Setting Regional Wetland Management Objectives

Phase 1:

Alberta Context, Knowledge Leader Opinions and Jurisdictional Review

Public Report

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1.0 Introduction

The Government of Alberta (GoA) has identified the task of setting regional wetland management objectives in Alberta as important as it proceeds with regulations and initiatives such as the Wetland Policy and regional planning under the Land-use Framework (LUF). While the term 'wetland management objective' has been used in documents such as the LUF Regional Plans and terms of reference (TOR) documents, the term has yet to be defined. There is however an innate recognition that wetlands management needs to evolve from a case-by-case wetland approvals context, to one that plans for managing and retaining the functions that wetlands provide on the landscape, and that setting regional wetland management objectives could play a role in the planning process.

The purpose of this report is to inform the context and process of setting regional wetland management objectives in Alberta. In order to do this, the report provides the following:

- a scan of current legislation, policies and initiatives that include wetland objectives or could be pertinent for setting regional wetland management objectives;

- a summary of interviews with individuals (Knowledge Leaders) in the wetland field providing expert opinions and information about setting regional wetland management objectives in Alberta; and

- a jurisdictional review of North America which provides case studies of other regions that have set wetland management objectives and the potential applications to the Alberta context.

The term 'objective' has been interpreted and used in various ways in the initiatives and processes outlined in this report. While it was not the intention of this report to be prescriptive and outline what a regional wetland management objective should be, it became apparent through the Knowledge Leader interviews that one of the next key steps in the process of creating regional wetland management objectives will be to provide a precise definition for the term.

Initially, this report was intended to seek information on acreage-based wetland objectives, but as the report progressed, it was amended to include function-based wetland objectives in order to be more in alignment with the direction of the Alberta Wetland Policy.

Lilium Consulting was commissioned by the North American Waterfowl Management Plan (NAWMP) Partnership to create a report to inform setting

regional wetland management objectives in Alberta. This report describes the results of the research, interviews and jurisdictional review performed for informing setting regional wetland management objectives.

2.0 Provincial Context

The term 'wetland objective' or other applicable language is referenced in legislation, regulation, policy and plans within the GoA. An overview of provincial context around wetlands objectives in existing documents sets a foundation for how the GoA may consider setting wetland objectives in the future.

While certain policies, plans and initiatives directly mention setting regional wetland objectives, others such as the Wetland Policy allude to it through the use of terms such as "wetland goals" or "wetland outcomes". Current legislation, policies, strategies, plans and initiatives within Alberta that could enable, guide or support the setting of regional wetland objectives are summarized below.

2.1 Legislation

The key pieces of legislation that provide the overarching laws that pertain to wetlands include the *Alberta Land Stewardship Act*, the *Environmental Protection and Enhancement Act*, *Wildlife Act*, the *Public Lands Act,* the *Municipal Government Act* and the *Water Act.* The notable sections of the Acts where wetland objectives could be enabled and supported are also included below, for example under the *Alberta Land Stewardship Act* where regional wetland management objectives could be enabled under an issues-specific plan, or under the *Municipal Government Act* where a municipal authority could require a wetland to be provided as environmental reserve. Please note that the following is not a comprehensive review of all legislation, rather only a cursory review of pertinent legislation.

2.1.1 *Alberta Land Stewardship Act*

- Section 10(1) – Enables Sub-regional Plans, issue-specific plans or other arrangements. Regional wetland management objectives could be enabled under an "issue-specific plan".

- Section 25 – Enables mechanisms that support the protection, conservation and enhancement of the environment, the protection conservation and enhancement of natural scenic or esthetic value and the protection, conservation and enhancement of agricultural lands or land for agricultural purposes. This could enable the conservation of key wetlands identified by regional wetland management objectives.

2.1.2 *Environmental Protection and Enhancement Act*

- Section 21- Enables the government to enter into an agreement with a landowner in order to restrict the land-use for environmental enhancement and protection reasons, as well as provide for the agreement of the

government to provide compensation to the landowner. This could enable any incentive programs necessary to put into place regional wetland management objectives.

- Section 30(2)- Enables the use of funds from the Environmental Protection and Enhancement Fund for environmental protection and enhancement. Could enable the use of funds for the protection and enhancements of key wetlands or wetland areas identified as valuable under regional wetland management objectives.

- Section 36(1)- Enables regulations to be made for the establishment and operation of environmental monitoring programs. Could pertain to any wetland monitoring programs created to track progress on regional wetland management objectives.

2.1.3 *Wildlife Act*

- Section 6- Enables the preparation and adoption of recovery plans for species at risk. Wetland objectives could be utilized in species recovery plans to protect key wetlands that contain important habitat for species at risk.

2.1.4 *Public Lands Act*

- Section 3– The Crown owns title to bed and shore. The Crown could therefore implement regional wetland management objectives for crown-owned waterbodies (crown claimable wetlands).

- Section 8- Enables regulations authorizing and governing dispositions of public land. This could enable the restriction of various types of land-use in wetland areas identified for retention in regional wetland management objectives.

- Section 11(1)– Minister may establish and support programs and initiatives for the purpose of conservation and resource management that assist in resource protection and enhancement, purpose of education and research and assist in resolution of multiple use concerns. This could allow the establishment of the wetland management objectives and the various components required to have stakeholder input.

2.1.5 *Municipal Government Act*

- Section 632- Legislation pertaining to municipal development plans, addressing plans for future land-use and environmental matters within a municipality. Regional wetland management objectives could be incorporated into municipal development plans.

- Section 633- Enables the creation of area structure plans to provide a framework for subsequent subdivision and development of an area of land, including land-uses. Plans could include plans for the retention of wetlands to provide ecosystem services as identified under regional wetland management objectives.

- Section 634- Permits the designation of an area of a municipality as a redevelopment area which can allow for the preservation of lands. Wetlands could be preserved to adhere to regional wetland management objectives.

- Section 654- Outlines the ability for an authority to approve or reject an application for subdivision, and outlines that the proposed subdivision would not interfere with the amenities of the neighbourhood. Wetland values could be taken into account when considering subdivision approvals, and the values of a particular region, expressed through regional wetland management objectives, could be reason to retain wetlands in the area.

- Section 664-Enables authorities to require a landowner that is the subject of a proposed subdivision to provide part of the parcel of land as environmental reserve. Lands that can be required to become environmental reserve include land that consists of swamp, gully, ravine, coulee or natural drainage course, land that is flooding and land not less than six metres in width that is abutting a body of water. Wetlands and adjacent lands identified as important while setting regional wetland management objectives could be conserved as environmental reserves when subdivision of land is taking place.

2.1.6 *Water Act*

- Section 8- Aquatic environment protection strategy. This section of the Water Act could enable wetland objective setting as part of a larger strategy.

- Section 36 – Water Act approval is required for activities in a water body. Can be used as a tool to implement regional wetland management objectives and manage toward set objectives.

2.2 GoA Policies, Frameworks and Strategies

There are many policies and frameworks related to wetlands in Alberta. While the Wetland Policy for Alberta has not been implemented as of yet, its implementation is expected to occur soon and the Wetland Policy will then provide the strategic direction for wetlands across Alberta. In the meantime the Interim Wetland Policy is still in place for the White Zone.

The LUF is another key policy that will have an opportunity to play a role in managing wetlands across the province through regional planning and management frameworks. The regional planning will regulate land-use across Alberta and will form the basis for land management decisions within specific regions. Wetlands management under regional planning and/or management frameworks serves as an important tool to guide wetland decision making by all land-use decision-makers.

2.2.1 The Alberta Wetland Policy

The Alberta Wetland Policy was established to provide a clear and consistent direction for wetlands to land and resource managers, developers, land users and stewards (GoA 2013). The overarching goal of the policy is:

"to conserve, restore, protect and manage Alberta's wetlands to sustain the benefits they provide…" (GoA 2013).

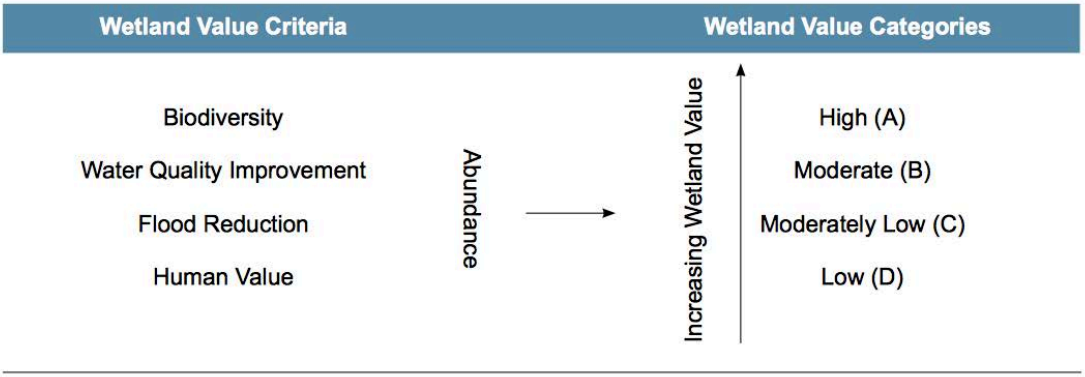
There is no direct mention of the term "wetland objective" in the Wetland Policy, however the intent of the policy is to be more of a strategic high level policy document and the forthcoming Wetland Policy Implementation will provide more specific pieces, such as prescriptive recommendations or objectives (personal communication with Knowledge Leader).

The Wetland Policy does however set in place outcomes and guiding principles to achieve the overarching policy goal. The Wetland Policy outcomes are as follows:

- *Wetlands of the highest value are protected for the long-term benefit of all Albertans.*
- *Wetlands and their benefits are conserved and restored in areas where losses have been high.*
- *Wetlands are managed by avoiding and minimizing negative impacts, and, where necessary, replacing lost wetland value.*
- *Wetland management considers regional context* (GoA 2013).

The policy also outlines how wetland value will be determined by comparing wetlands across a common list of metrics through the 'relative wetland value approach' in the Wetland Value Approach Matrix (Figure 1) (GoA 2013). By examining the biodiversity and ecological health, water quality improvement, hydrologic function, human uses and relative abundance of a wetland, a high-low (A-D) wetland value category will be assigned (GoA 2013).

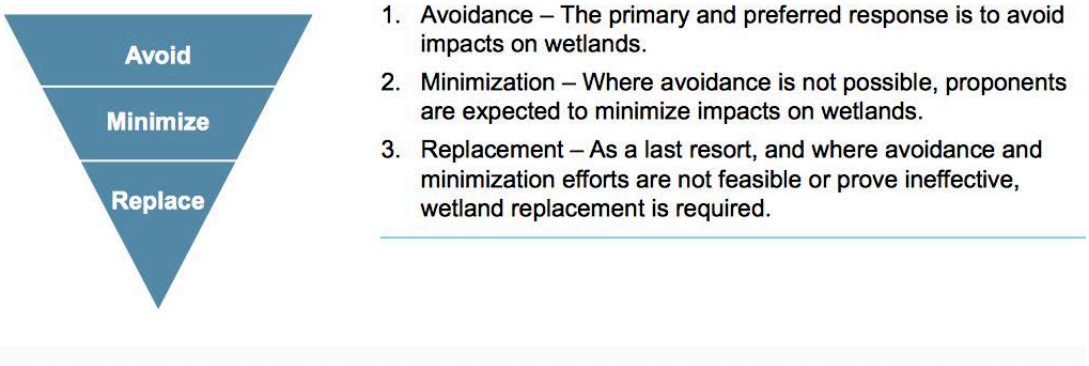
Figure 1. Wetland Value Approach Matrix



(GoA 2013)

Wetland mitigation under the Wetland Policy is used to guide management activities for the avoidance and minimization of negative impacts to wetlands, and as a last resort, replace lost wetlands where necessary (GoA 2013). The mitigation hierarchy (Figure 2), which will be informed by the relative wetland value, will be the basis for wetland management decision-making (GoA 2013).

Figure 2. Wetland Mitigation Hierarchy



(GoA 2013)

The guiding principles of the wetland mitigation system under the Wetland Policy are:

- *The primary focus of the wetland mitigation system is to sustain the full range of wetland functions and benefits.*

- *The mitigation hierarchy will encompass consistent and predictable processes. It will begin with (and place the greatest emphasis on) wetland avoidance, proceed through minimization only if avoidance is not practicable, and consider wetland replacement only as a last resort.*

- *Mitigation is one component of a broader policy approach to wetland management that includes planning, education and awareness, and voluntary stewardship programs.*

- *The wetland mitigation system will support cumulative effects management on a landscape scale through land-use and regional planning. It will guide site-specific regulatory decisions by considering place-based economic, social, and environmental priorities.*

- *The wetland mitigation process will be considered in all stages of a project; from land or lease purchase, planning, siting, and design, through implementation and monitoring.*

- *The wetland mitigation system will be efficient, cost effective, predictable, fair, easily understood, and publicly accessible.*

- *No one group will be expected to bear the entire burden of wetland tradeoff decisions. There must be some consideration of what constitutes an equitable sharing of environmental, social, and economic costs between all groups involved, including society at large.*

- *Monitoring is an essential component of an adaptive management approach. In cases where a monitoring requirement is identified, proponents will bear the cost of site level monitoring; the Government of Alberta will be responsible for monitoring and evaluation of the broader wetland mitigation system.*

- *The wetland mitigation system will be adaptable, acknowledging and incorporating new information, as wetland science and public policy continue to evolve.*

- *A comprehensive record-keeping system will be developed and used to maintain an administrative link between a development activity, the management decision, wetland impacts or losses incurred, and any resulting mitigation activities* (GoA 2013).

Guiding principles are also written into the policy for the wetland avoidance system and the wetland minimization system (GoA 2013). A wetland replacement matrix (Figure 3) has also been created for the wetland replacement component of the wetland mitigation hierarchy.

Figure 3. Wetland Replacement Matrix

The Wetland Replacement Matrix

Value of Lost Wetland	Value of Replacement Wetland: D	C	B	A
A	8:1	4:1	2:1	1:1
B	4:1	2:1	1:1	0.5:1
C	2:1	1:1	0.5:1	0.25:1
D	1:1	0.5:1	0.25:1	0.125:1

*Ratios are expressed as hectares of wetland

(GoA 2013).

As the Wetland Policy's intent is to provide strategic direction, it has identified a number of elements that are required to support the development and implementation of the policy. System needs to support and enable the Wetland Policy include:

- *a provincial wetland inventory;*
- *a provincial wetland value assessment system;*
- *a wetland value assessment tool;*
- *a wetland database and reporting tool;*
- *an inventory of wetland restoration opportunities;*
- *certification systems;*
- *a repository of research priorities and needs; and*
- *an education and outreach program* (GoA 2013).

Setting regional wetland management objectives in Alberta would need to be in alignment with the Wetland Policy, and would have to adhere to the policy's guidance, particularly once the Wetland Policy Implementation is completed.

However, setting regional wetland management objectives could support the Wetland Policy outcomes and guiding principles in the following ways:

- regional wetland management objectives could set recommendations for how the Wetland Policy outcomes could be accomplished in a chosen region, while taking into account regional context and stakeholder values;

- setting regional wetland management objectives could be used as a tool to ensure that key wetlands and wetland habitats are conserved, adding additional wetland protection incentive;

- having a process for setting regional wetland management objectives in chosen regions could ensure that wetland planning happens across the Province at appropriate scales;

- setting regional wetland management objectives can ensure that the stakeholders are involved in the process of wetland management, and that they are helping to make trade-off decisions necessary for wetland retention, restoration and disturbance.

2.2.2 Wetland Management in the Settled Area of Alberta

Wetlands in Alberta are currently managed under an interim wetland policy put in place for the White Zone of the province. *Wetland Management in the Settled Area of Alberta: An Interim Policy*, hereby referred to as the Interim Wetland Policy, was put into place in 1993 to manage wetlands in the in the most populated portion of the province while awaiting a province-wide wetland policy (Alberta Water Resources Commission [AWRC] 1993).

The Interim Wetland Policy has numerous mentions of setting wetland management objectives and the context in which they would be used. The following excerpts from the Interim Wetland Policy pertain to setting regional wetland objectives:

- *Regional wetland management objectives will be developed. Wetland values, the type and distribution of wetlands and the policy intent will be considered when regional wetland management objectives are developed. Objectives will be reviewed and revised as more information becomes available.*

- *Inter-departmental wetland management planning, including development of regional wetland management objectives, will be coordinated by Alberta Environmental Protection and should occur at the watershed level.*

- *Municipal governments and regional planning commissions will be encouraged to use statutory plans and development controls to implement the wetland policy and regional wetland management objectives.*

- *Drainage of wetlands will be guided by the wetland management policy and regional wetland management objectives and may be permitted under license, inter-departmental referral of drainage proposals will continue, to ensure*

consideration of a full range of wetland values. Mitigation of lost wetland benefits may be required to meet regional wetland management objectives.

