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# Wetland Action Plan for British Columbia

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**Abstract:** In the fall of 2002, the Wetland Stewardship Partnership was formed to address the need for improved conservation of wetland ecosystems (including estuaries) in British Columbia. One of the first exercises undertaken by the Wetland Stewardship Partnership was the creation of a Wetland Action Plan. The Wetland Action Plan illustrates the extent of the province's wetlands, describes their value to British Columbians, assesses threats to wetlands, evaluates current conservation initiatives, and puts forth a set of specific actions and objectives to help mitigate wetland loss or degradation. It was determined that the most significant threats to wetlands usually come from urban expansion, industrial development, and agriculture. The Wetland Stewardship Partnership then examined which actions would most likely have the greatest positive influence on wetland conservation and restoration, and listed nine primary objectives, in order of priority, in a draft 'Framework for Action'. Next, the partnership determined that meeting the first four of these objectives could be sufficient to provide meaningful and comprehensive wetland protection, and so, committed to working together towards enacting specific recommendations in relation to these objectives. These four priority objectives are as follows: (1) Work effectively with all levels of government to promote improved guidelines and stronger legislative frameworks to support wetlands conservation; (2) Provide practical information and recommendations on methods to reduce impacts to wetlands to urban, rural, and agricultural proponents who wish to undertake a development in a wetland area; (3) Improve the development and delivery of public education and stewardship programs that encourage conservation of wetlands, especially through partnerships; and (4) Conduct a conservation risk assessment to make the most current inventory information on the status of B.C. wetlands available to all decision makers. This paper presents those portions of the Wetland Action Plan that are pertinent to the framework, and describes how the partnership intends to implement it.

**Key Words:** wetland, estuary, policy, threats, action plan, inventory, Best Management Practices, British Columbia

## 1 Introduction

In the fall of 2002, the Wetland Stewardship Partnership was formed to address the need for improved conservation of wetland ecosystems (including estuaries) in British Columbia (B.C.). Membership of the Wetland Stewardship Partnership includes representatives from the Federation of B.C. Naturalists, the Canadian Wildlife Service, the British Columbia Ministry of Sustainable

Resource Management, the West Coast Environmental Law Foundation, the British Columbia Ministry of Water, Land and Air Protection, Ducks Unlimited Canada, the Nature Conservancy of Canada, B.C. Hydro, and the Department of Fisheries and Oceans.

The partnership's vision is as follows:

**Vision of the Wetland Stewardship Partnership:**

A province where the functions and values of wetlands and the larger watersheds of which they are a part are appreciated, conserved, and restored for present and future generations.

The partnership's mission is as follows:

**Mission of the Wetland Stewardship Partnership:**

To maintain and restore properly-functioning wetland ecosystems throughout B.C. by promoting activities that positively affect wetland conservation, encouraging collaborative partnerships among government and non-government organizations, and prioritizing and implementing the recommendations found in the Wetland Action Plan.

The Wetland Stewardship Partnership prepared its strategic action plan to stimulate discussion on options to conserve wetlands, determine appropriate actions to be taken, and ultimately to implement activities that will have positive and enduring effects. The time frame for the action plan is multi-year with revisions to be made annually in response to completion of tasks, shifts in management regimes, and changes in availability of resources of the member groups. The Wetland Stewardship Partnership is currently working with a number of organizations and is interested in developing further linkages with other groups who share similar objectives. The partnership has a designated coordinator and meets regularly. For more information on the Wetland Stewardship Partnership and its activities, visit our web site at <http://wlapwww.gov.bc.ca/wld/wetlands.html>

## **2 Status of B.C. Wetlands**

### **2.1 Wetlands Defined**

Wetlands are defined as “land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic (water-loving) vegetation, and various kinds of biological activity which are adapted to a wet environment” (National Wetlands Working Group 1988).

Wetlands are divided into classes: bogs, marshes, fens, swamps, and shallow open water. Each is associated with varying amounts and types of water and soil, and distinguishing types of plants and animals. In B.C., wetland classification is currently being studied by the Wetland and Riparian Ecosystem Classification project of the B.C. Ministry of Forests Research Branch. A recent identification guide for B.C.'s wetlands is available at their web site:

<http://www.for.gov.bc.ca/hre/becweb/subsite-wrec/reports-wetlandsofBC.htm>

Well known examples of wetlands in B.C. include Burns Bog and the Englishman River Estuary. British Columbia also contains three wetlands recognized by the International Convention on Wetlands (or Ramsar Convention) for their international significance—the Alaksen National Wildlife Area, the Creston Valley Wildlife Management Area, and the Columbia River Marshes:

