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BRITISH COLUMBIA

Canadian National Wetland Inventory

British Columbia

V13

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Version History

Version History	Date Came into Force	Change Summary	Spatial Template Update
Version 13	March 5, 2026	Updated soil domain descriptions. Removed some 'undetermined' and 'non-wetland' categories for vegetation descriptors - can be captured in 'not reported'. Removed not applicable from wetland hydrology field (added descriptions for how to handle bogs and tidal throughout). Removed non-natural hydrological system codes and added guidance for coding to the 5 natural system codes only. Updated field validation methods section to 2026 protocols.	CWS Pacific
Version 12.i	January 30, 2025	Added text to explain the provincial data management fields (BAPID, PROJPOLYID, TEIS ID). Added a new field (SRCE_POLYID) to retain other polygon identification information. Changed TEIS ID field data type to short to align with provincial data submission standards.	CWS Pacific
Version 12	June 30, 2024	Updated order of fields and section headings. Added 'multiple' to hydrological system field. Updated 'mixed' wetland class definition. Algae – Macro Algae; Eel grass plants – shoots. Changed BAPID ID to number field; reduced length of Source Title, Source Wetland Class, TEIS ID to 50 characters. Added text on types of BC data (cross walk vs new mapping).	CWS Pacific
Version 11	January 2024	Added other project types (mapping in progress & crosswalk candidate), ephemeral hydroperiod, moved reservoir managed to hydrological system, added non-wetland codes to hydroperiod, system, etc. Added project type, hydroperiod and bryophyte field; added fern option for herbaceous vegetation. Changed % cover to 50% threshold. Added organic over water category for soil. Reordered sections to improve readability and flow. Removed CNWI Subclass category. Incorporated feedback from BCWF and WLRS on definitions and cross-connections to provincial terminology. Provided update to CWS-HQ for FME integration.	CWS Pacific

Version History	Date Came into Force	Change Summary	Spatial Template Update
Version 10	June 2023	Minor updates to add a couple extra attributes to ensure more seamless integration of past BC version datasets to the latest version	CWS Pacific
Version 9	April 2023	Aligned BC numbers and minor language updates to National schema. Updates to validation type / method field.	CWS Pacific
Version 8	March 2023	Many updates from BC provincial government feedback (permafrost, alpine/subalpine, BC unique soil types, etc.) Aligned BC codes and numbering to the newly created national schema and CNWI User Manual	Madrone
Version 7	August 2022	Minor changes and updates to align with ECCC technical working group	CWS Pacific
Version 6	July 2022	Many changes and updates to incorporate ECCC technical working group feedback	CWS Pacific
Version 5	May 2022	Changes and updates to incorporate ECCC technical working group feedback. Indicates start of TWG discussions	CWS Pacific
Version 4	April 2022	Changes incorporated from feedback from BC wetlands community of practice	CWS Pacific
Version 3	Not circulated	Internal updates	CWS Pacific
Version 2	Not circulated	Internal updates	CWS Pacific
Version 1	Fall 2021	Initial template	CWS Pacific

1. Introduction

1.1 Background

The Canadian National Wetland Inventory (CNWI) is an initiative to compile, process, quality control, and publish best available wetland mapping and field validation data, with its metadata, into a comprehensive publicly available database. It also aims to acquire additional wetland data to fill high priority gaps in coverage, with an emphasis on peatlands and coastal wetlands. The CNWI data will be used to train and validate remote sensing models to attempt to measure changes in wetland extent over time at a regional, provincial, and/or national scale.

The **CNWI** User Manual and metadata are available for download on the Government of Canada's Open Data Portal (https://open.canada.ca/en/open-data). The spatial data is openly available for use in geographic information system (GIS) software programs.

The **CNWI British Columbia (BC)** (this document) describes additional fields and domains to capture unique attributes and categories as described in various BC classification systems and standards (RISC 1998; RISK 2023; BCMFR and MOE 2010; MacKenzie and Moran, 2004; MacKenzie, 2012, etc.) and to ensure identification, tracking, and integration with provincial datasets. The CNWI BC, spatial dataset, and metadata are openly available for download through the BC Data Catalogue (https://catalogue.data.gov.bc.ca/). This document also provides a high-level overview of the process for cross-walking data collected to in BEC/TEM/TEI classification system to the CNWI-BC (Section 4.2.1); how new mapping is completed for areas with no suitable existing mapping (Section 4.2.2), and CNWI BC wetland field validation protocols (Section 5).

