Wetland Inventory Needs Assessment

Outcomes from the Wetland Mapping and Needs Assessment Workshop held on February 27, 2015

White Paper

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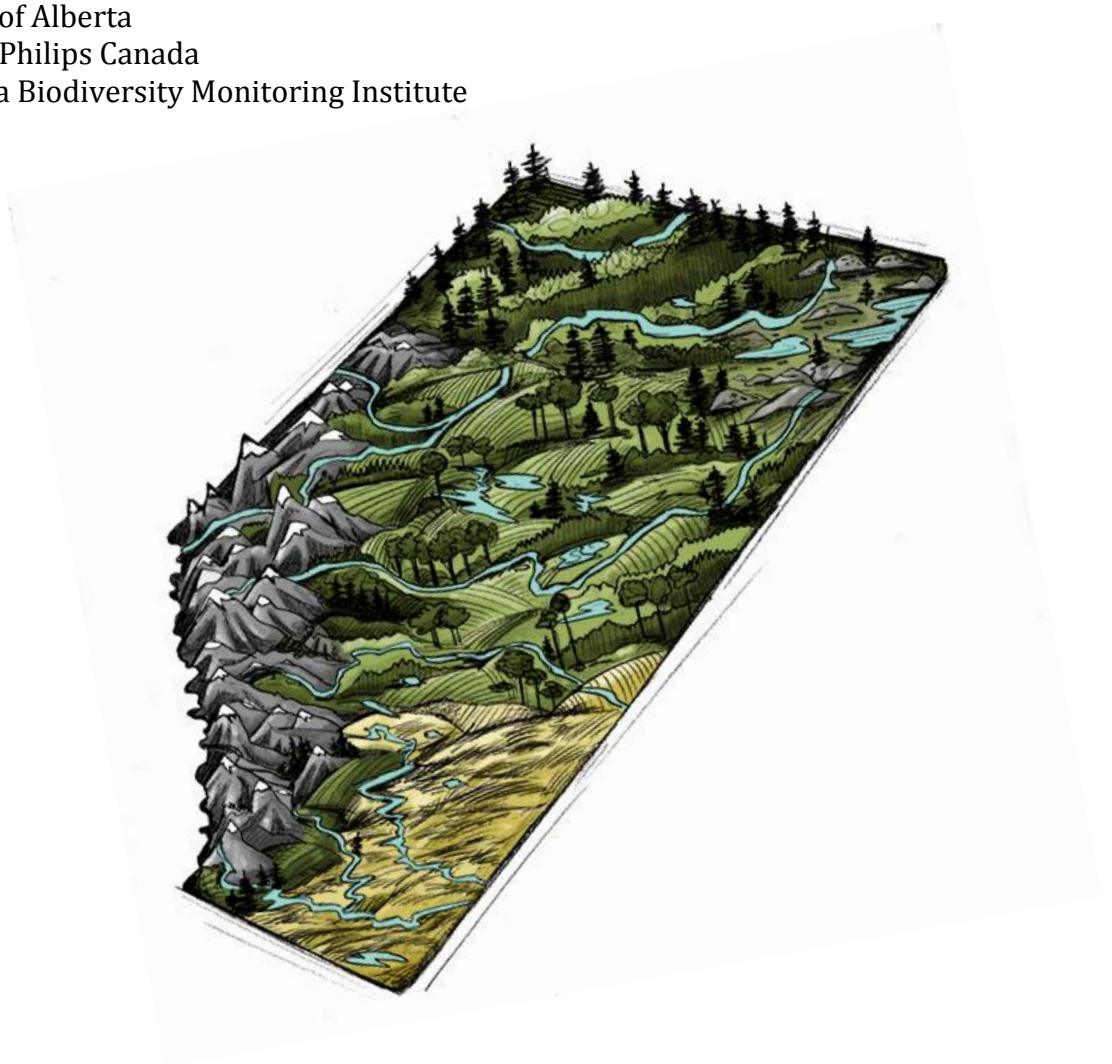

Executive Summary

Alberta's wetlands provide a wide range of ecosystem services, and they are a critical indicator of the health of Alberta's hydrological systems. Available information on location and state of Alberta's wetlands is currently limited. The best existing wetland inventory (geospatial product) is a composite derived from numerous sources, with varying degrees of quality, differing classification standards and intents. This lack of standardized, baseline data and standards for a wetland and aquatic inventory poses challenges to supporting Alberta's environmental policies and frameworks, including the Alberta Wetland Policy, land-use planning, and tracking loss and gains of wetland acreage.