- *Retention of natural wetlands within urban areas will be encouraged. Mitigation of the impacts of urban development on wetlands may be required to meet regional wetland management objectives.*

- *Retention of wetlands during transportation, utility and energy development will be encouraged. Mitigation of damage to wetlands and natural drainage patterns may be required to meet regional wetland management objectives.*

- *A provincial inventory* of *wetlands will be completed using new and existing information. Key data that will be collected at the broad level will include wetland extent/size/abundance, location/distribution, type, ownership and surrounding land use. More detailed information will be required to establish regional wetland management objectives and to make day-to-day wetland management decisions. Use* of *satellite-based information and a geographic information system will be evaluated (AWRC 1993).*

Despite having guidelines around wetland management objectives in the Interim Wetland Policy, these objectives were not implemented. The guidance under the Interim Wetland Policy does provide ideas for consideration however, some of the language in the Interim Wetland Policy is quite prescriptive. Setting regional wetland management objectives will need to consider the current wetland context and direction of the new Wetland Policy going forward.

2.2.3 Land-use Framework

The Alberta LUF was introduced in 2008 by the GoA as a regional management approach for achieving Alberta's economic, environmental and social goals, with regulatory backing from the *Alberta Land Stewardship Act* (GoA 2008a). The LUF enables Regional Plans to be developed in Alberta in 7 pre-determined regions, and allows provincial policy (such as the Wetland Policy) to be translated to a regional scale (GoA 2013).

The outcomes for the LUF are:

- *healthy economy supported by our land and natural resources;*

- *healthy ecosystems and environment; and*

- *people-friendly communities with ample recreation and cultural opportunities* (GoA 2008a).

The strategies under the LUF are as follows:

- *7 regional land-use plans based on 7 new land-use regions;*
- *create land-use secretariat and establish a regional advisory council for each region;*
- *cumulative effects management will be used at the regional level to manage the impacts of development on land, water and air;*
- *develop a strategy for conservation and stewardship on private and public lands;*
- *promote efficient use of land to reduce the footprint of human activities on Alberta's landscape;*
- *establish an information, monitoring and knowledge system to contribute to continuous improvement of land-use planning and decision-making;*
- *inclusion of Aboriginal peoples in land-use planning; and*
- *priority actions for the Land-use Framework* (GoA 2008a).

The Regional Plans establish regional visions, outcomes and objectives, and also include strategies and actions to achieve the outcomes and objectives (GoA 2008a). The use of indicators helps to assess whether regional and provincial outcomes are being achieved (GoA 2008a). Under the LUF process, the GoA has committed to setting thresholds, measurable management objectives, and to use indicators and targets for environmental resources (GoA 2008a). Regional Plans provide specific strategic and implementation guidance to land and resource managers within the regions.

Lower Athabasca Regional Plan

In 2012 the GoA released the *Lower Athabasca Region Plan* (LARP) (GoA 2012b). The initial TOR, released in 2009, had the following mention of wetland objectives:

- *The scope of future oil sands development therefore engages other land-use considerations, including the following:*
    - *land-use must be managed to meet regional and local environmental objectives, such as the protection of vulnerable waterbodies and wetlands (GoA 2009a).*

LARP did not include any specific reference to wetland objectives.

North Saskatchewan Regional Plan

Wetland loss and degradation is identified as a challenge in the North Saskatchewan region (GoA 2014c).

There is mention of setting regional objectives under the Wetland Policy in the TOR for the *North Saskatchewan Regional Plan* (NSRP):

- *Wetlands and riparian areas in the region have been degraded or lost leading to reduced wildlife habitat, water filtration and flood mitigation capacity. The Alberta Wetland Policy provides provincial direction. The Regional Plan will be an important vehicle to deliver this policy through setting regional objectives and strategies for wetland conservation and management. (GoA 2014b)*

The final report for the NSRP has not yet been released.

South Saskatchewan Regional Plan

In 2014 the GoA released the *South Saskatchewan Region Plan* (SSRP) (GoA 2014). The South Saskatchewan region has experienced altered flow regimes and degraded water quality as a result of wetland loss and degradation of riparian lands (GoA 2014c). As a result, the SSRP has committed to the following wetland strategies:

- *Establish regional wetland management objectives as enabled under the Alberta Wetland Policy. The objectives will focus on the wetland values that are of high priority including biodiversity, water quality improvement, flood reduction and human use.*

- *Continue to facilitate the advancement of wetland knowledge, data systems and science in the region. Current efforts in these areas include enhancement of the Merged Alberta Wetland Inventory, development of the Alberta Wetland Classification System and refinement of several wetland assessment tools.*

- C*ontinue to increase knowledge and improve management of wetland areas within the region* (GoA 2014c).

The SSRP includes environmental management frameworks as part of the overall regional planning process and several planning initiatives that support water management. These frameworks and Sub-regional Plans, specifically the *Surface Water Quality Management Framework (GoA 2014d)* and the *Bow River Phosphorous Management Plan (GoA 2014a)*, are examples that support key environmental topics within the region. A wetland management framework could potentially be created under the future LUF plans and could mirror the environmental frameworks that have already been done within the SSRP.

Summary of the Land-use Framework

The detail which would be required for setting regional wetland management objectives would likely be in the individual Regional Plans, Sub-Regional Plans or environmental frameworks associated with the Regional Plans. However, creating regional wetland management objectives would contribute to the overall LUF outcome of healthy ecosystems and environment and could also play a key role in helping to plan for conservation and stewardship, as well as be involved in the information, monitoring and knowledge systems outlined in the LUF strategies.

While there is a commitment in the SSRP to establish regional wetland management objectives, work has not begun on these objectives due to the ambiguity and complexity of how to set regional wetland management objectives (personal communication with Knowledge Leader). In order to begin establishing regional wetland management objectives under a Regional Plan, it is felt that the concept will need to be clearly defined and a straightforward process will need to be established (personal communication with Knowledge Leader).

There is an opportunity to create regional wetland objectives in the Regional Plans, in Sub-regional Plans or have wetland management frameworks drafted under the Regional Plans.

2.2.4 Water for Life Strategy

Water for Life is a strategy released by the GoA in 2003 as a vehicle for managing Alberta's water resources (GoA 2008b). This strategy was updated with *Water for Life: A Renewal* in 2008 to report on the progress that had been made on some of the key initiatives under the original Water for Life plan (GoA 2008b), and *Water for Life: Action Plan* in 2009 to provide outcomes within an updated context as well as more consistency with other current GoA strategic policies (GoA 2009b).

The Wetland Policy states that wetlands are integral to watershed health in Alberta and to the achievement of the three goals of Water for Life (GoA 2013). The three main goals of Water for Life are:

- *safe, secure drinking water;*
- *healthy aquatic ecosystems;*
- *reliable, quality water supplies for a sustainable economy* (GoA 2008b).

The Water for Life Renewal had only one mention of wetlands in the key actions for the updated strategy, under the knowledge and research goal:

- *enhance the provincial water monitoring and evaluation program including information on wetlands, groundwater, aquatic health, water quality, drinking water and water supply* (GoA 2008b)

The Water for Life Action Plan notes that:

- *standards to conserve wetlands will be implemented through a provincial wetland policy* (GoA 2009b)

Under the goal of healthy aquatic ecosystems in the Water for Life Action plan, the following key action pertaining to wetlands is written:

- *apply research and knowledge to develop and model indicators of wetland health (GoA 2009b)*

And under direction for knowledge and research are the following wetland references for the development and implementation of an education framework to support Water for Life :

- *develop print- and web-based public information resources on the following topics: watershed management, wetlands, groundwater, and water conservation;*

- *develop and support teacher resources and programs on watershed management, wetlands, groundwater, and water conservation;*

- *support and facilitate partnerships on education programs related to watershed management, wetlands, groundwater, and water conservation* (GoA 2009b).

Setting regional wetland management objectives could contribute to all three goals of Water for Life through the maintenance of the ecosystem services that wetlands provide, particularly the goal of having healthy aquatic ecosystems. The ways that setting wetland management objectives could contribute to the key actions of the Water for Life Renewal and the Water for Life Action Plan are as follows:

- the monitoring of wetland indicators that would likely be involved for regional wetland management objectives could contribute to the development of model indicators, as well as the enhancement of a provincial water monitoring and evaluation program; and

- setting regional wetland management objectives has the potential to help in providing public information and education around wetlands through a stakeholder engagement processes.

2.3 Watershed Groups

Under the Water for Life strategy, stakeholder involvement is identified as playing a key role in watershed planning. Watershed Planning and Advisory Councils (WPACs) serve to provide advice to the GoA through watershed management plans. Other watershed groups also known as Watershed Stewardship Groups have been formed at a grass roots level and support on the ground actions and in some cases watershed planning at a sub-watershed level.

2.3.1 Watershed Planning and Advisory Councils

WPACs have been created under Alberta's Water for Life Strategy (see section 2.2.4), in order to assess watershed conditions (Alberta WPACS 2012). These multi-stakeholder, non-profit organizations bring together key stakeholders to then create watershed management plans and develop activities to address watershed issues (Alberta WPACs 2012). The 11 WPACs in Alberta have successfully worked through collaborative processes to develop watershed objectives, including objectives for wetlands, in order to make recommendations to water and land-use decision-making authorities (GoA 2014c).

Of the 11 WPACs, four are mentioned in this report due to their work on wetland objectives. The Bow River Basin Council (BRBC) is highlighted as they have created an extensive list of regional wetland management objectives for the Bow River Basin.

BRBC

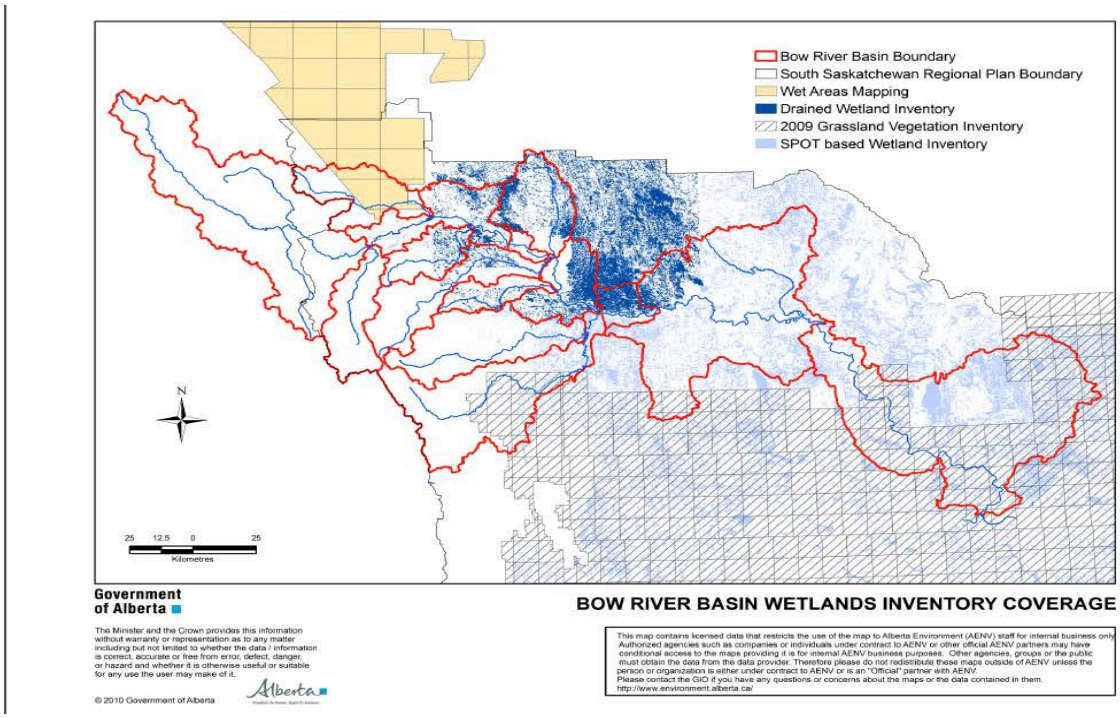
The BRBC has developed watershed outcomes and site-specific water quality objectives for the Bow River to achieve the watershed outcomes, which are described in detail in the second phase of the Bow Basin Watershed Management Plan (BBWMP)(BRBC 2012). The BRBC uses environmental indicators in their Adaptive Environmental Performance Management System (Figure 4) to measure, monitor and evaluate watershed conditions (BRBC 2012).

Figure 4. Environmental Performance Management System

(BRBC 2012)

The wetlands section of the BBWMP includes a list of the ecosystem services that wetlands provide, as well as the map of the current wetland coverage and historically drained wetlands for the area (Figure 5)(BRBC 2012).

Figure 5. Bow River Basin Wetlands Inventory Coverage



(BRBC 2012)

The Bow Basin Watershed Management plan also includes general outcomes, measurable objectives, indicators and thresholds as well as the strategies and actions to pursue the objectives and outcomes pertaining to wetlands (BRBC 2012).

The general Bow Basin wetland outcomes in the plan are as follows:

- *impacts to existing wetlands should be avoided wherever possible;*

- *existing wetland complexes including associated upland areas and ephemeral wetlands are kept intact or restored, ecologically functional, appreciated and valued;*

- *core ecological functions of healthy wetlands are maintained (e.g., water quality protection, water storage and flood protection, biodiversity, habitat, etc.);*

- *invasive plant species are reduced, especially in riparian lands adjacent to watercourses and water bodies; and*

- *enhanced knowledge and understanding of:*

    - *the role wetlands play in supporting healthy watersheds through water capture and storage, groundwater recharge and/or discharge, and water purification;*

    - *the importance of connectivity of wetlands to the continued functionality of wetlands* (BRBC 2012).

In order to be able to determine whether or not the wetland outcomes are being achieved, the following measurable objectives have been set in place by the BRBC:

- *no further net loss of wetland area;*

- *no further net loss of wetland number; and*

- *the percentage of Bow Basin municipalities with wetland conservation guidelines, policies and/or bylaws on no further net loss of wetland area (BRBC 2012).*

The measurable objectives have been assigned indicators, thresholds and timelines (Figure 6) (BRBC 2012).

Figure 6. Indicators, Thresholds and Timelines for the Measurable Wetland Objectives in the BBWMP

INDICATOR	TRIGGERS, LIMITS AND TARGETS[77]	PRIORITY & TIMELINE
Net loss of wetland area.	Limit: No further net loss of wetland area. This can be achieved using existing tools (e.g., avoidance of negative impacts, guidelines, policies, best management practices, compensation through restoration of wetlands, etc.).	Short-Term by End 2013
Net loss of wetland number and diversity.	Target: No net loss of wetland number and diversity. Cumulatively, multiple wetlands on the landscape provide greater benefit and function than fewer, larger wetlands. The diversity of wetland types also need to be maintained.	Short-Term by End 2013
Percentage of Bow Basin Municipalities with wetland conservation, restoration and management guidelines, policies and/or bylaws based on no further loss of wetland areas.	Target: 100% of Bow Basin Municipalities with wetland conservation, restoration and management guidelines, policies and/or bylaws based on no further loss of wetland areas.	Short-Term by End 2013

(BRBC 2012)

The specific strategies and actions to support the wetland outcomes and objectives are split into the categories of wetland policy/bylaws, planning, best management practices (BMPs), as well as knowledge and education (Figure 7) (BRBC 2012).