**Alaksen National Wildlife Area;** Migratory Bird Sanctuary. Ramsar site no. 243. This area in the Fraser River Delta includes arable land and grassland along with scattered wetlands varying from fresh to brackish, plus mud and sand flats supporting three primary vegetation types. It is an important link in the chain of wetlands used by waterbirds migrating between Arctic breeding grounds and southern wintering grounds. Up to 40,000 snow geese (*Chen caerulescens*) of the Wrangel Island breeding population and up to one million shorebirds stage and winter here. Up to 25,000 ducks pass through in autumn, and 10,000 surf scoters (*Melanitta perspicillata*) congregate to feed on the tidal flats in late summer. More than one million people live in the Fraser River valley.

**Creston Valley Wildlife Management Area.** Ramsar site no. 649. This area is a wide river delta at the edge of the deep waters of Kootenay Lake where marsh, riparian habitats, and dry mountain forest all interface, providing some of the most important waterbird habitat in British Columbia. During spring and autumn migration, spectacular concentrations of birds—over 40,000 at one time—may gather. The area also provides significant habitat for numerous mammals, fish, plants, birds, amphibians, and reptiles that are at risk. Aboriginal peoples have lived in the area for thousands of years, while current human activities include recreation, limited agriculture, and water control regimes to help prevent damage to the wetlands.

The third site, the Columbia River Marshes in the east Kootenays, recently received designation on 2 February, 2004—International Wetlands Day—so detailed information was not yet available at the time this paper was written.

## 2.2 *Value of Wetlands*

Wetlands are one of the most biologically diverse, productive, and important life support systems on earth. They provide critical habitat for amphibians, reptiles, fish, birds, and other wildlife. Most wildlife in B.C. use wetland habitat at some point in their life cycle, and many red- and blue-listed species are wetland dependent. The functional contribution wetlands make in helping to reduce or remediate environmental problems is also substantial.

Wetlands are an integral component of the hydrological cycle in a watershed. For example, water may enter a watershed as rain, seep up from the ground from aquifers, or remain close to the surface as groundwater. Wetlands, lakes, and streams are the visible part of this cycle. Much of the interconnected pattern of water flow throughout the landscape is never fully revealed. A large part of the process occurs beneath the surface; consequently, it is often unclear how human actions may be affecting the water cycle. For instance, draining a wetland will not only affect the plants and animals that rely directly on that wetland, it could also affect groundwater recharge and purification of water downstream, and a multitude of other services that wetlands provide.

The 'natural or ecosystem services' that wetlands provide benefit humans directly through flood control, contaminant reduction, water purification, storm water runoff reduction, and erosion control. Indirectly, wetlands contribute to recreation and tourism industries, scientific study, fisheries industries, agriculture, trapping, hunting, and a host of other resource-dependent activities in British Columbia.

## 2.3 *Extent of B.C. Wetlands*

Canada contains almost 25% of the world's wetlands, and about 60% of North America's. Various scientific studies have attempted to estimate the precise extent of B.C.'s wetlands. In a 1992 study which used soil surveys, National Topographic Series (NTS), and Canada Land Inventory maps, the amount of land in B.C. considered to be wetlands was calculated at 52,883 km<sup>2</sup>, or 5.6% of the total provincial land area (van Ryswyk and Hall 1992). Baseline Thematic Mapping (BTM) data from 1999 shows that wetlands larger than 15 ha comprise the majority of that area—39,616.78 km<sup>2</sup> (Fig. 1). A third mapping technology that could be used to estimate wetland area is the digitized B.C. Watershed Atlas, which was developed primarily for fisheries aquatic analysis and is based on the federal 1:50,000 NTS map series. These data show the distribution of wetlands through different regions of the province, and indicate that B.C. wetlands cover about 36,000 km<sup>2</sup> (Fig. 2, Table 1).