Built with the best data collection methods and analytical approaches, a wetland inventory is necessary to inform management decisions and trigger management responses to protect the wetland function and ecosystem services. In light of these needs, the Alberta Biodiversity Monitoring Institute hosted a Wetland Mapping and Needs Assessment Workshop on February 27, 2015. The workshop brought together developer and user partners to collectively identify the needs, challenges, and gaps associated with Alberta's wetland inventory and to create solutions for an optimal wetland mapping and monitoring platform.

The workshop highlighted the next steps for a wetland inventory for Alberta with a focus on two themes: leadership and action. The workshop participants recommended steering committee of developer and user partners to lead the establishment an optimal wetland mapping platform and system in Alberta. The primary action of the steering committee is to provide open-access data grounded with sound and credible mapping standards.

The key outcome of the workshop was the creation of a vision statement to guide leadership and action for an optimal provincial scale wetland inventory. *The wetland inventory will provide comprehensive and standardized wetland information and datasets for Alberta that is freely and timely available with the detail level to support the needs of stakeholders and users.* The wetland inventory will create the following for Alberta:

- *Wetland information and geospatial layers to support Alberta's environmental policies and frameworks and meet regional and sub-regional planning needs.*
- *All data and information is readily and publicly available in a standardized format.*
- *Effective developer and user input into the program.*

The wetland inventory will provide the state of the art wetland information to meet user needs, inform wetland management decisions, integrate with other mapping initiatives and inventories in Alberta, and support the implementation of Alberta's environmental policies and frameworks, including the Alberta Wetland Policy. To build a single inventory, the needs, challenges, leadership, and action as identified in the workshop should guide future work.

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Cover Illustration
Amanda Schutz

Introduction

Wetlands in Alberta provide a wide range of ecosystem services and are a key ecosystem component found in all of the province's biomes. The value of ecological services provided by wetlands is widely recognized. In addition to critical aquatic and terrestrial wildlife habitat, wetlands provide water purification and quality protection, flood control management, and erosion - all important ecosystem services. The state of Alberta's wetlands is an indicator of the status of the province's aquatic and terrestrial ecosystems. Currently for much of Alberta, there is only limited information available about location and status of Alberta's wetlands (mapping) and inventory of lost and drained wetlands is lacking. Furthermore, the current spatial wetland inventory for Alberta, released by the Government of Alberta (GOA) in September 2014, is a composite derived from numerous sources, with varying degrees of quality, differing classification standards and intents. There is a strong need to have a detailed wetland inventory program to support the Alberta's land-use planning process and implementation of the Alberta Wetland Policy. On February 27, 2015, the Alberta Biodiversity Monitoring Institute (ABMI) hosted the Wetland Mapping and Needs Assessment Workshop to examine the strengths and limitations of the existing wetland mapping inventories and identify potential methods and priorities for an optimal wetland inventory.

1.0 Workshop Overview

1.1 Goals and Objectives

The workshop was designed to identify the needs of stakeholders with respect to an inventory and the gaps that are not being filled by the existing provincial scale wetland inventories for Alberta. The objectives of this workshop were to:

1. Assess the needs of multiple stakeholders for a wetland inventory
2. Build awareness of criteria and design methods that have been used to build the existing wetland inventories
3. Identify a vision and criteria for an optimal provincial scale wetland inventory
4. Gather input to inform a white paper that summarizes the needs of stakeholders and provides recommendations on framework and characteristics of an optimal provincial scale wetland inventory
5. Identify the concepts and recommendations to be incorporated into the White Paper

1.2 Workshop Methods

One of the primary ideas discussed during the workshop development was that it should engage a diverse group of developers and users of wetland inventories in Alberta. There were more than forty participants participated in the workshop. There were both

developers and users of various levels of experience and background. The workshop consisted of two parts:

- Part 1 – Panel discussions
- Part 2 – Round Table discussions

1.2.1 Panel Discussions

There were two panel discussions; the first of which was *Perspectives from the Developers of the Inventories*. In this panel, there were four panelists who were invited to present some of the key aspects of their work related to existing inventories, discuss what needs are being filled by their inventories and list the challenges to be faced when meeting these needs. Presenters were:

- Kathleen Jaques (Government of Alberta) – *The Alberta Merged Wetland Inventory*,
- Barry White (Government of Alberta) – *Update on Alberta's wet areas mapping initiative*
- Alain Richard (Ducks Unlimited Canada) – *DUC's Enhanced Wetland Classification Overview for Boreal Alberta*
- Lyle Boychuk (Ducks Unlimited Canada) – *DUC High Resolution Wetland Inventories, Alberta White Zone*

The second panel was *Perspectives from the Users of the Inventories*. Panelists were asked to provide a summary of their topic/research, some of the challenges they are facing and what needs are not being met by the existing inventories. There were five *Users* panelists:

- Nadia Rochdi (University of Lethbridge) – *Large-Scale Mapping: Examples and Issues*
- Jahan Kariyeva (Alberta Biodiversity Monitoring Institute) – *Overview of ABMI's Wetland Monitoring Projects*
- Mike Watmough (Canadian Wildlife Service) – *Wetland Status and Trends Monitoring in the Prairie Habitat Joint Venture*
- Faye Wyatt (Fiera Biological Consulting) – *Industry perspective: Why Alberta needs a standardized, reliable, and publicly available wetland inventory*
- David Aldred (University of Western Ontario) – *Wetland Inventories: opportunities and challenges in Alberta*

Both panels were moderated and, following the completion of all presentations, there was discussion between panelists and the other workshop participants. During both the presentations and the discussions, two facilitators were taking notes on large papers to the sides to capture and share needs and challenges. The notes were consolidated and used as a reference in later round table discussions to allow for further development and refinement of ideas realized during the panel sessions.

1.2.2 Round Table Discussions

There were two round table discussions. Participants were dispersed into six tables with six to eight people per table. Panelists and participants were asked to split up and not sit with those in their own company to ensure diverse opinions and backgrounds.

The first discussion centered on identifying the needs of users and developers. Participants were asked to discuss their needs, but to also think in terms of the group as a whole, while considering the notes that were taken from the morning session. There were specific questions provided for them to consider which included:

- *Starting with the list compiled from the morning panel discussion, what are the form and function of the needs from wetlands inventory?*
- *Which needs are mandatory and which are optional but desirable?*
- *Which needs are local in scale and which are provincial in scale?*

The discussions lasted approximately 40 minutes and the last five minutes were reserved for participants to prioritize their lists. Following their discussions, each of the groups shared the three most important aspects of their conversations with the whole workshop. All the discussions were recorded and papers from each of the table were collected to ensure no data was missed.

The second discussion was centered on identifying gaps and solutions of various users and developers. Participants were again asked to discuss their needs, but to also think in terms of the group as a whole. In addition to the notes from the morning session, there were specific questions provided for them to consider which included:

- *At a high level, which needs are being met under current systems and where are the prominent gaps?*
- *Which needs should be met through a provincial scale wetland inventory?*
- *What are the minimum thematic and spatial requirements for a provincial scale wetland inventory?*

The discussions lasted 40 minutes and the last five minutes were reserved for participants to prioritize their lists. Following these discussions, the groups shared the three most interesting aspects of their conversations with the whole workshop. Once again, the discussions were recorded and papers from each of the table were collected to ensure no data was missed.

The final 20 minutes of the workshop was devoted to the closing conversation. In this session, it was important to have the opportunity to revisit some of the initial questions and to summarize the discussion outcomes. Most importantly, this session provided participants with the opportunity to discuss the next steps to move the initiative forward.

1.3 Workshop Summary

Discussions throughout the workshop yielded the themes below. Summaries were organized by Needs, Challenges, Gaps, and Solutions. Themes were established through a thematic analysis.

1.3.1 Existing Needs

The first topic considered here are the Needs that were identified during the workshop. Seven themes were derived from the responses captured throughout the day, including:

- Policy
- Increased Standardization
- Data and Metadata
- Increased Flexibility
- Change Detection and Inventory
- Access
- Resources

The data that makes up these themes has been provided in brief in Table 1 (Summary of Needs).

Policy

Attendees had discussions regarding the policy and governance required to support the wetland database. Tools focused on implementation and certification processes, along with collaboration between agencies were seen as an important shift. The Alberta Wetland Policy (AWP) was noted as being the starting point when determining the main driving force for development and completion of appropriate provincial scale wetland inventory platform.