Figure 7. Strategies and Actions for the Wetland Outcomes and Measurable Objectives in the BBWMP

NO.	TOPIC	RECOMMENDATION	PROPOSED IMPLEMENTERS	PRIORITY & TIMELINE
		WETLANDS - POLICY AND/OR BYLAWS		
2.43	Wetland Conservation Guidelines for Municipal and Urban Areas	Develop wetland conservation and management policies and/or bylaws based on no further loss of wetland areas, and develop strategies and tools for measuring and implementing no net loss within municipal boundaries.[78] Municipal examples provided.	Bow Basin Municipalities, Bow Basin First Nations	Medium to Long-Term by 2015 or beyond
2.44	Wetland Conservation and Management Guidelines for Agricultural Areas	In consultation with landowners, develop wetland conservation, restoration and management guidelines, policies and/or bylaws based on no further loss of wetland areas, and develop strategies and tools for measuring and implementing no net loss within agricultural areas.	Bow Basin Municipalities, Bow Basin First Nations	Medium-Term by End 2015
2.45	Provincial Wetland Policy	Finalize and release a provincial wetland policy. For the Bow Basin, the BRBC recommends that this policy should be based on the concept of no net loss of wetland area.	GOA	Short-Term by End 2013

NO.	TOPIC	RECOMMENDATION	PROPOSED IMPLEMENTERS	PRIORITY & TIMELINE
		WETLANDS - PLANNING		
2.46	Priority Wetland and Riparian Areas in the Bow Basin Workshops [79]	Host a workshop (or workshops) of experts and key stakeholders to: • identify high priority areas for future wetland and riparian inventories in the Bow Basin; • with the information available, develop a strategy to identify all "significant wetland and riparian lands and/or complexes" in the Bow Basin. • determine if further management actions are required (in addition to those contained herein). This information should be made available on the BRBC website for municipalities and other decision makers as an information and decision support tool. A list of clearly defined action items and next steps should result from these workshops. The inventory should be kept up-to-date as new information become available.	BRBC, DUC, Cows and Fish, GOA (ASRD, AEW, AARD), Bow Basin Municipalities, Bow Basin First Nations, WSG	Short-Term by End 2013, Medium-Term by End 2015 to Complete
2.47	Wetland Restoration	Continue with efforts to restore and/or reclaim lost and/or degraded wetlands.	DUC, GOA (AEW) Western Sky Land Trust, Southern Alberta Land Trust Society, Foothills Land Trust	Short-Term by End 2013
2.48	Land Trusts and Wetlands Conservation	Land trusts should continue to work with landowners and other key stakeholders to help conserve and protect significant riparian and wetland areas.	Nature Conservancy of Canada	Short-Term by End 2013
		WETLANDS - BEST MANAGEMENT PRACTICES		
2.49	Wetland and Riparian Lands Best Management Practices [80]	Apply best management practices for all wetlands and riparian lands (e.g., targeted access points, alternative grazing management systems such as rotational grazing, apply buffers around wetlands and riparian areas, etc.).	Bow Basin Municipalities, Bow Basin First Nations, Landowners, Industry, AEPA	Short-Term by End 2013
		WETLANDS - KNOWLEDGE		
2.50	Alberta Wetland Classification System	Finalize and release a single wetland classification system to be used throughout Alberta.	GOA	Short-Term by End 2013
		WETLANDS - EDUCATION		
2.51	Wetland and Riparian Management Tools Workshop [81]	Host a workshop of experts and key stakeholders to raise awareness of existing wetland and riparian conservation and management tools (e.g., existing policies, tradable credits, incentives, disincentives, direct methods, indirect methods, financial methods, social methods, guidelines, policies, bylaws, zoning regulations, land use overlays, etc.). A list of clearly defined action items and next steps should result from this workshop.	BRBC, Cows and Fish, DUC, GOA, Bow Basin Municipalities, Bow Basin First Nations, WSG	Short-Term by End 2013 Short-Term by End 2013
2.52	*Wetland Education*	Develop an education strategy to specifically target the loss of wetlands in agricultural areas.	DUC, BRBC, GOA	
		WETLANDS - KNOWLEDGE		
2.53 (Link 1.61)	*Wetland Function Research*	Further research into wetland function including investigating groundwater recharge and surface water quantity relationships in wetland function.	DUC*, AEW, University of Calgary	Medium-Term by End 2015

(BRBC 2012)

The wetland outcomes, measurable objectives, indicators and thresholds, as well as strategies and actions provide usable wetland objectives that could serve as regional wetland management objectives, or as an example of how regional wetland management objectives could be formed and what they could include. The BRBC ensured that their wetland objectives aligned with Provincial policy (BRBC 2012), and used a multi-stakeholder process to create the objectives. The indicators, thresholds and timelines ensure accountability in the process.

Milk River Watershed Council

The Milk River Watershed Council (MRWC) completed the Milk River Integrated Watershed Management Plan (MRIWMP) in 2014, and has set an annual review period, and an update period of every three years to reflect the current circumstances of the Milk River watershed (MRWC 2014). Outcomes outlined in the MRIWMP were determined through community and stakeholder meetings, and are intended to be considered by resource managers and watershed users (MRWC 2014).

General concerns of the watershed include:

- *ability to maintain wildlife and biodiversity;*
- *potential loss/degradation of wetlands and riparian areas; and*
- *impact of various land uses (e.g. recreation, oil and gas, and agriculture) on watershed resources* (MRWC 2014).

General recommendations, outcomes and goals as well as targets and thresholds are provided under the section on riparian areas and wetlands. The overall objective of the riparian and wetland topic is:

- *to recommend minimum setback requirements for development from the Milk River and its tributaries and recommend appropriate management strategies to protect and/or enhance riparian and aquatic ecosystems* (MRWC 2014)

The overall outcome and goal for riparian areas and wetlands is:

- *healthy, functioning riparian areas that contribute to streambank stability, good water quality, forage, shelter and biodiversity in the Milk River watershed* (MRWC 2014)

The targets and thresholds for riparian health were scored by categories established by Cows and Fish:

- *Riparian Health Target: Riparian health scores should fall within the "Healthy" category (i.e., having a score of equal to or greater than 80 for all four river reaches).*

- *Riparian Health Threshold: Riparian health scores should not be less than 70 in all river reaches (70 is the mid-point of the Healthy with Problems" category)*(MRWC 2014).

The watershed is divided into tributaries, and the health of the riparian areas was gauged for each tributary reach and indicated in the MRIWMP (MRWC 2014). Recommendations are made in the plan to address areas where riparian health was rated as being less than healthy, but recognize that the usage of the strategies is ultimately at the discretion of the land managers in the area (MRWC 2014). The specific recommendations made under the following categories:

- *vegetative cover of streambanks and floodplain;*

- *invasive and disturbance-caused plants;*

- *tree/shrub establishment and regeneration; and*

- *stream channel incisement and stability* (MRWC 2014)

Setback requirements for specific agricultural activities are emphasized in the recommendations within the report section on riparian areas and wetlands due to the nature of the land use in the area (MRWC 2014). An implementation plan is provided in the MRIWMP (Figure 8), which outlines the recommendations, jurisdictions that would be responsible for implementing the recommendation, the actions required, the timeline and the value of the recommendation for the community (MRWC 2014).

Figure 8. Implementation Strategy for Riparian Area and Wetland Recommendations in the MRIWMP

RECOMMENDATION	RESPONSIBLE JURISDICTION	ACTIONS	TIMELINE	COMMUNITY VALUE
8.4.3 a Encourage riparian management strategies when riparian health scores approach or fall below the threshold score of 70.	Landowners; Municipalities; ESRD	Landowners are encouraged to partner with NGOs to complete riparian health assessments. Access funds to collaborate with non-profit organizations to complete riparian health assessments where no assessment exists or review riparian health assessment scores. Develop an action plan to improve scores where needed.	M	L
	GOA	Provide funding support for invasive species management on Public Land to municipalities. Establish grazing management strategies that reduce the occurrence of weeds on Public Lands.	H	H
8.4.3 b Re-establish preferred native tree and shrub species.	Stewardship Groups	Access funding and implement projects that protect native tree and shrubs adjacent to the Milk River. Projects may include tree plantings and bioengineering of streambanks on tributaries to the Milk River. Include wildlife proofing to assist with project success. Manage beaver population.	M	M
8.4.3 c Manage the timing and duration of flows to promote the regeneration of native tree species.	ESRD; Government of Montana	ESRD and the Government of Montana should discuss the timing and volume of St. Mary River diversion flows to meet riparian and aquatic needs in the Alberta reach within the context of the Boundary Waters Treaty (1909) and the IJC Order (1921). Consider recent research regarding river flows and vegetation establishment (Golder Associates 2010). Based on the recruitment box model, the river stage that would provide improved riparian recruitment after a major flow event (i.e., the 1 in 5 year flood event or greater) corresponds to flows between 10 m^3/s and 30 m^3/s (353 cfs and 1,059 cfs) (in mid-June through July) for cottonwoods and between approximately 5 m^3/s and 15 m^3/s (177 cfs and 530 cfs) for willows (Figure 8). Managing flow recession and providing seasonal flow variability within this range of flows will likely result in improved riparian conditions on the Milk River (Golder Associates 2010).	M	M

RECOMMENDATION	RESPONSIBLE JURISDICTION	ACTIONS	TIMELINE	COMMUNITY VALUE
8.4.3 d Apply appropriate riparian setbacks to new developments.	Municipalities; ESRD	Amend Land Use Bylaws to include riparian setbacks.	M	M
8.4.3 e Permitted and restricted activity in riparian setbacks.	Municipalities	Amend Land Use Bylaws to include permitted and restricted activities within riparian setbacks.	M	M
8.4.3 f Industrial activity.	Industry	Industry should abide by 100 m setback back rule for water bodies and steep slopes.	H	H
8.4.3 g Apply BMPs.	ESRD; AARD; MRWCC	Promote landowner participation within programs to subsidize the cost of BMP implementation and long-term maintenance (e.g., Growing Forward II). MRWCC should encourage the GOA to develop an Environmental Goods and Services policy. Develop an Ecological Goods and Services program to address the implementation of biodiversity BMPs in the watershed and their long-term maintenance.	H	H
	MRWCC; ACA; MultiSAR	Develop a factsheet, in collaboration with partners, to highlight cost-effective BMPs that are appropriate for use in the Milk River watershed.	M	M
	Land Managers	Seek technical and financial assistance to apply appropriate BMPs within land management strategies wherever possible.	M	M
8.4.3 h Riparian health assessment program.	ESRD; MRWCC; ACA; Biodiversity Monitoring Institute	Develop a riparian health assessment monitoring program, including a funding mechanism, to re-assess riparian areas every 5 to 7 years. Riparian health data should be reported in the Milk River State of the Watershed Report.	H	H
8.4.3 i Research the establishment and survival of Plains Cottonwood.	MRWCC	Develop a Terms of Reference to guide a research study on Plains Cottonwood and other riparian vegetation establishment and survival. This may include implementation of a pilot project for Cottonwood establishment.	M	M

H = High Priority, 2014-2016; M = Medium Priority, 2017-2019; L = Low Priority, 2020-2023

(MRWC 2014)

The concerns for riparian areas and wetlands in the MRIWMP represent the values of stakeholder in the region, and combined with the objectives, outcomes, goals, recommendations and implementation strategies, the plan would be an excellent starting point to create wetland management objectives in the Milk River watershed.

Red Deer River Watershed Alliance

The Red Deer River Watershed Alliance (RDRWA) drafted a Background Technical Report on Riparian Areas, Wetland and Land Use for the Red Deer River Integrated Watershed Management Plan (IWMP) (RDRWA 2013).

As part of the report, draft wetland goals and outcomes were created for the Red Deer Watershed (RDRWA 2013). The draft management goals for the Red Deer Watershed are as follows:

- *wetlands as well as their functions and ecosystem services are protected, restored, or enhanced;*
- *wetlands contribute to maintaining or improving surface water quality and other watershed management objectives (e.g., water conservation, flood damage minimization, biodiversity);*
- *landowners, governments, and other stakeholders are active stewards of wetland environments; and*
- *knowledge of wetlands is improved* (RDRWA 2013).

The draft outcomes for the draft management goals are the following:

- *no further net loss of wetland area and functions;*
- *restore lost or degraded wetlands where feasible and beneficial;*
- *where ecologically significant wetland complexes exist, maintain or restore associated upland areas to retain or enhance landscape connectivity;*
- *maintain core ecological functions and services of wetlands (e.g., water storage, flood control, biodiversity support, climate regulation, etc.) through planning of compatible adjacent land uses;*
- *the values and functions of wetlands are recognized by all stakeholders when making decisions and taking action;*
- *wetlands are conserved and managed by all stakeholders based on a watershed stewardship approach; and*

- *knowledge of wetlands in the watershed is enhanced, including distribution, functions, and services of wetlands and interrelationships with surrounding areas and society* (RDRWA 2013).

Indicators and targets, created to measure the progress of the outcomes, are outlined in the report (Figure 9)(RDRWA 2013).

Figure 9. Wetland Indicators and Targets for Measuring Progress of Wetland Outcomes in the Red Deer River Watershed

Indicator	*Type of Indicator*	*Scale of Analysis*	*Targets*	*Notes*
Key Recommended Indicators				
Wetland Cover (%)	Environmental	Watershed	>7.5%	Greater than baseline conditions to achieve no net loss outcome
		Landscape Units and Sub-watershed	e.g., >13.6% in Medicine sub-watershed	
Peatland Cover (%)	Environmental	Landscape Units	e.g., >6.0% in Upper Headwaters	Greater than baseline conditions
Municipalities with Wetland Conservation/ Restoration Bylaws or Policies	Programmatic	Watershed Municipal	100% of all municipalities in the watershed	May be combined with riparian bylaws/policies Should address avoidance, Environmental Reserve, compensation, setbacks, inter-municipal collaboration, etc.
Awareness of all stakeholders (residents, farmers, developers, etc.)	Social	Watershed	e.g., 30% increase over 10 years	Will require standardized and statistically random surveys

(RDRWA 2013)

The specific recommendations for wetland management in the Red Deer River Watershed are grouped under the categories of monitoring and data acquisition, research needs and suggested BMPs for wetlands. The recommendations are as follows and are described in more detail in the IMWP:

Monitoring and Data Acquisition:

- *improve the current wetlands inventory;*
- *conduct a drained wetlands inventory;*
- *identify ecologically and hydrologically significant wetlands;*
- *LiDAR and drainage basin definition; and*
- *integrate wetlands indicators within an integrated monitoring and reporting system (RDRWA 2013).*

Research Needs:

- *long-term wetland monitoring program;*
- *investigate wetlands targets in a nested hierarchy of scales;*
- *hydrologic study on wetlands;*
- *integrate ecological research with economic models;*
- *regionally-calibrated wetland function models;*
- *review and harmonize municipal policies and plans; and*
- *ensure coordination and integration of wetlands with other watershed considerations* (RDRWA 2013)

A detailed section on suggested key BMPs for protection and compensation tools, compensation considerations, scientific BMPs and education strategies around BMPs is also in the IMWP as part of the recommendations (RDRWA 2013).

As with the BRBC and MRWC, the draft management goals, outcomes, indicators and recommendations provided by the Red Deer River Watershed Alliance, could easily become the basis for regional wetland management objectives, as they represent the wetland concerns and information of the Red Deer River watershed region.

Vermillion River

The Vermillion River watershed has been altered considerably through extensive wetland drainage to benefit agriculture, transportation and other development (North Saskatchewan Watershed Alliance [NSWA] 2012). The Vermilion Lakes and Vermillion River have also been channelized in response to damaging floods that occurred in the region (NSWA 2012). These alterations have affected the watershed's ability to function and consequently the watershed's health has been rated as poor (NSWA 2012). The Vermillion River Watershed Management Plan (VRWMP) provides recommended actions to meet the Water for Life Strategy goals and guide decision-making around watershed resources in the region (NSWA 2012).

The goals of the VRWMP and the recommended actions under the broad-based goals are as follows:

Develop capacity and knowledge in the Vermillion River watershed

- *Establish an inter-municipal partnership to promote and coordinate watershed stewardship programs and plans among municipalities and explore*

opportunities for the partnership to act as a wetland mitigation and restoration agency.

Improve reliability of surface water supply in the Vermillion River watershed

- *Evaluate and report risks to water supply (water quantity) in the Vermilion River resulting from climate change, human uses, landscape-scale alterations (from wetland loss and land clearing), and from current approaches to surface and groundwater management.*

- *Evaluate the ability of natural, and constructed or restored water bodies and wetlands to provide water storage and environmental benefits, both locally and downstream, to meet current and future needs.*

- *Develop wetland protection and restoration plans, practices and policies to conserve existing wetlands, restore drained or degraded wetlands, or create new (ecologically functional) wetlands where storage is needed but restoration is not feasible:*

  -Prioritize wetlands/wetland complexes for conservation and restoration based on hydrology, water quality and biodiversity significance

  -Develop and implement policies that mitigate wetland loss, prevent unlicensed drainage, and balance ecological needs with drainage requirements by increasing wetland area where beneficial and acceptable.

- *Use a variety of tools (regulations, incentive programs and market-based instruments) to encourage beneficial management practices and alternative use and management of land that support wetland restoration and development of water storage areas in floodplains*

Maintain or improve surface water quality in the Vermillion River watershed

- *Explore alternative uses and treatment options for wastewaters (including irrigation, surface application and constructed wetlands) to mitigate impacts of municipal release of effluent to surface water bodies.*

Maintain or improve aquatic ecosystem health in the Vermillion River watershed

- *Assess, monitor changes, and report on wetlands, riparian areas, and floodplain conditions throughout the Vermillion River Watershed*

- *Update wetland inventory as required*

- *Complete wetland assessments on major wetlands in the watershed*

- *Develop, fund and implement long-term monitoring of aquatic ecosystem health on priority water bodies and watershed features, including rivers, lakes, wetlands, riparian areas, floodplains and permanent vegetative cover.*

- *Develop Aquatic Ecosystem Health Objectives for key water bodies and features in the watershed including wetlands*

- *Develop and implement Fish Management Objectives for the Vermilion River mainstem, tributaries, wetlands and lakes to protect significant fish habitat and populations. Identify fish habitat that has been lost or degraded.*

- *Identify and implement beneficial management practices, incentive policies and programs in order to:*

    - *Restore wetlands and riparian areas to support biodiversity and ecosystem services.*

- *Establish a network of interpretive sites at key Environmentally Significant Areas (lakes, wetlands, and floodplain sites in or near towns) so people can learn about the natural and cultural history, and attributes, of the Vermilion River watershed.*

Protect and sustain groundwater quality and supply in the Vermillion River watershed

- *There were no recommended actions for wetlands under this goal.* (NSWA 2012)

Each of the recommended actions in the VRWMP identifies what team members are responsible to follow through with the action item (NSWA 2012).