All wetland inventory data in BC should be completed to the CNWI BC standard. CWS Pacific will integrate CNWI BC data to the CNWI (national) periodically.

The CNWI (National and BC products) have two main goals:

1. Build an openly accessible database containing the best available wetlands inventory data from across the country in a standardized geodatabase, with enhanced attributes, providing easy access to existing wetlands data for all Canadians; and

2. Collect high-quality field data to train and validate predictive wetland mapping products derived from machine learning algorithms to contribute towards a national, predictive wetland map of Canada and perform time series analyses.

The CNWI (National and BC products) provides baseline data to help Canadians:

a. understand the current extent of wetlands in Canada,
b. monitor changes in the extent and function of wetlands, and
c. assess how humans are influencing these changes.

1.2 Defining Wetlands

As per the Canadian Wetland Classification System (CWCS), wetlands are defined as "…. Land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment" (National Wetland Working Group, 1988). Wetlands are critical ecosystems that provide a suite of ecosystem services and functions that directly and indirectly contribute to human health and economic well-being (e.g., clean water, carbon storage and sequestration, biodiversity, flood control, shoreline protection, water storage, and cultural values) (Ramsar, 2021).

The CNWI includes natural, constructed, and managed wetlands in freshwater, estuarine, inland, and coastal marine systems. There are five classes of wetlands for the purposes of the CNWI: **shallow open water, marsh, swamp, fen, and bog** (see **Figure 1 and 2**).

1.3 Applications of CNWI

The CNWI (both National and BC) will be used for analysis and reporting by a wide range of organizations including governments, Indigenous governments and people, environmental non-governmental organizations (ENGOs), academia, land managers, industry, and the public. It supports Canada's Nature-Based Climate Solutions Initiative by providing data to help inform biodiversity conservation, climate change adaptation, and greenhouse gas storage and sequestration reporting (ECCC, 2021). It also supports Canada's national reporting (ECCC, 2016). It can also be used to inform ongoing identification of suitable wetland sites for conservation, restoration, and improved management to benefit biodiversity, and other wetland related ecosystem services and functions. Of particular interest is being able to model the carbon storage of wetlands and to estimate the carbon sequestration potential of wetland and wetlands undergoing restoration.

