data collection and/or analysis to generate this critical information or to verify details of the WFSP narrative. An important requirement will be to ensure that any new data collected is compatible with existing data standards. In identifying critical information gaps and in determining how to fill them, the technical committee – if it does not already include them – should seek technical advice from government or other specialists.

In Stage II, the purpose of analysis is to fill critical gaps in the watershed profile. Important tasks may include finding out why a fish population is in decline or identifying habitat that is considered to be at risk. Many of the technical tasks required for Stage II will require the involvement of specialists. With guidance, however, non-specialists will be able to carry out a number of Stage II technical tasks, for example the mapping of streams in the planning area. Appendix II includes a preliminary list of manuals that may help the technical committee with some of these tasks. One of the goals in implementing the earliest WFSPs is to test and refine procedures for carrying out Stage II technical tasks and to create a more comprehensive tool kit for participants.

Once WFSP participants have developed a detailed watershed profile they will have a better – although not necessarily a complete – understanding of how the watershed works, what may be affecting the status of fish and habitat, and how they can most effectively intervene in it. For example, fish production in a stream may be unacceptably low because there is a shortage of appropriate spawning habitat, because one or more instream barriers block migration, or because of another factor. Once WFSP participants know which of the many possible factors is actually affecting fish production, they will be in a better position to find a solution.



Identification of Restoration Priorities in the Kennedy Watershed, Clayoquot Sound

Researchers working in the Kennedy watershed have concluded that some locations show strong evidence of a link between past harvesting, habitat degradation, and productivity declines. They have identified areas that are restoration priorities in the Kennedy watershed by integrating information about

- the risk to spawning habitat, based on the proportion of stream length affected by logging and road construction, and adjacent to highly erodible soils, and
- the salmon and trout production values in each stream and within the sub-basin.

Logging impacts on streams were assessed as:

- high: >50% of total stream length affected by logging (and/or road construction)
- low: 1-50% of total steam length affected by logging (and/or road construction)
- no: no logging (and/or road construction) impacts

Salmon and trout production values were assessed as “low” through “high” based on known salmon distribution and abundance.

Figure 8 identifies restoration priorities, by sub-basin, within the watershed. Each sub-basin was ranked from “1” (no logging, low salmon/trout value) to “5” (high logging impact, high salmon/trout value). Sub-basins with a higher rank are considered to be of greater priority for restoration.

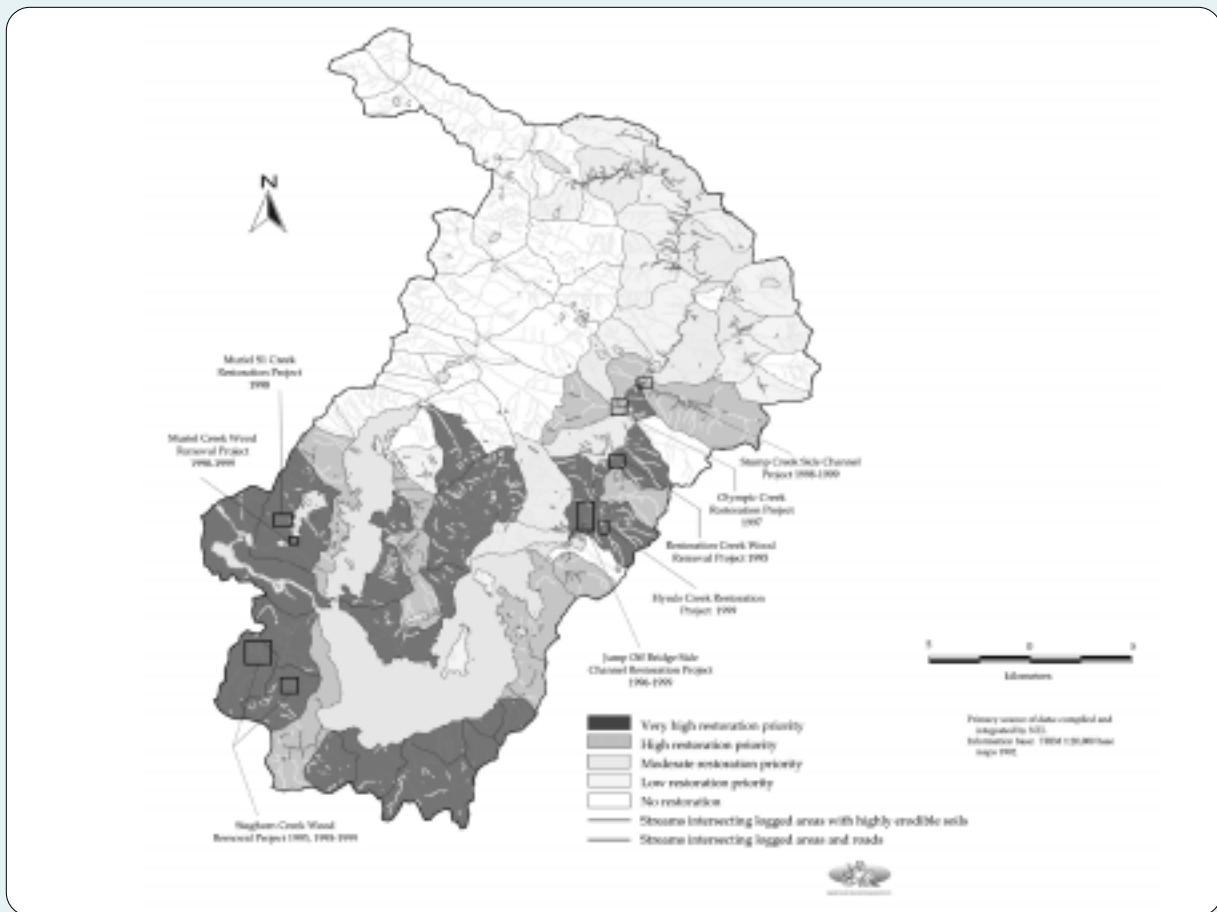


Figure 8. Salmon Habitat Restoration Priorities in Kennedy Watershed, by Sub-Basin

SOURCE: Johannes, M.R.S., C.L.K. Robinson and K.D. Hyatt, 1999. Kennedy Watershed Atlas Series-Volume I: Watershed Overview, A Working Atlas. Northwest Ecosystem Institute, Lantzville, B.C. 35 pp.



Classification

In Stage II, the technical committee classifies sub-units within the watershed planning unit to identify priorities for protection and/or restoration. Characteristics or filters that may be useful in Stage II include:

- degree of risk (e.g., high, medium, low)
- potential for successful restoration (e.g., high, medium, low)
- urgency of the need for intervention (e.g., high, medium, low)
- amount of intervention required (e.g., large, medium, small)
- complexity of the issues to be addressed (e.g., complex, medium, simple)

IDENTIFYING STRATEGIC OPTIONS

The second important task of the technical committee in Stage II is to identify strategic options for management of the watershed planning unit. Keeping in mind the overall WFSP emphasis on conserving fish populations, fish habitat, and biodiversity, there may be one or more strategic options for effective intervention in the watershed planning unit.

Strategic options are usually expressed in terms of

- conditions in aquatic, riparian, and upland portions of the watershed
- species balance
- the productive capacity of fish populations
- the productive capacity of habitats, and
- the potential for effective intervention.

Strategic options emphasize conservation, protection, restoration, or enhancement, or a combination of such initiatives. They vary from one watershed planning unit to another, reflecting the unique biological characteristics of each watershed.

In identifying strategic options, the technical committee considers the biological characteristics of the watershed planning unit. For example, the committee may have determined that cumulative damage to salmon habitats within a portion of a given watershed is so

extreme that short-term habitat restoration interventions are unlikely to improve productive capacity. The team might therefore identify as strategic options: (a) the conservation and protection of those habitats and populations that are still viable in the watershed; and (b) mitigation for the loss of formerly productive habitats and populations through artificial enhancement (e.g., enhanced production from spawning channels or hatcheries). They would likely reject as a strategic option the immediate restoration of habitats that have been altered to such an extent that they are marginally recoverable.

The technical committee must also consider federal and provincial legislation and policy in identifying strategic options for the watershed planning unit. For example, the proposed federal Wild Salmon Policy calls for the maintenance of all populations at or above a limit reference point (LRP) below which they are considered to be at risk. Enhancing production of one species through activities that put other species at risk is unacceptable. In a watershed where coho populations are depleted, acceptable strategic options would therefore include enhancing coho production, enhancing production of all species including coho, and enhancing coho production while maintaining other species above the LRP. More information about federal and provincial laws and policies regarding fish and their habitat is included in Appendix I. When working on watershed planning units for which there is limited biological information, the WFSP committee should be able to identify strategic management options based on legislation and policy alone.

It will typically be the responsibility of the technical committee to identify strategic options for the management of the watershed planning unit, to identify possible ways of implementing these options on the ground, to evaluate the potential cost of these implementation measures, and to present this information to the planning team. The planning team will in turn consider these options and costs in developing the overall direction for the management of the watershed planning unit.



DEVELOPING A LOCAL STRATEGIC OVERVIEW

At the watershed as well as at the regional level, WFSP considers social, cultural, economic, and political as well as ecological issues. Two management options, from an ecological and policy perspective, may be equally valid. In deciding which one to select, WFSP participants must consider a broader range of criteria. For example, all else being equal, the option that involves less expense is more likely to be supported and successfully implemented. The planning team may also consider development plans for the watershed and – again all else being equal – select the option that is likely to be most compatible with these plans.

To obtain the additional information WFSP participants need in order to make such decisions, the planning team develops a strategic overview. This overview identifies the key social, cultural, economic, and political values within the watershed planning unit, and the resources potentially available for WFSP. In developing the overview, the planning team engages with and invites input from those fish conservation interests within the watershed that are not already actively involved in the WFSP process.

The Stage II strategic overview identifies

- local priorities and concerns with respect to fish and their habitat
- the level of local support for WFSP
- the available resources and expertise for WFSP
- existing and proposed programs, processes, plans, and commitments that affect the watershed
- regional priorities and other outside factors that may affect the watershed, and
- the general priorities of non-fish interests in the watershed planning unit.

ESTABLISHING STRATEGIC DIRECTION(S) FOR FISH SUSTAINABILITY

During Stage II, the planning team establishes the overall strategic direction(s) for long-term fish sustainability and habitat protection in the watershed planning unit, keeping in mind the fish first focus of WFSP. The strategic

direction(s) are general prescriptions designed to maintain or restore the productive capacity of the watershed planning unit. They guide the development of a detailed WFSP action plan for the watershed planning unit. The direction(s) chosen should be feasible; for example, restoration of a fish population or a habitat to its historic condition may not be realistic in areas where extensive development has occurred, although it may be attainable in less developed areas.

The strategic direction(s) for the WFSP are expressed in terms of

- desirable conditions in the aquatic, riparian, and upland portions of the watershed
- biology (e.g., desirable species mix)
- utilization and escapement of fish populations
- habitat protection, restoration, and enhancement,

Rural River WFSP: Strategic Directions

The Rural River (a hypothetical river) in southwestern BC supports coho and sockeye, cutthroat, steelhead, and rainbow trout. Although fish and habitat values within the watershed remain high, the watershed has been altered by past development. Riparian vegetation has been removed along a number of tributaries, and in some areas, soil erosion has led to stream siltation. Water quality in some reaches is poor, primarily as a result of septic tank leakage and agricultural runoff. Poorly designed drainage pumps on the river kill 30% of juvenile fish as they migrate downstream. Annual monitoring of coho shows a significant recent decline in the number of returning spawners. Finally, existing natural values within the watershed are threatened by rapid urban and agricultural development. Participants in the Rural River WFSP may identify the following general strategic directions for conservation within the watershed.

Strategic Directions (general goals for the watershed planning unit)

- decrease mortality of juvenile fish (smolts)
- preserve existing fish and habitat values, and
- improve watershed conditions where needed.



and

- research, development and inventory activities.

In establishing the strategic direction(s), the planning team considers

- the strategic options put forward by the technical committee, including their costs and benefits, and their expected impact on fish and habitat, and
- the information in the strategic overview, including local values and the resources available for WFSP.

The team also needs to obtain input from “fish conservation interests” within the watershed planning unit that are not already actively involved in the WFSP process. The strategic direction(s) should reflect common ground between WFSP participants and with these other parties. Even if there are disagreements about some management directions, it should still be possible for WFSP participants to agree on others. For example, stakeholders may agree to work together to enhance sockeye productivity, even though they may disagree on long-term management for other species in the same watershed.

Finding this common ground may be one of the most challenging tasks the planning team faces. The principles for collaboration and consensus-building described in Appendix V may be extremely useful for the planning team at this stage of the process. Working towards consensus can be difficult and time-consuming, but it ultimately pays off.

INITIATING AN INTERIM REVIEW

The planning team may wish to initiate an external review of its progress midway through Stage II. Such a review provides the planning team with an opportunity to obtain feedback on the general direction of the fish sustainability plan from an informed but external body – such as the Regional Planning Team or the WFSP Steering Committee. It should help the planning team decide how to address difficult issues and ensure that the plan is consistent with established law and policy. It should also help the team identify potential implementation challenges and address these challenges in advance.

ESTABLISHING OBJECTIVES, TARGETS AND STRATEGIES

Once the planning team has established the overall strategic direction(s) for the WFSP, it identifies specific management objectives, targets, and strategies that are compatible with these direction(s). These are expressed in quantifiable terms and typically address

- fish population size (e.g., escapement, hatchery inputs, harvesting)
- genetic diversity of fish populations
- fish habitat status (e.g., condition of water, substrates, vegetation)
- protection, restoration, enhancement, and development
- enforcement requirements, and
- research and inventory requirements.

An important goal of WFSP is to provide direction on fish and fish habitat to other provincial land and water use planning processes, some of which are described in Appendix IV. For this reason, it is important that the planning team develop Stage II objectives that are clear and quantifiable and are expressed in language that can easily be integrated into these other processes.

ESTABLISHING A MONITORING AND ASSESSMENT FRAMEWORK

The planning team works closely with the technical committee to develop a monitoring and assessment framework that recognizes the need to review progress in implementing WFSP activities and progress in improving the status of fish populations and habitats in the watershed planning unit through these activities.

The framework in Stage II identifies specific, measurable indicators of fish and habitat status. These indicators are based on the strategic direction(s) and management objectives, targets, and strategies for the watershed planning unit. They will likely include measures of watershed health, fish production, habitat productivity, and water quality and quantity.

For example, if a Stage II objective is to improve flows and reduce sediment loading in the watershed planning unit within 10 years, appropriate indicators of effectiveness would be based on maximum and



Rural River WFSP: Objectives, Targets, and Strategies

Participants in the Rural River WFSP may supplement their general strategic directions with the following objectives, targets and strategies.

Objectives (what WFSP participants want to achieve):

- Improve passage of juvenile fish through pumps
- Preserve and restore riparian habitat, wetlands and marshes
- Preserve and restore in-stream habitat (e.g., large organic debris, pools, riffles)
- Improve water quality (e.g., minimize contamination and siltation, improve summer temperatures)

Targets (how to tell if WFSP participants have achieved objectives):

- No juvenile fish die in pumps
- 50% increase in area capable of carrying out natural riparian functions
- Contaminant levels in river meet or exceed standards for the protection of aquatic life and fisheries; minimize non-point sources of pollutants

Strategies (how WFSP participants will achieve these objectives):

- Replace existing drainage pumps with pumps that do not kill fish
- Promote conservation of healthy riparian vegetation and upland forests
- Restore riparian areas damaged by past development (e.g., by replanting, bank stabilization)
- Increase in-stream habitat complexity in selected tributaries
- Establish measures to reduce contamination from septic systems, agricultural runoff (e.g., manure, pesticides, and fertilizers)

minimum flow rates and measures of sediment loading at specific time intervals.

