WETLANDS ON THE LANDSCAPE:

Wetland Inventories

Wetland inventories refer to the systematic processes of identifying, documenting, and categorizing wetlands within a geographic area. Wetland inventories support ecosystem-based management by providing infomation about where wetlands are (wetland inventory) and what what type of wetlands are present (wetland classification). Wetland inventories are an important tool for managing the whole landscape as they can inform industry planning and practices, wetland policy implementation, land use planning, species monitoring, and research.

Wetland inventories may be conducted at various scales, from local to regional or national levels. Inventories and their associated maps are a comprehensive tool, consolidating, assessing, and validating a wide range of remote sensing data to create detailed, large-scale representations of boreal landscapes. Wetland inventories require an underlying classification system, this can be as simple as wetlands vs. uplands, the five major wetland classes found in most Canadian Wetland Classification Systems (***Factsheet #3***), or more detailed categories that align with regional classification systems (e.g., Ducks Unlimited Canada's Enhanced Wetland Classification System, the Alberta Wetland Classification System). Wetland inventories typically involve collecting data on the location, size, type, and ecological characteristics of wetlands, as well as their functions and values.

Various techniques are used to develop a wetland inventory, such as:

Remote Sensing:

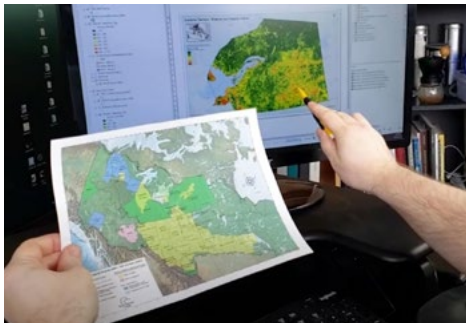
Utilizing satellite imagery, aerial photography, light detection and ranging (LiDAR) to identify and delineate wetland areas based on spectral characteristics, vegetation patterns, and hydrological features.

Field Surveys:

Conducting on-site surveys to validate remote sensing outputs by collecting data on wetland type, vegetation structures, soil characteristics, and hydrological conditions.

Geographic Information System (GIS) Analysis:

Using GIS software to digitize, manage, integrate, analyze, and visualize spatial data related to wetlands.



There are numerous wetland inventories covering different parts of the western boreal forest, but the two described in this factsheet, the Enhanced Wetland Classification Inventory and the Canadian Wetland Inventory, cover significant geographic areas and span beyond a single jurisdiction. They are also not wholly independent, the Canadian Wetland Iventory is a compilation of inventories that meet a certain standard. In boreal Canada, the Enhanced Wetland Classification Inventory is the main component of the Canadian Wetland Inventory.

Enhanced Wetland Classification System Inventory

Ducks Unlimited Canada (DUC) has created detailed and accurate wetland maps for large areas of the western boreal forest (Figure 1). To date, nearly 146 million hectares (approximately 25% of the western boreal forest) have been mapped; of this, 98 million hectares have been mapped to DUC's Enhanced Wetland Classification (EWC) standards. These standards align with the five major wetland classes described in ***Factsheet #3*** (bog, fen, swamp, marsh, and shallow open water).

The EWC inventory is based on multi-source and multi-temporal Earth observation datasets (i.e., optical, radar and topographic information). Reference data including helicopter-based vegetation surveys and high-resolution photo-interpretation are used to train and test the machine learning models. The result is a 10 or 30-metre raster dataset detailing up to 19 wetland classes, conforming with both the Alberta and Canadian Wetland.