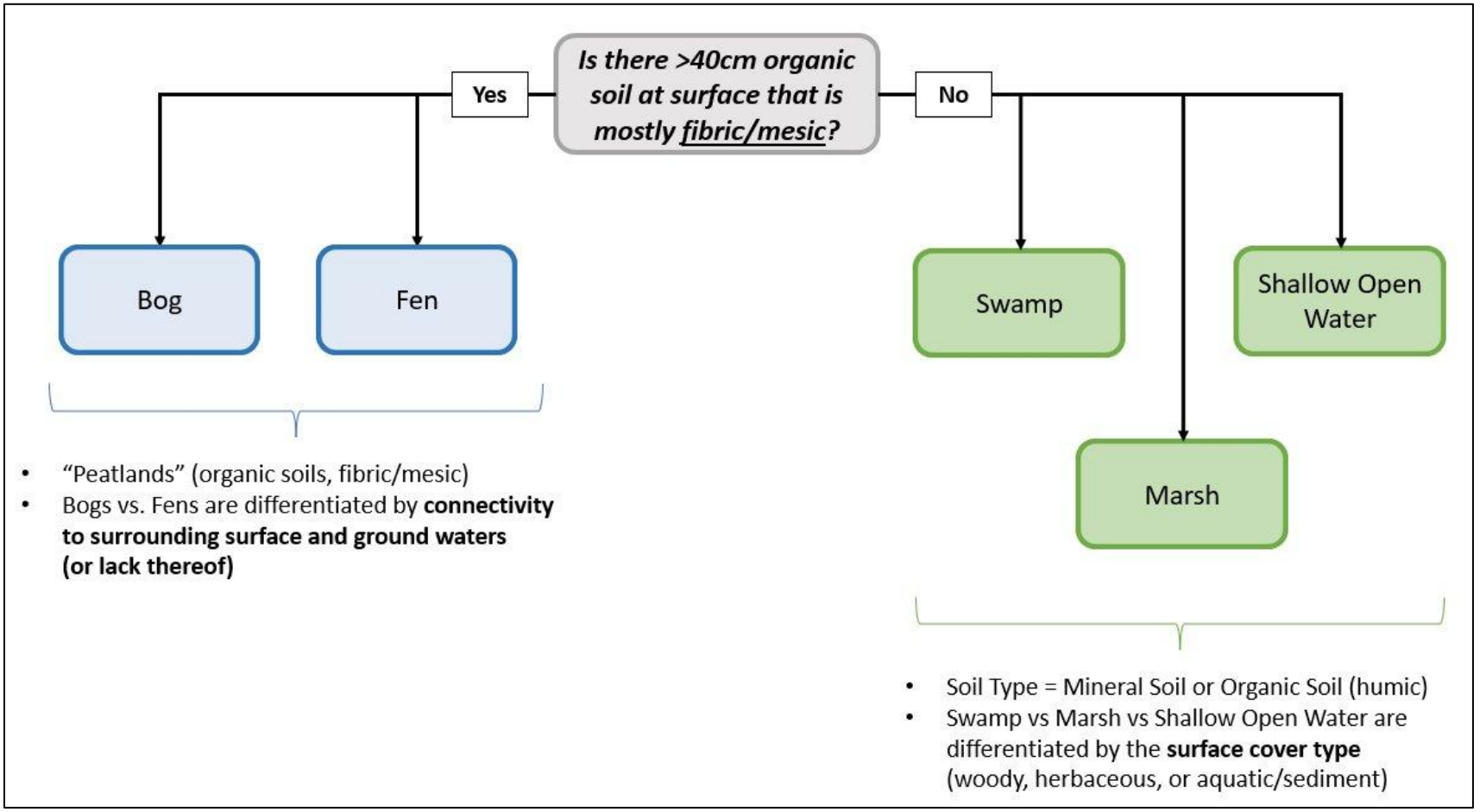

Figure 1. Wetland Classes for CNWI-BC (Simplified).