The framework also identifies benchmarks that are related to the indicators and against which participants can measure the progress they have made towards fish sustainability and maintaining and/or restoring fish populations and habitat. These can be referred to as benchmarks of effectiveness. In some cases, these benchmarks may reflect conditions in similar, undisturbed watersheds. (*See box, page 40*)

The monitoring and assessment framework recognizes that the information gained through monitoring will be used in Stage IV to assess the effectiveness of the WFSP, to identify new management issues, and to guide the ongoing improvement of the WFSP.

OBTAINING FINAL APPROVAL

The essential elements of a Stage II plan for the watershed planning unit include

- a watershed profile
- a strategic overview of local values and resources
- strategic direction(s)
- management objectives, targets and strategies, and
- a framework for monitoring and assessment.

While Stage II plans are not yet complete, they are the basis for the development of detailed watershed-level fish sustainability action plans in Stage III and for the implementation of such plans in Stage IV. Because they are the foundation for further planning it is important that Stage II plans contain all the necessary elements and that they reflect good process.

The federal and provincial governments have an interest in the quality of Stage II plans. These governments expect to provide faster and easier access to programs and resources for projects identified through WFSP. They expect to give greater weight to recommendations developed through the WFSP process. They want to ensure, therefore, that final fish sustainability action plans are built on solid foundations.

WFSP participants also have an interest in the quality of Stage II plans. They can ultimately expect faster and easier access to government programs and resources if



Rural River WFSP: Indicators and Benchmarks

Participants in the Rural River WFSP may choose to measure their progress with a variety of indicators and benchmarks. Indicators are what WFSP participants will measure. They will compare the measurements they obtain against fixed benchmarks in order to assess progress towards their objectives. A benchmark may represent a target, a starting point, or conditions within a similar but more healthy watershed.

STAGE II OBJECTIVE: IMPROVE PASSAGE OF JUVENILE FISH THROUGH PUMPS

Indicator(s) of effectiveness:

- percentage of juvenile fish killed in drainage pumps during downstream migration.

Improvement in this area can be measured against the existing benchmark: 30% of juvenile fish killed in drainage pumps during downstream migration

STAGE II OBJECTIVE: PRESERVE AND RESTORE RIPARIAN HABITAT

Indicator(s) of effectiveness:

- area of undisturbed riparian habitat
- area of restored riparian habitat
- quality of riparian habitat, represented by number of appropriate indicator species present, composition and density of vegetation, volume of woody vegetation
- summer water temperatures, and
- extent of bank erosion.

Improvement in this area can be measured against benchmark(s) that represent the area and quality of riparian habitat before disturbance; these will likely be estimates. Alternatively, improvements can be

measured against benchmark(s) derived from conditions at “reference” sites (e.g., stream reaches or other streams) that are indicative of healthy riparian structure and function.

STAGE II OBJECTIVE: PRESERVE AND RESTORE IN-STREAM HABITAT

Indicator(s) of effectiveness:

- area of in-stream cover
- area of pools, riffles, and
- fish production.

Improvement in this area can be measured against benchmark(s) that represent the area of in-stream cover before disturbance; these will likely be estimates. Alternatively, benchmarks could also be based on conditions at reference sites. Fish production can be compared against known biostandards for specific types of restoration activities (e.g., the expected gain in fish production through creation of a new side channel).

STAGE II OBJECTIVE: IMPROVE WATER QUALITY

Indicator(s) of effectiveness:

- level of contaminants of concern (e.g., nitrate, ammonia)
- number of point sources of contaminants
- sediment composition and levels, and
- biotic integrity.

Improvement in this area can be measured against benchmark(s) that represent highest annual loading of contaminants etc. over the past decade. In general, levels (at the source) are measured against acceptable standards for protection of aquatic life and fisheries.

their plans are based on good process and good information. And they can expect to be able to implement final fish sustainability action plans more easily when they have obtained broad local support.

To ensure that further fish sustainability planning efforts and final fish sustainability action plans are based on solid foundations, the federal-provincial

WFSP Steering Committee will review Stage II plans. The committee will oversee a peer-review process (referring the plan for review by government agencies and stakeholders) to ensure that the plan

- contains all essential Stage II elements
- is based on solid information



- is compatible with current federal and provincial legislation and policy (e.g., *Water Act, Fish Protection Act, Fisheries Act, Policy for the Management of Fish Habitat*)
- reflects the broad participation of fish conservation interests within the watershed
- reflects priorities for fish sustainability (e.g., protecting and restoring productive capacity, genetic diversity)
- is workable, and
- is likely to have positive impacts on fish and their habitat.

If the Stage II plan meets the above criteria, government approves it and enters it in a WFSP registry that is accessible to the public. Governments will provide guidance as needed to WFSP proponents in bringing the Stage II plan up to an acceptable quality.

Approved Stage II plans are not static but are expanded in Stage III of WFSP and are implemented, reviewed, and updated in Stage IV.

PUBLIC OUTREACH

By focusing on fish in the early stages of planning and developing strong working relationships, WFSP participants can develop a solid Stage II plan. However, the plan will not work unless it has wide support from the local community. The planning team will need to use its intuition to pick the right timing for broad public involvement in the process.

Stage II of WFSP requires extensive, open, ongoing interaction and dialogue among planning team participants and among the planning team, First Nations, and other parties with an interest in fish and fish habitat in the watershed planning unit. The planning team should design a participation process that involves all of these parties in the establishment of the strategic direction(s) and management objectives for the watershed planning unit. Effective stakeholder participation mechanisms for Stage II might include workshops, ongoing round-tables, working sessions, and public forums that focus on specific aspects of the planning process.

At the same time, the planning team needs to inform



WFSP strategic directions may include rebuilding salmon populations while ensuring support for commercial and recreational fisheries.

the broader community about the progress of the WFSP. For example, it may wish to contact private landowners whose lands contain riparian habitat, and Ministry of Forests District Managers in order to notify them that WFSP will be identifying riparian areas that need protection. This broader outreach helps to promote ongoing local interest in, understanding of, and support for the WFSP process, and to establish a foundation for the broader negotiations that are likely to take place in Stage III.

While WFSP has a fish-first emphasis, it cannot succeed unless participants understand and address the concerns of non-fish interests. These are groups and individuals (e.g., forest companies, ranchers) who may be negatively affected by measures that promote fish sustainability. For example, landowners may incur costs if they choose to install fences to protect riparian habitat. In Stage II, WFSP participants identify these non-fish interests and establish initial contact. In Stage III, when they develop a detailed implementation plan, they work more closely with these interests to address their concerns.

The level of outreach required during Stage II depends on the level of community interest in the WFSP. At a minimum, the planning team should ensure that the broader community has access to the completed Stage II plan, which can be made available on the internet, through community newspapers, or through a public open house. If the community has a high level of interest



in WFSP, the planning team may choose to facilitate ongoing involvement through a series of open houses or public workshops.

PRODUCTS OF STAGE II

- a working protocol between WFSP participants
- a detailed watershed profile
- a strategic overview that identifies local values and resources
- strategic management direction(s) (general prescriptions)
- specific management objectives, targets, and strategies (specific prescriptions)
- a monitoring and assessment framework including indicators of effectiveness, and
- a government-approved Stage II plan



Notes from the Field: Stage II

WFSP is designed to be revised and improved as new information becomes available. Feedback from participants is therefore important. The WFSP Steering Committee invites users of this guide – as they work through the Stage II process – to fill out the following questionnaire as an aid to memory. They invite guide users to send in their answers to the address on page 85, or to provide their comments through workshops or other future WFSP events, or use the form on the WFSP Web site at www.bcfisheries.gov.bc.ca.

Please indicate which Stage II activities you participated in directly:

- *developing a watershed profile*
 - *identifying strategic options*
 - *developing a local strategic overview*
 - *establishing strategic directions*
 - *establishing objectives, targets, and strategies*
 - *establishing a monitoring and assessment framework*
 - *finalizing the Stage II WFSP*
 - *other (please specify)*
-

Working Protocol

Please comment on the way in which participants in the Watershed Planning Team worked together. How effective was the working protocol in defining roles and responsibilities? How often did the participants meet? What other mechanisms did the participants use to communicate with each other? What worked? What was challenging?

Watershed Profile

What elements of the profile were the easiest and the most difficult to obtain? Were there other important elements not identified in the guide? What roles did specialists and non-specialists play in developing the profile? What additional information could this guide provide to help in the development of such a profile?

Strategic Options

What further information could this guide provide to help in the identification of strategic options?

Strategic Overview

What mechanisms did you use to communicate with and to elicit the views of groups and individuals with an interest in fish conservation within the watershed? What worked? What was challenging? Please comment on any resources you found particularly helpful in developing a local strategic overview for fish sustainability. What further information could this guide provide to help in preparing such an overview?

**Strategic Directions**

What mechanisms did you use to communicate with and to obtain the views of the broader WFSP constituency with respect to establishing strategic directions? What criteria did you use in establishing strategic directions? What weight did you place on these criteria? What was challenging about this process? What further information could this guide provide to help in establishing strategic directions?

Participation

What other fish conservation and non-fish interests did you identify? How did you communicate with these interests? What worked? What was less effective? How could this guide help participants improve this aspect of Stage II?

General Comments

Please comment on any other aspects of Stage II.

Objectives, Targets, and Strategies

What mechanisms did you use to communicate with and to obtain the views of the broader WFSP constituency with respect to establishing objectives? What information did you draw upon in establishing objectives? What further information could this guide provide to help in establishing objectives?

Monitoring and Assessment Framework

What further information could this guide provide to help in establishing the monitoring and assessment framework?



Stage III: Developing a Watershed Plan

In Stage II, WFSP participants draw upon a broad range of information to decide what needs to be done to protect and restore fish populations and habitat within the watershed planning unit. In Stage III they work out the details of who will do it, how, and when – and get the clear commitments needed to implement fish sustainability planning on the ground. The product of Stage III is a detailed, watershed-level fish sustainability plan that includes conservation, research, and monitoring activities.

STAGE III TASKS

The same Watershed Planning Team and Technical Committee that saw Stage II to completion continue their work in Stage III. The planning team coordinates the development of a detailed fish sustainability action plan that includes conservation, research and monitoring activities. The technical committee continues to work closely with and advise the planning team.

In Stage III, the Watershed Planning Team:

- identifies ways to achieve the objectives, targets and strategies identified in Stage II, including programs and processes

- identifies and contacts appropriate organizations and individuals to determine their capacity and willingness to assist in implementation and monitoring
- works with other stakeholders to establish specific commitments regarding implementation and monitoring, including time lines
- develops a detailed, multi-year fish sustainability action plan based on these commitments, and
- releases the fish sustainability action plan.

The technical committee:

- identifies appropriate monitoring and assessment options and
- identifies appropriate research, data collection, and analytical activities.

THE FISH SUSTAINABILITY ACTION PLAN

The final product of Stage III is a detailed, watershed-level fish sustainability action plan that includes:

- specific, on-the-ground activities expected to produce positive results for fish and habitat within the watershed

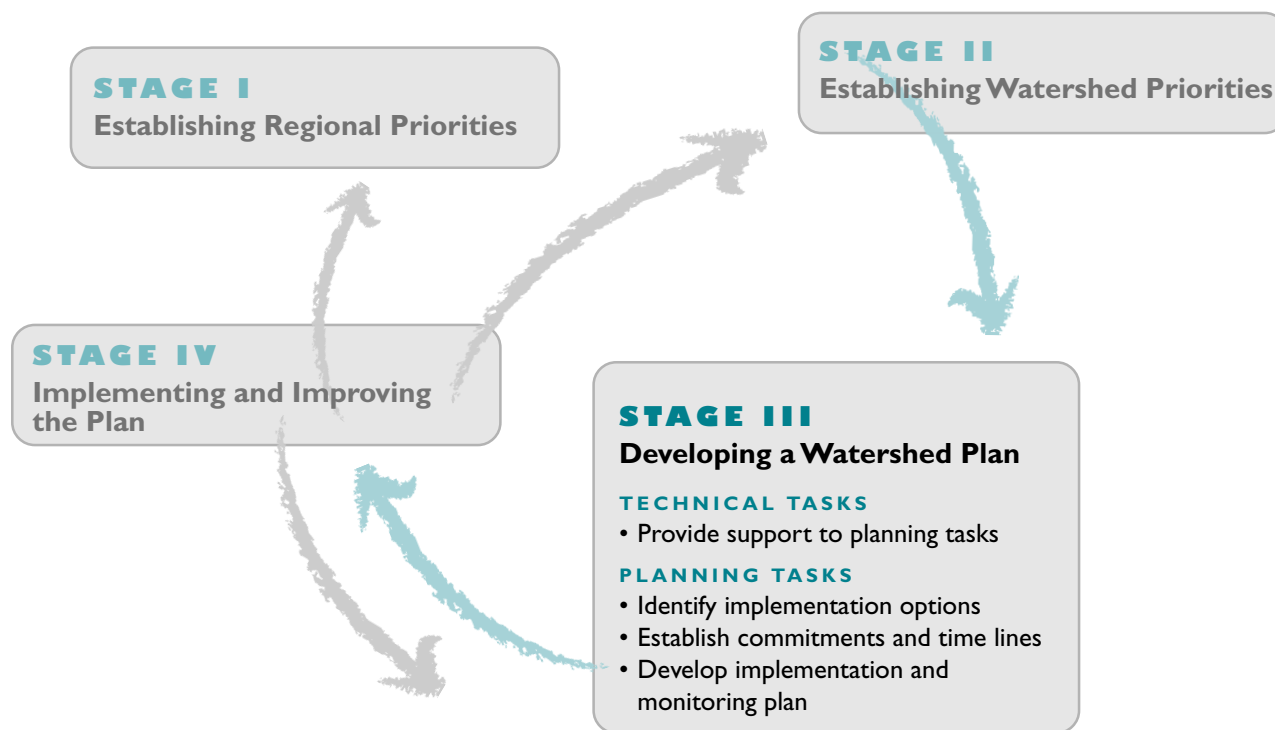


Figure 9. The WFSP Sequence: Stage III

- research, data collection and analytical activities designed to fill important gaps in information about the watershed
- monitoring and assessment activities designed to provide feedback about the effectiveness of the fish sustainability plan, and
- information about who will carry out these activities, and who will fund and otherwise support them.

Research and monitoring are vital components of fish sustainability planning. The information they provide are expected to be useful in developing future generations of the Stage III watershed-level plan and of the Stage I regional strategy.

IDENTIFYING WAYS TO PROMOTE FISH SUSTAINABILITY

In Stage III, the planning team identifies concrete actions that can promote the goals, targets and strategies identified for the watershed in Stage II. There will likely be many of these implementation options. Some will address urgent watershed management needs such as fish populations and habitat at risk. Others will address longer-term goals. Some will be easier to set in place, or to obtain funding for, than others.