Increased Standardization

The discussions during the workshop clearly indicated that agreement and consistency are required on the number of wetland classes used as well as how detailed the interpretation and database should be. Users and developers communicated that they require increased data resolution and coverage, consistent and accurate delineation and classification methods, and increased efficiency of data processing for wetland delineation and classification. Clearly defined standards and methodology were also identified as imperative. The province of Alberta has not yet determined standards for a wetland and aquatic inventory to support any of key Alberta policies and frameworks including the AWP. Developing such standards will provide land planners and managers with required tools to improve access to data and information to enable research in areas of strategic priorities.

Data and Metadata

Participants identified many different data parameters as necessary to be linked to the wetland delineation methods and approaches. Of these, depth of water was mentioned

most frequently. Ensuring the spatial data and accompanying wetland information corresponded and aligned well with existing databases was also flagged as a requirement.

Increased Flexibility
Flexibility for application was generally defined as different scales for different needs. Allowing flexibility in the database and tools was repeatedly mentioned in terms of accuracy. Flexibility should be based on appropriate scale to enable spatial and thematical scalability depending on applications, resolution of classification for different applications, and dual/appropriate standards for White vs. Green zones in Alberta.

Change Detection and Inventory
Increased temporal resolution of available data was a recurring requirement. Participants feel it is necessary to allow for effective inventory of the impacts of change on wetlands. Increasing data updates would facilitate tools required to detect and assess wetland loss, annual and inter-annual change dynamics, impacts of fire and anthropogenic and land use patterns, and long-term wetland trends. The lack of a well-developed infrastructure of baseline wetland and aquatic data that support Alberta's policies and frameworks is a key challenge for any wetland monitoring system developed in the future.

Access
The most commonly heard need relating to access was a need for open source data models and freely available and readily accessible data, which government, non-profit, and for-profit developers could use to address the accuracy and consistency issues raised throughout the discussion. Other access related requirements included efficiencies, transparency, collaborations, and facilitating a feedback mechanism to update and standardize the database of the existing and new data and develop an appropriate data distribution system for developers and users.

Resources
The need for more resources, ranging from money and skilled staff, to equipment, was a consistent theme throughout the workshop.

SUMMARY OF NEEDS			
THEME	**DATA**	**THEME**	**DATA**
INCREASED STANDARDIZATION	Consistency* Detail* Accuracy* Density* Coverage*(clouds, gaps) Automation* Resolution* 5 wetland classes Credible stakeholder sanctioned Repeatable methods Ecological classification by sub-region Extent Wetland condition Data gaps Validation Aligned with AB Wetland Classification System and Canadian Wetland Inventory	DATA AND METADATA	Depth* Pesticide-herbicide info Additional attributes Geometry Fused spectral data source Function Connectivity First Nations' land Water fowl Biodiversity Surface water table Soil conditions National database Reliable metadata Link mapping and data Hydrologic info Drained inventory standard
INCREASED FLEXIBILITY	Multiple scales* Flexibility Pseudo-LiDAR (photogrammetry-based) Accuracy according to scale Finer classification at regional local scale Change requirement (basin, watershed) White-green zones different requirements Auxiliary data Link to national scale Dynamic	CHANGE DETECTION AND INVENTORY	Updates* Dates* Drained wetlands* Trends* Loss monitor* High temporal resolution Changing conditions Seasonal changes Fire areas Anthropogenic change
ALBERTA WETLAND POLICY (and other relevant environmental policies and frameworks)	Regional planning Unplanned vs. delineation Support policy making Implementation Reclamation certification process Ownership Pilot programs Emergency response Conservation Collaboration	ACCESS	Open source* Feedback mechanism Distribution system Third party data access Feedback from Alberta Wetland Rapid Evaluation Tool (ABWRET)
		RESOURCES	Cost* Staff* Resources* Incorporating current resources

Table 1: Summary of Needs identified by participants. An asterisk (*) has been included for those statements that were repeated.

1.3.2 Existing Challenges

The Challenges that were identified during the workshop fell into seven themes, derived from the responses captured throughout the day, including:

- Diverse needs and priorities across the user and stakeholder groups
- Ancillary source data
- Transparency and standardization of data interpretation methods
- Ability to detect and map:
    - Change in wetland condition and health due to land use and climate change
    - Wetlands responses under natural climate variability: dry vs. wet periods
- Involved economic costs
- Access to data and standards of data acquisition
- Policy support

The data that makes up these themes has been summarized in Table 2 – Summary of Challenges.

Diverse Needs and Priorities

Discussions surrounding the variety of users and uses for these inventories occurred throughout the day. Users indicated that depending on the end use of the data there are different requirements in terms of level of detail and types of information they wanted to be included.