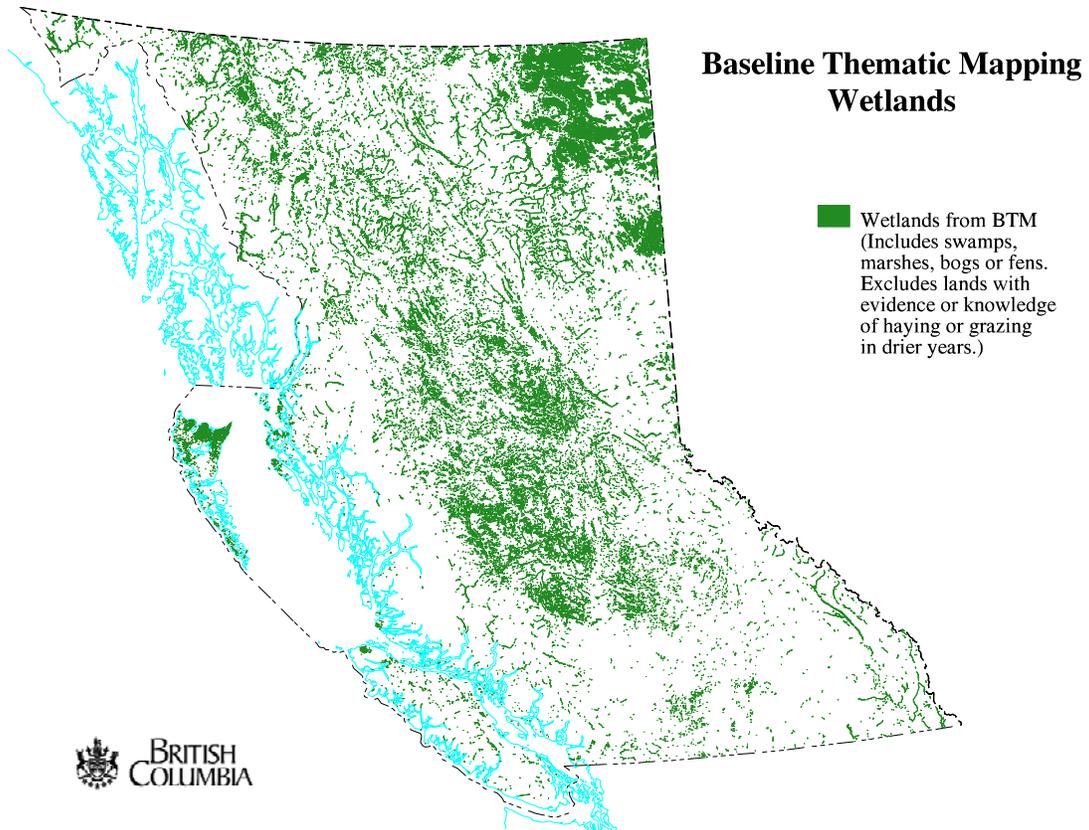


Figure 1. Baseline Thematic Map of wetlands 15 ha or larger (1999 data).



Figure 2. Regional administrative boundaries as shown on the British Columbia Watershed Atlas.

**Table 1. Total area of wetland in each region according to the British Columbia Watershed Atlas.**

<i>Region</i>	<i>No. of wetlands</i>	<i>Wetland area (ha)</i>
1	2575	19,785
2	549	9,318
3	6897	48,404
4	1217	21,053
5	18,126	238,477
6	23,846	330,683
7	36,987	2,953,122
8	2208	10,336
Total	92,405	3,631,178

To compare the three estimates, one first needs to convert the B.C. Watershed Atlas estimate from ha to km<sup>2</sup>: 3,631,178 ha is 36,311.78 km<sup>2</sup>. The BTM estimate is 39,616.78 km<sup>2</sup>, and the Agriculture Canada estimate is 52,883 km<sup>2</sup>. As shown, the maximum discrepancy in wetland area estimates among the three mapping sources is roughly 16,000 km<sup>2</sup>. Each map source has its weakness in terms of accuracy so it is difficult to know just which of the three numbers is most reflective of what is on the ground. Since BTM is the most recent technology and is based on satellite imagery, it is probably the most reliable; however, it only captures the large wetlands. A fourth mapping source—TRIM (Terrain Resource Information Management)—is a relatively recent tool which uses a 1:20,000 scale. TRIM would likely be the most accurate mapping source, however, work is required to analyze more than 7000 map sheets to create a provincial wetland coverage and area estimate.

## **2.4 Summary of Threats**

Historically, the value of wetlands was not always fully understood, and loss of these ecosystems was often viewed as ‘the price of progress’. Over the last two decades, however, concern over wetland loss has grown. Connections between loss of wetland habitat, reduced biodiversity, and complex, problematic effects on natural processes have become more distinct, while the economic, social, and other benefits of wetlands have become more visible. For example, scientists have begun to link the dramatic decline in North American waterfowl and shorebird populations to the destruction of continental wetlands. Fisheries experts have begun to recognize that wetland losses have been contributing to sharp declines in salmon, shellfish, and other valuable fishery resources. Increasing levels of contamination are being found in groundwater in some parts of B.C., which could possibly be linked to the loss or degradation of wetlands. Flooding and erosion damage along rivers and shorelines has also been increasing in wetland-damaged areas.