Once it has identified the implementation options for the watershed, the planning team needs to identify the benefits, costs, and feasibility of each. It also needs to secure the cooperation of the groups and individuals who can carry out implementation on the ground and/or provide funding, expertise, or other resources.

Federal, provincial, and local government agencies, First Nations, private groups, land users such as forest companies and ranchers, and landowners with property



along fish-producing streams can help implement fish sustainability. The planning team needs to work closely with each of these parties to secure their support and address any concerns they have about the process.

Implementation options include:

Programs and Resources

In general, the programs and financial resources needed to implement WFSP already exist, and WFSP builds on these initiatives. One of the key tasks of the WFSP process is to identify resources, match them to WFSP needs, and gain the support of the agencies, organizations, and stakeholders that can provide them. Appendix IV describes a number of relevant federal and provincial programs. In some cases, WFSP participants (such as Fisheries and Oceans Canada) will already be directly involved in the delivery of these programs.

Once it has identified the programs and resources most closely related to WFSP objectives, the planning team needs to take the appropriate actions to tap into them. For example,

- One or more WFSP participants may seek funding for specific WFSP activities from an existing program or funding body. A community group may seek funding from the Habitat Restoration and Salmon Enhancement Program for habitat restoration, population rebuilding, or resource and watershed stewardship activities. A First Nation or local government, community stewardship group or educational institution may seek funding from the provincial Urban Salmon Habitat Program for activities that promote protection, enhancement, and restoration of salmonid habitats in urban areas in the BC portion of the Georgia Basin.
- The planning team may encourage WFSP participants or other local stakeholders to commit existing resources to the WFSP implementation. For example, Forest Renewal BC provides funds to forest licensees through the Watershed Restoration Program for restoration activities in priority watersheds. Licensees that are eligible for such funding may be willing to commit them to projects that promote the management objectives of the WFSP.

Land, Water, and Resource Planning

In addition to drawing on program support, WFSP participants may seek to implement WFSP strategies, targets, goals, and objectives through other land and resource planning processes that may affect fish and habitat within the watershed planning unit. The planning team may make recommendations, through the appropriate agency or organization, to these processes. For example, if a watershed planning unit contains fish populations at risk, is sensitive to development, or contains unstable terrain, the planning team may choose to convey these concerns to the local LRMP process and recommend that the watershed be given specific objectives and strategies to address fish and habitat issues. Where an LRMP is already completed, outputs from the WFSP can be fed into the monitoring committee set up to oversee the implementation of the LRMP. In some cases, the planning team may choose to actively participate in these other planning processes.

Support from Private Landowners

Where fish-producing streams flow through or are affected by activities on private lands, property owners can make a significant contribution to the implementation of WFSP objectives. Depending on the circumstances, they can do so in a number of different ways, including

- protection or restoration of riparian vegetation
- diversion of waste and/or pesticides away from streams, and



Initiatives such as the Habitat Restoration and Salmon Enhancement Program provide funding to rebuild salmon populations. One method is the artificial incubation of chum salmon eggs in hatcheries.



Rural River WFSP: Monitoring Options and Actions

In Stage II participants in the Rural River WFSP identified the indicators and benchmarks they will use to measure their progress in achieving their objectives and targets. In Stage III they identify how they will obtain these measurements and who will be responsible.

STAGE II OBJECTIVE: DECREASE JUVENILE MORTALITY

Indicator of effectiveness: Percentage of juvenile fish killed in new pumps

Monitoring option: Juvenile fish counts above and below new pumps (Note: new pumps are known to be effective, and monitoring is expected to confirm this).

When: First May and June of operation (during downstream migration of juvenile fish)

Who can do it?: watershed stewardship group

STAGE II OBJECTIVE: PRESERVE AND ENHANCE RIPARIAN HABITAT

Indicator(s) of effectiveness: area of riparian habitat restored; summer water temperature; rate of bank erosion

Monitoring option: field measurements and mapping

When?: every five years

Who can do it?: watershed stewardship group/local government, supported by provincial government, DFO

STAGE II OBJECTIVE: PRESERVE AND ENHANCE IN-STREAM HABITAT

Indicator(s) of effectiveness: area of pools, riffles

Monitoring option: fish habitat use and fish production studies

Monitoring option: mapping

When?: annually/every five years

Who can do it?: DFO/watershed stewardship group

STAGE II OBJECTIVE: IMPROVE WATER QUALITY

Indicator of effectiveness: level of contaminant(s) of concern (e.g. nitrates)

Another indicator would be the application of best management plans, reduction of sources

Monitoring option: water quality monitoring (e.g. nutrients, temperature)

When?: timing will depend on specific contaminant (e.g., spring runoff, low summer flows)

Who can do it?: watershed stewardship group supported by DFO and provincial agencies

- conservation covenants that maintain specific values on private land.

While private landowners will often support the overall goals of WFSP, they may have concerns about its potential costs, such as impacts on property values. These concerns need to be addressed in order to gain the full support of such landowners. One of the tasks of the planning team will be to look for support for landowner initiatives from government and other programs.

IDENTIFYING RESEARCH GOALS

WFSP is an iterative process that makes use of the best available information. In Stage II the technical committee identifies important gaps in the information available about the watershed, and about fish and habitat within the watershed. In Stage III the committee identifies ways to fill some of these gaps through inventory, mapping, and other related activities, and determines who can carry out these research activities or support them with money, expertise, and other resources. As in Stage II, non-specialists will likely be able to carry out a number of these research tasks with suitable guidance from specialists.

It is important that new information collected about the watershed be compatible with existing data standards. For this reason, in developing a research plan for the watershed, the technical committee – if it does not already include appropriate specialists – should consult such specialists. It is also important that new information collected through WFSP be conveyed to the Canada-BC Fisheries Data Warehouse, which administers the Fisheries Information Summary System (FISS).

IDENTIFYING WAYS TO MONITOR WFSP PROGRESS

In order to improve future generations of the fish sustainability plan, WFSP participants need to be able to monitor their progress in

- implementing WFSP activities, and
- improving the status of fish populations and habitat through these activities.

Typically WFSP participants will measure progress in



implementing WFSP activities against simple benchmarks of performance – that is, whether or not an agency or organization met its implementation commitments within the established time frame. They will measure progress in improving the status of fish populations and habitat through WFSP activities with the indicators of fish and habitat status and the benchmarks of effectiveness identified in Stage II.

In Stage III the technical committee identifies ways in which WFSP participants can obtain the necessary measurements, taking into account impacts throughout the watershed. It also identifies appropriate time frames for these monitoring activities. It may not be possible, for example, to assess how effective WFSP actions have been until several years have elapsed and trends in fish population and/or habitat condition are more evident.

The committee also identifies those parties within the watershed planning unit with the ability to coordinate or carry out monitoring and assessment activities. Many of the participating groups in WFSP – including community stewardship groups – are able to take on some responsibilities for monitoring, with guidance and support from specialists. The assessment and interpretation of data, however, will likely require the full participation of specialists.

New information gained through monitoring as well as through research must be compatible with existing data standards, and conveyed to the Canada-BC Fisheries Information Warehouse.

DEVELOPING A FISH SUSTAINABILITY ACTION PLAN

Once it has identified possible implementation and monitoring options, the planning team follows up on its initial Stage II contact with fish and non-fish interests within the watershed, including federal, provincial, or local government agencies, First Nations, and other organizations, stakeholders, and individuals.

In Stage III, the planning team contacts these parties again to confirm their support for WFSP, to determine their capacity and willingness to help, and to identify ways in which they are willing to contribute to implementing WFSP strategies, objectives, and targets on the ground, and to monitoring WFSP progress.

Rural River WFSP: Fish Sustainability Action Plan

In Stage III participants in the Rural River WFSP identify the specific actions they and others will take to achieve their objectives and targets.

STAGE II OBJECTIVE: DECREASE JUVENILE MORTALITY

Stage II strategy: replace drainage pumps

Stage III action(s): the Rural River Stewardship Group will seek funds to support the installation of fish-friendly pumps

STAGE II OBJECTIVE:

PRESERVE AND IMPROVE RIPARIAN HABITAT

Stage II strategy:

- Promote conservation of healthy riparian vegetation and forested upland
- Restore riparian areas damaged by past development (e.g., replanting, bank stabilization)

Stage III action(s):

- DFO and Rural River Stewardship Group will work with landowners to replant riparian vegetation, construct setback fences, establish cattle crossing sites;
- the local township will map Environmentally Sensitive Areas;
- DFO and the local township will coordinate a process to develop a long term local plan to protect the watershed

STAGE II OBJECTIVE: IMPROVE WATER QUALITY

Stage II strategy: Establish measures to reduce contamination from septic systems, agricultural runoff (e.g., manure, pesticides, and fertilizers)

Stage III action(s):

- the local township will pass a septic tank maintenance bylaw and initiate an education program on septic tanks
- the township will change zoning to limit subdivision (and therefore installation of new septic tanks)
- the Rural River Stewardship Group will work with landowners to encourage compliance and reduction in the use of pesticides and fertilizer
- Stewardship Group will work with landowners to promote stewardship, best management practices in agriculture, activities to reduce runoff and protect surface and groundwater quality
- DFO and the province will monitor and enforce compliance with existing laws regarding water quality



Once it has obtained general commitments, the planning team works closely with the appropriate parties to develop a detailed, multi-year watershed-level fish sustainability action plan that

- reiterates the strategic direction(s) and management objectives, targets and strategies for the watershed planning unit developed in Stage II
- identifies implementation, research, and monitoring commitments, the agencies, organizations, and individuals that will carry them out, the resources these parties have pledged to contribute, and time lines for action
- describes in detail commitments for the coming year, including implementation, research, and monitoring activities, and who will carry them out
- outlines in less detail actions that will be undertaken in the following years, and
- establishes how and when the results of watershed-level research and monitoring will be conveyed to the Watershed Planning Team, to the Canada-BC Fisheries Information Warehouse, and to the regional planning process.

The details of implementation and monitoring will vary from one WFSP to another, depending on plan objectives, targets, and strategies, available resources, and existing management and planning processes within the watershed planning unit.

PUBLIC OUTREACH

The actions needed to maintain and restore healthy fish populations and habitat may have impacts on non-fish interests. For instance, conditions imposed on forestry or ranching operations that protect fish habitat may result in an expense on business operations. And if building up a wild fish population means reducing the population of an introduced fish species, recreational fishers may lose out in the short term.

Successful implementation of WFSP depends on broad support from everyone in the community who is interested in sustaining fish and their habitat – and of non-fish interests as well. Stages I and II of the process focused entirely on the needs of fish, without consideration of human needs. In Stage III, WFSP

participants need to consider how fish needs can be met in a way that takes into account human activities in the watershed. For this to happen, the participants need to make sure that they understand the implications of implementation options on landowners, businesses, and residents and look at ways to address any concerns.

What is good for one interest isn't necessarily bad for another – but it may take collaborative negotiation and creative thinking to come up with ways of accommodating different interests that at first glance seem to conflict with one another. Appendix V provides suggestions for ways of reaching out to different interests in the community and building the kind of trust needed to increase the possibility of reaching consensus or finding win-win solutions.

Reconciling fish conservation and non-fish interests requires ongoing, intensive communication among members of the planning team, between the planning team and other parties in the watershed with an interest in fish and habitat conservation, and between the planning team and parties with other interests and priorities. It also requires communication between the planning team and the agencies and organizations responsible for the programs and processes that can help implement WFSP. Interaction between these parties during Stage III will likely take the form of one-to-one meetings and/or small working groups. Members of the planning team may choose to solicit directly the support of key organizations or individuals – for example landowners adjacent to important riparian habitat.



The effectiveness of WFSP depends on its ability to obtain the support of “non-fish” interests such as ranchers and forest companies.



The level of public outreach and participation during Stage III of WFSP depends on the degree of interest the public has in the process. At a minimum, the completed product of Stage III – the detailed watershed-level fish sustainability action plan – should be made available to the public through a Web site, community papers, or open houses. If the level of public interest is high, the planning team could inform and invite input through public meetings, or an interactive Web site. Public outreach during this stage may result in unexpected offers of help with planned or additional activities from private landowners, community groups, or other interests.

PRODUCTS OF STAGE III

- specific commitments from federal, provincial, and local governments, First Nations, stakeholders, and other parties with respect to implementation, research and monitoring
- a detailed multi-year watershed-level fish sustainability plan that identifies actions, actors, and time lines



Notes from the Field: Stage III

WFSP is designed to be revised and improved as new information becomes available. Feedback from participants is therefore important. The WFSP Steering Committee invites users of this Guide – as they work through the Stage III process – to fill out the attached questionnaire as an aid to memory. They invite guide users to send in their answers to the address on page 85, or to provide their comments through workshops or other future WFSP events, or fill in the questionnaire form on the WFSP Web site at www.bcfisheries.gov.bc.ca.

Please indicate which Stage III activities you participated in directly:

- *identification of possible implementation mechanisms*
- *development of implementation plan*
- *development of monitoring plan*
- *outreach to broader constituency*
- *other (please specify) _____*

Implementation Options

What mechanisms did you use to communicate with and elicit the views of the broader constituency regarding implementation? What worked well? What was a challenge? To what extent did the watershed overview developed in Stage II assist in identifying key players and mechanisms? How could the guide be improved to help in this aspect of WFSP?

Research and Monitoring Options

What mechanisms did you use to work with other fish conservation interests to identify research and monitoring options? What worked well? What was a challenge? How could the guide be improved to help in this aspect of WFSP?

Fish Sustainability Action Plan

What mechanisms did you use to work with government agencies, organizations and stakeholders to establish commitments? How did you build support for WFSP implementation? What worked well? What was a challenge? How could the guide be improved to help in this aspect of WFSP?

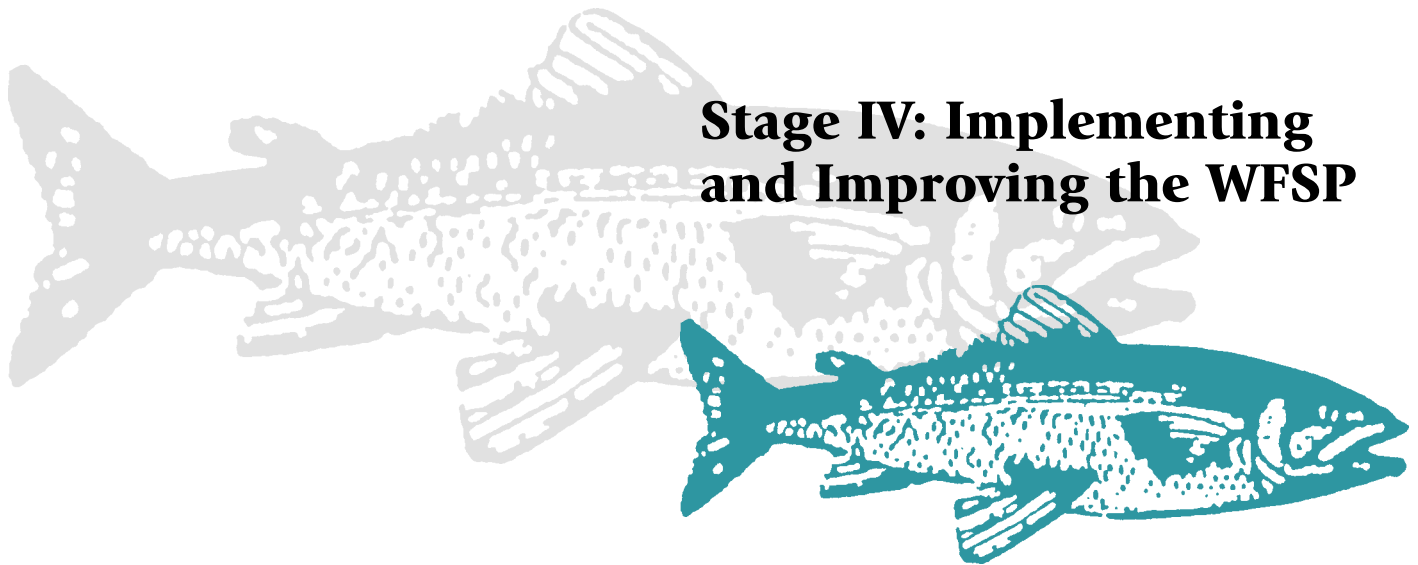
Participation and Outreach

What mechanisms did you use to communicate with and elicit commitments from the broader constituency with respect to WFSP implementation and monitoring? What worked well? What was a challenge? How could the guide be improved to help in this aspect of WFSP?