The goals and recommended actions for wetlands under the VRWMP could be set as regional wetland management objectives, or could serve as the basis for setting wetland management objectives for the area.

2.3.2 NGOs

Beaver Hills Initiative

The Beaver Hills region, located East of the Capital region of Alberta, spans five counties and is an area that has had land-use pressures on the landscape and natural resources due to increased economic activity (Beaver Hills Initiative [BHI] 2015). The BHI, a multi-stakeholder partnership, formed in 2002 to work to preserve and create a more sustainable existence for the area (BHI 2015). The partnership is comprised of individuals from the government, academia, industry and residents (BHI 2015).

The BHI Land Management Framework is an approach to identify key environmental resources in areas under pressure for development, and identify systems and means to manage the resources in a sustainable way if development proceeds (BHI 2007).

In the most current phase of the *BHI Land Management Framework* (Phase 2), the BHI sets broad management objectives pertaining to wetlands and watercourses under the headings of 'surface water' and 'ground water' (BHI 2007). The broad management objectives are listed below and more detail can be found in the *BHI Land Management Framework Phase 2* report.

Surface Water
Broad Management Objectives:

- *maintain vegetation along watercourses/wetlands;*
- *maintain diverse, disturbance-free vegetation cover around watercourses/wetlands;*
- *avoid contamination of watercourses/ wetlands; and*
- *avoid wetland/watercourse loss, diversion or alteration from development, especially where part of an environmentally significant area* (BHI 2007)

Groundwater
Broad Management Objectives:

- *maintain vegetation in floodplains;*
- *avoid draining wetlands;*
- *avoid contamination of groundwater recharge zones; and*

- *avoid concentrating high-demand groundwater users* (BHI 2007)

Under each of the broad management objective sections, pages of specific recommendations were listed under the following categories:

- *Environmental BMPs*
    - *developmental design considerations;*
    - *planning review considerations; and*
    - *construction conditions*
- *Potential referrals (regarding referrals to specific Acts)* (BHI 2007)

A few examples of the specific recommendations under the Environmental BMPs section are as follows:

- *Maintain a minimum vegetative buffer of 30m width along watercourses/ wetlands to:*
    - *provide vegetation that can capture and degrade potential contaminants to protect water quality and limit evaporation of moisture from bare soils,*
    - *stabilize banks and prevent their erosion, and*
    - *prevent sedimentation carried by overland water flow and deposition of wind-blown soils into waterbodies.*
- *Avoid creation of access roads that will cross watercourses or require filling of wetlands; design subdivision road networks with linkage to existing road networks as much as possible* (BHI 2007).

Some examples of specific recommendations under the 'potential referrals' sections are as follows:

- *Where water resources, including all wetland types, could be impacted by diversion, draining or filling, the Alberta Water Act approval process applies. Refer such proposals to Alberta Environment.*
- *Where development occurs on the bed or shores of permanent, naturally occurring waterbodies, including work within wetlands or watercourse realignments, the Alberta Public Lands Act approval processes applies. Refer*

such proposals to Alberta Sustainable Resource Development, Public Lands Branch. (BHI 2007)

The broad management objectives and specific recommendations pertaining to wetlands that were established through a multi-stakeholder process in the BHI Land Management Framework are great examples of sub-regional wetland objectives that reflect the wetland values in the Beaver Hills region. These could serve as regional wetland management objectives or could be the starting point to further developing wetland management objectives in the region. Of particular note in the BHI process, is the detailed inclusion of the environmental BMPs (particularly important for a region under high development pressure) and the potential referrals section, which could be useful information to include in a central, publicly available wetland information repository.

2.4 Municipalities

Municipalities have an important role in the management of wetlands. There is a great deal of interest in wetlands by municipalities and their associations however, many municipalities in Alberta were not found to have any specific guidance for wetland management outside of the *Municipal Government Act*. Some municipalities who are considered leaders in wetland management within the province, have provided detailed policies, initiatives or objectives pertaining to the wetlands within their jurisdiction.

2.4.1 City of Calgary

The City of Calgary recognizes that wetlands provide valuable ecosystem services, and that it is estimated that 90% of the pre-settlement wetlands in the city have been lost to development in their State of the Environment Report (City of Calgary 2010).

The City of Calgary currently has a no net loss policy for Environmental Reserve Wetlands, a wetland setback guideline for new subdivisions and guidelines for construction and other development pertaining to wetlands (City of Calgary 2010). The City of Calgary notes that in order to ensure no net loss of wetlands in the City, they rely on conservation and/or mitigation within areas of future urban development (City of Calgary 2010).

They do no currently have specific wetland objectives.

2.4.2 City of Edmonton

The City of Edmonton outlines their wetland objectives and actions in their Wetland Protection Planning and Process report (City of Edmonton 2011). The main wetland objective for the City of Edmonton is:

- *The City protects, manages and integrates natural wetlands into new and existing developments as key assets in Edmonton's ecological network* (City of Edmonton 2011).

The actions to support and complement the main wetland objective and to actively support the Alberta Wetland Policy are:

- *In partnership with the Province, the Capital Region Board, and adjacent municipalities, develop a comprehensive plan for wetland conservation and the integration of wetlands into the urban environment.*

- *Where appropriate, acquire wetlands, riparian areas, and buffers according to the Municipal Government Act definition of environmental reserve.*

- *Where privately held wetlands cannot be protected through other means, encourage their dedication through conservation easements.*

- *Work with landowners to see that compensation required by the Province as a result of the alteration or destruction of wetlands is carried out within city boundaries.* (City of Edmonton 2011)

The other actions to support the main wetland objective for the City of Edmonton are that the City:

- *will dedicate permanent, semi-permanent, and seasonal wetlands (i.e., Class III, IV, and V Wetlands in the Stewart and Kantrud system) and all peatlands as Environmental Reserve upon subdivision of land; and*

- *requires compensation within the borders of the city for wetland drainage or alteration (in full or part) for all non-ephemeral wetlands (i.e., Class II, III, IV, and V wetlands in the Stewart and Kantrud system) and all peatlands in the form restoration or construction of a similarly functioning wetland.* (City of Edmonton 2011).

The City of Edmonton has also been working pro-actively with the GoA to ensure they know which wetlands are permanent so they can then acquire the land and conserve those particular wetlands (personal communication with Knowledge Leader).

2.4.3 Strathcona County

Strathcona County's Wetland Conservation Policy has a main goal of no net loss of wetlands within the urban and rural area (Strathcona County 2009). No net loss in the county is accomplished through strict mitigation activities with defined outcomes in alignment with federal and provincial legislation, as well as regulations

in their required biophysical assessment for future development areas (Strathcona County 2009).

Strathcona County is one of the partners of the BHI noted above in section 2.3.2 (BHI 2015).

2.4.4 Parkland County

Parkland County has completed an inventory of environmentally significant areas (ESAs), which includes management considerations for each of the identified areas (Parkland County 2014). Some of the management considerations are wetland specific, and these management considerations are similar to wetland objectives (Parkland County 2014).

Examples of some of the management considerations that pertain to wetlands are as follows:

- *maintain riparian buffers to safeguard the integrity of lake and wetland habitats and enhance water quality;*

- *continue to restrict encroachment from adjacent subdivision on wetland and surrounding riparian areas; and*

- *similar projects to the wetland restoration project successfully completed in the area should be undertaken to promote connectivity for wildlife and support overall hydrologic function* (Parkland County 2014).

Summary of Municipalities

Wetland objectives in the municipalities, such as those found above (particularly in the City of Edmonton) could be incorporated as regional wetland management objectives, however many of the objectives found at a municipal level are not detailed enough to provide a management plan for wetlands with a defined outcome. There was a vast inconsistency in the quality and detail of wetland objectives across municipalities. Further direction is necessary to ensure wetland management activities are aligned under any setting of wetland objectives.

3.0 Knowledge Leaders Interviews

In order to inform the why, who, where and how of setting regional wetland objectives in Alberta, individuals with various types of wetland expertise were interviewed by phone to provide their opinions. They are hereby referred to as Knowledge Leaders in this report.

The Knowledge Leaders were chosen based on their roles having potential involvement or valuable insights for setting regional wetland management objectives in Alberta. Interviews were performed with Knowledge Leaders from various key stakeholder groups in order to gain a range of perspectives.

In order to compile the interviews the comments were collated and common themes, differences of opinions and specific ideas were chosen and represented below. The Knowledge Leaders presented their personal opinions, and their comments are not on behalf of the organizations they represent. The initial report contained the names and roles of the Knowledge Leaders, however these have been taken out for the public version of the report in order to respect the confidential nature of the interviews.

Many of the Knowledge Leaders commented that exploring the setting of regional wetland management objectives was important to do in the near future given the current wetland context in Alberta with the high degree of historical loss and recent pressures around flooding etc. It was agreed upon that there was a need for up-front planning for wetlands on a regional basis in order to focus on the retention of key wetlands or wetland areas, and that measurable wetland objectives could provide a system of accountability in the province (personal communication with Knowledge Leaders).

3.1 Why

In order to understand what is driving the need for setting wetland objectives, the following questions was asked:

Why are we setting wetland objectives?

A few of the Knowledge Leaders stated that the various reasons, or criteria that can drive the need to set specific, measurable wetland objectives will vary by region, as each local context will differ based on the values of that particular region's population and types of land-use (personal communication with Knowledge Leaders). Drivers could include historical loss of wetlands, water quantity issues, water quality issues, carbon sequestration or traditional use (personal communication with Knowledge Leader).

3.1.1 Protection of Key Wetlands and Wetland Areas

Various Knowledge Leaders pointed out that the setting of wetland objectives could be put in place to identify hot spots or no-go zones in the early stages of land-use planning (personal communication with Knowledge Leaders). This could also potentially ensure the securement or protection of wetlands or wetland areas that are integral for specific reasons (for example, being identified as valuable by stakeholders, or containing species at risk habitat) even if they do not have high composite scores through the Wetland Policy's Wetland Value Approach Matrix (Figure 1) (personal communication with Knowledge Leaders).

When the protection or retention of wetlands was discussed in the interviews, many of the Knowledge Leaders spoke to the value of retention, for various reasons, a few being the inability to know what functions have been lost when wetlands are destroyed (even if wetland restoration is occurring), as well as the costs for construction and maintenance required for restored wetlands which is not a factor in natural wetlands.

"Retention is far more efficient than restoration. While it is often quoted, it needs to become an unassailable, agreed upon fact" (personal communication with Knowledge Leader).

3.1.2 Up-front Planning for Wetlands

Many Knowledge Leaders observed that the process of setting regional wetland management objectives was a great way to ensure wetland planning at the initial stages of a wetland management process, and that this report was timely as the Province moves towards a regionally based land-use planning process under the LUF. This was seen as a positive shift from the current practice of dealing with wetlands management on a one-off basis, which does not allow for key sites to be protected (personal communication with Knowledge Leader). Setting wetland objectives at a regional scale could also allow for the broader-scale thinking required for the Boreal in Alberta, where the wetlands tend to be part of large, interconnected complexes (personal communication with Knowledge Leader).

3.1.3 Large-scale Acreage Goals for Specific Regions

With the recognition that retention and restoration are important for the wetland context in Alberta, particularly in areas that have experienced high historical loss, it was also acknowledged by a few of the Knowledge Leaders that a net increase in wetlands would not likely be a viable objective for every specific region, and that maintaining current levels of wetlands or even allowing net loss of wetlands in some regions would potentially be part of the land-use planning process (personal communication with Knowledge Leaders). These overall goals of gaining, maintaining or losing wetland area were identified as a potential means to guide any

specific retention or restoration plans in a region (personal communication with Knowledge Leaders).

3.1.4 Stakeholder Wetland Values

It was noted that while the *Water Act* informs water and wetland management, it allows for the issuance of approvals for wetland development, and leaves a gap in wetland stewardship for securement and restoration (personal communication with Knowledge Leader). This however pointed to a need for a conversation at the local and regional scale to engage stakeholders on the values wetlands provide and determine what land-use trade-offs they are willing to accept for the retention and restoration of wetlands in a given region (personal communication with Knowledge Leaders). The work done on the ecosystem services of wetlands was brought forward as a way to have stakeholders understand the values wetlands provide, in order to gain participation in the process of setting regional wetland objectives (personal communication with Knowledge Leader).

It was noted that it is easier to champion wetland retention and restoration if stakeholders understand wetland functions, as not all stakeholders will make a direct link between wetlands and the important functions they provide such as improvement of water quality, or water storage for flood attenuation (personal communication with Knowledge Leaders). This points to communicating to stakeholders why wetlands are important before engaging them in the process of setting regional wetland management objectives. The role of the public in setting regional wetland management objectives is explored further in section 3.2.1.

3.1.5 Integration of Jurisdictions on Wetland Management Issues

Setting regional wetland management objectives was also seen as a potential means of aligning wetland management practices across different levels of government in Alberta. Knowledge Leaders familiar with the disconnect between the municipal and provincial wetlands management processes were quick to point out that there have been many known cases where the provincial approvals process has unknowingly undermined municipal wetland initiatives (personal communication with Knowledge Leaders). One Knowledge Leader mentioned that many planners and developers alike would like a more clear wetland management process and that specific regional wetland objectives would allow municipal policies to be updated with an action-driven initiative that could still have the potential to respect the direction of individual councils (personal communication with Knowledge Leader). Another Knowledge Leader noted that setting regional wetland objectives could create the process to evolve landuse decision-making to a point where municipal planners could be looking at the bigger picture through a process requiring them to think about the effect that specific land-use decisions are having on the watershed (personal communication with Knowledge Leader).

3.2 Who

It was recognized amongst the Knowledge Leaders that wetland management affects many different stakeholder groups on many different levels. The importance of involving a variety of stakeholders in the setting of regional wetland management objectives was also a prominent point brought up in most of the interviews conducted. Therefore it was not surprising that a comprehensive list of stakeholder groups was formed when the Knowledge Leaders were asked:

Who should be involved in the setting of regional wetland management objectives?

The following stakeholder groups were mentioned by Knowledge Leaders as being important in the setting of regional wetland management objectives:

- GoA (namely Alberta ESRD, Alberta Agriculture and Alberta Transportation);
- municipalities and Municipal Affairs;
- academics (namely Wetland Ecologists);
- the development industry and industry groups (ex. CAPP);
- watershed groups (ex. WPACs);
- the Alberta Water Council;
- landowners;
- forestry companies and departments;
- First Nations;
- land trusts;
- conservation groups involved with wetland and waterfowl issues (namely DUC, NAWMP, Cows and Fish and Delta Waterfowl);
- naturalists;
- fisheries groups;
- recreation groups; and
- the general public.

While many Knowledge Leaders agreed that many stakeholders should be engaged in the setting of regional wetland management objectives, opinions differed when it came to the various roles that stakeholder groups should play and at what point of the process they should be involved (ex. the initial setting of the regional wetland management objectives versus reviewing wetland management objectives that had already been formulated).

3.2.1 The Roles of Key Stakeholder Groups

The four stakeholder groups that were discussed in detail in many of the interviews, that require a more in-depth look are; the GoA (specifically Alberta ESRD), municipalities, WPACs and the general public. While key roles were discussed for specific groups, it is recognized that the definition of a regional wetland management objective and the scale it will be performed at would need to be determined before roles could be defined.

Government of Alberta

The Knowledge Leaders were mostly in agreement that the GoA (namely Alberta ESRD) had a leadership role in the process of setting wetland management objectives in Alberta. Knowledge Leaders stated that this leadership role was inherent due to the GoA's legislative responsibility around policy and regulations for water and wetlands (personal communication with Knowledge Leaders). A Knowledge Leader mentioned the GoA's key role is also due to legislative responsibility for other factors that relate to wetlands such as species at risk (personal communication with Knowledge Leader).

There was also recognition in most interviews that the leadership role that the GoA could play would ultimately be with stakeholder support and engagement. There were various suggestions on how stakeholder engagement could be accomplished:

- working team of relevant stakeholders during the implementation of the LUF planning process;
- processes involving municipal governments;
- use of watershed groups such as WPACs; or
- a workshop process involving stakeholders engaged on wetland issues, such as a NAWMP forum (personal communication with Knowledge Leaders).

A few Knowledge Leaders commented that it was important to first gain an accurate representation of the will of their constituency before the GoA could attempt to set and deliver regional wetland management objectives (personal communication with Knowledge Leaders), and that regional and sub-regional planners (including Alberta

ESRD) could be synthesizing information provided by stakeholders to then provide advice to GoA decision-makers (personal communication with Knowledge Leader). Other Knowledge Leaders felt it might be best for the GoA to first set wetland management objectives (as basic as they may be at the beginning of the process or at a large scale) and have key players provide feedback or work towards meeting the pre-set objectives (personal communication with Knowledge Leaders). The idea behind many of these concepts remained that the GoA would be the ultimate decision-maker and set the direction for the wetland management objectives.