Solution: A clear policy and regulatory direction under strategic overarching goal of the AWP to identify critical requirements and priorities for wetland inventory and minimize some of the diversity of the overall needs.

Ancillary Source Data

The workshop results suggest that there is a significant amount of missing or incomplete data. Limited or no data is available for national parks and First Nations and Metis land. Specifically, in the Regional Municipality of Wood Buffalo there are substantial areas that have very limited wetland information. In addition, workshop participants indicated that there is no bathymetry data currently available to distinguish deep water from shallow water environments, due to the lack of field data collection. The spatial resolution and types of available data also proves challenging during the interpretation process.

Solution: Adequate standards for ancillary source data and means of compiling and sharing/distributing existing and required data to support a provincial scale inventory.

Data Interpretation Standards

Data interpretation challenges arise due to the application of subjective variability of air photo interpretation, inconsistent methods, standards of classification, and standards of accuracy assessment and reporting. Errors and challenges with accuracy were identified multiple times and in many different ways. For example, consistently missing small water bodies and misclassifying roads as wetlands came up often enough to be their own item, but are also clear errors in the data classification. Some of the errors in the existing databases may be directly related to the available source data.

Solution: Data accessibility, transparency, and standardization for information interpretation methods, accuracy assessment, and reporting.

Change Detection and Inventory of impacts?

Participants indicated that changes of various kinds were impossible to identify and track due to lack of a means to assess and monitor wetland loss. Because of the lack of temporal resolution in available data, it is difficult to capture seasonal variation, longer cyclical changes due to the local climate, fire events, or wetland loss (hydrological loss, ecosystem services and changes in spatial extent). In addition to changes to the land being studied, participants also indicated that changes to the standards used to collect and interpret the field and remotely sensed data were causing them challenges.

Solution (long-term monitoring): A credible and science-based system for documenting and reporting change in wetland status, boundaries and wetland loss. The system will need to include standards, methods and definitions on wetland loss and management objectives, definitions on change (natural vs. anthropogenic) and other information relevant to long-term monitoring system.

Cost

Participants indicated that acquiring data of sufficient resolution, ensuring accurate interpretation and developing tools could be cost prohibitive. Maintaining the skill set and resources necessary to maintain and update the existing databases was flagged as difficult within the public and non-profit realm. This could be due to Alberta's economic climate. Finally, the vast land base and consequently the data cloud are seen as requiring considerable computing power that currently does not exist.

Solution: ***(long-term monitoring)***: Incorporate existing resources and staff to collaborate on the standardized system for monitoring wetland status, boundaries and wetland loss. The solution is collaborative funding model with clearly outlined end-goals of the outputs (i.e., data available to public at no cost).

Access to Data and Data Acquisition Standards

Data access constrains and lack of standardized means for data acquisition was flagged as a challenge. Data ownership restrictions and lack of communication between developers were raised as issues that limit the ability to build robust mapping tools and participants indicated that they increase the likelihood of redundancy.

Solution: Adequate standards for source data and means of compiling existing and required data to support a provincial scale inventory program with clearly outlined distribution mechanism.

Policy

The workshop participants flagged the disparity between the wetland regulations, requirements for enforcement and the tools being developed. Attendees also identified governance of implementation standards as challenging.

Solution: There is a need for a stronger linkage between the AWP and a provincial wetland inventory program. Setting clear and measurable policy and regulatory requirements through the implementation of the AWP will ensure that the wetland inventory need, terms and processes are consistently and clearly defined for all the stakeholder groups.

SUMMARY OF CHALLENGES			
THEME	**DATA**	**THEME**	**DATA**
DIVERSE NEEDS AND PRIORITIES	Varied needs* Defining function* Unclear expectations Too complex	DATA INTERPRETATION STANDARDS	Error* Definitions* Different standards* Accuracy* Varied methods* Miss small bodies* Classifications bias Contour drainage hard to pick up
ANXILLARY SOURCE DATA	Interference* Incomplete* Resolution* Missing depth of water* Lack of attributes No inventory on fed lands Missing soil conditions Provincial DEM not enough Data coverage Scales differences in AB No national data base	CHANGE DETECTION AND INVENTORY	Changing standards Changing climate Fire events Wetland loss Seasonal change Limited monitoring Frequency of data
ECONOMIC COST	Cost* Manpower* Time* LiDAR* Resolution* Duplication* Large spatial area* Computing power Skill set constraints Can't catch-up Size of data	ACCESS TO DATA AND DATA AQUISITION STANDARDS	Not a public model set* Access to ancillary data Ownership Communication
		POLICY	Implementation Policy makers are not as actively engaged in conversation Land use planning framework* Science and regulations disconnected

Table 2: Summary of Challenges identified by participants. An asterisk (*) has been included for those statements that were repeated.