General Comments

Please comment on any other aspects of Stage III.

Stage IV: Implementing and Improving the WFSP



In Stage IV, WFSP participants ensure that the watershed-level fish sustainability action plan developed in Stage III is implemented. They ensure that organizations and individuals who made commitments in Stage III deliver on those commitments in Stage IV.

Stage IV does not mark the end of WFSP, however. WFSP is a cyclical process that revisits earlier stages on a regular basis. As new information about the watershed becomes available, and as new opportunities for protection and restoration within the watershed open up, WFSP participants review their earlier work and use it as the basis of a new, second-generation fish sustainability plan.

STAGE IV TASKS

The Watershed Planning Team and Technical Committee continue to be active in Stage IV.

The Watershed Planning Team (planning team)

- oversees delivery of the fish sustainability action plan
- meets annually or more often as needed to review performance and effectiveness, and to identify emerging issues, and

- reports annually or more often as needed to the public and to the Regional Planning Team regarding progress in delivering the fish sustainability plan.

The Watershed Technical Committee (technical committee)

- assesses research and monitoring data and
- reports new information to the planning team.



Monitoring the effectiveness of a WFSP implementation plan may include fish counts. Salmon fences are one tool for making this possible.

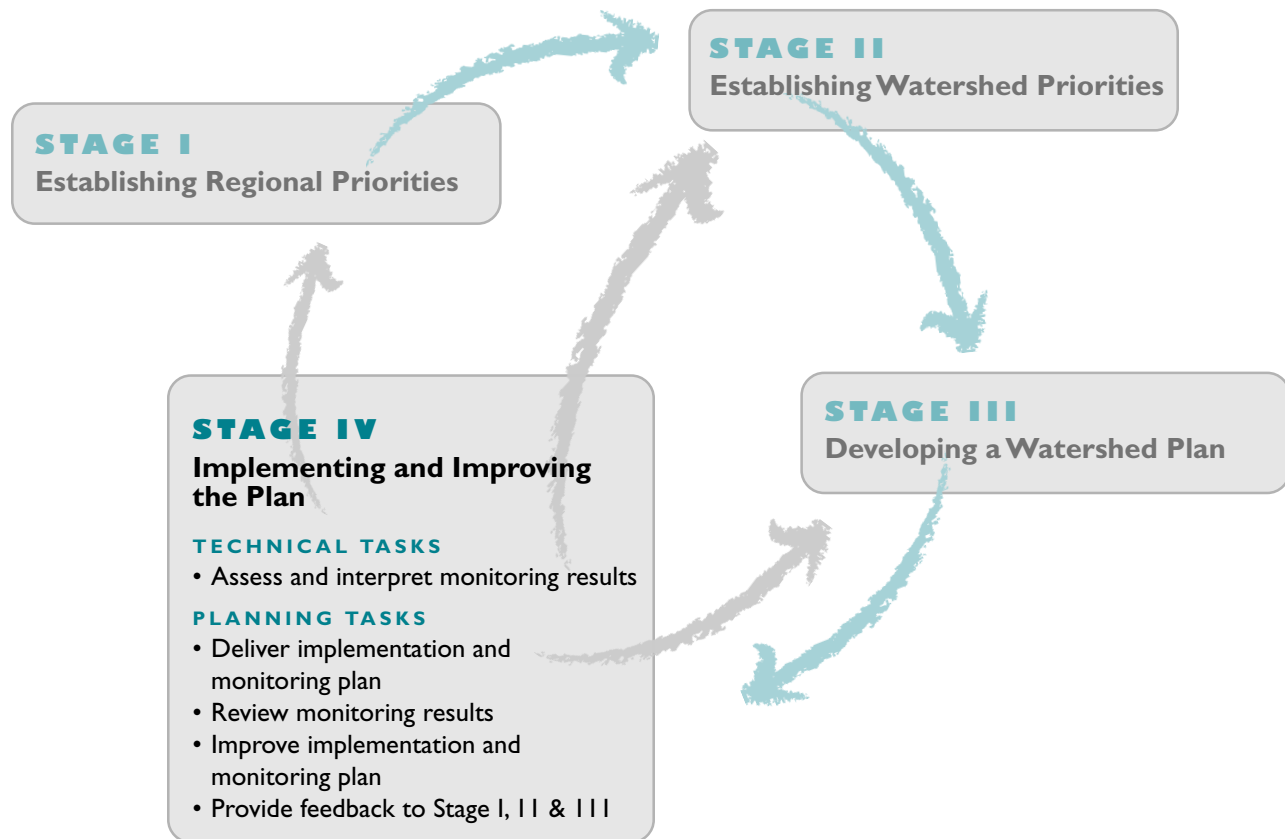


Figure 10. The WFSP Sequence: Stage IV

IMPLEMENTING THE FISH SUSTAINABILITY ACTION PLAN

The planning team works closely with the appropriate government agencies (federal, provincial, and local), First Nations and stakeholders to ensure that all parties deliver on the commitments established in the fish sustainability action plan.

The technical committee coordinates the assessment of monitoring data about the impacts of WFSP activities on fish and habitat. It reports results back to the planning team on a regular basis, as outlined in the plan.

Monitoring, assessment, and reporting are vital components of WFSP. Monitoring and assessment provide information about the effectiveness of WFSP interventions in improving fish populations and/or

habitat conditions. Reporting ensures that this information is available to a broad group of decision-makers who can use it to refine and improve the watershed-level plan and the regional strategy.

REVIEWING AND IMPROVING THE WFSP

Even when all elements of the first-generation fish sustainability action plan have been delivered, the work of the planning team and the technical committee is not finished. The action plan will continue to evolve. It is designed to be a living document that is revised and improved as new information gained through research and monitoring becomes available and as new opportunities for action open up within the watershed.



The work of watershed level planning is therefore ongoing.

Every one to two years, WFSP participants:

- review the fish sustainability action plan and revise it, if appropriate, and
- provide feedback to the Regional Planning Team about the progress of the WFSP and any new information about the watershed.

Every three to five years, on average, WFSP participants:

- review the watershed profile, incorporating new information about the watershed
- review new policy developments, changes in the social, political, and economic values within the watershed, and other emerging issues, and
- review Stage II directions, objectives, goals, and strategies.

PUBLIC OUTREACH

Implementation and monitoring during Stage IV require a close, ongoing working relationship between the planning team and other parties that have made commitments within the watershed planning unit. This relationship will likely involve one-and-one and/or small group discussions. Stage IV also requires ongoing reporting on WFSP performance and effectiveness to all participants, as well as to the public and others not directly involved in the WFSP. These reporting needs can be served through regular progress reports, newsletters, an up-to-date web site, local media reports, and community meetings.

PRODUCTS OF STAGE IV

- delivery of commitments regarding WFSP implementation and monitoring
- assessment of monitoring data and impacts on fish and their habitat, and
- feedback to Stages I, II, and III.



Notes from the Field: Stage IV

WFSP is designed to be revised and improved as new information becomes available. Feedback from participants is therefore important. The WFSP Steering Committee invites users of this Guide – as they work through the Stage IV process – to fill out the attached questionnaire as an aid to memory. They invite guide users to send in their answers to the address on page 85, or to provide their comments through workshops or other future WFSP events, or fill in the questionnaire form on the WFSP Web site at www.bcfisheries.gov.bc.ca.

Please indicate which Stage IV activities you participated in directly:

- *implementation of WFSP commitments*
- *research activities*
- *monitoring and assessment*
- *review and revision of WFSP*
- *other (please specify) _____*

Implementation

*How well were you able to meet your commitments?
What factors, if any, influenced your capacity to deliver on commitments? How could the guide be improved to help in this aspect of WFSP?*

Research, Monitoring and Assessment

*How well were you able to meet your commitments?
What factors, if any, influenced your capacity to deliver on commitments? How could the guide be improved to help in this aspect of WFSP?*

Review and Revision

What process did you use to integrate new information into the WFSP? What worked well, and what could be improved? How could the guide be improved to help in this aspect of WFSP?

Participation in WFSP

The guide describes the roles of the various participants in WFSP. How closely did the actual role of your organization correspond with that described in the guide? Please comment on the aspects of WFSP to which your organization was able to make a significant contribution, and describe that contribution.

General Comments

Please comment on any other aspects of Stage IV.



Glossary

Anadromous: fish that spend much of their life in the ocean but ascend rivers from the sea to spawn

Benchmarks of effectiveness: standards against which WFSP participants can measure the progress they have made towards maintaining and/or restoring fish and habitat health

Benchmarks of performance: standards against which WFSP participants can measure the progress they have made in carrying out on the ground the commitments identified in the detailed implementation and monitoring plan

Biodiversity: the variability among living organisms and the ecological complexes of which they are a part; includes diversity within species and between species, and diversity of ecosystems

Conservation: managing fish and habitat to ensure sustainability and biodiversity; conservation activities include preserving, maintaining, restoring, rehabilitating, recreating, enhancing fish and habitats

Conservation unit: a term used in the draft federal Wild Salmon Policy to describe a group of closely related local wild salmon populations that can be managed as a single unit

Enhancement: using hatcheries, spawning channels, lake fertilization, or habitat restoration to increase the survival of a fish species at some stage of its life

Escapement: the number of fish that remain in a population after harvesting

Fish habitat: includes “spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes” as defined in the federal Policy for the Management of Fish Habitat, and the *Fisheries Act*, sec. 34(1)

Fish population productive capacity: the potential of a given fish population to generate future returns within one generation

Fish sustainability: the maintenance and restoration of the natural productive capacity of habitats to produce genetically diverse, stable and self-sustaining fish populations, and the management of fish populations in a way that takes full advantage of this habitat

Fish sustainability action plan: the detailed, watershed-level implementation and monitoring plan started in Stage II of WFSP, completed in Stage III and implemented in Stage IV

Habitat productive capacity: the immediate capacity of a given habitat to support the production of fish, given full use of the habitat by fish

Indicator: a quantity or measure that provides information about a particular aspect of a population or habitat

Keystone species: a species that plays a role vital to the functioning of an ecosystem

Land and Resource Management Plan (LRMP): a sub-regional, integrated resource management plan that establishes direction for land use and specifies resource management objectives and strategies



- Lead project:* a project that is among the first group of WFSPs initiated in BC and will help government and other participants test and improve the WFSP process at the regional and/or the watershed level
- Population:* a discrete, although not necessarily geographically isolated, group of interbreeding individuals, sometimes referred to as a stock, whose size is generally measured in numbers of individuals
- Precautionary principle:* the recognition that in the face of uncertainty (for example about predicting fish population and survival levels) it is desirable to act with caution
- Watershed profile:* a detailed description of fish and habitat, and of their joint productive capacity, in a watershed planning unit
- Protection:* the process of maintaining existing fish and/or habitat values
- Region:* the unit of planning in Stage I of WFSP, usually incorporating a river basin or sub-basin, or a collection of similar watersheds within the same geographical area
- Regional Planning Team:* the body responsible for the planning aspects of Stage I of WFSP, usually consisting of representatives from federal and provincial agencies, First Nations, and key stakeholder groups
- Regional Technical Team:* the body responsible for the technical aspects of Stage I of WFSP, usually consisting of specialists from federal and/or provincial agencies, and consultants and other experts from outside of government
- Restoration:* the process of bringing back fish and/or habitat values that used to exist but are not currently present
- Stock:* a discrete, although not necessarily geographically isolated, group of interbreeding individuals, sometimes referred to as a population, whose size is generally measured in numbers of individuals
- Watershed Planning Team:* the body responsible for the planning aspects of Stages II to IV of WFSP, usually consisting of representatives from governments, First Nations and stakeholder groups
- Watershed planning unit:* the unit of planning in Stages II, III, and IV of WFSP, usually incorporating a complete drainage or drainages within an area of approximately 50,000 hectares or smaller
- Watershed Technical Committee:* the body responsible for the technical aspects of Stages II to IV of WFSP, typically consisting of government specialists, consultants, and non-government specialists
- Wild salmon:* defined in the draft federal Wild Salmon Policy as fish “produced by natural spawning in fish habitat from parents that were spawned and reared in fish habitat”



Appendix I

LEGISLATIVE AND POLICY FRAMEWORK FOR FISH CONSERVATION

Watershed-based Fish Sustainability Planning (WFSP) places the highest priority on the long-term needs of fish and their habitat and addresses fisheries management and habitat protection from an ecosystem perspective. Its goal is to promote effective conservation and management of fish and their habitat in British Columbia. It is designed to be consistent with federal and provincial legislation and policy concerning the conservation and management of fish and habitat.

The federal and provincial governments share the responsibility for managing fish in British Columbia and have set in place a number of legislative and policy tools designed to protect, conserve and restore native fish populations and their habitats, to maintain the viability of aquatic ecosystems and to ensure long-term social and economic benefits from the resource. Many of these initiatives recognize explicitly that the conservation of fish habitat is fundamental to the maintenance and restoration of healthy and diverse fish populations and the long-term future of fisheries.

Key conservation goals include

- a net gain in habitat productive capacity
- maintenance of the quality and diversity of habitats required by fish during all life stages
- conservation of the genetic diversity and integrity of local fish populations, and
- maintenance and restoration of the natural watershed processes that create habitat characteristics favourable to fish.

The Legislative Framework for Fish Conservation

Canada is a signatory to the international Convention on Biological Diversity, which came into force in 1993 and has been ratified by more than 175 countries, and is committed to the sustainable use of biological resources and to minimizing adverse impacts on biological diversity. The Convention requires governments to develop legislation and policies that will protect ecosystems and natural habitats and maintain viable species populations.

The federal *Fisheries Act* provides the legislative authority for the management and regulation of fisheries and the protection of fish. The federal government manages salmon and all salt water species of fish. The provincial government, through an administrative arrangement with the federal government, manages all freshwater fish and steelhead salmon.

The primary responsibility for protecting fish habitat resides in the federal *Fisheries Act*, which requires proposed alterations to habitat to be authorized by Fisheries and Oceans Canada. The provincial and municipal governments, however, regulate land and water use activities that affect aquatic ecosystems and fish populations in British Columbia. Conservation and effective management of fish and fish habitat therefore depend on cooperative efforts by all levels of government, as well as on community stewardship.