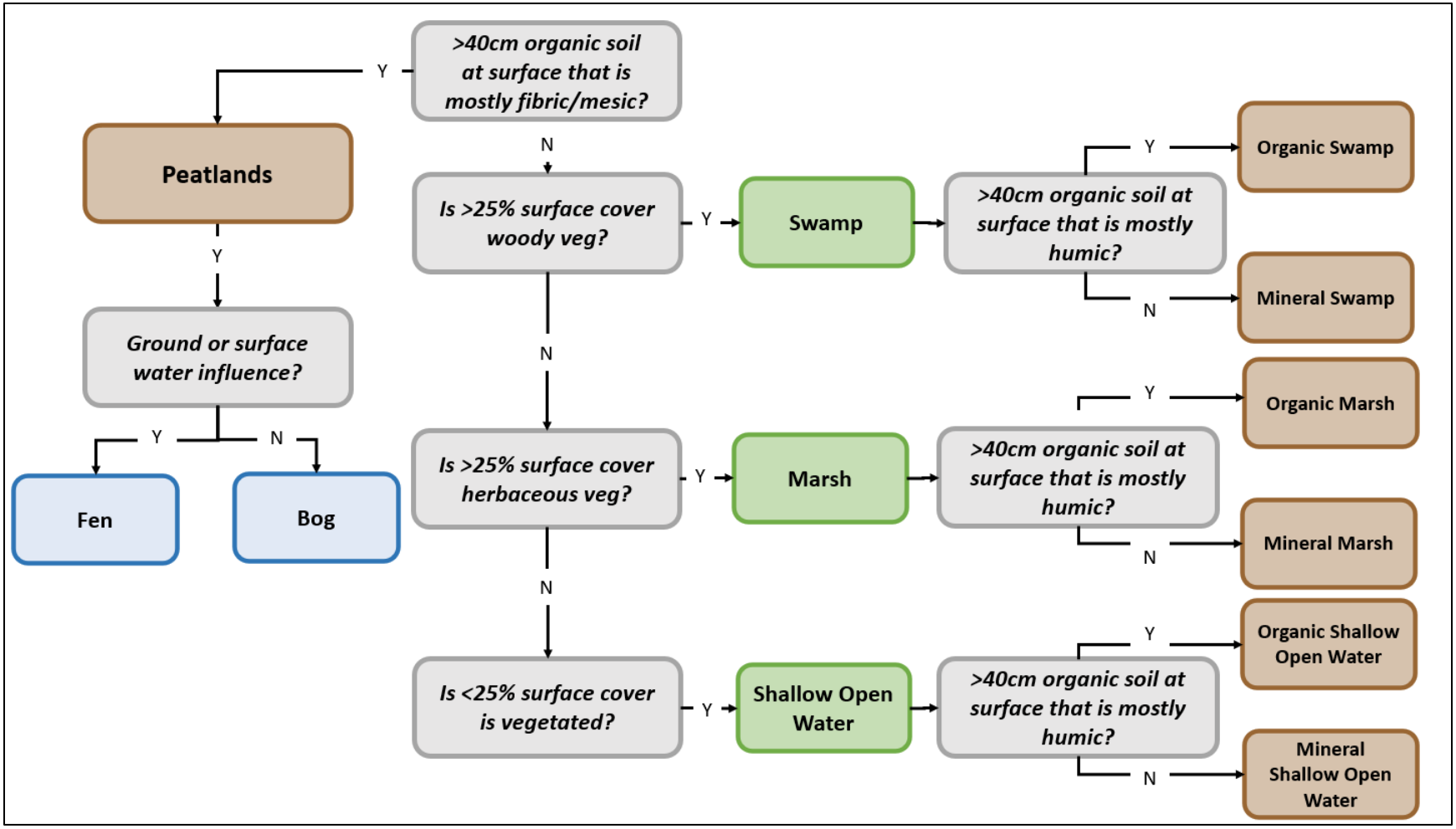

Figure 2. Wetland Classes for CNWI-BC (Detailed).

Wetlands can be separated based on differences of soils properties (brown), hydrology (blue), or vegetation structure (green).

2. Inventory Data Standards

2.1 Spatial Data

Wetland areas in the CNWI are represented as a polygon provided in the format and projection described below and meet CNWI standards in BC.

Wetland plot data in the CNWI are represented as points and provided in the format and projection described below and meet CNWI standards in BC.

2.2 Format and Projection

The data are stored as feature classes within an ESRI™ file geodatabase (NAD 1983 EPSG: 4269). The projected coordinate system in British Columbia is NAD 1983 BC Environmental Albers (EPSG 3005). Data submitted to CWS is accepted in the WGS 1984 projection; it will be reprojected prior to publication.

3. CNWI

The CNWI definitions and structure is built upon two foundational documents: The Canadian Wetland Classification System (National Wetlands Working Group 1988, 1997), and the Canadian Wetland Inventory Data Model (Ducks Unlimited Canada, 2016).

The CNWI (.gdb file) contains **twenty-three fields** as shown in ***Table 1*** below. This layer, user manual and meta data are available for download at on the Government of Canada's Open Data Portal (https://open.canada.ca/en/open-data).

Table 1 CNWI: Fields and Attributes

#	Alias	Field Name	Description
1	Unique Source Feature Id	FID	Text field with three parts that contains: jurisdictional source, inventory source name and source date, and feature ID number of the wetland polygon assigned in the source dataset
2	CNWI Wetland Class	CNWI_CLASS	Wetland class or subclass assigned for polygon feature based on the CNWI Classification Schema.
3	Source Wetland Class	SRCE_CLASS	The wetland class/form/type assigned for polygon feature in the source dataset
4	CNWI Source Title	SRCE_TITLE	The standardized title produced by the CWS for the source dataset, including those merged from multiple original

#	Alias	Field Name	Description
			datasets. The title reflects the file structure in which the data was received from providers and stored internally and does not necessarily reflect data ownership.
5	Feature Created Date	DT_CREATED	The exact date or year that the source organization delineated the wetland polygon or completed the wetland inventory.
6	Verification Methodology	VERIF_TYPE	This field provides a description about the type of methodology used for verification of the presence of wetland.
7	Soil	SOIL	An organic or mineral soil status assigned to wetland based on soil characteristics.
8	Impact	IMPACT	Type of impact on the wetland caused by natural and/or anthropogenic disturbances.
9	System	SYSTEM	System refers to complex of wetland habitats that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors.
10	Tidal or Seiche	TIDAL	Tidal or seiche status assigned to wetlands if they occur in tidal or seiche zones of the seacoast and estuaries.
11	Wetland Surface Cover	SURF_COVER	Dominant cover type assigned to wetland based on the general physiognomy of the surficial cover.
12	Tree Type	TREE_TYPE	Tree species composition assigned to wetland if canopy coverage is >= 1%.
13	Herb Type	HERB_TYPE	Type of dominant herb species assigned to wetland if herbaceous coverage is >= 25%.
14	Woody Vegetation Canopy Cover Status	VEG_CANOPY	CNWI's determination status of Woody Vegetation Canopy Cover.
15	Woody Vegetation Canopy Cover Upper Bound	VEG_CAN_UP	The upper bound of Woody Vegetation Canopy Cover as a percentage. Will be NULL if the canopy cover value is not reported in the original source data or is undetermined
16	Woody Vegetation Canopy Cover Lower Bound	VEG_CAN_LO	The lower bound of Woody Vegetation Canopy Cover as a percentage. Will be NULL if the canopy cover value is not reported in the original source data or is undetermined
17	Woody Vegetation Height	VEG_HT	Woody vegetation height category assigned to wetland if woody vegetation canopy coverage is >= 1%.
18	Salinity	SALINITY	Salinity is the measure of the amount of dissolved salt contained in a solution.
19	Permafrost	PERMAFROST	The status (i.e., presence or absence) of permafrost (i.e., ground that remains frozen throughout multiple years) assigned to wetland.