Municipalities

Municipalities (urban centres including cities and towns, rural counties and municipal districts) were identified as having a key role to play in setting regional wetland objectives by many of the Knowledge Leaders. This was for two main reasons. Firstly, municipalities are able to have large impacts on the landscape, as they are making the land-use decisions for non-crown lands (thereby determining if wetlands are retained or eliminated in these areas) (personal communication with Knowledge Leaders), and secondly, they have the closest relationship to the public and therefore have the opportunity to gain public feedback on wetland management priorities or pre-set wetland management objectives (personal communication with Knowledge Leaders).

"*Municipalities are at the front and centre (of the process for setting regional wetland management objectives) as they have a lot of tools at their disposal and the relationships with Albertans*." (personal communication with Knowledge Leader)

While a few Knowledge Leaders stated that municipalities could be ideal for setting or helping set regional wetland management objectives, the ability for municipalities to do so was noted as being hindered by some significant challenges. The main challenge was the lack of consistency in expertise, tools and general resources to set or implement wetland management objectives across the various municipalities in the province (personal communication with Knowledge Leaders).

"In order to include wetland management of any type in municipal planning, it is important to have staff with appropriate capabilities, knowledge and expertise in wetlands, otherwise what can result is planning for what is best for the tax base, not the watershed." (personal communication with Knowledge Leader).

Another potential challenge identified for municipalities as wetland objective setters, was the disconnect between municipal and provincial wetland planning and policy initiatives. Not only were Knowledge Leaders aware of cases where provincial approvals have undermined municipal wetland initiatives (as noted above), but there have also been cases where developers have obtained different responses to wetland permit applications from municipal and provincial levels of government (personal communication with Knowledge Leader). It was also mentioned that there is also not a clear understanding by municipal employees as to

who their point of contact should be for wetland related issues at the provincial level (personal communication with Knowledge Leader).

To remedy the challenges that municipalities could face if involved in setting and/or implementing regional wetland management objectives, Knowledge Leaders recommended the GoA provide guidance, leadership, tools and resources to decision-makers in municipalities (personal communication with Knowledge Leaders). Ensuring better communication and relationships on wetland issues across the different levels of government in Alberta was also noted as being important (personal communication with Knowledge Leader).

The Province was also seen as being able to play a key role in providing the opportunity for the cooperation between municipalities by providing more resources to municipalities that have wetland expertise and to have a means of linking them with other municipalities that may require help in wetland management (personal communication with Knowledge Leaders). There are successful examples of municipalities with strong wetland staff capabilities and tools helping other municipalities with wetland planning (e.g. the Beaver Hills Initiative or the City of Calgary initiatives through their Regional Cooperation Principle), but often municipalities don't know where expertise and tools reside and resources for helping other municipalities can be scarce (personal communication with Knowledge Leaders).

It was noted that involving municipalities in a collaborative approach for setting regional wetland management objectives would likely make the process more successful (personal communication with Knowledge Leader).

Watershed Planning and Advisory Councils

Watershed groups were identified as having the potential to play an important role in setting, implementing or gaining feedback on regional wetland management objectives. WPACs were specifically mentioned in many interviews as ideal due to the fact that they are watershed-based groups that are already in place and contain many of the key stakeholders that would be important to include for setting regional wetland management objectives (see stakeholder list in section 3.2).

The role of a WPAC as it relates to specific processes such as the LUF and how they could potentially fit into setting and implementing regional watershed management objectives was not clear to many of the Knowledge Leaders. There were differences of opinion as to the role that WPACs could or should play in setting regional wetland management objectives.

Some Knowledge Leaders commented that WPACs could be the best group for setting wetland objectives due to the fact that the WPACs are already provincially recognized and funded, have GoA staff and wetland experts as members, have a legitimacy to their process in the way that they are assembled, and have an inherent

transparency that appeals to the public (personal communication with Knowledge Leaders). One Knowledge Leader noted that if WPACs were tasked with setting regional wetland management objectives it would be important to ensure that the resulting objectives fit within the context of the Wetland Policy and the LUF (personal communication with Knowledge Leader).

The BRBC is a WPAC that has formulated some of the most specific wetland management objectives seen to date in the province in their watershed plan for the Bow River Basin (see section 2.3.1). It is however recognized that it is now ultimately up to stakeholders to determine their level of compliance with the objectives set by the BRBC (personal communication with Knowledge Leader).

It was the recognition that there is not currently any authoritative means for WPACs to enable the achievement of wetland management objectives in the context of current GoA initiatives, or enforce the requirement to abide by them that had other Knowledge Leaders questioning whether WPACs would be the best groups to be responsible for setting regional wetland management objectives. For example, one Knowledge Leader spoke to the good direction that WPAC watershed management plans provide to stakeholders such as municipalities, but pointed out that that the direction for how wetlands are managed must ultimately come from the GoA (personal communication with Knowledge Leader).

Another potential role identified for WPACs, was as leaders or coordinators to workshop wetland management objectives that had already been created, in order to gain stakeholder feedback and support in the watershed area (personal communication with Knowledge Leaders). It was also mentioned that WPACS could feed any potential wetland management objectives or goals in the watershed planning process into existing processes (such as regional or sub-regional planning) and play a key part in the wetland retention conversation due to their collective knowledge base and integrator roles (personal communication with Knowledge Leader).

General Public

There was recognition amongst Knowledge Leaders that Albertans need to play an important role in helping to set regional wetland objectives for the province. There is also currently more awareness internally within the GoA around the importance of engaging the public on various policy initiatives (personal communication with Knowledge Leader). Getting an accurate representation of the values placed on wetlands in a particular region was recognized as important, not only to start the process of setting regional wetland objectives, but also to champion and ultimately have the required cooperation to implement regional wetland management objectives.

The practical steps to involving the public (deciding how to engage the public and how far to take the public engagement process) would need to be determined before

beginning the process of setting regional wetland management objectives (personal communication with Knowledge Leader). This could be in the form of having the public weigh in on draft objectives (personal communication with Knowledge Leader), and could be in the form of multi-stakeholder groups based on watersheds instead of sectors (personal communication with Knowledge Leader).

Ultimately it was agreed upon by the Knowledge Leaders that the setting of regional wetland management objectives should be a multi-stakeholder process, and that the public and key stakeholder groups need to be on board with the objectives that are set in order for the wetland management objectives to be implemented and followed through with successfully. A common theme throughout many of the interviews was that whoever is chosen to ultimately come up with the regional wetland management objectives needs to have the appropriate knowledge, tools, resources and input to do so.

3.3 Where

In order to provide context on 'where' regional wetland management objectives should be set, the topics of scale and potential pilot areas were discussed with Knowledge Leaders.

3.3.1 Scale

In order to gain ideas on how to define the 'region' in regional wetland management objectives, Knowledge Leaders were asked:

At what scale should regional wetland objectives be set in order to be successful?

The idea of success for regional wetland management objectives had two main ideas attached to it for many Knowledge Leaders. Considerations that need to be taken into account from policy and ecological standpoints (current policy initiatives, watershed boundaries, wetland types etc.) and secondly, considerations that need to be taken into account from a practical standpoint (resources, criteria that will be measured etc.). Overall there was a broad range of responses for a scale that would be ideal for setting regional wetland management objectives. The scales suggested were as follows:

- province;
- municipality;
- township;
- basin;

- watershed;
- LUF region;
- LUF sub-region;
- Capital region;
- Hydrologic Unit Code (HUC) 4;
- HUC 6
- Relative Wetland Value Assessment Unit (RWVAU);
- Wetland Management Units;
- individual landowner.

Many Knowledge Leaders provided a range of scales for setting regional wetland management objectives with an understanding that at the coarse level the scale needed to be practical for the resources available, but with the desire to see wetland management objectives set at as fine a scale as possible. It is important to note however, that what were labeled as coarse scales and fine scales were not in alignment among the Knowledge Leaders, for example some Knowledge Leaders regarded a sub-region as their coarsest scale and others regarded it as their finest scale.

Knowledge Leaders who provided coarser scale approaches recognized that these coarser scales would be ideal for setting broader strategic wetland goals, and that multiple scales would ultimately be required in order to also set more specific wetland management objectives at finer scales (personal communication with Knowledge Leaders). One Knowledge Leader emphasized that a one size fits all approach would not be appropriate for all of Alberta, and that scales would need to be determined separately in the Boreal, Parkland and Prairie areas of the province due to the differences in wetland ecology of each area (personal communication with Knowledge Leader).

The most discussed scales of the interviews are provided with more detail below.

LUF Regions and Sub-regions

Common themes throughout the interviews were the need for a chosen scale to be able to represent common hydrological and geographical similarities as well as be representative of particular types of land-use. Many felt that the LUF regions and sub-regions did a particularly good job of representing these similarities, and could

be used for setting regional wetland management objectives, or could be a starting point for smaller regions to be created within (personal communication with Knowledge Leaders).

Watersheds and Sub-watersheds

Many Knowledge Leaders also mentioned the necessity of considering the watershed or sub-watershed when setting regional wetland management objectives (personal communication with Knowledge Leaders). A watershed-based scale was brought up as being fundamental for conservation purposes (personal communication with Knowledge Leader), that it is a scale that allows for local partnerships to be engaged and therefore encourage volunteerism for water stewardship, as that it is also a scale that coincides nicely with municipal boundaries (personal conversation with Knowledge Leader). The watershed scale was also deemed important due to the fact that wetlands are dictated by the physical landscape they are within or surrounded by, and the watershed scale provides a good connection with the biology of the area and is self-defining in terms of boundaries (personal communication with Knowledge Leaders).

One Knowledge Leader noted that the RDRWA's IWMP (RDRWA 2013) created small-scale landscape units within a sub-watershed based on land-use and geographical features that could potentially be used as an example when deciding on a scale for setting regional wetland management objectives (personal communication with Knowledge Leader).

Relative Wetland Value Assessment Units

A Knowledge Leader spoke to the fact that RWVAU's have been created in the province of Alberta, and that these RWVAUs would be ideal for a unit to scale regional wetland objectives, in order to align well with the Wetland Policy (personal communication with Knowledge Leader). These RWVAUs were created with the assumption that wetlands within a particular unit will have similar geography, wetland type etc. and have been integrated with other layers such as HUCs at a Minor Sub-watershed level (personal communication with Knowledge Leader). The RWVAUs divide the province into 21 wetland units based on principles that wetlands be assessed with common hydrological unit boundaries (watersheds) and with similar ecological or land-use units (personal communication with Knowledge Leader).

A concern brought forward by another Knowledge Leader regarding the use of RWVAUs is the fact that their purpose is to compare wetlands against each other to provide relative values, and that as the landscape changes over time, these units will need to be updated, however there was no defined planning cycle in which to do this (personal communication with Knowledge Leader). It was recommended that if a similar unit were to be used, it be tied to an existing planning cycle in order to

ensure values of wetlands in respective areas are kept current (personal communication with Knowledge Leader).

Important Considerations

The following considerations were deemed important by Knowledge Leaders to take into account when choosing a scale to set regional wetland management objectives:

- It is important to ensure that data for measuring any particular chosen criteria are available at the scale selected (personal communication with Knowledge Leader).

- If the scale chosen for setting regional wetland management objectives is too large, community engagement will not be present, as there is an inherent disconnect for the public at larger scales according to current social science research, a scale that is too large will also create public push-back as there will be too many interests and uses on the landscape to consider (personal communication with Knowledge Leader).

- It is important to really understand the context of the watershed for decision-making, as it is too difficult to understand the consequences of specific decisions if they are being made at a scale that is too large (personal communication with Knowledge Leader).

3.3.2 Piloting Setting Regional Wetland Management Objectives

The idea of potentially piloting setting wetland management objectives was well received by Knowledge Leaders during the interview process, and many thought it was a great idea in order to gain an understanding of the process and potential challenges that may arise. The question that was asked to Knowledge Leaders was:

What would be an ideal place to pilot setting wetland management objectives?

A large range of ideas were brought forward, as nearly every Knowledge Leader had a different idea on where a pilot, or series of pilots could occur.

Many Knowledge Leaders were in favour of putting a pilot or pilots in the southern portion of Alberta. Reasons for this ranged from the idea that there would be strong financial and political backing for a pilot in southern Alberta (personal communication with Knowledge Leader), that the pilot area should have high historical wetland loss or high flood mitigation priorities, or be an area where stakeholder engagement was already present (personal communication with Knowledge Leaders). Additionally, Knowledge Leaders felt it was important to choose an area where good wetland data was already available (personal

communication with Knowledge Leaders), and southern Alberta was identified as fitting these requirements.

Specific pilot areas brought forward for consideration in southern Alberta were as follows:

- Bow River Basin; and

- South Saskatchewan Region (Under the SSRP) (personal communication with Knowledge Leaders).

There was also a considerable portion of Knowledge Leaders that felt that multiple pilots were necessary. The reasons for multiple pilots ranged from the necessity of having different issues reflected (personal communication with Knowledge Leader), to wanting to see pilots stratified across the boreal, parkland and prairies to reflect the different provincial regions (personal communication with Knowledge Leaders). Having a range of pilots was recognized as a means of foreseeing the range of issues that could come up during the process of setting regional wetland management objectives (as different issues would be present in areas under extreme development pressure than those under low development pressure) (personal communication with Knowledge Leader). Having one expert panel group perform all of the pilots was an idea brought forward as a suggestion as a means to ensure consistency in the piloting process (personal communication with Knowledge Leader).

Specific pilot areas brought forward for the idea of having multiple pilots:

- Example for northern Alberta:

  1- Oilsands area (high development pressure);

  2- Utikuma (moderate development pressure);

  3- South of Wood Buffalo National Park (low development pressure) (personal communication with Knowledge Leader).

- Example for southern Alberta:

  1- Unbroken agricultural area along the Milk River Ridge;

  2- Intensive agriculture area where wetlands have been mostly drained;

  3- Peri-urban areas around suburban development (personal communication with Knowledge Leaders).

Other pilot ideas that were mentioned included the following:

- The Beaver Hills area- due to the broad host of types of development in one area (personal communication with Knowledge Leader) and the Beaver Hills Initiative having information and stakeholders readily available (personal communication Knowledge Leader).

- Vermillion River Holden Drainage District – in this area the drainage councils are looking to reinvent themselves as water managers, there has been significant drainage in this area and they have been looking for restoration opportunities, some modeling has been done and they have an application in under the Watershed Resiliency and Restoration Program to replace wetlands as flood mitigation (personal communication with Knowledge Leaders).

3.4 How

The process of setting regional wetland management objectives was discussed in the interviews with Knowledge Leaders, however it was understandably difficult to delineate specifically how to proceed in setting objectives in the absence of specific definitions of what was being examined, what regional scale was being looked at and who would be setting the wetland management objectives.

However, Knowledge Leaders were able to provide some general considerations for examining how to set regional wetland management objectives, the existing policy frameworks and initiatives under which these objectives could be performed, data availability and requirements and ideas around monitoring, tracking and communication of regional wetland management objectives. The additional topics of incorporating species at risk, and ecosystem services were also brought up to include in the process of setting of regional wetland management objectives.

3.4.1 General Considerations for the Process of Setting Regional Wetland Management Objectives

The establishment of a clear and consistent set of guidelines to establish successful regional wetland management objectives was brought up by various Knowledge Leaders. It was mentioned that complexity and interpretation could be counter productive to the process (personal communication with Knowledge Leader) and that having a consistent committee of people tasked with leading the process of setting regional wetland objectives would be a means of ensuring success (personal communication with Knowledge Leaders). Ensuring that the wetland management objectives in the different regions have similar language, metrics, outcomes and

measures were also identified as important, given that the objectives would be formulated across the province (personal communication with Knowledge Leader).

The Knowledge Leaders mentioned that re-inventing the wheel was not necessary for setting regional wetland management objectives and that utilizing existing frameworks, adapted from policy initiatives in Alberta or other jurisdictions, could be a means of setting up an efficient process that could be put into place in and timely manner (personal communication with Knowledge Leaders).

Acreage-based vs. Function-based Wetland Management Objectives

The initial task for this report was to inform setting acreage-based regional wetland management objectives, however over the course of the interviews with Knowledge Leaders, it became apparent that a broader focus, which included function-based wetland objectives, was necessary.

Some of the Knowledge Leaders felt that an acreage-based approach to setting wetland management objectives did not coincide with the function-based approach that the GoA is moving forward with under the Wetland Policy (personal communication with Knowledge Leaders).

There was apprehension that focusing strictly on numerical values for wetland management could detract from a value-based direction and that this could counteract public engagement in the process of setting regional wetland management objectives, by potentially instilling a perception that the government would be mandating the seizing of personal property (personal communication with Knowledge Leader). It was also noted that it would be hard to determine if the GoA could deliver on specific numbers on a landscape with complex challenges (personal communication with Knowledge Leader).