The 1997 *Canada Oceans Act* commits Canada to managing marine ecosystems to conserve biological



diversity and natural habitats. It promotes conservation based on an ecosystem approach that emphasizes the protection of the complex interactions between different species and moves away from single species management. It also provides the legislative framework to apply a precautionary approach in the management of coastal marine resources.

With respect to provincial legislation, projects affecting fish habitat are reviewed under the provincial *Water Act*, which governs the allocation of water, water licensing, and the regulation of works in and about a stream. The province can also protect fish habitat under the provincial *Wildlife Act*, the effluent and waste regulations of the *Waste Management Act*, and the *Pesticide Control Act*.

British Columbia has also developed statutes and regulations that provide a legal framework for the regulation of land development activities and can assist in protecting fish habitat. This legal framework includes the new provincial *Fish Protection Act*, the *Water Act*, the *Water Protection Act*, and the *Forest Practices Code of British Columbia Act*. Regulations developed under the *Fish Protection Act*, for example, protect fish populations and habitat in streams identified as “sensitive”, and revisions to the *Municipal Act* strengthen the powers of local governments in habitat protection.

The Policy Framework for Fish Conservation

The 1986 federal Policy for the Management of Fish Habitat provides Fisheries and Oceans Canada with the mandate to protect, restore, and improve fish habitat. The objective of the policy is to apply the principle of No Net Loss and achieve a Net Gain in the productive capacity of habitats. The No Net Loss principle is fundamental to conservation. It is designed to ensure that the productive capacity of fish habitat is not reduced through urban or industrial development, or resource-based industries such as mining and forestry. To achieve it, Fisheries and Oceans Canada reviews development proposals to ensure that impacts on fish habitat are avoided, mitigated, or compensated. Building on this base, Net Gain is to be achieved through the restoration, improvement or creation of new fish habitat.

Recent federal policies have placed more emphasis on the conservation of west coast salmon and fish habitat. The 1998 federal discussion paper, “A New Direction for Canada’s Pacific Salmon Fisheries,” outlines 12 broad policy directions that will guide management for conservation, sustainable use and improved decision-making. Directions that are most relevant to WFSP include

- the establishment of conservation as the primary objective in the management of Pacific salmon populations
- the continued emphasis on a precautionary approach to fisheries management that takes into account uncertainties in predicting fish population and survival levels
- a continued emphasis on a net gain in productive capacity in order to ensure that natural salmon habitat is maintained to support naturally reproducing populations of salmon
- an ecosystem approach that recognizes the complex interactions between different species and moves away from single species management, and
- an emphasis on the long-term sustainability of the resource, based on the best available science, and a commitment to avoid compromising long-term goals for short-term gain.

The proposed federal Wild Salmon Policy, introduced in March 2000 in the form of a discussion paper, outlines six principles for conserving the genetic diversity of wild Pacific salmon populations and for protecting their habitat, while recognizing the importance of sustainable use of the resource. The policy applies to all wild Pacific salmon, including those mixed with cultivated (or enhanced) populations that are able to reproduce in natural surroundings. Principles most relevant to WFSP and fish sustainability include

- an emphasis on maintaining the diversity of local wild salmon populations and their habitats
- the aggregation of closely related local wild salmon populations into “conservation units” for the purposes of management and conservation
- the determination of specific minimum and target levels of abundance for each conservation unit



- the management of each conservation unit to optimize long term sustainable benefits or productive capacity
- the strategic use of salmon cultivation techniques where their use can preserve populations of wild salmon at greatest risk of extinction, and
- an emphasis on the conservation of wild salmon populations over other production objectives involving cultivated salmon, when genetic diversity and long-term viability are at risk.

The government of British Columbia has embarked on an integrated approach, under the provincial Fisheries Strategy, to protect fish and fish habitat and to provide water for fish through a wide range of initiatives. Among the guiding principles of the strategy, those of most significance to WFSP and to fish sustainability planning are that

- saving fish is the first and most fundamental priority – habitat must be protected and restored in every salmon-bearing river and stream, and
- the biological diversity of wild populations and the integrity of fish habitat are critical to healthy fish populations.

Provisions of several provincial statutes are important to the implementation of the strategy. These include the provincial *Water Act*, the *Wildlife Act*, the *Waste Management Act*, the *Pesticide Control Act*, and other provincial statutes for the development of provincial policies and guidelines for managing fish habitat. For example, the provincial government is developing Streamside Protection Policy Directives under the *Fish Protection Act* to guide local governments in providing riparian protection.

In addition to legislation and policies, both the federal and provincial governments have established programs to improve the conservation and management of fish and fish habitat. These programs are described in greater detail in Appendix IV.

For More Information

The following websites provide detailed information about relevant federal and provincial policies and legislation:

Federal Policy for the Management of Fish Habitat

http://www.dfo-mpo.gc.ca/habitat/Policy/english/index_e.htm

A New Direction for Canada's Pacific Salmon Fisheries

www-comm.pac.dfo-mpo.gc.ca/english/newdirections/default.htm

<http://www-comm.pac.dfo-mpo.gc.ca/english/publications/alloc/st9808e.htm>

Federal Habitat Conservation and Protection Guidelines

http://www.dfo-mpo.gc.ca/habitat/c&pguide/english/index_e.htm

Federal Guidelines for Attaining No Net Loss

http://www.dfo-mpo.gc.ca/habitat/GuideLin/english/index_e.htm

Proposed Federal Wild Salmon Policy

<http://www-comm.pac.dfo-mpo.gc.ca/wsp-sep-consult/wsp/wsp.pdf>

Provincial Fish Protection Act

www.elp.gov.bc.ca/fsh/protection_act/index.html

Canada-BC Agreement on the Management of Pacific Salmon Fisheries Issues

<http://www-comm.pac.dfo-mpo.gc.ca/english/publications/mou/toc.htm>



Appendix II

A TOOLKIT FOR FISH SUSTAINABILITY PLANNING

Sound information and informed decision-making are the foundation for effective fish sustainability planning. Accurate information helps WFSP participants identify appropriate management options. It adds weight to completed fish sustainability plans and strengthens the capacity of WFSP participants to support and defend the recommendations they develop for fish and habitat conservation, and to promote the implementation of these recommendations through other land and resource management processes.

The WFSP process requires participants to collate existing information about fish populations and fish habitat within the planning area – that is, within the planning region in Stage I, and within the watershed planning unit in Stage II. In many cases it also requires them to collect and assess new information about these populations and habitats.

Future versions of this WFSP Guide are expected to identify a standard set of tools that participants – and in particular participants in Stage II – can use to carry out some of these technical tasks. One of the priorities in implementing the earliest WFSPs will be to identify and refine the contents of a WFSP information toolkit. Some of the tools in this kit will be suitable for use by non-specialists, including community stewardship groups. Others will be more suitable for specialists in government and the private sector.

The toolkit is expected to identify:

- a consistent form and content for regional and watershed profiles

- data sets useful for WFSP at the regional and/or the watershed scale
- minimal data requirements for regional and watershed planning
- analytical models for regional and watershed planning, and
- tools appropriate for specialist and non-specialist users.

In the longer term, full implementation of WFSP in British Columbia will require better information and better access to this information, specifically through

- identification and filling of data gaps
- improvement of existing databases
- development of better integrated, multi thematic, map-based information systems dealing with both population and habitat data
- ongoing development of regional information systems, and
- testing, development and exploration of new analytical models for the interpretation of habitat indicator and salmon population index data

Until such time as a more detailed toolkit has been developed for WFSP, the following resources may be helpful to WFSP participants in designing regional strategies and watershed-level fish sustainability action plans.



Information for WFSP

WFSP participants preparing a bioregional profile in Stage I or a watershed profile in Stage II can take advantage of a significant body of existing information about fish and fish habitat in BC. They can start by searching the Fisheries Projects Registry and the Fisheries Information Summary System for data on the region or watershed and for information about previous studies of the area.

The Fisheries Projects Registry contains information about many of the fish and fish habitat projects that have been undertaken in British Columbia, specifically those related to inventory, assessment, enhancement, restoration, research, and economic development. The registry is a joint venture between Fisheries and Oceans Canada and the BC Ministry of Fisheries. It lists over 2,000 projects and can provide information about what projects have been undertaken in a specific region or watershed, who carried out the projects, what methods are being followed, and where more information can be obtained. (www.canbcfpr.pac.dfo-mpo.gc.ca/fpr/Qf_Welcome_dev.asp)

The Fisheries Information Summary System (FISS) – now called the **Canada-British Columbia Fisheries Data Warehouse** – provides spatially represented summary level fish and fish habitat data for water bodies throughout British Columbia and the Yukon. The information is in database format and can be displayed on the 1:50,000 Watershed Atlas. FISS is a jointly funded project by BC Fisheries and Fisheries and Oceans Canada. FISS is made up of data and map components and includes a complete list of references by water body. Fish and fish habitat themes include fish distribution, enhancement and management activities and objectives, gradient and macro-reaches, land use, water use, water quality activities, obstructions, resource use, flow, fisheries potential and constraints, escapements, value and sensitivity, life history timing, and harvest and use. (www.bcfisheries.gov.bc.ca/fishinv/fiss.html)

Although Stage I focuses on river basins or sub-basins, and Stage II focuses on watersheds of approximately 50,000 hectares, most of the resources described in this section of the Appendix can provide information useful for both levels of planning.

Further information about fish populations and fish habitat is available from:

BC Watershed Atlas, available from BC Fisheries. The Watershed Atlas is a digital representation of the stream network of British Columbia as depicted on 1:50,000 National Topographic Series maps along with watershed boundaries of 3rd order and larger watersheds. It is organized into 246 watershed groups that were originally assembled based on natural watershed groupings and size. The Atlas illustrates the connectedness and adjacency between watershed features, and represents drainage patterns and flow directions. Most importantly, it can be integrated with information from other data sets (e.g. physical, biochemical, species, and habitat data). (www.bcfisheries.gov.bc.ca/fishinv/basemaps.html)

Canadian Stock Assessment Secretariat (CSAS) stock status reports. The CSAS produces Status Reports that document the status of different stocks of fish, invertebrates and marine mammals in Canada as well as ecosystem and environmental issues. They also provide information about assessment processes, methodologies, techniques, and vocabulary used in their publications. Information is available online at www.dfo-mpo.gc.ca/csas/csas/English/Publications

Catch and Escapement Records, available from DFO

Department of Fisheries and Oceans, Pacific Region. 1985. Pacific Region Salmon Resource Management Plan: discussion document. This two-volume document contains information on the status of salmon stocks, habitats, and fisheries. It discusses the management problems that exist in each area as well as options to rebuild the salmon resource by management and enhancement. Copies may be available through DFO or other libraries.



Fish Habitat Assessment Procedure (FHAP) overviews, documented in the Fisheries Projects Registry, described above.

Pacific Fisheries Resource Conservation Council (PFRCC) background reports on Salmon Stocks, Fraser River Sockeye, Coast-Wide Coho, State of Salmon Conservation in the Central Coast Area, available at www.fish.bc.ca

Reconnaissance (1:20,000) Fish and Fish Habitat Inventory. This Resources Inventory Committee-standard provincial inventory provides biophysical maps and data for whole watersheds, focusing on fish species characteristics, distributions and relative abundance as well as stream reach and whole lake biophysical data for interpretation of habitat sensitivity and capability for fish production. The inventory's phased approach includes existing data compilation, stream reach and lake identification and classification, field sampling, reporting, and analysis, using the Fish and Fish Habitat Assessment Tool (FHAT 20). Forest Renewal BC has funded more than 350 reconnaissance inventory projects, which are listed in the Fisheries Project Registry.

Salmon Escapement Database (SEDS), available from DFO's Pacific Biological Station

Slaney, T. L., K. D. Hyatt, T. G. Northcote and R. J. Fielden. 1996. Status of anadromous salmon and trout in British Columbia and Yukon. Fisheries. 21: 20-35. This reference provides an example of a broad regional review of the classification of salmon population status with respect to overall health or risk of extinction. A standardized methodology is used to identify the status of a representative set of all anadromous salmon populations in each of 18 production areas located in B. C. and the Yukon. In addition, classification results such as those presented here may serve as one of the key filters in classifying regional watersheds (Stage I of WFSP) or streams and populations within a watershed (Stage II) for planning attention.

Steelhead Harvest Analysis data, available from BC Fisheries.

Stocks at Risk Database: information on status of salmon populations in the Pacific and Yukon region, available from DFO and BC Fisheries

Watershed Assessments carried out under the BC Forest Practices Code, documented in the Fisheries Projects Registry or available from the BC Ministry of Forests

Further information about biophysical processes and other ecological features of regions and/or watersheds is available from:

Anonymous. 1998. Environmental Trends in British Columbia. Ministry of Environment Lands and Parks, Victoria, B. C. 43 p. (<http://www.env.gov.bc.ca/sppl/soerpt>). This reference provides information on the development and use of a wide range of environmental indicators to characterize the state of ecosystem or environmental well-being in British Columbia. The reference presents information on 12 indicators, each of which provides a picture of the status or trends related to one key issue. Taken together, the indicators provide an overview of the condition of the environment in British Columbia. This is similar to the key indicators approach used in classifying fish populations and watersheds in WFSP (Stage I planning) and in selecting WFSP priorities.

Conservation Data Center information about rare and endangered fish and other species in British Columbia. (www.elp.gov.bc.ca/rib/wis/cdc/).

Digital GIS data sets related to Land Use Plans in British Columbia. The BC Land Use Coordination Office (LUCO) maintains digital GIS data sets pertaining to each Strategic Land Use Plan, where available. The primary data product available for most plans is a Resource Management Zone (RMZ) coverage. Plans are completed for 15 areas in BC, and underway for another seven. (www.gis.luco.gov.bc.ca/slup/)



Environmental Monitoring Database, available from MELP.

Forest land use and cover data, available from MOF and forest companies.

Hydrologic data available from the BC Ministry of Environment, Lands and Parks, Water Management Branch. The branch provides information on a number of water management topics, including water quality, water surveys, and water use planning. (www.elp.gov.bc.ca/wat/)

Watersheds BC (Environmental Statistics) and map folios: information categories include roads, rivers, fish, riparian, forest land use, non-forest land use, ecology, terrain. Available from BC Ministry of Environment, Lands and Parks, Geographic Data BC.

Information about specific regions and watersheds is available from several **Fraser River Action Plan** reports, available from Fisheries and Oceans Canada. These include:

Fraser River Basin Strategic Water Quality Plans for the following Habitat Management Areas:

- Series 01 (Lower Fraser River, Fraser Delta, Pitt-Stave, Chilliwack, and Harrison-Lillooet)
- Series 02 (North Thompson, South Thompson, and Thompson-Nicola)
- Series 03 (Seton-Bridge, Chilcotin, and West Road)
- Series 04 (Quesnel, Middle Fraser, Nechako, Stuart-Takla, and Upper Fraser)

Hydrology Reports for the following Habitat Management Areas:

- Fraser Delta; Chilcotin; Chilliwack/Lower Fraser; Pitt/Stave; Middle Fraser; Harrison; Upper Fraser; West Road; Quesnel; Thompson River; Seton/Bridge; Nechako

Water Quality Reports for:

- Nicola River, Salmon River, and Matsqui Slough

Strategic Review of Fisheries Resources and Salmon Watershed Planning Profiles for the

following Habitat Management Areas:

- South Thompson-Shuswap; North Thompson; Thompson-Nicola; Bridge-Seton; Middle Fraser; Upper Fraser; Fort St. James; Prince George; Vanderhoof; Lower Fraser Valley Streams.

