



DEVELOPING A STRATEGIC PLAN FOR THE CWSP

Given the extent and geographic complexity of the Columbia Wetlands, and the range of interests and capacity of member groups, planning is critical to provide the Columbia Wetland Stewardship Partners with a ranking of potential activities to preserve functioning wetland ecosystems and stem the loss of biodiversity and habitat.

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Introduction

Purpose

The objective of this report is to support the development of a strategic plan for the CWSP. Given the extent and geographic complexity of the Columbia Wetlands, and the varying capacity of member groups, planning is critical to provide the CWSP with a ranking of potential activities to preserve functioning wetland ecosystems and stem the loss of biodiversity and habitat. To create the strategic plan, the CWSP needs to discuss and prioritize stewardship activities. Some of the priority actions may require field research, some may require grassroots member activities, while others may simply require group consensus about ways in which to align and support current regional initiatives and management plans.

This document introduces a possible framework for developing a strategic plan. It reiterates the previously identified gaps in knowledge about factors that underpin a healthy and intact wetland ecosystem: gaps that include climate change sensitivity, hydrologic connectivity, and species and wetland ecosystems at risk. It also synthesizes and lends justification to addressing issues and goals previously laid out in CWSP reports, and at a conservation planning forum co-hosted by CWSP and KCP in December 2017.

This document provides a foundation for environmental stewardship that, when integrated with social, economic and governance considerations, will support decision-making by the partners of CWSP for their future activities. The CWSP strategic plan will allow the CWSP board to streamline their efforts by identifying how issues and potential activities relate to pre-determined strategic goals. If an objective or action is proposed that does not directly serve a strategic purpose, the board can ask themselves "Will this help us fulfil our stated objectives?".

History of CWSP Objectives and Planning to Date

CWSP began developing the framework for its strategic plan in 2016. Since that time, several projects have been completed to support this final step in the planning process. The objectives of the CWSP reporting projects were to:

- 1) Collect literature on the Upper Columbia Valley and write a review summarizing what is known and not known about wetland ecosystem parameters;
- 2) Identify the goods and services provided by the Columbia Wetlands ecosystem and summarize threats to its health; and
- 3) Synthesize conservation goals and objectives in existing conservation and management plans that apply to the Columbia Valley, identify gaps within the plans to addressing threats to the wetlands, and determine the status of plan implementation. A secondary goal of the review of management plans was to help determine a process by which CWSP could assist in the implementation of the various regional plans.

In addition to project reports, CWSP and the Kootenay Conservation Program (KCP) co-hosted the Columbia Valley Conservation Action Planning Forum in Invermere, BC on December 6, 2017. Both organizations are partnerships with a diverse membership, and they share a common interest in exploring collaborative strategies to conserve the biodiversity and ecological processes of the Columbia Valley. The purpose of the Forum was to gather expert opinion and bring together a broad range of perspectives to identify priority actions for enhancing and maintaining the ecological health and functioning of the portion of the Rocky Mountain Trench that extends from Canal Flats north to Spillimacheen. Although the area of focus did not include the part of the Columbia Wetlands from Spillimacheen to Donald, and the boundaries of the KCP “conservation neighbourhood” do not strictly align with those of the Columbia Wetlands, the research studies presented at the Forum, and the ecological values and threats identified by participants, are relevant to the Columbia Wetlands ecosystem and the adjacent contributing landscape with which CWSP is interested.

The Forum supported the CWSP strategic planning process by identifying environmental values and threats both to the Columbia Wetlands and the surrounding, contributing landscape. Participants worked together to identify priority actions that would help to maintain healthy fish and wildlife populations and ecological functions in the Columbia Valley over the next five years. Working in small groups, participants then selected the top actions they thought would make the most difference in the Columbia Valley over the next one to three years, and of these top actions, eight “Priority Actions” were further developed into action plans.

Strategic Planning

A strategic plan sets the direction of the organization. If it is well articulated, the plan becomes a roadmap for everyone involved in an organization to follow. It conveys what the organization's vision and mission are and what their three or four key strategic goals are, and it provides a summary of key activities that will support the mission and goals.