#	Alias	Field Name	Description
20	Global Id	Global_ID	Auto generated unique feature identifier of the wetland feature
21	Shape	Shape	Geometry of wetland feature i.e., polygon
22	Shape Length	Shape_ Length	Auto calculated length of the contour of the geometric features
23	Shape Area	Shape_Area	Auto calculated area of wetland polygon in the units of the feature class

4. CNWI in BC

4.1 Fields

Most attributes and fields in the CNWI BC are in close alignment, or full parity, to the CNWI (national). Additional fields and domains are included in the CNWI-BC to capture unique attributes and categories as described in various BC classification systems and documents ((BCMFR and MOE 2010; MacKenzie and Moran, 2004; MacKenzie, 2012, etc.) and to ensure integration with to provincial datasets. Different classification systems use different methods. For instance, a vegetation-based classification typically requires sampling in the center of a vegetation community, whereas a soil and formation-based classification system would require more consideration of the source of water and soil/bedrock type. A workflow to integrate CNWI BC data into the CNWI User Manual format will be detailed in other resources.

The CNWI BC (.gdb) contains **thirty-four** fields as show in **Table 2** below. The CNWI BC is the standard format that all CNWI projects in BC should follow. A template geodatabase (.gdb) is available from the CWS Pacific Region Wetland Specialist that is pre-coded to include all the appropriate fields and domains described.

Each wetland project included in the CNWI BC requires a Business Area Project ID (BAPID). BAPIDs are assigned by requesting a project number at TEI_Mail@gov.bc.ca. PROJPOLYID and TEIS Primary Key fields must follow the Terrestrial Ecosystem Information Digital Data Submission Standards. For more information or questions about these standards please email TEI_Mail@gov.bc.ca.

SRCE_POLYID field can be used for assigning a polygon identification number to relate data to the source organizations data management systems or for project reference.

Table 2 CNWI BC Fields

#	Label	Field Name	Data Type	Example
1	OBJECTID	OBJECTID	Object ID	1
2	Shape	Shape	Geometry	Polygon
3	Source Title	SOURCE_TITLE	Text, 50	CWS2020_Crosswalk_ ColumbiaNWATEM
4	Source Org	SOURCE_ORG	Text, 50	MOE
5	Business Area Project ID	BAPID	Short	6614
6	Project Polygon Identifier	PROJPOLYID	Text, 50	6614_53
7	TEIS Primary Key	TEIS_ID	Short	16541
8	Source Polygon ID	SRCE_POLYID	Text, 50	021
9	Project Type	PRO_TYPE	Short	Crosswalk
10	Feature Created Date	DT_CREATE	Text, 50	2017
11	Validation Method	VAL_METHOD	Short	Rapid ground
12	Date Validation	DATE_VAL	Text, 50	2018
13	Wetland or Non-Wetland	WETLAND	Short	Wetland
14	CNWI BC Wetland Class	CNWI_BC_CLASS	Short	Swamp
15	Source Wetland Class	SRCE_CLASS	Text	Ws50
16	Surface Cover	SURF_COVER	Short	Shrub
17	System	SYSTEM	Short	Riparian
18	Hydroperiod	HYDROPERIOD	Short	Seasonal
19	Tidal	TIDAL	Short	Non tidal
20	Salinity	SALINITY	Short	Fresh
21	Soil	SOIL	Short	Organic
22	Permafrost	PERMAFROST	Short	No
23	Alpine/ Subalpine	ALPLINE	Short	Non-alpine
24	Nutrients	NUTRIENTS	Short	Rich
25	Woody Vegetation Canopy Cover	WOOD_CNPY	Short	51-75%
26	Woody Vegetation Height	WOOD_HGT	Short	2-5 m
27	Woody Vegetation Type	WOOD_TYPE	Short	Broadleaved
28	Herb Type	HERB_TYPE	Short	Mixed
29	Bryophyte Type	BRY_TYPE	Short	Moss
30	Impact	IMPACT	Short	Linear Infrastructure
31	Global ID	GLOBAL_ID	Global ID	{0990477A-7356-4911-841F-4014B8D1DE01}
32	Hectare	Hectare	Double	8.13
33	Shape Length	Shape_ Length	Double	345.880939
34	Shape Area	Shape_ Area	Double	81394.244291

4.2 Domains and Definitions

This section lists domains, labels, and definitions for each of the attributes used classify wetland points and polygons in CNWI BC (V13).