1.3.3 Existing Gaps

Gaps that were identified during the workshop fall into two broad themes:

- Data
- Process

The data that makes up these themes has been provided in brief in Table 3 (Summary of Gaps).

Required Data
Workshop attendees flagged existing data gaps as gaps in coverage, poor spatial resolution, and lack of regular updates. More specific data gaps included change detection related to non-morphological changes (e.g., salinization, acidification, and chemical pollution) and burn areas. The most commonly identified gap was the inconsistent coverage of remotely sensed data required for wetland mapping, including the incomplete coverage of LiDAR data over the province.

Process
Gaps were also identified in the process of developing the wetland database and associated tools. These procedural gaps included standardized methods for production and validation, inventory systems, and a clear governance structure. Setting clear and measurable objectives of the wetland inventory would need to be determined before proceeding with development of an optimal wetland inventory system that will support the needs of various stakeholder groups.

SUMMARY OF GAPS	
THEME	**DATA**
REQUIRED DATA	Incomplete coverage of LiDAR over entire province* Coarse resolution in the green zone Poor change detection Non-morphological changes Gaps in recent burn areas/gaps in white zone Frequency of inventory updates
PROCESS	Dedicated inventory systems Clear framework & governance structure Data sharing: open data and information access Standardized auditing procedures and QA/QC standards Benchmark methods and gap analysis Standardized methods of production and validation Funding

Table 3: Summary of Gaps identified by participants. An asterisk (*) has been included for those statements that were repeated.

1.4 Conclusions from the Workshop: Solutions and Next Steps

The workshop was designed to inform and define the needs of stakeholders with respect to an optimal provincial-scale wetland inventory and identify the gaps that are not being filled by the existing provincial scale wetland inventories for Alberta.

Possible solutions to resolving the challenges and filling the needs and gaps were discussed during the final round table discussion and workshop closing. Two themes were derived from the responses captured during the table and group discussions:

- *Leadership*
- *Action*

The data that makes up these themes has been provided in brief in Table 4 – Summary of Solutions.

Leadership
The workshop attendees identified the need for appropriate level of leadership to set up an optimal wetland mapping platform and system in Alberta. A need for a steering committee

comprised of developer and user partners was suggested to provide policy direction as required.

Actions
The key aspects of wetland mapping that the group suggested the steering committee focus on revolved around transparency, including implementing a feedback loop and making the data publically available. Funding was raised again as a concern, along with the need to implement minimum mapping standards.

SUMMARY OF SOLUTIONS	
THEME	**DATA**
LEADERSHIP	Policy direction Steering committee Working group Partnership and stakeholders
ACTIONS	Transparency* Funding Feedback loop Publicly available data outputs Minimum mapping standards Coordination with other mapping initiatives and inventories in Alberta

Table 4: Summary of Solutions identified by participants. An asterisk (*) has been included for those statements that were repeated.

Throughout the session, the conversations highlighted areas where additional direction and input are needed before a plan of action can be reached. While attributes of a wetland layer have been developed under various mapping initiatives in Alberta, framework and specifications (e.g., clear objectives and comprehensive definitions) for a provincial scale wetland inventory have yet to be defined and standardized. In addition to support wetland management, developing a wetland inventory will support other mapping initiatives and inventories in Alberta, such as Alberta Base Features layer, provincial hydrological layers, the Alberta Vegetation Inventory, and the Grassland Vegetation Inventory.

2.0 Framework for an Optimal Provincial Scale Wetland Inventory

2.1 Criteria and Vision

Vision statement: Comprehensive and standardized wetland information and datasets for Alberta that is freely and timely available with the detail level to support the needs of stakeholders and users. The wetland inventory information will create the following for Alberta:

- Wetland information and geospatial layers to support Alberta's environmental policies and frameworks and meet regional and sub-regional planning needs. The policies, frameworks, and planning needs include but are not limited to the AWP, Land-use Framework, environmental protection, water resource protection, environmental emergency response, landscape planning, Environmental Impact Assessments, cumulative effects management, and reclamation certification.
- All data and information is readily and publicly available in a standardized format.
- Effective developer and user input into the program.