Strategic goals are the three or four broad objectives the organization sets for itself; in this case, the functions or services that CWSP offers. Strategic focus is generated by clarifying and stating broad goals in a plan, and contracted staff and volunteers can clearly identify their roles and contributions.

Charity Village has broken down the creation of a [non-profit strategic plan](#) into several steps.

1. **Describe the organization.** Get a clear and realistic understanding of the status of the group and its members and their capacity, competency, and commitment. In a partnership organization such as the CWSP, it is critical to understand the range of interest, capacity, and support among its member groups.
2. **Identify what's important.** Determine where the organization is heading over time. While not all goals are long-term, objectives within the strategic plan support the over-arching mission and vision. From this, the CWSP can determine priority issues—issues on which the strategic plan should focus.
3. **Define the objectives.** Clearly define what CWSP must achieve to address priority issues.
4. **Determine who is accountable.** How will CWSP allocate time, human capital, and money to address the priority issues and achieve the defined objectives. How will the CWSP review goals and track progress?
5. **Review.** A strategic plan must be regularly reviewed (and refined if necessary) to ensure that it reflects the current priorities of its membership and is supporting the work of CWSP as intended.

Summary of knowledge gaps and conservation priorities in CWSP efforts to date

CWSP Resource Database

Several recurring themes emerged through the evaluation of documents currently within the CWSP Resource Database. The following list, roughly grouped and not ranked, reflects the most frequently mentioned knowledge gaps, and what authors suggested is needed to better understand and manage the Columbia Wetlands.

Hydrological

- Water quality data for the wetlands and the Upper Columbia River
- Streamflow of the Upper Columbia River and the wetland water regime, including minimum flow requirements for wetland ecosystem maintenance
- Regional groundwater resources
- Implications of climate change to wetland ecosystem function
- Critical geomorphic and hydrologic processes that drive the presence of riparian habitat, and the causes of its loss

Species and Habitat

- Mapped riparian and wetland habitats
- Aquatic and terrestrial plants, and plants and plant communities at risk in the wetlands
- Status of cottonwood habitat in the wetlands
- Wetland-specific connectivity or habitat fragmentation
- Beaver and muskrat as agents of change
- Freshwater biodiversity
- Implications of the increase of kokanee in the system
- At-risk bird inventory, sensitive or critical habitat, and population status
- At-risk amphibian inventory, sensitive or critical habitat, and population status
- At-risk fish inventory, sensitive or critical habitat, and population status
- Game fish inventories, spawning data and abundance
- The seasonal use of wetland and riparian habitat by bears and other large mammals
- Identification and impact of both aquatic and terrestrial invasive species

Wetland Ecosystem Values and Threats

The Wetland Ecosystem Values and Threats report identified a broad series of threats to the Columbia Wetlands which could inform conservation priorities:

- Hydrologic Changes
- Water Quality
- Climate Change
- Invasive Species
- Species at Risk: Birds, Fish, Wildlife, Plants
- Development; Outdoor Recreation Pressures
- Timber Harvest
- Fire Suppression

- Habitat Connectivity; River Connectivity and Geomorphology
- Natural and Human Threats to Levees, Wetland Habitats, and Cottonwoods
- Lack of Data; Cumulative Effects

Columbia Valley Conservation Forum

The Columbia Valley Conservation Forum was intended to provide clear direction for how CWSP and KCP could support conservation actions in the Columbia Valley. Activities, resources, potential partners and collaborators, and time frames were identified for each of the following eight Priority Actions (not ranked):

- Conserve and Restore Montane Valley-Bottom Processes and Habitats that Benefit a Suite of Species of Interest and Conservation Concern
- Document Species Diversity, Relative Abundance, and Location of Bats
- Identify and Protect Existing High-quality Habitats
- Conserve and Restore Riparian and Wetland Habitats
- Protect, Monitor and Mitigate Decreases in Hydrologic Inflows into the Columbia River and Wetlands
- Identify and Enhance Connectivity and Corridors
- Develop a Statutory Recreational Access Plan for the Columbia Valley
- Take Aggressive Local Action to Reduce Emissions for Climate Change