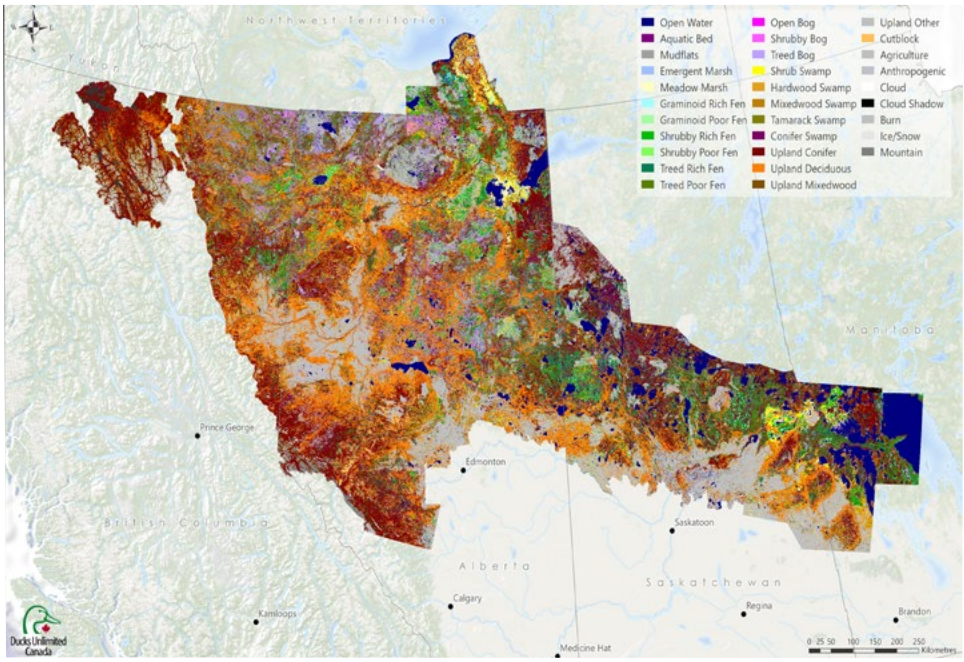


Figure 1. Ducks Unlimited Canada Enhanced Wetland Inventory map.

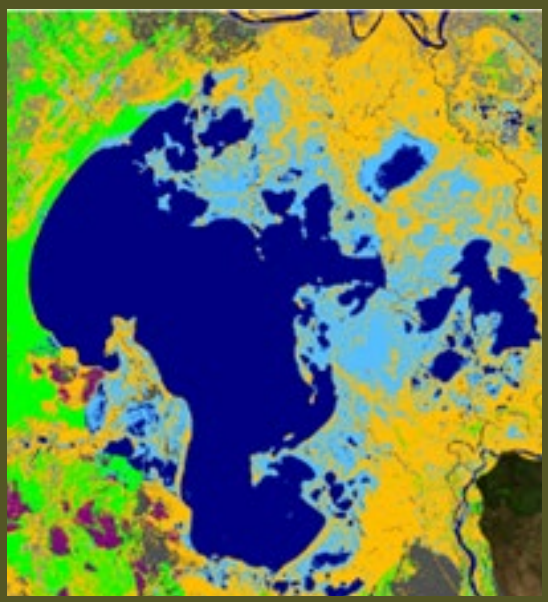
Mapping Canada's wetlands requires collaborative effort.

DUC has partnered with governments, Indigenous communities, and industries to map approximately 25% of the western boreal forest. Inventories are funded and completed on a project basis. Inventory renewal and detailed data availability is dependent on project funding, partners, and priority areas.

INFERRED PRODUCTS OF WETLAND MAPPING:

Wetland mapping can be used as a baseline for inferred products and further analyses.[2] Examples include:

- Water flow characteristics, soil moisture content, nutrient status;
- Biodiversity habitat assessments;
- Species modelling (e.g., waterfowl, caribou, bison);
- Wetland subsurface carbon storage modelling;
- Spatial prioritization for conservation planning; and
- Measuring the performance of policies and protocols towards landscape sustainability objectives.



Canadian Wetland Inventory

The Canadian Wetland Inventory was established in 2002 through collaboration between DUC, Environment Canada, the Canadian Space Agency, and the North American Wetlands Conservation Council.[1] Its primary objective is to provide a national framework for mapping wetlands, fostering consistent interpretations through a common data structure and classification system. This classification system aligns with the five major wetland classes described in ***Factsheet #3***.

A key outcome of these efforts was the development of an interactive Canadian Wetland Inventory Progress Map, displaying wetlands across Canada. This tool is a valuable resource for assessing prospective wetland loss, degradation, and restoration. The interactive map exhibits Canadian Wetland Inventory-compatible wetland inventory areas, both in progress and completed, throughout Canada. Compiled with the aim of making wetland information easily accessible, it adheres to diverse data use agreements, and catering to a broad range of users.