Due to the varying landscapes, climates, and human activities around B.C., different regions are experiencing very different types of pressure on their wetlands. Additionally, the effects of different activities on wetlands can vary from mild, temporary damage, to permanent elimination. In the southern half of the province, the most significant and permanent impacts on wetlands have come from drainage for purposes of agriculture and urban development. In northern B.C., activities like mining and oil and gas development are having permanent, deleterious effects on wetlands, but these effects are often localized and containable; however, though not yet a major concern in B.C., the destructive effects of coal bed methane production, in particular, can be extremely serious because the practice involves both permanently draining wetlands for water use and contaminating water sources.

While forest management practices occur on roughly 85% of the land base and can indeed have negative effects on wetlands, given sufficient time, affected wetlands will often return to health. Ranching has relatively little influence on wetlands when cattle access is properly managed. Hydroelectric dams, on the other hand, have completely flooded vast and significant wetland complexes. Notably, one of the most detrimental activities to wetlands throughout the province has been the construction of transportation and utilities networks, which tend to follow river valleys and other locations where water naturally flows.

Even when wetlands are protected, secondary threats can emerge. These include water pollution from agricultural or roadway runoff, waste dumping, and upstream water source diversion. Invasive plant and animal species are very difficult to control and can wreak havoc on native populations, while the effects of global warming trends could potentially be extremely dangerous to wetlands. Unfortunately, no studies have been done in B.C. to scientifically establish and rank the most significant threats to the province's wetlands; the Wetland Stewardship Partnership welcomes more research in this area.

## **2.5 Status of B.C. Wetlands**

There are no current, comprehensive studies of the status of wetlands throughout B.C.; however, many smaller-scale inventories have been done, particularly in more populated areas. Generally, in southern regions of the province, anywhere from 60–98% of wetlands have already been lost. In the less populated central and northern regions of B.C., the amount of remaining wetlands is significantly greater.

A number of scientific studies and inventories over the decades have attempted to accurately assess what has been happening to B.C.'s wetlands. Using direct source quotations, Table 2 summarizes the findings of some of the most important studies around the province which focused on either determining the amount of remaining wetlands or the amount of wetlands that have been lost, along with noting the common causes of wetland degradation or loss. More research in this area needs to be done, and the Wetland Action Plan attempts to address that need.

**Table 2. Inventory of wetlands in British Columbia and Canada.**

<i>Region</i>	<i>Amount lost (L) and/or remaining (R)</i>
Estuaries	<p><b>L</b> A study of marsh habitat at estuaries in the Strait of Georgia, outside of the Fraser River, showed a loss of about 60% of this type of habitat, including loss of over 50% in the Nanaimo and Cowichan estuaries and more than 30% in the Squamish estuary (Levings and Thom 1994).</p>
Vancouver Island	<p><b>L</b> In the Victoria region, approximately 70% of the original wetlands have been lost (Lands Directorate 1986).</p> <p><b>R</b> On Vancouver Island, there is only 1.7% remaining wetlands on the eastern side of the island (Ward et al. 1998).</p> <p><b>R</b> An audit of 663 sites in the Sensitive Ecosystem Inventory (SEI) showed that 7.8% were disturbed/severely degraded. The original SEI was done using early 1990s data, and the audit used 1999 data. The loss of ~8% of the SEI sites is particularly troublesome since the east side of the island only had a total of 1.7% wetlands (Caskey and Henigman 2002).</p>
Lower Mainland	<p><b>L</b> Since 1880, 99.9 % of the seasonal wet meadows and 84.6% of the bog habitat has been lost in the Fraser River Delta (Butler and Campbell 1987).</p> <p><b>L</b> In the 1920s, the 11,700 ha Sumas Lake wetland—one of North America’s most productive wetlands—was drained for agriculture purposes (State of Environment Reporting 1992).</p> <p><b>R</b> Inventory done in 1989 indicated that there were 41,906 ha of wetland left in the Fraser Lowland (Ward et al. 1992). (A 10-year update to this work should be available within the next couple of years).</p>
Thompson/Okanagan	<p><b>L</b> 85% of the natural wetlands in the ecologically critical South Okanagan valley area have now been lost due to channelization, land drainage, filling, vegetation removal, etc. (Sarell 1990).</p> <p><b>R</b> Only 15% (297 ha) of wetland habitats, existing prior to European contact, remain in the study area (Sarell 1990).</p> <p><b>L</b> Much of the drier portions of the wetlands of the Okanagan and Similkameen Valleys have been cleared of forest, drained, and used for a wide range of vegetable, cereal and forage crops because of the suitable climate (Kelley and Spilsbury 1949).</p>
Kootenays	<p><b>L</b> In the 1930s, a dam was built on the Kootenay River and 10,000 acres were converted to agriculture, including the large Kootenay Flats wetlands (Commission on Resources and the Environment 1994a, 1994b).</p> <p><b>L</b> The Columbia River dam projects of the 1960s led to the inundation of large areas of wetland when 100,000 ha of Kootenay valley lands were flooded (Commission on Resources and the Environment 1994a, 1994b).</p> <p><b>R</b> The objective of the sampling program was to determine the health of selected lentic ecosystems in the Invermere and Cranbrook Forest Districts that have received some restoration work, e.g., unlimited use versus controlled cattle access (fencing), and to initiate a monitoring program that would record changes in ecosystem structure and function over time...The majority of the wetlands sampled were classified as non-functional or at-risk. Many of the plant communities have floristic changes that are problematic. With the exception of the fens sampled, the vegetation composition of the wetlands indicates a trend away from the desired plant community towards a greater percent cover of increaser species (Smyth and Allen 2001).</p>