2.2 Goals and Objectives

The long-term goals of a coordinated provincial wetland inventory program include:

1. Wetlands mapped throughout Alberta (wall-to-wall).
2. Timely (3-5 years update cycle), consistent and effective production of relevant information and geospatial layers that facilitate effective reporting with information updated as frequently as necessary within the financial and technical restrains of the program.
3. Clear and easily understood definitions, terminology, and classification systems for all the features.
4. Consistent standards for accuracy assessment and reporting to promote consistency around data collection, analysis and reporting.
5. Standardized minimum mapping specification that conforms to the AWCS, aligns with the Canadian Wetland Inventory for broader national reporting, and supports other mapping initiatives and inventories in Alberta.
6. Appropriate spatial/thematic resolution and appropriate accuracy standards to support the AWP.
7. Well documented data sources, methods, and metadata standards consistent with provincial policies standards.

2.3 Concepts and Recommendations for Alberta Wetland Inventory Platform

The recommendations for Alberta Wetland Inventory platforms are as follows:

- Establish a collaborative approach involving different organizations/institutions, where each will be assigned a specific task related to its expertise.
- Develop protocols for mapping wetlands that integrate the AWP tools/methodologies and provide services to end-users and stakeholders across province.
- Develop a wetland-dedicated database that archives all field and available imagery and ancillary data.
- Develop strategy for maintenance and future updates of the system and database to support the integration of new tools, new data, and new sensors.

3.0 Conclusions and Next Steps

A provincial scale wetland inventory will support existing environmental policies and new policy development, regional and land use planning, cumulative effects management, emergency response and mitigation, and other inventories across various levels of government in Alberta. The wetland inventory program will inform management decisions and trigger management responses to protect the wetland function and ecosystem services and will provide the state of the art wetland information for users to use and query the data to meet their specific requirements. In order to continue to put the pieces in place to work towards building a single inventory and begin to answer the questions above, the needs and challenges as identified in the workshop and White paper should guide future work.

Some of the possible initial steps for the Alberta-wide wetland inventory are as follows:

- Define Key Terms
    - Develop and confirm the goals and objectives
    - Develop specific and clear terms
- Identify core drivers and key players under the leadership of the Government of Alberta
    - Determine the GOA agency responsible for each of the following: creating, managing, maintaining, and distributing a provincial wetland inventory.
- Develop appropriate and required mapping standards and protocols
    - Determine who will be involved in creating provincial wetland inventory
    - Identify tasks and roles
        - Core policy (AWP) drivers and key players
        - Key stakeholders

Deliverable: Business case and GOA support to proceed to action plan

- Develop a consistent and robust process
    - Specify the policy, strategy, or framework that wetland inventory initiative/program will take place under (e.g., AWP)
    - Determine process, metrics, outcomes and measures consistent across the regions in Alberta
    - Determine costs and required resources
    - Develop accountability and evaluation system
        - Develop a system to communicate progress: timelines and means of tracking the progress
        - Process for when and how to engage user and stakeholder input
        - Prepare a communication system
- Identify Pilot Areas
    - Priority areas
        - Regional vs. site-specific
    - Synergy among the existing wetland inventories

        - Assess the synergy among the existing wetland inventories (e.g., Ducks Unlimited inventories) to incorporate the collected knowledge and identify potential partners
    - Required scale
        - Spatial scale
        - Thematic scale
        - Temporal scale

Appendix 1: Workshop Agenda

Wetland Mapping and Needs Assessment Workshop

February 27th, 2015; 8:00 am – 3:00 pm

Lister Conference Centre (Prairie Room)

University of Alberta

11613 87 Ave NW, Edmonton, AB T6G 2H6

Goals and Objectives of the Workshop

There are a number of wetland inventories currently in existence in Alberta. To ensure that land-use planning initiatives effectively manage for the extent and condition of provincial wetlands, a wetland inventory is needed that reflects best data collection methods and analytical approaches, and meets the needs of multiple stakeholders.

The goal of the workshop is to identify the needs of stakeholders in an inventory, where we're at, and the gaps that are not presently being filled by the existing provincial scale wetland and wet areas inventories for Alberta. The objectives are to examine strengths and limitations of the existing wetland mapping inventories and identify potential methods and priorities for a wetland mapping platform that will produce optimal provincial scale coverage.