Salmon Reports on Fraser River sockeye, pink, chinook, chum, and coho

Wild, Threatened, Endangered and Lost Streams of the Lower Fraser Valley Reports:

- Volume 1: Lower Fraser Valley Streams Strategic Review
- Volume 2: Lower Fraser River Stream Inventory Atlas
- Volume 3: Wild, Endangered, Threatened and Lost Streams of the Lower Fraser Valley – Summary Report

Table 1 identifies some of the information that is likely to be required in regional and/or watershed-level WFSP, and shows how such information can be used, its source(s), and how accessible it is.

**Table 1. Examples of Data to Support WFSP: Themes, Types, Uses, Sources and Accessibility**

MAJOR DATA THEME	DATA TYPE	DATA USE	DATA SOURCE(S)	DATA ACCESSIBILITY
Salmon stock status by location or time interval	Adult catch	Direct measures of stock productivity and/or productive capacity of habitat by life history stage (e.g. fry, smolt, adult spawner), habitat unit (e.g. stream segment, entire stream, watershed, region) and time (e.g. single to multi-year interval)	DFO regional catch and escapement databases	DFO intranet or by request to DFO Salmon Data Systems (Internet access to summary catch & escapement data planned for future)
	Adult escapement	As above	As above	As above
	Fry or smolt production	As above	DFO Stock Assessment Program files, but no regional database	By request to DFO Stock Assessment Division or program heads
	Population traits (e.g., genetic uniqueness, age or size composition, average fecundity, spawn timing, migratory timing, disease profiles)	Used in various ways to identify stock conservation units, productivity, freshwater or marine survival values or trends, risk of losses to disease etc.	Program files of various DFO divisions. No regional database	By request to various DFO division or program heads
Habitat status by location or time interval	Stream segments that are accessible for use by anadromous salmon	Classification or quantification of historic to current habitat use	Fish Information Summary System (FISS) maintained jointly by Canada and BC	By internet connection to DFO/MELP data servers
	Status of forest cover as of 1992/93	Classification or quantification of current (i.e. 1992/93) forest cover status (e.g., % of watershed logged, % old growth) by watershed unit	Geographic Data BC Watershed Ranking Tool	Indicator data sets for watershed ranking available on CD-ROM or through internet connection to Geographic Data BC
	Status of stream corridor	Classification or quantification of current status of riparian or in-stream habitat of importance to fish production (e.g., % of stream length logged to bank, road-stream crossing density)	As above	As above
Hydrology	Discharge	Determine influence(s) of water quantity or quality variations on productive capacity of habitat–fish units in streams and watersheds	Inland Waters Division of Natural Resources Canada (NRCan)	Data sets documenting daily discharge for regional network of gauged streams and climate stations available in paper or electronic form for nominal fee on request to NRCan
Climate: freshwater and watershed	Air or water temperature	As above	As above	As above



Resources for Stage I: Developing a Regional Profile

During Stage I, the regional technical team will prepare a regional biophysical profile based on existing information, classify fish populations and watersheds within the region with respect to conservation status and other important features, and identify protection and restoration options. The following regional level planning resources may be useful to the technical team.

River Basin Characterization: The Washington State Department of Ecology is testing a new approach to modelling the relative changes to key river basin processes caused by development. Changes to these processes – including the movement of water, sediment, large woody debris, nutrients, toxics, and heat through the basin – are a major cause of ecosystem degradation. River basin characterization is a model for describing how and where these river basin processes have been altered by human activity over the last hundred years and – based on growth predictions – how and where they are likely to be altered in the next two decades. It is intended to supplement existing watershed assessment methods that focus on a smaller geographic scale. More information is available from the website at: (www.ecy.wa.gov/watershed/Characterization.htm).

Levy, D. A., L. U. Young and L. W. Dwernychuk. 1996. *Strait of Georgia Fisheries Sustainability Review*. Hatfield Consultants Ltd., West Vancouver, B. C., 441 pp. This reference serves as an example of an overview narrative that provides a highly detailed summary of the biophysical context for fish production within the Georgia Basin. The report examines the relationships among forest harvesting, log transportation, pulp and paper manufacturing, and fish sustainability. It also reflects the diversity of essential information types that may have to be considered at the regional scale for WFSP (Stage I planning) or for large watersheds where diverse resource extraction and land use practices have had cumulative effects over long time intervals.

Wood, A. 2000. *State of salmon conservation in the Central Coast area*. Background Paper No. 2000/4. 29p. Pacific Fisheries Resource Conservation Council, Vancouver, B. C. (www.fish.bc.ca). This reference illustrates types of information useful for an initial overview narrative summarizing the biophysical context for salmon production in a variety of watersheds on British Columbia's central coast. The narrative provides simple descriptive statistics to identify historic trends as well as the current status of salmon populations. Key habitat and fisheries conservation issues that require attention are identified. These include critical information gaps that must be filled to improve salmon population and habitat management in central coast watersheds (Stage I and Stage II planning).

Resources for Stage II: Developing a Watershed Profile

During Stage II, the watershed technical committee will prepare a watershed profile based on existing information, classify streams and sub-reaches within the watershed with respect to conservation status and other important features, and identify protection and restoration options.

In developing a profile of the watershed planning unit, the technical committee can draw upon existing manuals, some of them specifically designed for non-specialists, that outline watershed assessment and characterization techniques. These manuals outline techniques for evaluating how a watershed – including instream, riparian, and upland portions of the watershed – is working. They enable resource managers to

- identify the important features of the watershed,
- understand the natural processes that shape the watershed,
- evaluate fish habitat, water quality and other resources within the watershed,
- examine the human activities within the watershed, and
- examine the cumulative effects over time of natural processes and human activities on stream conditions and fish populations within the watershed.



The assessment process uses water quality and fish habitat conditions as indicators of ecosystem health. It is designed to provide information about the key factors limiting fish habitat and water quality within the watershed and to guide protection and restoration activities.

The following resources – aimed primarily at watershed level planning – may be the most helpful to WFSP participants in carrying out Stage II technical tasks.

Johnston, N. T. and P. A. Slaney. 1996. Fish Habitat Assessment Procedures (FHAP).

Watershed Restoration Program, Forest Renewal BC. (www.elp.gov.bc.ca/frco/bookshop/tech.htm)

This manual is a good introduction to the methodology of habitat assessment. While FHAP relates specifically to forest lands and to watersheds affected by past logging, the techniques described in this manual can be applied more broadly. The FHAP Overview and Stage I and II assessments are similar to work required in Stage II of WFSP. The manual also provides guidance on prioritizing restoration activities within a watershed. The techniques identified in this manual are most useful in non-urban areas and in watersheds where a Reconnaissance Inventory has already been undertaken through Forest Renewal BC .

Watershed Professionals Network. 1999. Oregon Watershed Assessment Manual. Produced for the Governor's Watershed Enhancement Board.

(www.watershednet.com/oweb.htm) This manual was designed for citizen-led watershed councils in Oregon to use in assessing current conditions for local watersheds, identifying protection and restoration opportunities, and developing local watershed restoration plans. It is specifically designed to be used by individuals with minimal technical background and experience in watershed assessment – although it recommends review of the final product by specialists. The manual includes information about

- how to organize a watershed assessment, assemble basic physical information about the watershed, and assemble a watershed assessment team

- the assessment of historical conditions
- the characterization of current conditions (hydrology and water use, riparian/wetlands, sediment sources, channel modification, water quality, fish habitat)
- how to identify problem areas and prioritize potential restoration opportunities, and
- how to develop a monitoring plan.

Other manuals that may provide information on how to develop a watershed profile include the following:

Economic and Engineering Services Inc. 1999.

Draft Guide to Watershed Planning and

Management. Prepared for the Association of

Washington Cities, the Washington State

Department of Ecology and other associations

and state agencies. ([www.ecy.wa.gov/biblio/](http://www.ecy.wa.gov/biblio/99106.html)

[99106.html](http://www.ecy.wa.gov/biblio/99106.html)) Developed as an aid to citizens, local governments, First Nations, and others interested in watershed planning, this manual provides information about the technical aspects of watershed planning as well as about how to effectively engage participants in making critical trade-offs at the heart of the watershed management process. It is designed to be updated and refined over time.

Hogan, D. L., S. A. Bird, and D. J. Wilford. 1996.

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Assessment (Interim Methods). BC Ministry of

Environment, Lands and Parks, Watershed

Restoration Program. ([www.elp.gov.bc.ca/frco/](http://www.elp.gov.bc.ca/frco/bookshop/tech.htm)

[bookshop/tech.htm](http://www.elp.gov.bc.ca/frco/bookshop/tech.htm)) The techniques described in this manual apply primarily to assessing the status of stream sub-reaches to help in the design of restoration plans.

Johannes, M., C. Robinson and K. Hyatt. 1999.

Kennedy Watershed Atlas series: Volume I:

Watershed Overview, A Working Atlas. Northwest

Ecosystem Institute. Lantzville, B. C. 35 p. ([http://](http://www.island.net/~nei)

www.island.net/~nei). This reference provides a

detailed summary of the biophysical context for fish production within one of the largest watersheds in Clayoquot Sound on the west coast



of Vancouver Island. Its focus is historic and current information on the state of salmon populations and their habitat within a large coastal watershed which has been subjected to roughly a century of fish and forest resource extraction and management. Upon completion, the multi-volume atlas is expected to serve as a common source for information on landscapes, forest, wildlife, salmon, and habitat resources in support of integrated natural resource management in the Kennedy Watershed. In addition, Volume I of the atlas provides examples of how standardized sets of environmental state indicators may be used to prioritize sub-basins within a watershed for habitat protection or restoration work.

Koning, C. W. (ed.). 1999. Riparian Assessment and Prescription Procedures. BC Ministry of Environment, Lands and Parks, Watershed Restoration Program. (www.elp.gov.bc.ca/frco/bookshop/tech.htm) The techniques described in this manual apply primarily to assessing the status of stream sub-reaches to help in the design of restoration plans.

Levy, David A. and Tim L. Slaney. 1993. A Review of Habitat Capacity for Salmon Spawning and Rearing. Prepared for B.C. Resources Inventory Committee and Department of Fisheries and Oceans, Habitat Management Division (www.for.gov.bc.ca/ric/o_docs/Aquatic/036/index.htm) This document describes federal policy with respect to salmon habitat, the habitat requirements of salmon at different life stages, and procedures for assessing habitat capacity. It focuses on the ability of existing habitat models to predict salmon abundance or biomass in aquatic areas.

Newbury, Robert. Video on habitat restoration.

Pacific Streamkeepers Federation. The Streamkeepers Handbook and Modules. Available from the Pacific Streamkeepers Federation, 720 Orwell Street, North Vancouver, B.C. V7J 2G3. The handbook is designed as an easy to use resource for getting actively involved in local stream assessment

and restoration. The package includes modules that may be helpful in developing a Stage II profile, including information on: surveying stream habitat, testing water purity, assessing stream health, identifying and counting spawning salmonids, and monitoring sport fishing effort and catch.

Resources Inventory Committee: The BC government's Resources Inventory Committee is responsible for establishing standards for natural and cultural resources inventories, including collection, storage, analysis, interpretation and reporting of inventory data. RIC publications including standards and background documents can be found at: <http://www.for.gov.bc.ca/ric/standards.htm>. RIC Aquatic Inventory Task Force publications may be helpful in developing a stage II profile can be found at: <http://www.for.gov.bc.ca/ric/Pubs/Aquatic/index.htm> (standards) and http://www.for.gov.bc.ca/ric/o_docs/Aquatic/Index.htm (background documents).

Spence, Brian C., Gregg A. Lomnicki, Robert M. Hughes and Richard P. Nowitzki. 1996. An Ecosystem Approach to Salmon Conservation. TR-4501-96-6057. Man Tech Environmental Research Services Corp., Corvallis, OR (www.nwr.noaa.gov/1habcon/habweb/ManTech/front.htm#TOC) This guide was prepared for the U.S. National Marine Fisheries Service, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service. Part I is intended to provide a comprehensive technical foundation for understanding salmonid conservation principles in an ecosystem context. Part II provides a general conceptual framework for achieving salmonid conservation on non-federal lands in the Pacific Northwest, as well as specific guidelines for the development of salmonid conservation plans.

USDA-USFS. 1995. Ecosystem Analysis at the Watershed Scale: The Federal Guide for Watershed Analysis. Version 2.1. Regional Ecosystem Office. (<http://www.or.blm.gov/ForestPlan/Watershed/watrtitl.htm>) or contact 503-



808-2176. This guide provides a systematic way to understand and organize ecosystem information to guide management decision-making on federal public lands in the U.S. Pacific Northwest. It describes the procedures used to characterize the human, aquatic, riparian, and terrestrial features, conditions, processes, and interactions within a watershed. It includes information about hydrology, vegetation, stream channel, erosion, water quality, species, and habitats. It outlines a consistent, interagency process to be applied by specialists. The manual includes a toolbox of optional analytical methods and techniques for each subject area, including a general and a detailed assessment.

Resources for Stage III: Protecting and Restoring Fish Populations and Fish Habitat (Developing a Watershed Plan)

WFSP participants can find more information about ways to protect and restore fish populations and fish habitat in the following sources:

Fraser River Action Plan Stream Stewardship Guides:

- Urban Stream Stewardship: From Bylaws to Partnerships – An Assortment of Mechanisms for the Protection of Aquatic and Riparian Resources in the Lower Mainland. 1996.
- Urban Stream Stewardship: From Bylaws to Partnerships. Summary Document. 1996.

Johnston, N. T. and G. D. Moore. 1995. Guidelines for Planning Watershed Restoration Projects. BC Ministry of Environment, Lands and Parks, Watershed Restoration program. (www.elp.gov.bc.ca/frco/bookshop/tech.htm)

Pacific Streamkeepers Federation. The Streamkeepers Handbook and Modules. Available from the Pacific Streamkeepers Federation, 720 Orwell Street, North Vancouver, B.C. V7J 2G3. The handbook is designed as an easy-to-use resource for getting actively involved in local stream assessment and restoration. The package includes modules that

may be helpful in developing a Stage III implementation plan, including information on: cleaning up a stream; selecting, propagating, and planing native species; designing and building fences to protect streamside vegetation; and assessing, designing, and building stream channel improvements.

Slaney, P.A. and D. Zaldokas (eds). 1997. Fish Habitat Rehabilitation Procedures. Watershed Restoration Technical Circular No. 9. Produced for the Watershed Restoration Program, BC Ministry of Environment, Lands and Parks. (<http://www.elp.gov.bc.ca/frco/bookshop/tech.htm>)

Washington State Department of Fish and Wildlife. No Date. Guidelines for Salmonid Habitat Protection and Restoration. (www.wa.gov/wdfw/hab/salguide/salguide.htm) Washington State is developing guidelines for the protection and restoration of salmonid habitat. The guidelines are designed to facilitate the consistent application of good science and practice for resource and habitat management, project design, construction, and operation in, near, or affecting aquatic systems. The guidelines will provide basic “how to” information for volunteers, planners, and designers of habitat restoration projects as well as for designers, builders, and operators of facilities and structures that affect fresh and marine water habitats. Draft guidelines are available for Integrated Streambank Protection, Fishways, Fish Protection Screens, and Fish Passage at Culverts.