**Table 2. Inventory of wetlands in British Columbia and Canada (cont'd).**

<i>Region</i>	<i>Amount lost (L) and/or remaining (R)</i>
Cariboo	<p><b>L</b> Wetlands of the Cariboo-Chilcotin region of B.C. comprise up to 15% of the total land area. They have been responsible for producing 50% or more of the total forage available to domestic livestock in that region since the first settlement in the 1800s. Many families' ranching operations still exist based on wetland forage from "the meadows" (van Ryswyk 1987).</p> <p><b>R</b> A detailed analysis of remaining wetlands was done for the Cariboo CORE (Commission on Resources and Environment) table in 1994 following the Cariboo Forest Region boundary. In general, wetlands larger than 10 ha were recorded but in some cases, based on map resolution, wetlands as small as 2 ha were also recorded (AIM Ecological Consultants 1994). Unfortunately, the wetland map has not been digitized, and a final tally of the extent of wetlands is not available.</p> <p><b>R</b> In the late 1930s, James A. Munro described 54 wetlands...in the Cariboo Parklands Region. Concerned about the potential loss of these wetlands...he revisited these same wetlands in 1958 and recorded the changes he observed. Following in Munro's footsteps, we re-sampled 35 (65%) of these wetland areas in 2001 and compared our results with his earlier inventories. In general, we found Munro's qualitative descriptions of these wetlands to be remarkably similar to what we observed in 2001. Nearly half (46%) of the 35 wetlands...we examined had been enhanced for waterfowl by Ducks Unlimited Canada. We found that many of Munro's concerns had not materialized over the period in review (Dawe et al. 2003).</p>
Prince George	<ul style="list-style-type: none"> <li>No historic data were available for this report.</li> </ul>
Northwest	<p><b>L</b> Many upper intertidal lands, which make up the tidal marsh area, were granted by the province (Crown Grant) to private ownership in the early 1900s, resulting in a variety of land uses. Unfortunately, many of these land uses in estuaries are incompatible with fish and wildlife habitat (Remington 1993).</p>
Northeast	<p><b>L</b> The majority of wetland loss in both the Cariboo-Chilcotin and the Peace River-Fort St. John area is a result of improved drainage via ditching and shrub clearing (Remington 1993).</p>
Canada	<p><b>R</b> About 60% of North America's wetlands are found in Canada, which lays claim to almost 25% of the world's wetlands (Environment Canada 1991).</p> <p><b>L</b> Wetland alteration or conversion has reached 70% in central Prairie sloughs, 65% in Atlantic salt marshes, 80–98% in urbanized regions, 70% in Pacific estuarine marshes, and 70–80% in southern Ontario and the St. Lawrence valley hardwood and shoreline swamps (North American Wetlands Conservation Council—Canada 1993).</p>

### 3 Framework for Action

The Wetland Action Plan presents an iterative, multi-year approach to wetland conservation and management in the province. It recognizes that change is gradual and needs to occur in close consultation with differing, sometimes competing interests, and requires a common sense approach which is responsive to change and unexpected developments. The mission of the Wetland Stewardship Partnership is to enhance wetland conservation in the province. The