Other Knowledge Leaders felt strongly about keeping acreage-based targets to ensure accountability, even if it was a combination of function-based and acreage-based wetland objectives. There were certain criteria that Knowledge Leaders felt were best measured by acreage-based targets such as water storage, biodiversity, waterfowl or species at risk (personal communication with Knowledge Leaders) or that using acreage-based targets would allow for the measurement of wetland permanence, size and class to relate wetland acreage to wetland function (personal communication with Knowledge Leader). A Knowledge Leader emphasized the value of considering and protecting wetlands from an acreage standpoint, noting the importance of spatial extent, however it was noted that this Knowledge Leader felt this went against the abundance modifier in the Wetland Policy (personal communication with Knowledge Leader).

3.4.2 Potential Alberta Policies, Frameworks and Initiatives for Regional Wetland Management Objectives

In order to collect ideas on the existing frameworks or initiatives that could be used for setting regional wetland management objectives the question posed to Knowledge Leaders was:

Under what current GoA frameworks or initiatives could regional wetland objectives be set?

Various policies, frameworks and initiatives were mentioned, and its important to note that the idea to place the setting of regional wetland objectives within a particular policy, framework or initiative was often mentioned in conjunction with another. For example, many Knowledge Leaders felt that the LUF was the best place to set regional wetland management objectives, but also noted that these objectives would need to be aligned with the Wetland Policy. Some Knowledge Leaders also came up with numerous ideas, and felt that the setting of regional wetland management objectives could fit under more than one framework or initiative.

Wetland Policy and Wetland Approvals under the Water Act

While the Wetland Policy does not specifically mention the setting of regional wetland management objectives, and therefore cannot ensure specific outcomes, it was noted as inherently placing an emphasis on managing wetland levels throughout the province, and fitting within a regional process since with its time and place dependent assessment component (personal communication with Knowledge Leader). The Wetland Policy is seen as lending itself to uncovering why wetland objectives would be set and the need to have wetlands considered in the context of specific regions, through the use of modifiers in the relative wetland assessment units matrix (personal communication with Knowledge Leader).

The Wetland Policy was noted as being the starting point for determining how to set regional wetland management objectives in the province (personal communication with Knowledge Leader). It was noted that any wetland management objectives would need to compliment the Wetland Policy, however there is a need for the Wetland Policy implementation to be completed, otherwise the linkage with how wetland regulations can be enforced would be missing (personal communication with Knowledge Leader).

Ideas for setting regional wetland management objectives under the umbrella of the Wetland Policy included using the Wetland Policy wetland valuation matrix for formulating the wetland objectives (i.e. use the same criteria) (personal communication with Knowledge Leader) and having a sliding scale which allows for adjusting the values of the Wetland Policy Wetland Value Approach Matrix based on regional wetland management objectives (personal communication with Knowledge Leader). One Knowledge Leader suggested the creation of a policy registry for

wetlands under the Wetland Policy Implementation that would allow wetland management objectives to be accessed and pulled into the wetland approvals process in order to make informed wetland avoidance decisions (personal communication with Knowledge Leader). Another Knowledge Leader agreed that wetland management and restoration could not be delinked with the wetland approvals process (personal communication with Knowledge Leader).

While recognizing the gap in the ability for wetland stewardship to occur within wetland approvals under the *Water Act*, it was felt that an approach with softer objectives under a regional wetland management objective strategy would likely be more effective in Alberta than a process linked to wetland approvals (personal communication with Knowledge Leader).

LUF

Most of the Knowledge Leaders mentioned that regional wetland management objectives should be set under or tied to the LUF process. It was recognized by Knowledge Leaders that the LUF is setting precedence for how resource management will be accomplished in Alberta, and therefore setting wetland management objectives should be tied to the LUF in order to ensure it moves forward. The LUF was noted as being a key tool to get the work of setting regional wetland management objectives accomplished as it could be combined with the implementation of the Wetland Policy (personal communication with Knowledge Leader). It was noted that another advantage of using the LUF to set regional wetland management objectives is that it does not have one specific government department or non-governmental organization leading the process, and this broader leadership could ensure that stakeholders support the initiative (personal communication with Knowledge Leader).

The Regional Plans under the LUF were noted as being ideal for providing clear direction for setting regional wetland management objectives (personal communication with Knowledge Leader). One Knowledge Leader felt that if provincial wetland goals were set, that more specific wetland management objectives could be set in the LUF regions (personal communication with Knowledge Leader) while others felt that broad wetland management goals could be set in the LUF regions and more specific goals could happen at a finer scale, such as the sub-regions (personal communication with Knowledge Leaders). Multiple Knowledge Leaders noted that municipalities and local groups could work toward broader regional wetland management goals with the creation of specific wetland management objectives, recognizing that these groups would require the support structure and resources from the GoA (personal communication with Knowledge Leaders).

A few of the Knowledge Leaders recommended that a Wetland Management Framework be set under the LUF as part of regional planning, and that this Wetland Management Framework could be similar to what has already been set up for the

Surface Water Quality Framework and other frameworks under the SSRP or LARP (see section 2.2.3)(personal communication with Knowledge Leaders).

Water For Life

A few of the Knowledge Leaders thought that setting regional wetland management objectives could be done by WPACs through their watershed management plans under the Water for Life Strategy (personal communication with Knowledge Leaders). It was noted however, that if wetland objectives were to be set through watershed management plans, that the challenge would be to set a process to ensure stronger legislative backing, which the WPACs would be unable to provide in their current role (personal communication with Knowledge Leader).

Municipal Policy

The importance of including municipal policy and initiatives for setting regional wetland management objectives came up in many of the Knowledge Leader interviews. Municipalities were seen as having a key role within their abilities to make decisions on non-crown lands and their ability to gain stakeholder buy-in (personal communication with Knowledge Leaders). It was noted that processes at the municipal level are where the biggest impacts could be made for setting regional wetland management objectives, as municipalities are dealing directly with citizens and have a prime opportunity to utilize and teach what has been learned about wetlands from an ecological services perspective (personal communication with Knowledge Leader).

One Knowledge Leader felt it was important that if municipalities were tasked with setting specific action-based wetland management objectives, that any guidance from the GoA must ensure that nothing is left open to interpretation so that regional wetland management objectives would be consistent across the regions (personal communication with Knowledge Leader).

The *Capital Region Air Quality Management Framework* (GoA 2012a) was noted as an example that could be examined for setting regional wetland management objectives, as it involved having a collaborative process for one key environmental topic (personal communication with Knowledge Leader).

Some key concerns that were brought forward were the need for support structures for municipalities at the provincial level (resources, guidance and connecting municipalities with each other), more concordance and clarity between provincial and municipal land-use decision-making and better relationships between municipal and provincial level decision makers on the topic of wetlands (personal communication with Knowledge Leaders).

"Currently, landowners are getting inconsistent answers (on wetland development applications) and can go to the authority that gives them the answer they want to hear" (personal communication with Knowledge Leader).

3.4.3 Wetland Data Availability and Needs

Knowledge Leaders were asked the following questions to ascertain data availability for setting regional wetland management objectives in Alberta:

What wetland data do we already have that could be useful for setting regional wetland management objectives?

What data would we need to acquire in order to set wetland management objectives in Alberta?

Once again Knowledge Leaders emphasized that defining the why and how of setting wetland objectives would need to be determined before proceeding with specific data collection (personal communication with Knowledge Leaders). With that said, there were still clear ideas from Knowledge Leaders on the types of wetland data available in Alberta, as well as what would be required for collecting and collating wetland data for setting regional wetland management objectives. One Knowledge Leader noted that data acquisition was a very regionally specific topic, that the particular challenges or values of a region will inform what wetland objectives will be set, and this would determine the data needs for a particular plan or framework (personal communication with Knowledge Leader).

There were differences of opinion amongst the Knowledge Leaders as to whether the process of setting regional wetland management objectives should proceed using existing data and have additional data collected as the process progresses, or whether the setting of objectives should be on hold until more sufficient wetland data becomes available.

Data Available for Setting Regional Wetland Management Objectives

Wetland data that would be useful in the process of setting regional wetland management objectives that is currently available mentioned by the Knowledge Leaders was as follows:

- relative wetland value map;
- wetland value map estimator for White Zone;
- provincial wetland inventory;
- City of Calgary wetland inventory;

- drained wetland inventory;
- flooding datasets;
- hydrologic data;
- wet areas map;
- conservation priorities inventory;
- wetland restoration inventory;
- wetland ecosystem services;
- biodiversity information through the Alberta Biodiversity Monitoring Institute (ABMI);
- land values;
- characteristics that lead to wetland loss and wetland loss hot spot maps; and
- spatial maps of soil organic carbon by the Climate Change and Emissions Management Corporation (CCEMC).

It was noted that the available wetland data could be improved, particularly in the case of the current provincial wetland inventory (personal communication with Knowledge Leader), and that some of the above-mentioned datasets are not complete, such as the ecosystem services work which would require more information to make it relevant for an Alberta context (personal communication with Knowledge Leaders).

It was also noted that there was a need for insight into a centralized place for tools and data available for forming wetland objectives, in order for them to become known to those who would potentially use them for setting regional wetland management objectives (personal communication with Knowledge Leaders). One Knowledge Leader questioned the need for more wetland planning data, asking if instead what was needed was a better way of planning and pulling in relevant wetland data for meaningful wetland objectives (personal communication with Knowledge Leader).

Data Required for Setting Regional Wetland Management Objectives

Knowledge Leaders came up with the following list of wetland data that they felt would be needed or desirable for the process of setting regional wetland management objectives in Alberta:

- improved wetland inventory for Alberta;
- inventory of lost/drained wetlands for Alberta;
- database to keep track of current wetland loss;
- map of current landuse;
- development trajectory to show where development pressures exist in specific areas;
- prediction of where wetlands will be lost or retained in the future;
- full list of wetland ecological goods and services with economic model;
- surface and ground water hydrology information for specific watersheds;
- watershed modeling data;
- full LIDAR coverage for the White Zone and more accurate digital elevation models;
- tools to measure wetland function and link wetland values to other watershed;
- evidence and anecdotes on what happens when wetlands are increased or retained to present to stakeholders;
- tools to examine cumulative effects that allow for measurement and tracking of wetland loss or gain; and
- hierarchy of provincially significant wetlands in regions and a map of prescribed no-go zones.

Many of the Knowledge Leaders mentioned the need for an improved Alberta wetland inventory as well as an inventory to show wetland loss in Alberta. There was mention of an excellent model of a drained wetland inventory done by DUC in the Vegreville area, where information on morphology and soil types was used to

determine where historical wetlands had initially resided (personal communication with Knowledge Leader).

The idea of a central registry or repository for wetland information was noted in multiple interviews. This was described as a database that planners, approvals staff or the public could reference in order to find:

- wetlands in a specific area;
- current provincial and municipal wetland policies and initiatives in the region;
- species at risk information (including habitat maps and recovery plans); and
- contact information for key government staff (personal communication with Knowledge Leaders).

Having regional management objectives driving the process of creating a central registry, or having the wetland management objectives linked into the central registry was of interest to Knowledge Leaders as well (personal communication with Knowledge Leaders).

It was noted that under the Wetland Policy there will be more of an onus on the applicant to know the current requirements for wetland regulations and initiatives, and the central registry could ensure that this information, along with any potential regional wetland management objectives, are available to potential developers (personal communication with Knowledge Leader).

It was also mentioned that a wetland mitigation portal is currently being discussed, and that this portal could potentially feed into the regional planning authorities to use within planning processes, and that information for the public domain was being discussed as well (personal communication with Knowledge Leader).

3.4.4 Monitoring, Tracking and Communicating Regional Wetland Management Objectives

In order to gain ideas pertaining to monitoring, tracking and communicating regional wetland management objectives, Knowledge Leaders were asked the following questions:

How should regional management objectives be monitored and tracked? How should this information then be communicated back to stakeholders?

Setting measurable regional wetland objectives was regarded as a means of ensuring accountability and transparency in wetland management (personal

communication with Knowledge Leaders). It was recognized that the specific data to be acquired for monitoring purposes would depend on what was being managed in a specific region however, a consistent process with reliable data and quality assurance procedures were noted as being integral to the process (personal communication with Knowledge Leader).

The need for a central registry in the form of a provincial database for all matters related to wetland management was brought up again by Knowledge Leaders in the context of monitoring, tracking and communication of regional wetland management objectives. It was mentioned that a provincial wetland database is currently being worked on for wetland tracking however, it does not currently contain the capacity to include regional wetland management objectives (personal communication with Knowledge Leader). Another Knowledge Leader stated that a wetland database needs to be created and be public facing in order to show whether or not wetland objectives are on track and that the database would need outputs in order to be used to support wetland management decision-making (personal communication with Knowledge Leader).

"It's important to know that we are trending in the right direction and that we are managing wetlands on a generational scale" (personal communication with Knowledge Leader).

Knowledge Leaders mentioned the need for either an acreage-based target, or a means of measuring whether or not specific regional wetland management objectives had been met (personal communication with Knowledge Leaders), as well as the need to re-visit and re-evaluate wetland objectives on a specific time cycle (personal communication with Knowledge Leaders). Two of the Knowledge Leaders noted that there is an annual reporting requirement for strategies under the LUF Regional Plans, and while this requirement does not currently include specifics such as wetland objectives, the idea of a recurrent reporting schedule would be important to provide assurance to stakeholders that the objectives are being met (personal communication with Knowledge Leaders). One Knowledge Leader noted the importance of aligning reporting cycles with current science pertaining to specific indicators or criteria as well as with the development pressure of a particular region (personal communication with Knowledge Leader).

One Knowledge Leader explained that it would likely require trial and error to fine tune the process of setting regional wetland management objectives, and re-visiting the objectives over time would allow proper adjustments to occur (personal communication with Knowledge Leader). However the importance of having a baseline threshold for wetlands was also emphasized as it would ensure the area of wetlands in the province does not go below a particular agreed upon extent (personal communication with Knowledge Leader).

Indicators were touted as being an excellent way to not only measure regional wetland management objectives, but also to educate the public on the value that wetlands can provide (personal communication with Knowledge Leader).

Monitoring, tracking and reporting were all seen as ways of ensuring quality assurance, however one Knowledge Leader recommended going a step above and have an expert panel write a manual and perform a range of pilots in order to be able to evaluate the setting of regional wetland objectives at pre-determined time periods (personal communication with Knowledge Leader). Having a non-governmental evaluation board with no groups or individuals that could potentially be seen as having a conflict of interest with setting regional wetland management objectives was also brought forward as an idea (personal communication with Knowledge Leader).

3.5 Additional Topics of Consideration

Key topics of consideration were explored in interviews with Knowledge Leaders with specific expertise. One Knowledge Leader was able to speak to how species at risk knowledge should be input into setting regional wetland management objectives. Another Knowledge Leader spoke to the importance of including wetland ecosystem services in setting regional wetland management objectives.

3.5.1 Species at Risk

Species at risk, particularly the presence or absence of species at risk, could make an excellent indicator for evaluating regional wetland management objectives (personal communication with Knowledge Leader). The wetland data for species at risk is already available and well established (personal communication with Knowledge Leader). The data available for species at risk can be found in the Fisheries and Wildlife Management Information System (FWMIS), Species at Risk Plans for wetland dependent species and maps created for the Industrial Referrals Process (personal communication with Knowledge Leader). It was noted that some species may be harder to plan for in specific region-based planning processes, because species such as Leopard Frogs and Spayed-foot Toads have scattered distributions (personal communication with Knowledge Leader).

A caution of including species at risk information is that the absence of the identification of a species at risk can also potentially mean that species at risk have not been found in a particular area or that the area has not been examined for species at risk (personal communication with Knowledge Leader). On the other hand, if we know of the presence of a species at risk in a particular wetland area, monitoring that species over time is an excellent indicator of wetland health, as sensitive species are typically the first thing to disappear once the health of a wetland begins to deteriorate (personal communication with Knowledge Leader).

Retention of wetlands that contain species at risk habitat should be first and foremost as our restoration knowledge and techniques have not proven advanced enough to retain the necessary wetland habitat functions for species at risk, and many of these species are very traditional in their use of particular areas and individual wetlands (personal communication with Knowledge Leader).

3.5.2 Ecosystem Services of Wetlands

One Knowledge Leader was chosen to provide feedback on how an ecosystem services approach could be used as a tool for setting regional wetland management objectives. The Knowledge Leader explained that wetland ecosystem services knowledge can engage stakeholders in wetland management by creating an understanding of the values that wetlands provide, such as flood mitigation, recreation and migratory birds (personal communication with Knowledge Leader).

Planning a process from an ecological services perspective also provides a holistic viewpoint and can allow for examination of key areas in an all-inclusive way while engaging multiple departments that may not have been making decisions together initially (for example looking at wetlands as providing water quantity and water quality functions on an urban agricultural interface) (personal communication with Knowledge Leader).

Another Knowledge Leader also mentioned a project by DUC that is just getting underway in Alberta, that will extrapolate what types of wetlands in specific areas could serve specific ecosystem services, and that this project will likely be most applicable at a sub-watershed scale (personal communication with Knowledge Leader).

4.0 Jurisdictional Review

A jurisdictional review was performed in order to examine where other jurisdictions have set regional wetland management objectives, and to learn from their experiences.