Table 3 Source Title

Domain	Definition
Text field (Length = 50)	Record the name of the area mapped and the type of surveys completed.

Description: This is the source title of the database.

Table 4 Source Organization

Domain	Definition
Source Org Name (Length = 50)	Record the name of the organization who completed the mapping. E.g., ECCC-CWS

Description: This is the name of the organization that completed the wetland mapping.

Table 5 Project Type

Domain	Label	Definition
1	Crosswalk	Projects originally completed in a different wetland classification system that was subsequently cross walked to the CNWI definitions & schema. Details on crosswalk methodologies are provided in meta data.
2	New Mapping	Projects completed by coding directly to CNWI Definitions and Schema.
3	Crosswalk Candidate–	Projects potentially suitable for inclusion in the CNWI originally completed in a BC wetland classification system.
4	New Mapping – In progress	Projects completed coding to CNWI Definitions and schema. These projects are 'in-progress', have not had field validation completed, and will be finalized after field validation and final polygon attributing / typing.

Description: This is an indication of the data was existing and cross-walked for newly collected for the CNWI in BC

Table 6 Business Area Project ID

Domain	Definition
Number field	Length = 5 See description below.

Description: (BAPID) contains a numeric project identifier assigned by the Ministry of Environment, Ecosystem Information Section. The project BAPID is used to identify all information relating to a project and is the unique identifier (PK) for the project and is the linking key used to join or relate other TEIS data sets such as the TEIS Polygon Attribute. For example: 1234. This is a field to link the data back to the BC source dataset (used in cross-walking projects only). BAPIDs are assigned by requesting a project number at TEI_Mail@gov.bc.ca.

Table 7 Project Polygon Identifier

Domain	Definition
Text (Length = 50)	See description below.

Description: PROJPOLYID field must follow the Terrestrial Ecosystem Information Digital Data Submission Standards. For more information or questions about these standards please email TEI_Mail@gov.bc.ca.

Table 8 TEIS Primary Key

Domain	Definition
Short	See description below.

Description: TEIS Primary Key field must follow the Terrestrial Ecosystem Information Digital Data Submission Standards. For more information or questions about these standards please email TEI_Mail@gov.bc.ca.

Table 9 Source Polygon ID

Domain	Definition
Text field (Length = 50)	A polygon identification field to relate data to the source organizations' data management systems or for project reference.

Description: This field can be used for assigning a polygon identification number to relate data to the source organizations data management systems or for project reference.

Table 10 Feature Created Date

Domain	Definition
Text field (Length = 10)	Record as YYYY-MM-DD (or YYYY) indicating the date that polygon was delineated, mapped, created, photo interpreted within a GIS software based on available imagery.

Description: This is the date the linework was created, i.e., the date that the polygon was mapped and created, and/or validated by imagery on desktop.

Table 11 Validation Type

Domain	Label	Definition
0	Not validated	This polygon was not verified or validated in the field
1	Qualitative Ground Plot	Validation of wetland attributes was completed on the ground without measurement of detailed information, using a plot-based approach. (E.g., CNWI BC Rapid Plot Form for ground plot without soil/veg sheets, BC Visual Inspection Plot, collection of photos and basic attributes but not a full vegetation plot or soils profile)
2	Quantitative Ground Plot	Validation of wetland attributes was completed on the ground with collection of detailed ground data attributes, based on a plot-based approach. (E.g., CNWI BC Detailed Plot Form with soil/veg sheets, CNWI BC Rapid Plot Form with soils/veg sheets, BC Full or Ground Plot, collection of detailed vegetation, soil, and hydrology data from a site)

3	Qualitative Air-based Plot	Validation of if wetland attributes was conducted from the air (i.e., helicopter or drone) with field notes taken. (e.g., air visual inspection)
4	Other	Validation was performed using a method not explicitly mentioned here (should be described in methods)
References: BCMFR and BCMOE 2010; ECCC 2023 (in draft).		