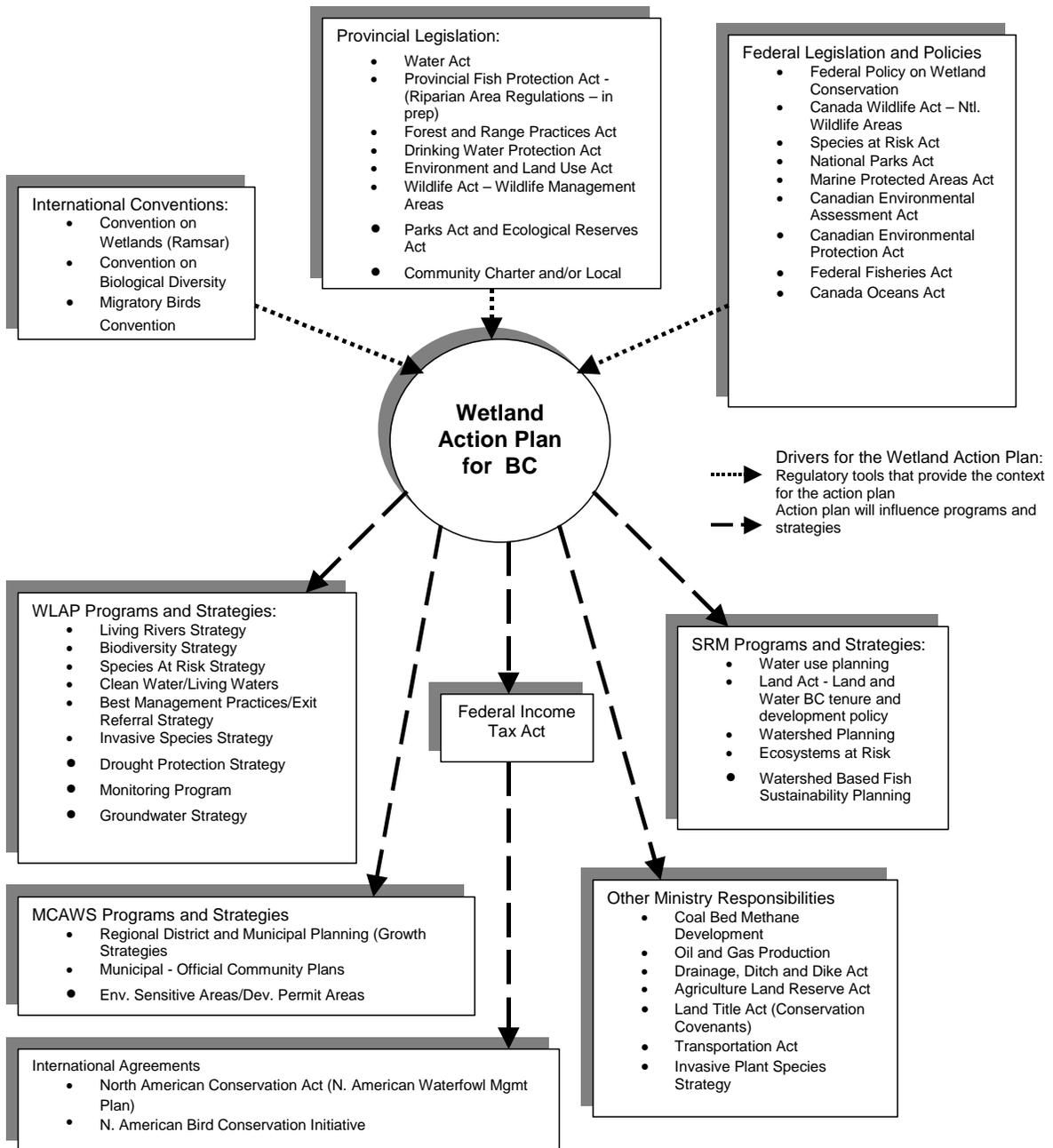
mission is broad, encompassing, and stable, whereas the objectives and actions are more fluid and open to change depending on opportunities and constraints. It is also expected that some of the objectives and actions may be amended or altered as performance measures are constantly monitored.

### **3.1 *Legislative Framework of the Action Plan***

The Wetland Action Plan is intended to operate as an integrated component of the existing legislative and strategic framework for natural resource management and biodiversity conservation in British Columbia (Fig. 3). This framework is underpinned by the B.C. government's sustainability principles, including accountability, transparency, science-based decision making, and continual improvement.

In B.C., responsibilities for wetland management are shared among a number of authorities. The *Water Act* provides the prime mechanism for managing and allocating water and protecting water regimes in the province's wetlands, but there is an extensive array of other policy and legal instruments, which can, and often do, have either direct or indirect impact on the management of wetland resources. These instruments operate at several levels: international, intergovernmental, national, provincial, and municipal.