Outcomes of the Workshop

1. Conduct an assessment of the needs of multiple stakeholders for a wetland inventory.
2. Build awareness of criteria and design methods that have been used to build the existing wetland inventories.
3. Identify a vision and criteria for an optimal provincial scale wetland inventory
4. Input is gathered to inform a white paper that summarizes the needs of stakeholders and provides recommendations on:
    a. Framework and package of tools required for an optimal provincial scale wetland inventory:
        i. Mapping platform to ensure remapping and monitoring
        ii. Data availability: actual wetlands and drained wetlands
        iii. Interactive online tool for mapping
    b. How this paper could be linked back to the policies it will support
    c. How to facilitate and promote collegiality: map developers and users working together
        i. How to resource and design a wetland mapping program that will meet stakeholders' needs
5. Identify workshop concepts and recommendations to be incorporated into the White Paper (including framework)

Workshop Agenda

February 27th, 2015; 8:00 am – 3:00 pm
Lister Conference Centre (Prairie Room)
University of Alberta
11613 87 Ave NW, Edmonton, AB T6G 2H6

7:45 am **Registration, Coffee and Networking**

8:00 am **Introductions and Workshop Overview**

8:30 am **Panel Discussions**

8:40 am ***Panel I: Perspective from the Developers of the Inventories***

Each panelist will have 15 minutes to address the following topics, followed by facilitated Q&A.

- Overview of the project
- What needs are you filling? Who is your audience?
- What challenges are you facing in meeting those needs?

Panelists

- The Alberta Merged Wetland Inventory (Kathleen Jaques)
- Update on Alberta's wet areas mapping initiative (Barry White)
- DUC's Enhanced Wetland Classification Overview for Boreal Alberta (Alain Richard)
- DUC High Resolution Wetland Inventories, Alberta White Zone (Lyle Boychuk)

10:10 am **Coffee Break**

10:30 am ***Panel II: Perspective from the Users of the Inventories***

Each panelist will have 15 minutes to address the following topics, followed by facilitated Q&A.

- Overview of your work or program
- What are your needs from a wetland inventory?
- What challenges are you facing in meeting those needs?

Panelists

- Large-Scale Mapping: Examples and Issues (Nadia Rochdi and Karl Staenz)
- Overview of ABMI's Wetland Monitoring Projects (Jahan Kariyeva)
- Wetland Status and Trends Monitoring in the Prairie Habitat Joint Venture (Michael Watmough)
- Industry perspective: Why Alberta needs a standardized, reliable, and publicly available wetland inventory (Faye Wyatt)
- Wetland Inventories – opportunities and challenges in Alberta (David Aldred)

12:00 pm **Lunch**

12:45 pm **Round Table Discussions**

1:00 pm ***Round Table I: Identify Needs***

- Starting with the list compiled from the morning panel discussion, what are the form and function needs from wetlands inventory?
- Which needs are mandatory and which are optional but desirable?
- Which needs are local in scale and which are provincial in scale?

1:40 pm **Report back – Needs Assessment**

1:50 pm **Coffee Break**

2:00 PM ***Round Table II: Gaps and Solutions***

- At a high level, which needs are being met under current systems and where are the prominent gaps?
- Which needs should be met through a provincial scale wetland inventory?
- What are the minimum thematic and spatial requirements for a provincial scale wetland inventory?

2:40 pm **Report back – Gaps and Solutions**

2:50 pm ***Workshop Closing – Summary and Next Steps***

- Summary of workshop discussion outcomes
- Discussion of next steps:
  - Develop a White Paper to summarize the goals and priorities for a complete and consistent wetland inventory for Alberta
    - Develop the goals, concepts and recommendations into a White Paper
    - Outline a framework for an optimal provincial scale wetland inventory
  - Identifying the roles of organizations and individuals in helping move the initiative forward

3:00 pm **Workshop Close**

Panelists:

1. Kathleen Jaques, Acting Manager for Data Services within Information and Data Provisioning Services, Alberta Environment and Sustainable Resource Development
2. Barry White, Ph.D., Senior Manager, Forest Management Branch
3. Alain Richard, Head Boreal Conservation Partnerships and Services, Ducks Unlimited Canada
4. Lyle Boychuk, Manager of GIS and Inventory Programs, Prairie Region, Ducks Unlimited Canada
5. Jahan Kariyeva, Geospatial Center, Alberta Biodiversity Monitoring Institute
6. Michael Watmough, Landscape Biologist, Canadian Wildlife Service, Environment Canada
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