Review of Management Plans

The review of management plans did not suggest potential conservation priorities. It did indicate, however, that the Priority Actions identified by participants at the Conservation Forum generally align with goals and objectives outlined in the management plans reviewed. The review also highlighted the need for collaboration among organizations, landowners, and land managers, and provided the following recommendations (not ranked) for CWSP to consider when developing their strategic plan:

- Align CWSP's strategic plan with the goals and recommended actions identified at the Columbia Valley Conservation Neighbourhood Forum;
- Promote the development of an OCP for Columbia-Shuswap Regional District "Area A";
- Meet with First Nations to determine conservation priorities and management of the wetlands;
- Meet with Regional District Planners and First Nations to further determine how local and First Nation government planning and development approval processes can support protection of wetlands;
- Identify additional plans that impact the Columbia Wetlands;
- Develop education and outreach initiatives; a lack of knowledge about the wetlands and their importance is a key threat to the long-term protection of the wetlands;
- Assess land use practices on lands adjacent to the wetlands (e.g., forestry, agriculture, CP Rail, transportation corridors), associated threats, and how to mitigate those threats;
- Determine the effectiveness of existing management plans and legislation for mitigating current and future threats to the wetlands; and
- Identify the main information needs, legal and planning tools, and actions and incentives that are needed to protect and manage the Columbia Wetlands effectively, and integrate these into CWSP's strategic plan.

Conservation Priorities

Identifying priority issues and areas for action is a significant challenge in conservation. However, several issues were consistently emphasized in CWSP reports and activities leading up to the development of the CWSP strategic plan. The overlapping issues can be broken down into categories (not ranked):

Climate change

Regional concerns about climate change centre around the uncertainty of impacts and the implications of climate change to wetland ecosystem function, riparian habitat, and wetland-dependent species. Unfortunately, there is a significant lack of data on biophysical indicators that could indicate climate change within the Columbia Wetlands.

Attendees of the Conservation Forum specified potential impacts which could narrow the list of possible actions and strategic objectives relating to climate change. Potential effects include: changing species distribution, catastrophic fire, vegetation changes, habitat shifts, hydrologic changes (flash floods, extreme droughts), mudslides, landslides, loss of snowpack, loss of cold-water creeks, forest pest spread, wildlife disease spread, and how water impoundments and other water storage may affect hydrology. Climate change was one of the Priority Actions identified at the Forum: "Take aggressive local action to reduce emissions for climate change".

Improving our understanding of wildfires (and fire suppression) has been identified as important in the region. There is a lack of data on fire in the wetlands and its impact on wetland ecosystems. Wildfires can affect hydrologic processes by increasing peak flows, increasing sedimentation and decreasing channel stability. An increase in regional wildfires has been suggested as a possible consequence of climate change.

Hydrology

The lack of data on the streamflow of the upper Columbia River and the Columbia Wetlands has been consistently recognized as a critical impediment to understanding the wetland water regime, including understanding minimum flow requirements for wetland ecosystem maintenance. Other concerns include lack of data on snowpack, glacial mass balance, groundwater resources, and hydrologic changes under climate change. "Protecting, monitoring and mitigating decreases in hydrologic inflows to the river and wetlands" were identified as a Priority Action at the Conservation Forum.

Water Quality

Several locations within the Columbia Valley have received considerable attention; however, there is a general lack of water quality data for the Columbia Wetlands and the upper Columbia River. Maintaining good water quality has been highlighted as a regional concern, and threats to that quality have been identified. Threats include non-point sources such as the deposition of atmospheric contaminants, and herbicide and pesticide runoff. Other concerns include the sources and levels of pharmaceuticals and other introduced compounds. Declining water quality was discussed at the Conservation Forum although it did not emerge as a Priority Action.

Connectivity

Threats to several types of “connectivity” have been identified by the CWSP and others; connectivity concerning the geomorphology of the river, and that relating to habitat. There is a lack of understanding about critical geomorphic and hydrologic processes that drive the presence of riparian and wetland habitat and the causes of its loss. Participants at the Forum identified the following potential threats to river connectivity and geomorphological processes: mining and gravel extraction; erosion and sedimentation; loss of large woody debris, gravel, rocks, and sediment due to climate change and human activity; and modification to natural hydrologic systems through water diversions, dams, water management, groynes, and docks.