In the initial phase of the report, when the definition of a regional wetland management objective was strictly acreage-based, a specific search revealed very few case studies that fit the criteria, particularly when the searches were for government-set acreage based wetland objectives (excluding the United States of America [US] federal No Net Loss Policy). Broadening the scope to more general regional wetland management objectives enabled a larger number of case studies to be found, and these case studies were all found within North America. Once the case studies were examined more closely, many of them were found to contain some type of acreage-based wetland objective, and these were often in conjunction with more function-based objectives. Many of the case studies were done through partnerships that included governmental departments but were led by or involved the participation of other groups.

4.1 PHJV and NAWMP Implementation Plan

The *Alberta NAWMP Implementation Plan 2007-2012* is one of the few examples in Alberta where measurable, acreage-based regional wetland objectives have been set. This particular plan, which is part of a larger 25 year project by the Prairie Habitat Joint Venture (PHJV), is the second in a series of five-year plans, aimed at ultimately providing guidance for provincial partners in matters of conservation planning, program implementation and policy initiatives as they relate to the support and maintenance of continental waterfowl populations (Alberta NAWMP 2008). The PHJV is a multi-stakeholder partnership that includes members with a variety of interests in conservation of prairie, parkland and boreal forest landscapes in western Canada (PHJV 2015).

While waterfowl habitat is only one of many services provided by wetlands, the Alberta NAWMP Implementation Plan could provide a model for how biodiversity values could be utilized to set and measure wetland objectives across Alberta, particularly when biodiversity is identified as priority value for an individual wetland or wetland area or individual wetland in a regional planning process.

In order to link current and future landscape conditions with waterfowl populations, the Alberta NAWMP Implementation Plan used the Waterfowl Productivity Model and the Pintail Productivity Model as planning tools (Alberta NAWMP 2008). These models use hatched nests as the unit of measurement, and include policy and regulatory changes that result in broad-scale wetland and upland habitat protection in the modeling scenarios (Alberta NAWMP 2008).

The five-year plan includes complementary, direct, extension and policy habitat program actions for restoration and retention of wetlands and uplands in the prairie and parkland regions of Alberta (Alberta NAWMP 2008). The acreage-based objectives (Figure 10), include the following actions for retaining and restoring wetlands:

- *long-term securement tools (conservation easements/agreements, management agreements and forage agreements);*
- *restoration programs (returning historic and ecological function to previously drained basins);*
- *provision of information to change land-use decisions or maintain desirable ones;*
- *activities with outcomes that change government and industry policies; and*
- *programs that positively impact wetland and waterfowl habitat* (NAWMP 2008).

Figure 10. Alberta NAWMP Habitat Objectives and Expenditure Forecast

Activities	25-Year Habitat Objective (Acres)	5-Year Habitat Objectives (Acres)					% 25-Year Habitat Objective	5-Year Expenditure Forecast
		Direct NAWMP	Extension NAWMP	Policy NAWMP	Industry Trend *	Total		
Habitat Restoration								
Winter Wheat	872,100	25,000	149,400	0	0	**174,400**	20%	$ 775,000
Tame Pasture	1,433,100	49,000	4,000	0	233,600	**286,600**	20%	$ 3,108,000
Tame Hay	955,600	49,000	4,000	0	138,100	**191,100**	20%	$ 3,108,000
Planted Cover	7,700	1,500	0	0	0	**1,500**	20%	$ 4,200,000
Wetlands **	227,900	5,300	0	0	0	**5,300**	2%	$ 7,734,900
Restoration Sub-total	**3,496,400**	**129,800**	**157,400**	**0**	**371,700**	**658,900**	**19%**	$ 18,925,900

	25-Year Habitat Objective (Acres)	5-Year Habitat Objectives (Acres)					% 25-Year Habitat Objective	5-Year Expenditure Forecast
		Direct NAWMP	Extension NAWMP	Policy NAWMP	Industry Trend *	Total		
Habitat Retention								
Wetland	1,378,500	6,200	300	1,372,000	0	**1,378,500**	100%	$ 2,464,500
Upland ***	91,800	20,000	5,000	0	0	**25,000**	27%	$ 5,643,000
Retention Sub-total	**1,470,300**	**26,200**	**5,300**	**1,372,000**	**0**	**1,403,500**	**95%**	$ 8,107,500
Direct and Extension	**4,966,700**	**156,000**	**162,700**	**1,372,000**	**371,700**	**2,062,400**	**42%**	$ 27,033,400
Policy								$ 1,262,100
Operation & Maintenance								$ 12,353,200
Research & Evaluation								$ 7,448,400
Communication								$ 2,766,800
Coordination								$ 7,188,600
Grand Total								$ 58,052,500

* An estimate of change of specific land use types based on current, broad-scale data (Ag Census).
** Assumes small basins are primary restoration target (range 0.5-1.0 acre, average 0.75 acre)
*** May include tame or native grass acres

(Alberta NAWMP 2008)

4.2 The Chesapeake Bay Program

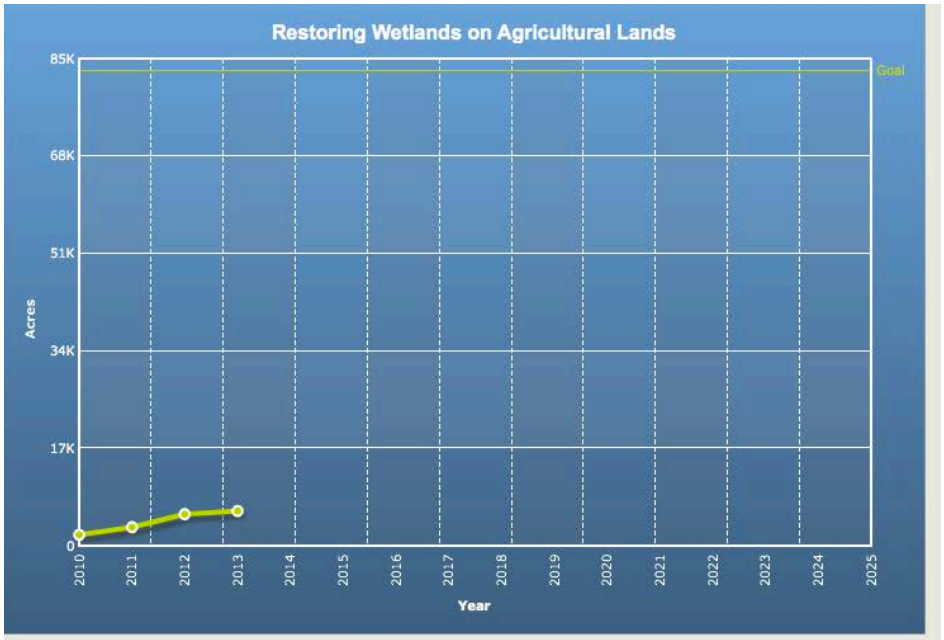
The Chesapeake Bay is the largest estuary in the US, and has had ongoing concerns with pollution as well as wildlife and aquatic loss (Chesapeake Bay Program 2015a).

In 1983, the Chesapeake Bay Program was formed, and through a partnership consisting of federal and state agencies, local governments, non-profit organizations and academic institutions, this multi-faceted program has implemented many restoration and protection activities throughout the Chesapeake Bay watershed (Chesapeake Bay Program 2015a). Some of the key issues issue areas dealt with in the Chesapeake Bay Program are wetland issues, as wetlands are recognized as providing critical habitat and improving the health of the Bay through water filtration, flood water collection, etc. (Chesapeake Bay Program 2015b).

The Chesapeake Bay program is an excellent example of how a multi-stakeholder group can bring together leaders, experts and resources to accomplish wetland conservation and restoration objectives, but is also a great reference for how to structure a website to allow stakeholders to learn about key wetland topics and track indicator progress.

Wetland management objectives have been set for the region, and an example of one of the acreage-based wetland objectives for the region has been to create or restore 83,000 acres of wetlands on agricultural land by 2025 (Chesapeake Bay Program 2015b). A simple graph (Figure 11) allows stakeholders to visually track the progress of the goal over time, and the rest of the website page highlights the importance of the wetland objective (referred to as a goal in the program), details the specific goal, summarizes trends related to the goal, provides additional pertinent information and the contact information of the best person to reach for questions or concerns regarding the goal (Chesapeake Bay Program 2015b).

Figure 11. Progress on Goal of Restoring Wetlands on Agricultural Lands in the Chesapeake Bay Watershed



(Chesapeake Bay Program 2015b)

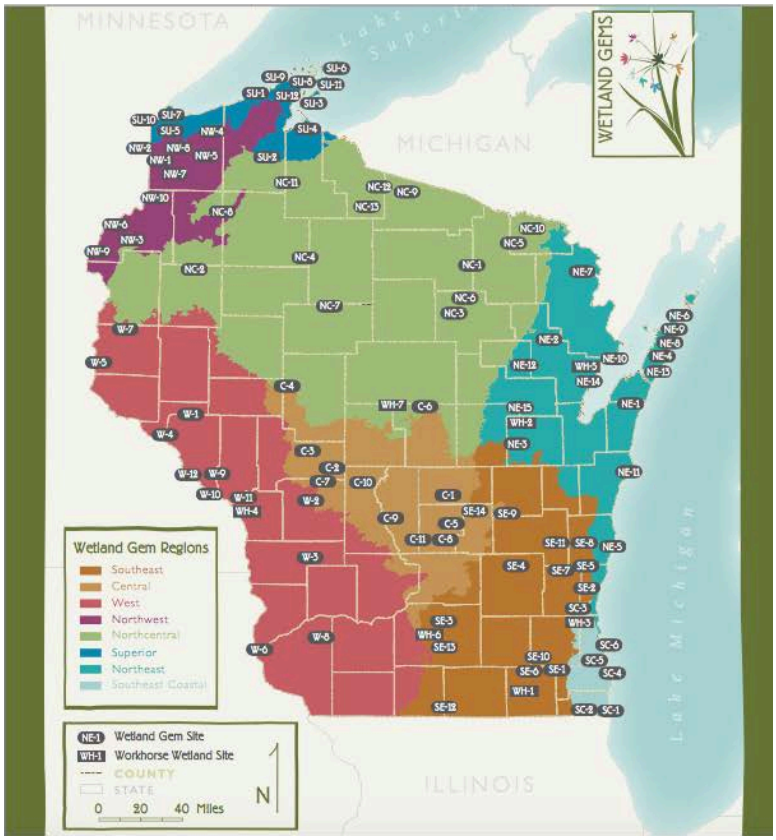
The wetlands page on the Chesapeake Bay Program website also includes news articles related to wetlands in the program, pertinent publications and maps (Chesapeake Bay Program 2015b).

4.3 Wisconsin's Wetland Gems Project

Ensuring that stakeholders are a key part of the process for setting regional wetland management objectives was identified as important in the Knowledge Leader interviews (see section 3.0). It was acknowledged that stakeholders do not always understand the value of wetlands, and that engaging the public on the services that wetlands provide is a key way of ensuring wetlands are recognized in regional planning processes.

The Wisconsin Wetland Association's Wetland Gems is an example of a state level program that has been successful in helping stakeholders understand the value of wetlands (personal communication with Knowledge Leader). The Program, launched in 2009, was set in place to increase public awareness and appreciation of wetlands in order to generate wetland stewardship at a citizen level (Wisconsin Wetlands Association 2015). The main activities for promoting the recognition and value of wetlands to the public has been through a series of publications which describe 100 high quality wetland sites chosen for their ecological value in representative wetland community types, as seen in the map in Figure 12 (Wisconsin Wetlands Association 2015).

Figure 12. Wetland Sites Chosen for the Wetland Gems Project



(Wisconsin Wetlands Association 2015)

The Wisconsin Wetlands Association, a member-based, non-profit organization, leads the project however; other partners included the Wisconsin Department of Natural Resources Wetland team and site property owners (Wisconsin Wetlands Association 2015). Through celebration events in the individual Wetland Gem sites, and individual wetland fact sheets with colourful photos, local community members have been given the opportunity to gather and learn about the wetland assets in their areas (Wisconsin Wetlands Association 2015). As part of the project, 11 priority Wetland Gems were chosen for nomination as RAMSAR designated sites (Wisconsin Wetlands Association 2015). In 2012 one of the sites was officially listed as a RAMSAR site and other site nominations are still underway (Wisconsin Wetlands Association 2015).

4.4 Colorado Wetlands Initiative

The Colorado Wetlands Initiative was put in place in 1997 to strategically protect wetlands and wetland-dependent wildlife throughout Colorado (Colorado Riparian Association 2015). It is done through voluntary and incentive-based mechanisms and is led through a partnership group including private landowners, municipalities, state and federal agencies, and non-governmental organizations (Colorado Riparian Association 2015). The initial large-scale goal was to conserve 15,000 acres of

biologically significant wetlands (amidst other goals and objectives), and this goal has been exceeded (Colorado Riparian Association 2015).

This initiative is an example of a regional process, which utilizes a partnership group to identify priority issues, goals, objectives and projects in order to manage wetlands and retain and restore priority wetland values.

The Colorado Wetlands Initiative and other wetland programs in Colorado, utilize focus areas (regions) previously established to implement the NAWMP, and focus protection efforts on wetlands in need of conservation. Strategic plans, with broad goals and specific objectives have been created for focus areas. Each focus area has priority wetlands that have been identified and conservation and restoration activities are planned and initiated.

One example of a strategic plan for wetlands under the Colorado Wetlands Initiative is the *Lower Colorado River Focus Area Strategic Plan* (Colorado Parks and Wildlife 2005). Under the strategic plan for the Lower Colorado River Focus Area, the values of the area have been determined to relate predominantly to waterfowl populations (Colorado Parks and Wildlife 2005). Priority wetland areas were identified by a focus group and the following key priority issues for the areas were set:

- *impact of human development on wetlands and waterfowl habitat; and*

- *decline of waterfowl dependent on wetlands throughout the Intermountain West* (Colorado Parks and Wildlife 2005).

Goals were then formulated to address the priority issues:

- *protection, maintenance and enhancement of wetlands, migratory and winter water bird habitat; and prevention of purple loosestrife invasions into new wetlands;*

- *produce more waterfowl in focus area; and*

- *provide public environmental education and recreation in the focus area* (Colorado Parks and Wildlife 2005).

Specific objectives were then set to accomplish the goals. For example under the goal of '*providing public environmental education and recreation in the focus area*', the objectives set were:

- *protect through easements or acquisition key wetland and riparian areas that are most important for public recreation, outdoor recreation and open space; and*

- *coordinate efforts with various river protection projects including Mesa County riverfront program, Uncompahgre River corridor efforts, and Colorado Legacy programs* (Colorado Parks and Wildlife 2005)

Specific projects were then chosen to accomplish the objectives, and project choice took into consideration feasibility, long-term benefits, operational considerations, scientific and ecological values and programmatic considerations (Colorado Parks and Wildlife 2005). Projects were prioritized and identified for implementation (Colorado Parks and Wildlife 2005). Details such as funding sources (grants, Wetland Initiative partner resources, landowner cost sharing etc.) as well as management and monitoring requirements were outlined in the strategic plan (Colorado Parks and Wildlife 2005).

4.5 San Francisco Bay Area Wetlands Ecosystem Goals Project

While the wetland types examined for the San Francisco Bay Area Wetlands Ecosystem Goals Project (Goals Project) do not coincide with wetland types in Alberta, this case study is a well-documented example of how regional wetland objectives can be formulated, how a scientific review panel can add value to the process, how the use of acreage-based wetland objectives can be used in conjunction with function-based wetland objectives, and how goals and objectives can be set at multiple scales. The public participation component of this case study is also worth noting, as how the public was engaged as well as at what points in the process they were engaged was outlined clearly in the Goals Project report.

The San Francisco Bay Area Wetlands Ecosystem Goals Project began in 1995, and involved participants representing local, state and federal levels of government, academics and individuals from the private sector. This project was to set to establish a long-term vision for a healthy and sustainable ecosystem in the bayland area and to guide a regional wetlands planning process to restore the ecological integrity of the wetland communities (Goals Project 1999).

Participants of the Goals Project were assigned groups, and these groups included a Resource Managers Group (RMG), an Administrative Core Team, a Science Review Group (SRG), Focus Teams and a Hydrogeomorphic Advisory Team (HAT) (Goals Project 1999). The RMG, for example, composed of state and federal resource agencies, oversaw the project and was ultimately responsible for the content and format of the goals (Goals Project 1999).