Description: a description of the type of independent validation completed on a wetland polygon. This also provides a confidence ranking for various polygons, as polygons with more detailed ground validation provide more data and evidence supporting the classification and attribution of the wetland. (e.g., Quantitative Ground Plot > Qualitative Ground Plot > Qualitative Air Based Plot)

Table 12 Validation Date

Domain	Definition
Text field (Length = 10)	Record as YYYY-MM-DD (or YYYY) indicating the date that field data was collected

Description: This is the date that the field validation work was performed (e.g., detailed ground plot/rapid ground plot, or air-based inspection (e.g., drone, helicopter). If no field validation was performed, this field should be N/A.

Table 13 Wetland

Domain	Label	Definition
1	Wetland	Land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment (National Wetlands Working Group 1988). Where there are deciles in a cross-walked BEC/TEM/TEI polygon, cross-walked wetland site associations sum must be greater than or equal to 0.7 (70%).
2	Non-Wetland	Land that does not meet the definition of a wetland, as above.
References: NWWG, 1997.		

Description: to identify if the polygon or point is a wetland or non-wetland. This code does not exist in the CNWI national schema but is assigned for BC schema to ensure database integration with BC datasets and reporting.

Table 14 CNWI BC Wetland Class

Domain	Label	Definition
1	Bog	Wetland typically with >40cm surficial organic horizon where bryophytes (typically *Sphagnum* moss) dominate ground cover often co-occurring with lichens and ericaceous shrubs and trees (often black spruce trees). Bogs ombrogenous (typically receive water inputs from precipitation, fog, snow melt only) with the water table at or slightly below the surface for all or most of the year. The land surface is raised or level with the surrounding terrain. Water is low in dissolved minerals and generally acidic (ranging from pH 4.0-4.8). In BC, for bogs, the dominant organic soil texture in the top 40 cm is typically fibric organics (Von Post 1-4).
2	Fen	Wetland typically with >40cm surficial organic horizon where bryophytes and/or graminoids dominate ground cover. Fens are minerogenous (receiving water inputs from precipitation, surface water, runoff, and groundwater). Water flows through fens can create different fen surface characteristics (e.g., patterning, and open water pooling). Fen surface cover can be water, herbaceous, bryophyte, shrubby, or treed. Nutrient rich fens have a pH generally >5.5; poor fens have a pH <5.5. In BC, fen's dominant organic soil texture in the top 40 cm is typically fibric/mesic organics (Von Post 1-6).
3	Swamp	Wetland with >25% woody vegetation canopy coverage on mineral soils (<40cm surficial organic horizon) or organic soils (>40cm surficial organic horizon). It includes coniferous, deciduous, mixed wood and shrub swamps. Periodic or persistent surface water may occur with water levels that can fluctuate seasonally and annually. In BC, organic swamps' dominant organic soil texture in the top 40 cm is typically humic organics (Von Post 7-10). In BC, swamps can also be found on mineral soil where there is <40cm surficial organic soil.
4	Marsh	Wetland dominated by herbaceous vegetation (i.e., graminoids, forbs; and less commonly algae) covering >25% of the surface area. Shrubs and trees canopy cover <25% of the surface area. Vegetation can occur randomly across a marsh or can be arranged in distinct zones of parallel or concentric patterns in response to gradients of water depths, frequency of drawdowns, water chemistry or disturbance. Periodic or persistent surface water may occur with water levels that can fluctuate seasonally and annually. In BC, organic marshes' dominant organic soil texture in the top 40 cm is typically humic organics (Von Post 7-10). In BC, marshes can also be found on mineral soil where there is <40cm surficial organic soil.
5	Shallow Open Water	Wetland area with standing, slow moving, or flowing water present for all or most of the year. Water depth can fluctuate seasonally but is typically less than 2 m during mid-summer. Aquatic vegetation (floating or submerged plants) and eelgrass may or may not dominate shallow water. Sediments may be exposed during a tidal cycle or low water conditions. Water and exposed sediment must cover >75% of the