Concerns about connectivity between habitats centre on the lack of knowledge about wetland-specific habitat connectivity and habitat fragmentation. Participants at the Forum identified barriers to wildlife corridors; transportation corridors and hydro lines; and wildlife collisions on transportation corridors (highways, railways, transmission lines) as specific threats. “Identifying and enhancing connectivity corridors” emerged as one of the eight Priority Actions at the Forum.

Habitat

The CWSP identified several critical needs concerning understanding, and thus protecting, Columbia Wetland habitats. Mapping of riparian and wetland habitats emerged as a need, as has filling the related knowledge gap of long-term trends in wetland composition and distribution. Filling this gap would allow the identification of wetland types which are more sensitive to disturbance or provide greater habitat value than others, and which are of greatest concern. The need to identify and map wetland ecosystems and associated threats was also suggested within the review of management plans.

CWSP also identified a need to restore fish-bearing creeks that have been impacted by development or industrial activity, including forestry, agriculture and transportation. Habitat emerged as a clear priority at the Conservation Forum. Three Priority Actions relate to habitat:

- Identify and protect existing high-quality habitats
- Conserve and restore riparian and wetland habitats
- Conserve and restore montane valley bottom processes and habitats that benefit a suite of species of interest and conservation concern

Species of Importance

Neither invasive species nor at-risk species emerged as Priority Action items at the Conservation Forum. However, previous reports clearly suggest a need to identify and understand impacts of both aquatic and terrestrial invasive species. Participants at the Forum discussed zebra and quagga mussels; invasive plants; American bullfrog; fungus (chytrid and white nose syndrome); non-native fish; white pine blister rust; and the potential impact of domestic sheep diseases. Participants also discussed the role of linear corridors in the spread of invasives.

There is a lack of information about aquatic and terrestrial plants within the wetlands in general, and freshwater biodiversity has not been adequately examined. There are gaps in knowledge about plants and plant communities at risk in the wetlands, the status of cottonwoods and cottonwood habitat in the wetlands, and significant gaps in knowledge relating to population trends, distribution, and conservation status of at-risk species. There is a lack of information about sensitive or critical habitat for at-risk birds,

amphibians, and fish; and a lack of inventory and population status of at-risk birds, amphibians, and fish, including game fish. A need has also been identified for an investigation into the status of fish and wildlife that are critical to maintaining habitat (muskrat, beaver) or altering the nutrient status of the wetlands (kokanee).

Recreation Pressure

The CWSP Wetland Ecosystem Values and Threats report identified threats to wildlife and habitats associated with recreation conducted in an unsustainable manner. Discussions at the Forum also highlighted a range of threats to the region from an increase in outdoor recreation. These include increased trail and off trail use (multi-use and non-motorized); increased new and unauthorized trail building; motorized watercraft on lakes; increased access to backcountry and high alpine; increased activity in the wetlands; snowmaking; and the increased presence of drones, planes and helicopters. "Developing a statutory recreational access plan for the Columbia Valley" emerged as a Priority Action at the Conservation Forum.

Development Pressure

Development pressures vary across the Columbia Wetlands landscape, and development, in various forms, has been identified as a regional concern. Portions of the wetlands are susceptible to on-site development, while others are more vulnerable to activities on adjacent uplands that can disrupt wetland hydrology. Attendees at the Conservation Forum itemized very specific threats, including: extensive logging and road building, major commercial or residential development, urban sprawl, agricultural expansion or intensification, overgrazing or poor range management, unsustainable harvesting of native species and poaching (aquatic vegetation, fish and wildlife, native plants), harvesting and falling of wildlife trees, and persecution and extermination of wildlife. Previous CWSP reports identified both short and long-term effects on wetlands and riparian landscapes from timber harvest, and the impact of development on habitat connectivity in southern portions of the wetlands. Previous reports also identified human threats to levees and cottonwoods as a result of water withdrawals and agricultural activities in association with natural change.

Identifying Key Objectives

Within some of the previous categories, filling one or two key data gaps would begin to address the issue. Identifying these core data needs would help CWSP determine strategic goals or objectives. For example, under climate change, wetland-specific concerns about climate change centre around the implications of climate change to wetland ecosystem function, riparian habitat, and wetland-dependent species. These concerns could be at least partially addressed by responding to the specific need for data on biophysical indicators that could indicate climate change within the wetlands.