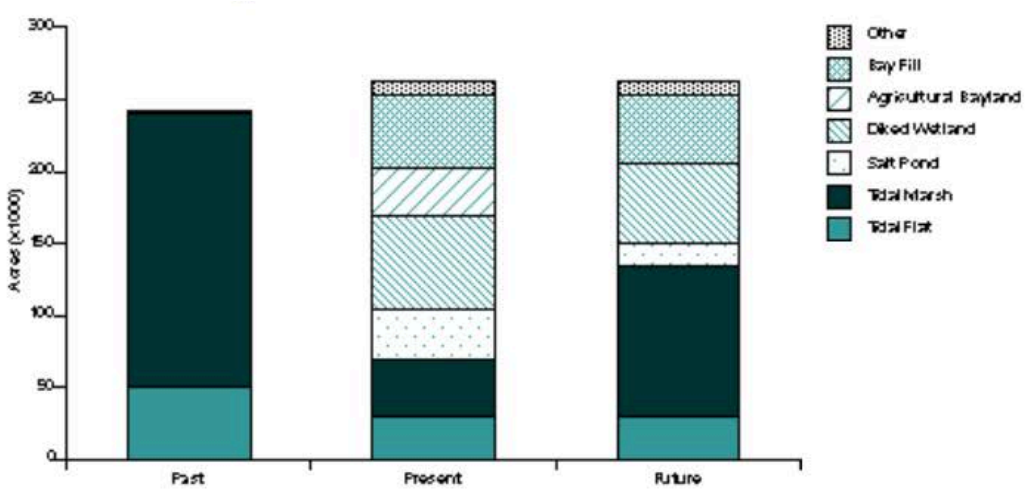
The goals set for the Goals Project were based on key wetland species and their habitats, due to the wealth of information available on bayland species and their habitats (Goals Project 1999). There was general agreement amongst participants that developing goals for improving wetland habitat for plants and animals would concurrently provide other wetland services (i.e. flood control, nutrient cycling, water quality improvement, etc.) (Goals Project 1999). Ultimately, 120 species and 24 key habitats were chosen to represent the region, and qualitative and

quantitative data was assembled to form the initial recommendations (Goals Project 1999). The main premise for the recommendations was as follows:

"There should be no additional loss of wetlands within the baylands ecosystem. Furthermore, as filled or developed areas within the baylands become available, their potential for restoration to fish and wildlife habitat should be fully considered." (Goals project 1999)

Goals were set at three scales (Goals Project 1999). General goals were set at the regional and sub-regional scales, and detailed recommendations were provided at the segment scale (Goals Project 1999). Regional and sub-regional goals included acreage targets for key habitats (Figure 13) (Goals Project 1999).

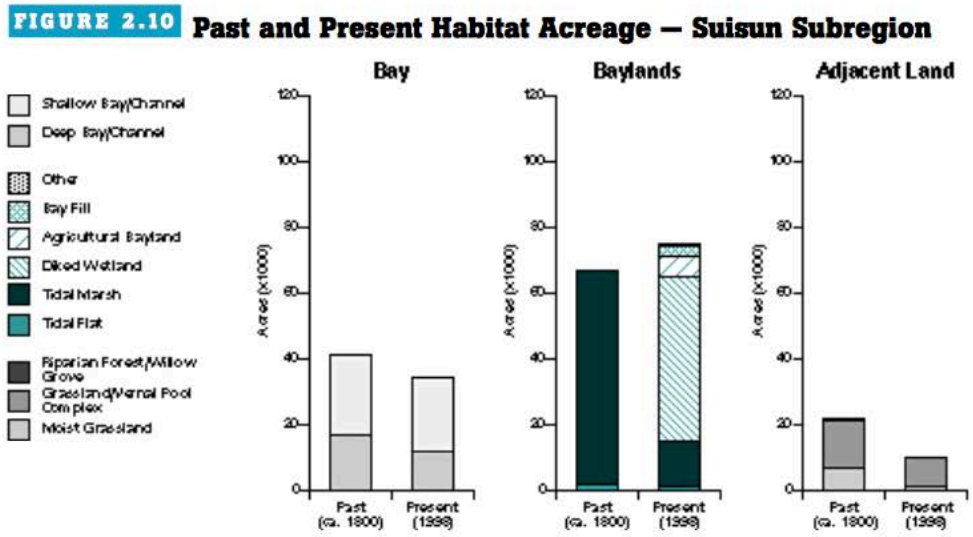
Figure 13. Past, Present and Recommended Future Acreage Targets for Key Areas of the Baylands Area



(Goals Project 1999)

Sub-regional goals were more specific than the regional goals and are described in detail in the Goals Project report (Goals Project 1999). At the sub-regional level a comparison of past and present habitat acreage was examined (Figure 14 provides an example of a comparison) (Goals Project 1999).

Figure 14. Example of Past and Present Habitat Acreage Analysis at the Sub-regional Scale

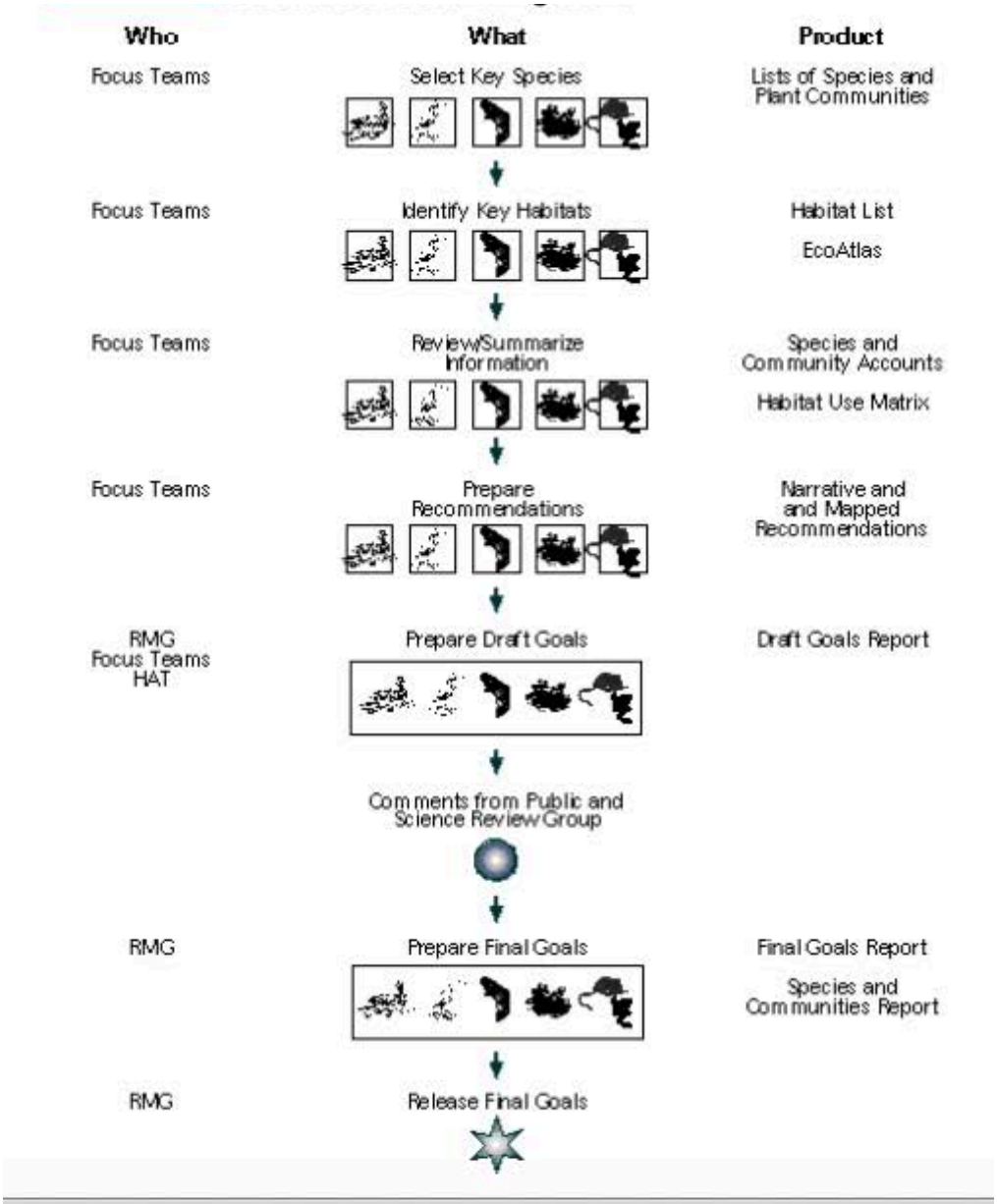


(Goals Project 1999)

The finest scale used in the Goals Project was the segment scale (Goals Project 1999). Each sub-region was split into segments of various sizes, and each segment was identified alphabetically (A-M) (Goals Project 1999). The Goals Project report includes: recommendations, maps of past and present conditions, descriptions of major and unique features, restoration opportunities and benefits as well as potential constraints for each segment (Goals Project 1999).

A defined process was used for establishing the goals, and each of the pre-assigned groups had clear roles with specific deliverables at particular points within the process (Figure 15) (Goals Project 1999). Public input was formally requested after draft goals had been prepared by the Goals Project team, however the public was involved throughout the entire process through the project's public outreach program which included workshops, meetings, brochures and reports (Goals Project 1999).

Figure 15. Process for Establishing Goals in the Goals Project



(Goals Project 1999)

The SRG was a panel established to provide critical oversight of the process and product of the Goals Project (Goals Project 1999). The expertise of the SRG members included ecosystem analysis, integrated resource planning and conservation biology (Goals Project 1999). The SRG provided an arms-length overview and the recommendations it provided were put into place as the project progressed (Goals Project 1999).

The goals established through the Goals Project established a 'flexible vision' for wetland restoration in the baylands area, however it recognized that close

coordination between landowners, agencies and other stakeholders was necessary to implement the recommendations laid out in the report, and that tracking and monitoring of the goals and recommendations was seen as essential for keeping the process going (Goals Project 1999). In 2001 the San Francisco Bay Joint Venture (SFBJV) published a 20-year collaborative plan for the restoration of wetlands and wildlife in the Bay area called *Restoring the Estuary: an Implementation Strategy for the SFBJV*, which built upon the goals established in the Goals Project (SFBJV 2015). Further goals, objectives and strategies were provided for wetland ecosystems in the plan (SFBJV 2015).

4.6 Oregon Wetlands Conservancy Greatest Wetlands

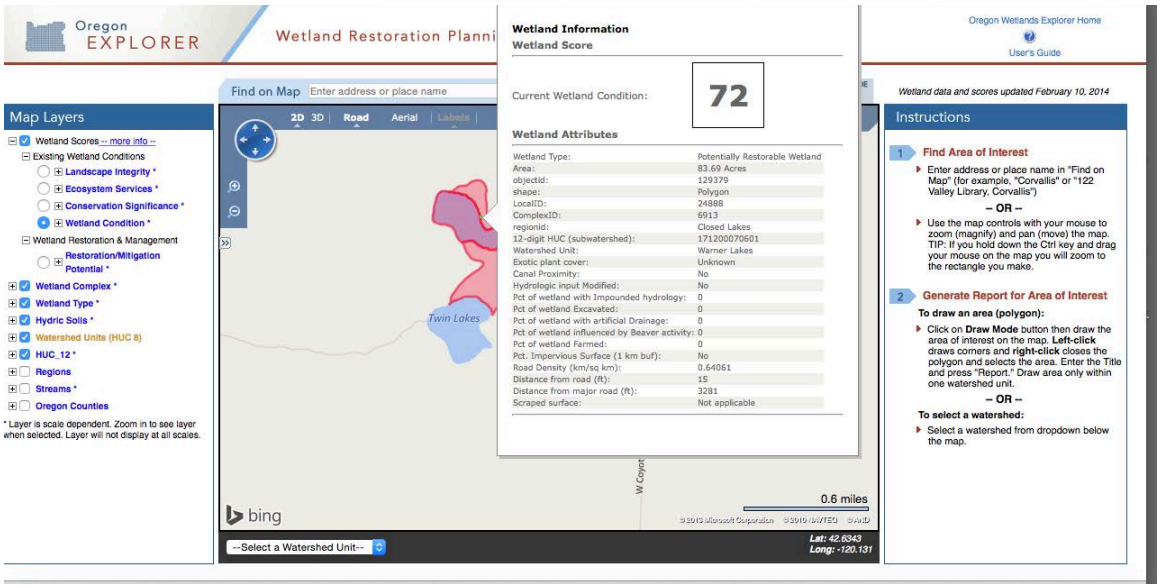
The Wetlands Conservancy of Oregon identified Oregon's Greatest Wetlands in response to large amounts of historical wetland loss in the state (Wetlands Conservancy 2015). The Greatest Wetlands were identified as being the most biologically significant wetlands in Oregon by a group of 20 wetland ecologists, and data regarding the wetlands was then compiled to create a portal called the Wetlands Explorer (Wetlands Conservancy 2015). Information about the wetlands was collected, compiled and reviewed and put into map form (Figure 16) (Wetlands Conservancy 2015).

Figure 16. Map of Oregon's Greatest Wetlands

(Wetlands Conservancy 2015)

Priority wetland map layers were piloted in key areas and then the methods used were adapted to all wetlands in each Oregon watershed unit (typically HUC 4 unit level) (Oregon Wetlands Explorer 2015). Wetlands were scored for their conservation status, ecosystem services provided, site-specific condition and landscape-level condition using the Wetland Restoration Planning Tool (Oregon Wetlands Explorer 2015). The Wetland Restoration Planning Tool is an interactive map-based tool that allows the user to search a specific area for landscape integrity, ecosystem services, conservation significance and wetland condition (Figure 17) of the wetlands in a chosen area (Oregon Wetlands Explorer 2015).

Figure 17. Example of Wetland Condition Information in the Oregon Wetland Restoration Planning Tool



(Oregon Explorer 2015)

Oregon's Greatest Wetlands program is an example of how a steering committee can highlight specific wetlands at a watershed unit scale for restoration and conservation purposes, as well as how mapping tools can be incorporated into the process of wetland management, particularly when the objectives are functions-based.

5.0 Next Steps

The next steps in setting regional wetland management objectives according to Knowledge Leaders and what can be learned through the above case studies, are that key terms and processes need to be defined, and that stakeholder input is required. The next steps outlined below are not prescriptive in nature, as they are ideas of key considerations for setting regional wetland objectives, and the definitions and processes would remain at the discretion of whoever leads the process. These next steps are not necessarily in the order in which they would occur.

Define Key Terms

- Clarify why setting regional wetland management objectives is important in Alberta.

- Develop a definition for a regional wetland management objective with specific and clear terms.

Decide Who the Key Players Are

- Determine who will be involved in setting regional wetland management objectives.

- Define roles of leaders and stakeholders in the process for setting regional wetland management objectives.

- Define a process for when and how to engage key stakeholder groups.

Develop a Consistent Process

- Specify the policy, initiative or strategy that setting regional wetland management objectives will take place under.

- Outline the process of setting regional wetland management objectives and ensure that the language, metrics, outcomes and measures will be consistent across the participating regions in Alberta.

Choose Scale and Pilot Areas

- Set the regions and at what scale(s) wetland management objectives will be created and managed at.

- Find a pilot area or pilot areas that will allow the process of setting regional wetland management objectives to be tested and bring forward successes and challenges to learn from.

- Identify criteria and indicators that can be used for specific wetland values at the chosen scale.

Determine Data Needs and Means of Compiling Data

- Identify what wetland data is needed to successfully proceed with setting regional wetland management objectives.

- Create a system that ensures data is compiled, shared and collected in a way that allows decision-makers and stakeholders to access what they need for the successful setting and implementation of regional wetland management objectives.

Workshop Ideas with Key Stakeholders

- Host a workshop to inform initial decisions on setting regional wetland management objectives (narrow the scope and identify non-starters).

- Initiate other workshops to inform the process of setting regional wetland management objectives and to engage stakeholders on wetland values in specific regions.

Develop Accountability Systems

- Determine if an oversight committee or review team will be used and if so, compile the committee/team to allow input into the process of setting regional wetland management objectives at an early stage.

- Develop a means of tracking and monitoring regional wetland management objectives.

- Develop a system to communicate progress of regional wetland management objectives back to stakeholders.

Choose an Evaluation Cycle

- Create a system for the evaluation of the process of setting regional wetland management objectives.

- Set a timeline for the re-evaluation of regional wetland management objectives.

6.0 Conclusion

Regional wetland management objectives have the potential to support existing provincial legislation, policies and initiatives across various levels of government in Alberta. These objectives could help achieve a wetland management system in the Province through up-front wetland planning, and evolve from the case-by-case wetland decision-making that exists currently through the Alberta wetland approvals system.

While wetland objectives have been created under various initiatives in Alberta, regional wetland management objectives have yet to be defined and standardized under a provincial process. If the GoA decides to proceed with setting regional wetland management objectives under the LUF or through the implementation phase of the Wetland Policy, it is imperative that wetland management objective terms and processes are defined in order to ensure consistency and clarity for stakeholders.

Existing jurisdictions that have set objectives for wetland planning in Alberta and areas within the US can serve as models for what regional wetland management objectives can include, and can provide examples as to the measurable criteria and indicators that can serve to hold the process accountable.

Establishing regional wetland management objectives in Alberta could be an opportunity to educate stakeholders on the functions and values of wetlands in their local regions and to involve them in the process of conserving and restoring key wetland functions that have been lost due to high levels of wetland drainage in the past.

7.0 Literature Cited

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