Appendix III

NOTES ON PRODUCTIVE CAPACITY

WFSP participants need a certain amount of information about a region or watershed planning unit – and specifically about fish populations and fish habitat within the region or watershed – in order to make long-term management decisions. They need to be able to identify current and potential future problems, to know where these problems are most serious, how serious they are, and what is likely to be causing them. Once they know more about the problems, they are in a better position to address them.

Appendix III describes productive capacity and its importance in WFSP, problems resource managers face in trying to measure productive capacity, and ways in which researchers can assess productive capacity where adequate data and analytical models are available.

Productive Capacity

The 1986 federal Policy for the Management of Fish Habitat defines productive capacity for practical purposes as “the maximum natural capability of habitats to produce healthy fish, safe for human consumption, or to support or produce aquatic organisms upon which fish depend”. Productive capacity also describes the potential of existing fish populations to generate future returns, and the potential resulting from the combination of stock and habitat productivity.

The conservation goals of WFSP – to conserve wild fish populations and the natural habitats that support them – can also be expressed in terms of productive capacity. WFSP focuses on maintaining the natural

productive capacity of habitats, on managing fish populations in a manner that makes full use of it, and on directing resources effectively to activities that protect, restore, or enhance it. This is consistent with federal and provincial government policy regarding fish conservation.

WFSP participants need to know whether productive capacity is increasing, decreasing, or remaining steady, and what factors are causing any change in productive capacity. Some of these factors (such as an increase in the number of predators in the northern Pacific as the result of warmer ocean conditions associated with global climate change) can affect an entire hemisphere. Other factors (such as an increase in the volume of spring runoff in a stream as a result of upstream logging) can affect an area as small as a specific spawning site. Some factors (such as development) influence the quality and quantity of habitat; others (such as fishing) influence the size of fish populations. Some factors can be addressed within individual watershed planning units, others are best addressed at the regional level, and others may require international efforts.

A key task of the technical team in Stages I and II of WFSP is to develop a profile of the planning area that includes information about:

- fish populations
- fish habitats
- past, present, and future productive capacity
- factors that have influenced or may influence



productive capacity, and

- the potential for maintaining or restoring productive capacity

DEFINING PRODUCTIVE CAPACITY

The term “habitat productive capacity” refers to the immediate capacity of a given habitat to support the production of fish, given full use of the habitat by fish. For example, the habitat in a given watershed may support 10,000 spawners (adults and offspring), which will produce a total return of 30,000 spawners in the next generation. The habitat productive capacity would be assessed as 30,000 fish. Habitat has a productive capacity whether or not fish are present.

The term “productive capacity of a stock” refers to the immediate (i.e., short-term, within a generation) ability of a given population to generate future returns. The productive capacity of the population in the situation described above would be assessed as 30,000 fish. However, under a variety of circumstances the short-term productive capacity of a stock may be considerably lower than the productive capacity of the habitat.

The term “fish-habitat productive capacity” refers to the immediate productive potential of the fish-habitat combination. The following alternative scenarios, based on the example above, illustrate different ways in which habitat and stock productivity can interact.

- if the 30,000 fish return to the watershed, and harvesting removes 20,000 fish, 10,000 fish still remain to “reseed” the habitat to its full productive capacity
- if an error in harvesting removes 29,500 fish from the watershed, only 500 fish remain to reseed the habitat. These 500 spawners will produce a return during the next generation that is far fewer than 30,000 fish (a typical return might be 2,000 adults). Thus the productive capacity of the population has fallen to only 2,000 adult fish. This is far below the productive capacity of the habitat, which remains at 30,000 fish. The overall fish-habitat productive capacity would be 2,000, and would be limited by the number of spawning fish.
- if 10,000 fish return to the watershed, but

development has reduced spawning habitat, fewer fry will survive. The overall fish-habitat productive capacity would be considerably lower than 30,000 fish, but in this case would be limited by the amount and/or condition of habitat.

Productive capacity is quantifiable and varies depending on the temporal or spatial scale under consideration. Ideally, for the purposes of WFSP, participants need to be able to assess it for some or all of the following spatial scales:

- provincial
- regional
- sub-regional
- watershed planning unit
- local stream, and
- habitat units associated with different life stages (e.g., spawning grounds, rearing grounds, lakes and streams, winter refuges).

Ideally, they need to be able, at a minimum, to assess it for the following points in time:

- the past (historically pristine or near-pristine conditions)
- the present (operationally the most recent 10-20 year interval), and
- the future (operationally 10-20 years from the present)

ASSESSING PRODUCTIVE CAPACITY

In most cases it will be difficult for WFSP participants to assess productive capacity accurately and systematically because of limitations in stock and habitat data and in the analytical models needed to interpret these data. For most planning areas, and for most fish populations, WFSP participants will likely have to extrapolate from what is known about other, similar populations and watersheds. They can, however, obtain usable approximations of productive capacity:

- where data on fish production and escapement is available, they can look at historic averages (e.g. best 10 to 20 years of production and escapement numbers)



- where habitat data is available they can use information about habitat (e.g., area of gravel suitable for spawning), and
- where there are known biostandards (e.g., number of fish required to seed one kilometre of stream) they can match these with the characteristics of the stream (e.g., length of stream).

These approximations will usually be adequate for the purposes of WFSP, and particularly for the development of first-generation fish sustainability plans. One of the advantages of WFSP is that it is an iterative process that revisits the same regions and watershed planning units on a regular basis. Each generation of a fish sustainability plan takes advantage of the best information available at the time, and as new information becomes available, it is incorporated into the planning process. Even when information is currently limited, WFSP therefore can and should proceed.

In a few planning areas, and for a few fish populations, more detailed information about productive capacity may be required. For example, a number of watersheds in British Columbia have been identified as index watersheds, which are used as a baseline or reference against which other watersheds can be compared. In these watersheds, it will be important to work out more accurate productive capacity figures. This will likely require improvements in data sets and analytical tools.

With respect to data, while some existing provincial data sets are comprehensive, up-to-date, readily available in electronic form, and easy to use, others contain gaps, are held in different agencies and regions, exist only on paper, or are based on anecdotal evidence. They may have little accompanying documentation or metadata to permit appraisal of their relative usefulness (e.g., FISS observations, much of SEDS) without extensive auditing before use. Data sets for species other than salmon are limited.

With respect to analytical models, more testing is required to determine the accuracy of existing models in producing estimates of productive capacity. More work is needed to determine fundamental relationships between variations in the productive capacity of stocks and the productive capacity of habitat in a given

watershed and to develop appropriate models based on these relationships.

To date, productive capacity estimates have not been systematically derived for any species of salmon in British Columbia, with the possible exception of steelhead. Considerable work has been conducted on Fraser River sockeye populations, and existing data sets and models are capable of generating preliminary estimates of productive capacity for sockeye on a regional basis, based on productivity of lakes and spawning grounds. They may also be capable of generating preliminary productive capacity estimates for chinook, based on productivity of spawning areas, and for coho, based on productivity of rearing or over-wintering areas.

Where data and models are adequate for the task, WFSP participants can assess productive capacity by looking at stock data, habitat data, or both types of data at once. They can interpret this data in various ways, using a range of analytical models. All three approaches can provide information about productive capacity at the appropriate temporal (i.e., past, present, and future) and spatial intervals (i.e., regions, watersheds, streams, and major habitats associated with specific life history stages of fish).

1. The Stock Measures Approach

Non-habitat factors such as ocean conditions, predation, and harvesting can influence the productive capacity of fish populations and overall fish production. WFSP participants can use a stock measures approach to obtain information about fish-habitat productive capacity. This approach is based on measurements over time of specific fish population variables (e.g., total number of fish, escapement, catch, fry abundance, smolt abundance). Such population data can be used to provide an approximation of fish-habitat productive capacity. The analyses that are used to interpret such data range from simple (e.g. arithmetic mean, range of abundance) to moderately complex calculations (e.g., population-recruit analysis with variance estimates, residual analysis).

For example, the team may look at the historical record to determine the past and present productive capacity of a stock, and compare this with information about harvesting to determine whether or not



over-exploitation has occurred. They may obtain a rough approximation of productive capacity by looking at the best sustained historic average versus the recent (i.e., 10- to 20-year) average number of fish.

The stock measures approach is the one most often used in BC to approximate productive capacity and the one most likely to be familiar to WFSP participants. It is direct and relatively simple to use. It also takes advantage of the fact that existing regional data – in particular historical data – tend to emphasize population rather than habitat information. The technical team is therefore most likely to use the stock measures approach when data about the past and present status of a given population are well developed and likely to provide good information about the fish-habitat productive capacity of a given watershed.

2. The Habitat Measures Approach

In general, habitat quality and productive capacity have a strong influence on fish production. WFSP participants can therefore also use a habitat measures approach to obtain information about productive capacity. This approach is based on measurements of habitat variables (e.g., area of spawning habitat; area or volume of lake or stream rearing habitat, volume of over-wintering pools, quality of riparian vegetation; steepness of slopes and volume of soil that is easily erodible, water quality and quantity). These measurements are then used as inputs to analytical processes of variable complexity to produce habitat-based estimates of productive capacity.

For example, the team may identify the maximum number of fry, smolt, juvenile fish and adults a stream can support by looking at the amount of spawning, rearing, and over-wintering habitat it contains, and the quality of this habitat. They may look at the potential impact on habitat of any development proposed within a watershed to assess its potential impact on productive capacity. They may obtain a rough approximation of productive capacity by looking at biostandards such as the volume of gravel in a river, the length of a river, the volume of flow, or the percentage of the river that is in pristine condition.

The technical team is most likely to use the habitat measures approach when stock measures cannot provide

an adequate estimate of productive capacity, in particular when there is little historical data about a population. They may also use it along with a stock measures approach to provide an alternative assessment of stock-habitat productive capacity. The effectiveness of the habitat measures approach depends on the availability of a substantial amount of data, in particular historical data, and the availability of suitable analytical models.

3. The Stock-and-Habitat Measures Approach

In all watersheds, the combined influence of habitat and stock productive capacity determines fish production. WFSP participants can use a stock-and-habitat measures approach to obtain information about fish-habitat productive capacity. This approach is based on combinations of stock and habitat measurements that are used as inputs to a range of simple (e.g., arithmetic, bivariate) to complex (e.g., multivariate) analytical models. Because both types of measurements are variable, this is generally the most complex of the three approaches.

The technical team is most likely to use the stock-and-habitat measures approach when the Stage I narrative has identified a connection between both habitat and non-habitat factors and a change in fish production.



Appendix IV

MECHANISMS FOR IMPLEMENTING WFSP

A number of federal and provincial programs and other initiatives may be applied directly or indirectly to WFSP. Some provide resources to specific stakeholders who may choose to use them in projects that meet WFSP objectives. Others are ongoing sources of funding that WFSP stakeholders can apply to directly for specific projects. In addition, WFSP may promote the interests of fish and their habitat through ongoing land, water, and resource planning processes.

Federal initiatives that may be applied to WFSP include:

- **the Resource Rebuilding component of the Canadian Fisheries Adjustment and Revitalization Program, including:**
 - the Habitat Restoration and Salmon Enhancement Program
<http://www-heb.pac.dfo-mpo.gc.ca/english/programs/hrsep/default.htm>
 - the Strategic Stock Enhancement Program
 - the Habitat Conservation and Stewardship Program
<http://www-heb.pac.dfo-mpo.gc.ca/english/programs/hcsp/default.htm>
 - the Salmon Endowment Fund.

The Habitat Conservation and Stewardship Program is creating Stewardship Coordinators, Habitat Auxiliaries, and Habitat Stewards to work with communities on watershed planning and habitat protection activities. The federally funded

Habitat Restoration and Salmon Enhancement Program (HRSEP) focuses on increasing the quantity and quality of salmon habitat and conserving salmon populations in British Columbia and the Yukon. Its main objective is to revitalize salmonid populations through habitat restoration, population rebuilding and resource and watershed stewardship. Each year, HRSEP contractually funds over one hundred worthwhile habitat restoration works, stewardship initiatives, and stock-rebuilding activities operated and administered by a variety of community groups and agencies.

- **restoration and stewardship initiatives through the Salmonid Enhancement Program**

The federal government has provided support for salmon cultivation activities since 1977 through the Salmonid Enhancement Program (SEP). Salmon cultivation has been used as a tool for stock-rebuilding and the provision of associated social and economic benefits. New and developing policies, however, are shifting the focus of salmon cultivation away from production and towards rebuilding wild populations through appropriately scaled short-term supplementation, habitat restoration, and community stewardship. Government is developing a new policy to define the objectives of this new approach.

<http://www-comm.pac.dfo-mpo.gc.ca/wsp-sep-consult/default.htm>



- **restoration and stewardship initiatives through the Aboriginal Fisheries Strategy**

The Aboriginal Fisheries Strategy (AFS), launched in 1992, applies in areas where Fisheries and Oceans Canada manages the fishery and where there is no fishery management regime established through a land claim settlement. Through the strategy, DFO has entered into arrangements with some First Nations to establish a mutually acceptable, time-limited framework for managing their fishery. Fisheries agreements negotiated under the AFS contain cooperative management projects such as stock assessment, fish enhancement, and habitat management.

http://www.dfo-mpo.gc.ca/communic/FISH_MAN/AFS_e.htm

- **Integrated Fisheries Management Plans (IFMPs)**

IFMPs are designed to achieve consistency in processes and approaches for all Canadian fisheries, to integrate complex fisheries factors, and to provide a planning framework for conservation and sustainable use of fisheries resources. The plans encompass: an enhanced focus on conservation; expanded information about relevant programs; identification of all major issues; quantifiable management objectives with measurable criteria; and an annual review of the previous year's activities. Co-management is at the heart of IFMPs.

<http://www.pac.dfo-mpo.gc.ca/ops/fm/IFMP/default.htm>

- **Recovery Strategies/Conservation Agreements**

The proposed federal Species at Risk Act (SARA) calls for the development of recovery strategies for species – including aquatic species – listed as endangered or threatened. Recovery strategies will provide baseline scientific information and identify any threats to the survival of the species, including loss of habitat. They will describe broad measures, including time lines, to address those threats and identify as much critical habitat as possible. Action plans based on these strategies will identify specific implementation measures and time lines and evaluate the socioeconomic costs and benefits of action. Implementation will often involve

partnerships between the federal and provincial governments, First Nations, landowners, and key stakeholders. Stewardship activities on private, provincial crown, municipal, and First Nations lands will be promoted through conservation agreements implemented and funded through SARA.

http://www.cws-scf.ec.gc.ca/sara/media/policy2_e.htm

- **initiatives under the New Directions policy**

The “new direction” in fisheries management is one that promotes conservation-based fisheries, community-based stewardship initiatives, further restoration and enhancement work for fish habitat, and more consultation processes to ensure that all parties are heard in determining the future of Pacific fisheries. To date, initiatives that reflect this new direction include the promotion of selective fishing and new ways to allocate the annual salmon catch.