Likewise, within the issue of wetland hydrology, a lack of data on the streamflow of the upper Columbia River and the Columbia Wetlands was recognized as a critical impediment to understanding the wetland water regime. Collecting flow data could partially address the need to understand the hydrologic processes that drive the presence of riparian habitat and the causes of its loss; hydrologic changes under climate change; and human modification to natural hydrologic regimes.

It can be harder to shape strategic goals around broad issues, but there are still ways that CWSP can address them. Though the CWSP may lack the capacity to tackle broad, large-scale issues relating to pressure from development, for example, there are regional aspects that can be addressed. Strategic efforts to support the newly-crafted Columbia Wetlands Management Plan or aligning priorities with those already identified by regional and/or major funders could increase the capacity of CWSP to make a difference at a “higher level”.

Tools to Determine Priorities

Conservation priorities can be scored many ways. Ecosystem priorities can be ranked according to perceived value – whether environmental, economic, or cultural. Alternatively, individual species can be prioritized based on the amount of potential value they provide for different purposes (although going that route can neglect to consider those species that are just as valuable but in less tangible ways).

Priorities can also be based on urgency, or perhaps the desire to achieve small successes ("low-hanging fruit") on the path towards larger goals. Areas or species can also be ranked as a high priority because of a lack of status or protection, or by the opposite – a desire to strike fast to protect and maintain a currently intact ecosystem or species.

Risk analysis is the process of prioritizing risks based on the probability of the risk occurring and the impact it would have. [Qualitative risk analysis](#) uses a relative or descriptive scale to measure the likelihood. For example, a qualitative analysis would use a range of "Low, Medium, High" to indicate the likelihood of a risk occurring. The impact of a risk occurring could be ranked similarly with the description of the impact defining where it fell on the grid, e.g., decreased flows within the Columbia River – high impact.

A risk analysis of potential threats to the Columbia Wetlands could help evaluate both the impact and likelihood of various threats to help prioritize issues and provide strategic direction for future actions. For example, threats such as increased non-point pollution; loss of biodiversity (including wetland-dependent organisms); or the loss of the ability of wetlands to mitigate climate change, could be ranked qualitatively according to their likelihood versus impact. Strategic objectives could then be based on highest ranking threats. It should be noted that there are also organization threats. Limited funding, limited sharing of data and limited capacity also have consequences, one of which is the risk that CWSP cannot fulfill its mission.

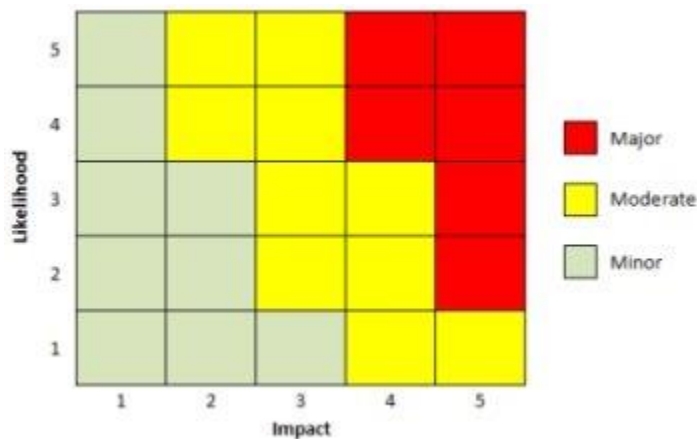


Figure. Risks are plotted on a Risk Assessment Matrix. An issue or threat of low likelihood and low impact would fall into the minor category and not be considered a strategic priority for CWSP.

The Bigger Picture

Regional Funding Priorities

The review of management plans identified the plans with the most significant potential impact on the management of the wetlands. The review also suggested that there are commonalities among the management plans, Priority Actions identified at the Conservation Forum, and funding priorities for programs such as the Columbia Basin Trust's Ecosystem Enhancement Program and the Fish and Wildlife Compensation Program's Riparian and Wetlands Action Plan.