It is obvious that a great number of human activities have the potential to influence wetlands, and this is reflected in the wide range of different policies and pieces of legislation that have a bearing on wetland conservation and degradation. The Wetland Stewardship Partnership conducted a comprehensive examination and gap analysis of B.C.'s legal and policy framework governing wetlands. The analysis identified specific opportunities for improving decision-making processes and enhancing wetland conservation. In addition, the study indicated that, in future, the province will likely need to develop policy and legislation which specifically and comprehensively addresses wetlands in order to both guide management practices and improve conservation. The Wetland Action Plan addresses this need to develop, in consultation with all stakeholders and interested parties, more effective and practical legislation to conserve wetlands.



**Figure 3. Where the Wetland Action Plan fits in with international, national, and provincial legislation, policies, and programs.**

### **3.2 Principles, Objectives, and Actions**

#### **3.2.1 Principles of the Wetland Action Plan**

In addition to the provincial government's sustainability principles, the following principles regarding wetland management have been drafted by the Wetland Stewardship Partnership, and are in keeping with the vision for wetlands in the province:

- 1) Wetlands serve numerous valuable social, economic, and environmental functions, and contribute significantly to the health and well-being of British Columbians, and as such, are a priority for environmental conservation and sustainable development efforts.
- 2) In recognition of the historical and ongoing wetland loss, concerted efforts are required to conserve remaining wetlands.
- 3) The management of wetlands should aim to maintain or rehabilitate natural wetland functions and structures, and wherever possible, mitigate the effects of human activities.
- 4) There should be recognition of wetland values and their management and protection in all relevant statutory and non-statutory planning processes.
- 5) Wetlands of recognized conservation significance should be given special protection and management so as to maintain their ecological values.
- 6) Ongoing development and refinement of scientific knowledge and inventory in British Columbia is fundamental to the achievement of wetland conservation.
- 7) Integrated watershed management and planning for all water bodies is the preferred option for addressing wetland loss.

#### **3.2.2 Recommendations for Action**

The purpose of the Wetland Action Plan's objectives and actions are to try to direct efforts towards undertaking the most useful activities for mitigating wetland loss. The 'Recommendations for Action' lists nine general objectives with corresponding recommended actions. The Wetland Stewardship Partnership selected the first four objectives as a priority for focusing its own activities, and many of the recommendations for action are already underway or have been committed to by the partnership.

**Objective 1:** Work effectively with all levels of government to promote improved guidelines and stronger legislative frameworks to support wetlands conservation.

Recommendations for Action:

- Review existing federal and provincial policies and legislation, and in consultation with common stakeholder groups, develop guidelines for wetland conservation.
- Advise governments on possible legislative, regulatory, policy, or enforcement improvements, where appropriate.
- Provide advice, support, and where appropriate, leadership on provincial wetland conservation designation initiatives.

- Encourage the development of provincial standards for activities or projects in or near significant wetlands.
- Provide advice and support to municipal and regional staff on available laws, bylaws, inventory options, and methods to conserve wetlands.
- Promote the conservation of wetlands for their additional benefits to municipal and regional services like watershed planning and storm water control.

The Wetland Stewardship Partnership has done a systematic review of all legislation, regulation, and policy to determine if any of it runs counter to protecting wetlands and estuaries, and is in the process of drafting proposed guidelines.

**Objective 2:** Provide practical information and recommendations to urban, rural, and agricultural proponents on methods to reduce impact on wetlands.

Recommendations for Action:

- Create a Best Management Practices (BMP) document to assist proponents in understanding the multiple functions of wetlands, determining the level of risk their activity poses to wetlands and estuaries, and using existing methods to reduce those risks.
- Facilitate BMP review processes with concerned stakeholders in specific development projects.

The Wetland Stewardship Partnership has prepared a draft BMP document which will be finalized once the guidelines are completed and incorporated into it.

**Objective 3:** Improve the development and delivery of public education and stewardship programs that encourage conservation of wetlands, especially through partnerships.

Recommendations for Action:

- Provide information to interested members of the public on practical methods to enhance the conservation of wetlands in their communities.
- Conduct public education outreach in schools and with the media on the role of wetlands in the environment.
- Provide relevant government staff with consolidated, illustrative information and statistics on wetlands as background for the State of the Environment Report.

An Education and Stewardship Subcommittee of the Wetland Stewardship Partnership is currently conducting a review of all existing wetland and estuary programs being offered in the province. Upon completion, creation or modification of programs will be undertaken to meet the objectives of the Wetland Stewardship Partnership.

**Objective 4:** Conduct a conservation risk assessment to make the most current inventory information on the status of B.C. wetlands available to all decision makers.