Currently, the Canadian Wildlife Services of Environment and Climate Change Canada is leading a new collaborative effort to compile a comprehensive publicly available Canadian National Wetlands Inventory.

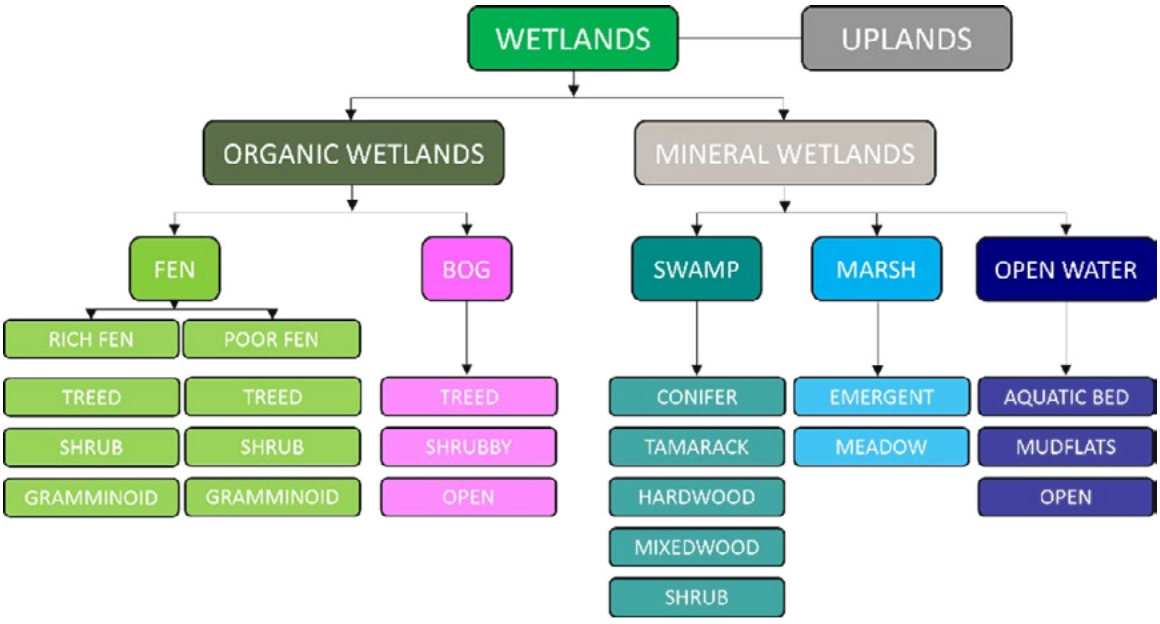


Figure 2. Ducks Unlimited Canada's Enhanced Wetland Classification System aligns with the Canadian Wetland Inventory at the five major class level.

Resources:

- Canadian Wetland Inventory Data Model
- Canadian Wetland Inventory Progress Map
- Canadian National Wetlands Inventory
- Alberta Biodiversity Monitoring Institute Wetland Inventory
- British Columbia Wetland Atlas

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- Merchant, M. A., Warren, R. K., Edwards, R., & Kenyon, J. K. (2019). An object-based assessment of multi-wavelength SAR, optical imagery and topographical datasets for operational wetland mapping in boreal Yukon, Canada. Canadian Journal of Remote Sensing, 45(3-4), 308-332.
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1. Ducks Unlimited Canada. (2022, July 22). Canadian Wetland Inventory — Ducks Unlimited Canada. https://www.ducks.ca/initiatives/canadian-wetland-inventory/
2. Ducks Unlimited Canada enhanced Wetland classification and mapping. (2021, May 7). Canadian Conservation and Land Management (CCLM) Knowledge Network. https://www.cclmportal.ca/resource/ducks-unlimited-canada-enhanced-wetland-classification-and-mapping
3. Ducks Unlimited Canada. (2023, March 9). Boreal Wetland inventory - Ducks Unlimited Canada National Boreal Program. Ducks Unlimited Canada National Boreal Program. https://boreal.ducks.ca/boreal-wetland-inventory/