The review indicated that further consultation between CWSP Partners is needed to identify priorities for guiding CWSP's strategic plan. Further discussion might increase collaboration between CWSP members, reduce competition for funding between watershed stewardship groups, and provide access to funds allocated for issues considered by granting agencies to be of a high priority.

Cumulative Effects

The cumulative effects of emerging and current physical and biological stressors can have a profound impact on the ecological functions of the Columbia Wetlands and its adjacent landscape. BC's draft cumulative effects framework is a set of policies, procedures and decision-support tools that help identify and manage cumulative effects. Interim assessment protocols have been approved for [aquatic ecosystems](#). According to the province of BC, "the Aquatic Ecosystems protocol is comprised of an initial set of indicators intended to capture different aspects of watershed functioning and are designed to inform a range of watershed management decisions relating to mitigating the impacts of localized development pressures. The set of core indicators were considered key ones that could reflect a range of sediment production and transport processes, hydrologic processes, the composition, structure, and dynamics of upslope vegetation cover, and riparian conditions that could be affected by land management activities within a watershed." The CWSP has the opportunity to incorporate the protocols into future projects to help decision makers plan for and manage development and other pressures within the wetlands.

Sustainable Development Goals

[Sustainable Development Goals](#) (SDGs) aim to conserve and restore the use of terrestrial ecosystems such as forests, wetlands, drylands, and mountains by 2020. Aligning CWSP planning with the broad goals of the SDGs might lead to funding opportunities. Goal targets have been identified within each of the 17 SDGs. Two SDGs can be considered of relevance to CWSP strategic planning; SDG 15: Life on Land, and SDG 13: Climate Action. Target goals under SDG 15 include:

- By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains, and drylands.
- Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
- By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.

Goal targets under SDG 13: Climate Action include:

- Integrate climate change measures into policies, strategies, and planning.
- Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Incorporating Emerging Technologies

Lack of data is an issue within the Columbia Wetlands, but new technologies have facilitated the development of techniques to generate useful information from incomplete data. Species **ecological niche modeling** is one example. All species of animals and plants obey ecological rules that determine their geographical distribution. Even partial knowledge of the geographic distribution of a species in the present and the levels of environmental variation it tolerates (temperature highs and lows, rainfall, and so on) can be fed into computer algorithms and geoprocessing tools to obtain a quantitative representation of its ecological distribution.

Quick and inexpensive DNA sampling of a river, stream, or lake can now divulge what fish or other animals live there. This rapidly growing **environmental DNA**, or eDNA, technology is proving to be a “game-changing conservation tool”. [Scientists say](#) that eDNA can be used not only to detect the presence of invasive species in a river, lake, or ocean, but also to help reintroduce native species, to study genetic diversity among fish stocks, and to better manage commercial and endangered species. By knowing where the fish live, managers can direct funding for protecting and restoring riparian habitat. eDNA assessment has also become a new, powerful weapon in the fight against invasive species. The ease and low cost of collecting samples have enabled widespread use of the powerful technique and eDNA can be gathered by just about anyone. This technique could be employed with a citizen science project within the Columbia Wetlands.

Next steps

This document is presented as a tool to stimulate discussion about the strategic plan. The CWSP has a broad membership and the priorities of each member, whether individual or group, must be considered. It is frequently easier to discuss broad topics by having points with which to start a conversation. Therefore, the following list provides examples of potential goals based on the overlapping priorities from the reports (to stimulate discussion only; not ranked):

Goal: Address the need for data on biophysical indicators that could indicate climate change within the wetlands.

Goal: Support the collection of flow data to address the need to understand the hydrologic processes that drive the presence of riparian habitat and the causes of its loss; hydrologic changes under climate change; and human modification to natural hydrologic regimes.

Goal: Align projects with those considered by granting agencies to be of a high priority.

Goal: Support the new CWWMA management plan, by aligning priorities with outcomes identified in that plan.

Goal: Identify high-quality wetland habitats that benefit a suite of species of interest and conservation concern.

Goal: Improve understanding of critical geomorphic and hydrologic processes that drive the presence of riparian and wetland habitat and the causes of its loss.

Once CWSP has identified what is important (Step 2 in the creation of a strategic plan), the group must then determine how it will address those priority issues, including how time, human capital and money will be allocated.