**Recommendations for Action:**

- Assess historic and current extent of wetlands and threats to wetlands in B.C., and prepare a comprehensive conservation risk assessment report that can be updated annually.
- Identify priority areas and coordinate wetland inventories using all available, up-to-date data at multiple scales.
- Prepare a provincial TRIM map to provide a broad overview of the historic and current status of wetlands.
- Work with provincial government agencies towards the adoption of a uniform classification scheme, along with standardized methodologies and criteria for wetlands inventories.
- Make all wetland inventory information publicly available.

The Wetland Stewardship Partnership has begun preliminary discussions with partners involved in inventory to determine the best approach to conduct the conservation risk assessment.

**Objective 5:** Encourage the conservation of privately-owned wetlands.**Recommendations for Action:**

- Evaluate the level of success of current incentive programs, and where appropriate, assist governments in redesigning economic, tax, and other incentives to encourage conservation of privately-owned wetlands.
- Educate governments, industry, and the general public on the visible and less visible cost-benefit relationships among wetland conservation, wetland loss, and economic revenues/losses.
- Implement more partnership-based incentive programs.

**Objective 6:** Implement wetlands research and monitoring projects.**Recommendations for Action:**

- Assess the effectiveness of current wetlands monitoring and management techniques and tools, and support scientific research into wetlands.
- Liaise with other organizations and researchers working in wetlands conservation in the Pacific Northwest.

**Objective 7:** Support compliance and enforcement activities throughout the province.**Recommendations for Action:**

- Work towards greater cooperation and harmonization between Canada and B.C. on cross-jurisdictional wetland issues.
- Liaise with provincial and federal departments and nongovernmental organizations on wetland conservation issues.

- Assist governments in evaluating levels of compliance, and in determining the most appropriate and effective types of enforcement activities.

**Objective 8:** Increase the quality and quantity of healthy wetlands.

Recommendations for Action:

- Assist organizations involved in wetland restoration or creation in determining optimal locations for both.
- Provide technical advice to organizations involved in wetland rehabilitation or creation.
- Broaden the existing tracking system of wetland creation, rehabilitation, and enhancement projects throughout the province, and publicize the results to improve public awareness and encourage similar projects.

**Objective 9:** Support the acquisition and placement of covenants on wetlands.

Recommendations for Action:

- Based on the conservation risk assessment, prioritize those areas of the province that should be protected through purchase or covenants, and work with Crown agencies to place protective designations on high priority wetland habitats.
- Provide assistance to independent organizations involved in purchasing or covenanting land.
- Develop innovative funding mechanisms for wetlands acquisition.

## **4 Implementation, Monitoring, and Review of Performance**

### **4.1 Fundamental Benchmarks**

The measure of success for the Wetland Action Plan will be gauged by both the extent and condition of B.C.'s wetlands into the future. It is the clear intention of the Wetland Stewardship Partnership to ensure that actions are taken to not only prevent further degradation of wetlands, but to see their condition and status improve through proactive measures.

Given these broad performance benchmarks, monitoring of implementation and outcomes must be geared to provide, at the most basic level, a picture of the province's total area of wetlands and their condition. Tracking of these over time will then provide a clear assessment of whether the action plan is effective, and will indicate if changes in the specifics of the action plan are required.

It will initially be difficult to measure these fundamental benchmarks for those regions where wetland inventory is presently the least comprehensive. Also, because there has not been, to date, a rigorous, systematic, and standardized approach to classifying and describing the condition of wetlands across the province, there are some difficulties in setting the initial baseline against which the success of the action plan will be measured.

In spite of these limitations, one of the priorities of the Wetland Stewardship Partnership is to undertake the necessary classification and inventory work. It is expected that this will be a multi-year project. For comparison purposes, the Grassland Conservation Council undertook a similar exercise for grasslands, which constitute less than 1% of the province's land base, and the project took roughly three years to complete. Since approximately 6% of the B.C. land base is wetland, it will likely take at least this long to complete a comprehensive wetland inventory.

#### ***4.2 Responsibility for Coordinating and Leading Implementation***

The Wetland Stewardship Partnership is the primary body for coordinating the action plan; however, it will not be successfully implemented without the support of all levels of government, nongovernmental organizations, and industry sectors. It is hoped that the Wetland Action Plan will help generate interest and involvement from stakeholders and the general public in continuing to refine and implement the action plan. The Wetland Stewardship Partnership is interested in working with all interested parties. To get involved, or to obtain more information on the Wetland Stewardship Partnership and the status of the action plan, go to

<http://wlapwww.gov.bc.ca/wld/wetlands.html>

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