<http://www-comm.pac.dfo-mpo.gc.ca/english/newdirections/default.htm>

<http://www-comm.pac.dfo-mpo.gc.ca/english/publications/alloc/st9808e.htm>

Provincial initiatives that may be applied to WFSP include:

- **Fisheries Renewal BC initiatives, including the Salmonid Renewal Program, the Planning and Partnerships Program, and Original Renewal Ideas**

The Salmonid Renewal Program provides funds to specific program delivery partner groups, which in turn fund local groups in conservation, restoration, and enhancement activities on public, private, and First Nations lands. Projects funded must demonstrate technical feasibility, cost effectiveness, and measurable benefits to fish. In 1999, the program provided \$10 million to habitat restoration, fish production, and community stewardship projects.

<http://www.fishrenewal.gov.bc.ca/programs.htm>

<http://www.fishrenewal.gov.bc.ca/fsrbcprograms/salpinfo.htm>



- **Forest Renewal BC initiatives, including the Watershed Restoration Program, Planning Unit Tables, and research and inventory programs**

Through the Watershed Restoration Program, Forest Renewal BC provides funding to forest licensees, government agencies, First Nations, and community groups for restoration activities in priority watersheds on public land. The program encourages partnerships between proponents to address the needs of whole watersheds. Its goal is to restore the productive capacity of forest, fisheries, and aquatic resources that have been adversely affected by past forest harvesting. Activities funded range from hill slope stabilization and road restoration to riparian revegetation and fish habitat improvement. The Fish and Fish Habitat Inventory Program focuses on identification of fish and fish habitat values for application to resource planning and management. Over the years it has invested approximately \$80 million to these activities.

http://www.fishrenewal.gov.bc.ca/otherprograms/frbc_wrp.htm

<http://www.forestrenewal.bc.ca/>

- **Water Use Plans (WUPs)**

The BC government developed water use planning as a means to balance increasing and competing demands on provincial water resources, including the needs of fish. WUPs relate to projects with the potential to divert significant amounts of water from provincial waterways. Although they are required of all facilities subject to the provincial *Water Act*, the first phase of the program focuses on BC Hydro facilities. An individual WUP is developed for each separate facility through a consultative planning process that considers economic, social, and environmental values. In some cases, interim orders provide immediate benefits to fish before the WUP is completed.

<http://www.elp.gov.bc.ca/wat/wup/wup.html>

- **Urban Salmon Habitat Program, a component of the Salmon Habitat Conservation Plan**

The Urban Salmon Habitat Program provides funding to First Nations, community stewardship groups, educational institutions, and other non-profit organizations within the BC portion of the Georgia Basin. Its goal is the protection and restoration of salmonid habitats in urban areas in this region. The program encourages community involvement in the protection, enhancement, and restoration of urban watersheds, and participation of stewardship groups in the planning stage of urban, agricultural, and industrial development. Eligible activities include assessment and mapping of salmonid habitats, public awareness, education, outreach to landowners, restoration of urban salmonid streams, monitoring, and evaluation. A related program provides funding to municipal governments to help improve their ability to protect, conserve, and enhance salmonid habitats on lands under their jurisdiction.

http://www.fishrenewal.gov.bc.ca/otherprograms/usshp_cg.htm

http://www.fishrenewal.gov.bc.ca/otherprograms/usshp_lg.htm

- **recovery plans under the Fish Protection Act (1997)**

This legislation allows the provincial government to designate Sensitive Streams. These are fish-bearing streams that require special management attention because inadequate water flows and other habitat concerns pose a risk to fish populations. On these streams, fish sustainability will receive the highest priority. Those designated streams that are unable to recover naturally may be subject to recovery plans that include stakeholder involvement in finding innovative solutions, and may include development and implementation assistance from Forest Renewal or Fisheries Renewal BC.

http://www.env.gov.bc.ca/fsh/protection_act/sstreamb/



A valuable resource is the Fisheries Renewal BC website, which identifies all BC government programs that fund fisheries related work.

<http://www.fishrenewal.gov.bc.ca/otherprograms/otherprograms.htm>

Other initiatives that may be applied to WFSP include:

- **Fish Harvest Management Plans sponsored by the federal and provincial governments and by First Nations**
- **fish culture facilities set up by the federal and provincial governments and designed to rebuild fish populations and sustain fisheries. Techniques used include hatcheries and spawning channels.**

Organizations that can provide resources and assistance to WFSP include:

- **Habitat Conservation Trust Fund**

The fund supports habitat restoration, species conservation, land stewardship, environmental education, and land acquisition activities. It administers four on-going projects. One of these projects, the Public Conservation Assistance Fund, funds projects that contribute to the conservation of wildlife or fisheries, including: the improvement of spawning grounds; construction of bird houses; planting shrubs for cover; tagging animals; fish egg incubation; and waterfowl nesting floats and boxes. The fund was created in 1974 and is supported by surcharges on hunting, fishing, trapping, and guiding licences in BC, compensation funds from industry, money from Crown Lands, donations, and cost-sharing funds.

<http://www.fishrenewal.gov.bc.ca/otherprograms/hctf.htm>

<http://www.elp.gov.bc.ca/hctf/>

- **Pacific Salmon Foundation**

The Pacific Salmon Foundation is a federally incorporated, non-profit, charitable organization which aims to conserve, restore, and enhance Pacific salmon and their habitat through volunteer, community-based projects.

http://www.dfo-mpo.gc.ca/communic/fish_man/salmon/eng/index_e.htm

- **Pacific Streamkeepers Federation**

<http://www-heb.pac.dfo-mpo.gc.ca/pskf/home.htm>

Land, water, and resource use planning processes that may affect fish and their habitat include:

- **Land and Resource Management Planning (LRMP)**

LRMP is the sub-regional integrated resource planning process for British Columbia. It considers all resource values and requires public participation, interagency co-ordination, and consensus-based land and resource management decisions. Land and Resource Management Plans establish direction for land use and specify resource management objectives and strategies. They provide a comprehensive, broadly accepted and approved management framework to guide resource development and more detailed planning. The Fish Protection Act and other legal, policy, and program initiatives require that provincial LRMP processes comply with new riparian protection and enhancement measures.

<http://www.luco.gov.bc.ca/slupinbc/wrldiff.htm>

- **Landscape Unit Plans (LUPs)**

Landscape units are areas of land, usually 50,000 to 100,000 hectares in size, that are the basis for addressing the conservation of forest biodiversity. There are approximately 1,300 such units across BC. Planning for these landscape units occurs under the provincial Forest Practices Code and is a joint initiative of the Ministries of Forests and Environment, Lands and Parks. The short-term



priorities are to address targets for old-growth conservation and wildlife trees, as both agencies agree that these are the most critical elements for retaining forest biodiversity.

<http://www.for.gov.bc.ca/hfp/planning/lup/index.htm>

- **Official Community Plans (OCPs)**

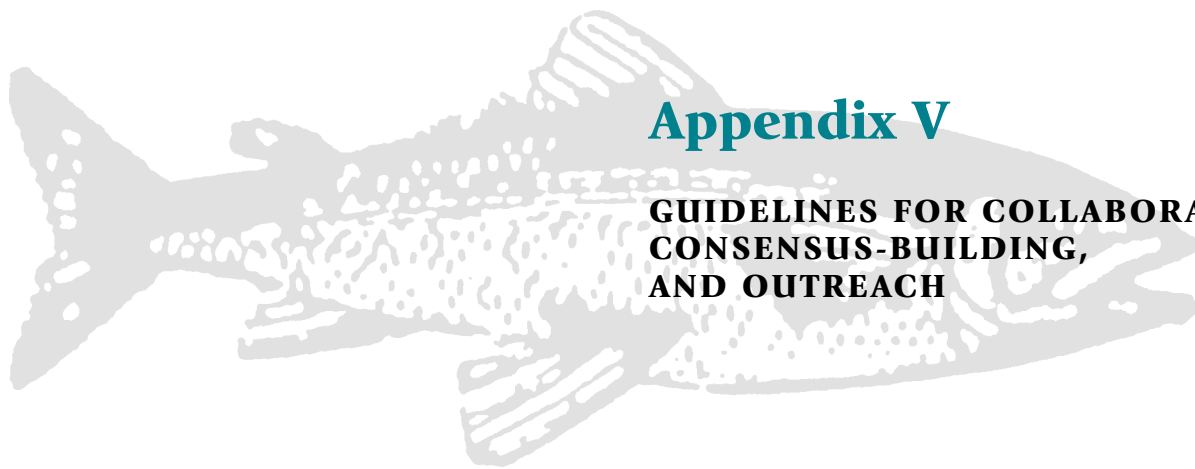
By expanding the definition of the natural environment to include areas important to protection of ecosystems and biodiversity, recent amendments to the *Municipal Act* give local governments clearer authority to incorporate environmental policies and guidelines into their OCPs. Many local governments already recognize streamside areas as environmentally sensitive in their OCPs.

<http://www.marh.gov.bc.ca/GROWTH/index.htm>

- **Growth Management Strategies**

A Regional Growth Strategy (RGS) is a regional vision that commits municipalities and regional districts to a course of action designed to meet common social, economic, and environmental objectives. An RGS is initiated, prepared, and enacted by a regional district with the full involvement of its member municipalities, provincial agencies, and others. It is a voluntary, interactive process intended to involve a wide range of interests and achieve a general consensus as to how growth should take place. An RGS gives long-range planning direction for regional district and municipal official community plans (OCPs), and provides a basis for decisions regarding implementation of provincial programs in the area.

<http://www.marh.gov.bc.ca/GROWTH/index.htm>



Appendix V

GUIDELINES FOR COLLABORATION, CONSENSUS-BUILDING, AND OUTREACH

Consensus-building and effective public consultation have been proven time and again to be the key to producing planning results that work. In general, WFSP processes are developed and coordinated at the regional and watershed planning unit levels by planning teams that include representatives of the federal and provincial governments, First Nations, and key stakeholders. Planning team participants should develop, implement, monitor, and improve the WFSP in a collaborative manner. They should also inform and consult with broader constituencies and the general public. The following principles and guidelines are intended to assist planning teams in fostering collaborative relationships conducive to building internal consensus while also engaging in effective outreach.

Principles for Collaboration and Consensus-building

Adopt a collaborative approach.

WFSP planning combines the resources and knowledge of a wide range of organizations and individuals to achieve a common purpose: benefits for fish populations and habitat. By working together, organizations and individuals will achieve more than they would by working independently.

WFSPs are created through a collaborative process involving government agencies, First Nations, and stakeholders with a strong interest in healthy fish

populations and habitats. Their long-term success depends on ongoing cooperation between these parties, characterized by constructive working relationships based on trust, reciprocity, delivery on commitments, and the sharing of information and knowledge in an open and timely manner.

Integrate interests to build better decisions.

Planning team participants need to ensure that they clearly understand the interests of those groups and individuals affected by the resolution of WFSP issues before they make decisions. Planning bodies that make decisions based on uninformed or pre-formulated solutions often miss opportunities to create more benefits simply because they are unaware of or do not understand the relevant interests. Where issues are controversial, there may be a tendency for planning team participants to be positional, which can lead to ill-conceived compromises or stalemates. This is less likely if the relevant interests are fully explored before the team tries to negotiate resolutions.

Build on common ground.

While WFSP participants will differ on some issues, they will also share significant common goals – such as establishing and maintaining healthy fish populations and habitat. This common ground needs to be identified and expanded as the WFSP is developed. Disagreement over how to deal with specific issues should not present a barrier to progress on other issues.



Guidelines for Collaboration and Consensus-building

Identify and include accountable representatives of all interests within planning teams. At a minimum, representation should include those parties whose interests are affected and those parties that are going to decide on or participate in implementation.

Develop a clear and simple Memorandum of Understanding that contains a set of procedural ground rules that cover at a minimum:

- How decisions will be made – e.g., by consensus
- The definition of consensus – e.g., consensus is reached when there is unanimous agreement by all team members or at least general agreement by all team members on a package of decisions, recognizing that some members may not agree with some decisions but that they can support the whole package. Team members may stand aside on specific decisions to avoid blocking consensus.
- Roles and responsibilities of team members, and the chair/facilitator/coordinator (if there is one) – e.g., orderly running of meetings, attending meetings, maintaining a record of decisions and discussions, keeping constituents informed.
- Communication and information exchange protocols – e.g., team members are committed to sharing information and addressing problems that may arise in a respectful manner.
- Commitment to resolve issues through interest-based discussion and negotiation.
- Delegation of specific issues to small task groups or working groups

Principles and Guidelines to Promote Broader Outreach

Recognize that everyone has something to contribute.

The successful development, implementation, monitoring, and improvement of WFSPs depends on the contribution of knowledge, experience, and resources from broad constituencies and the general public in addition to the organizations and governments represented on the planning teams. Planning teams need to reach out and engage this broader community in order

to maximize the potential for WFSPs to provide long term benefits to fish populations and fish habitat.

Make transparent decisions after consultation and consensus-building.

When people put their time and effort into planning processes they need to know how their contributions have been considered even if their interests are not completely satisfied. Transparency is therefore necessary if WFSPs are going to establish and maintain the diversity of support that they need for implementation.

Plan the participation process.

Each stage of WFSP requires some form of outreach to broader constituencies and the general public. Such outreach is more likely to be effective if it is based on participation plans that identify clear objectives and specific activities for each stage of planning. Effective outreach also requires WFSP participants to dedicate sufficient time and resources to the implementation of these plans.

Use a range of participation mechanisms.

The degree to which broader constituencies and the general public need to participate in WFSPs will vary from one watershed to another, and from one stage of planning to another. It is therefore important that WFSP planning team participants be responsive to the needs of the broader community and of the WFSP in selecting participation mechanisms. Consensus-building and negotiation processes are essential to ensuring that all planning team participants are committed to developing and implementing the WFSP. Consultation and information mechanisms can elicit feedback from and provide updates to the broader community.

Mechanisms to Keep Broader Constituencies and the General Public Informed:

- newsletters
- web sites
- open houses
- community-based events
- media briefings and regular news releases
- open line radio shows
- direct communication with established organizations
- communication through established processes



Mechanisms to Consult with Broader Constituencies and the General Public:

- printed questionnaires (distributed within community)
- electronic questionnaires (available on web sites)
- focus groups
- workshops
- open houses
- dedicated phone lines (invite opinions)
- open line radio shows (invite opinions)



Appendix VI

PARTICIPANTS IN WFSP DEVELOPMENT

MEMBERS OF THE WFSP STEERING COMMITTEE

Guy Beaupré	Regional Director, Habitat & Enhancement Branch, Fisheries and Oceans Canada
Rod Davis	Director, Habitat Branch BC Ministry of Environment, Lands and Parks
Jamie Alley	Director, Fisheries Management BC Ministry of Fisheries
Ed Woo	Director, Bio/Engineering Support Division Fisheries and Oceans Canada
Kevin Conlin	Mitigation/Restoration Biologist BC Ministry of Fisheries
Andy Witt/Bob Cox	Head, Urban & Fisheries Unit BC Ministry of Environment, Lands and Parks

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Alex Grzybowski & Associates
Jenny Fraser
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Cox, Bob	BC Environment
Cross, Carol	Fisheries and Oceans – HEB
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Zevit, Pamela	BC Environment



For Further Information

For more information about WFSP or about how to become involved in the WFSP process, please visit www.bcfisheries.gov.bc.ca or contact us by mail or phone:

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