Domain	Label	Definition
		surface area; terrestrial vegetation (e.g., trees, shrubs, and herbs) and emergent herbaceous vegetation (e.g., cattails and bulrushes) must cover <25% of the surface area. A shallow open water wetland can be situated on deltas, floodplains, along rivers and streams, or along the margins and shores of lakes, oceans, and other open water bodies. In BC, organic shallow open waters' dominant organic soil texture in the top 40 cm is typically humic organics (Von Post 7-10). In BC, shallow open water can also be found on mineral soil where there is <40cm surficial organic soil.
6	Peatland	An area with (typically) >40 cm of accumulated organic matter with a surface dominated by bryophytes, graminoids, and/or brown mosses. Shrubs, trees, and open water pooling may be present. Note: only use peatland category when it is not possible to discern a bog vs a fen (e.g., when classified aerial imagery or from cross-walked data) In BC, the dominant organic soil texture in the top 40 cm is typically fibric/mesic organics (Von Post 1-6).
7	Mixed	Adjoining wetlands classified as 'wetland complex' or individual wetland polygons reported with two or more wetland classes in source datasets. Note: minimize the use of the 'mixed' category by applying logical and deductive reasoning with the minimum mapping unit (0.1 ha) and 25% thresholds in the wetland class definitions. For example: • If there is a patch of one wetland class (e.g. shallow water), within the larger wetland class (e.g. marsh) that is >0.1ha. Then the small patch (e.g. shallow open water) should be drawn out as a separate polygon. • A swamp has >25% woody veg cover. Therefore, if you have a marsh is some shrubby patched in it (<25% of total cover) and those shrubby patches are not >0.1 ha, then those shrubby areas do not need to be drawn out. The whole wetland should be coded to marsh in this case. • Similarly, a marsh has >25% herbaceous cover. Therefore, if you have a marsh with some ponds/open water patches in it (<25% of total cover) and those individual ponds are not >0.1 ha, then those shallow open water wetlands areas do not need to be drawn out. Code it all to marsh. • Same goes for shallow open water which has <25% above ground veg cover. If there some random patches of herbaceous or woody veg (<25% of total cover) and those individual vegetation patches are not >0.1 ha, then those patches do not get drawn out and the entire polygon gets coded to shallow open water. Where there are deciles in a BC polygon, cross-walked wetland site associations sum must be greater than or equal to 0.7 (70%). If 70% (0.7)

Domain	Label	Definition
		of polygon is wetland but it is a variety of classes apply the following hierarchy to reduce coding to mixed: • If =>40% of polygon is bog, code to bog; if not then, • If =>40% is fen, code to fen; if not then, • If =>40% is swamp, code to swamp; if not then, • If =>40% is marsh, code to marsh; if not then, • If =>40% is shallow open water; code to shallow open water • Otherwise, then code to mixed.
8	Non-Wetland	An area that is not a wetland
-1	Unclassified	Unclassified wetland polygons included within a classified wetland dataset or classified wetland polygons in source datasets that cannot be cross walked to CNWI classes based on the currently available information.
References: NWWG, 1997; DUC, 2016; MacKenzie and Moran, 2004; BCMFR and BCMOE 2010; ECCC 2023 (in draft).		

Description: to identify what wetland class the wetland is as per the definitions below. Unconfirmed wetland classes are "Unclassified", "Peatland", "Mixed". These categories should only be used where it is not possible to identify the specific class (bog, fen, marsh, swamp, or shallow open water).

Table 15 Source Wetland Class

Domain	Definition
Text field (Length = 50)	Record the source wetland classification used in the source dataset, if applicable. (e.g., CWHxmWb05)

Description: The type / classification of wetland used if the source database (if applicable)

Table 16 Surface Cover

Domain	Label	Definition
-1	Not Reported	No information reported.
1	Woody	Area with woody plants with ≥ 25% canopy cover (used only where treed / shrub height cannot be determined, or where there is >25% canopy cover of trees and shrubs combined). Note: do not include dwarf woody vegetation.
2	Treed	Area with woody plants ≥ 5 m high with ≥ 25% canopy cover.
3	Shrub	Area where woody plants, typically less than 5 m in height, contribute ≥25% surface cover. **Note:** Do note include dwarf woody vegetation (e.g. bog rosemary *[Andromeda polifolia]* bog laurel *[Kalmia microphylla],* labrador tea *[Rhododendron groenlandicum]* in the shrubby or woody surface cover category. The reason for this is because dwarf woody vegetation looks considerably different from imagery than other 'typical' trees and shrubs. Typically, open bogs/fens with dwarf woody vegetation are coded to herbaceous or bryophyte surface cover type.

Domain	Label	Definition
		Stunted trees & shrubs (e.g. black spruce [*Picea mariana*] or lodge pole pint [*Pinus contorta*] should still be included in the applicable tree/shrub surface cover category.
4	Herbaceous	Area where herbaceous plants contribute ≥25% surface cover. (Tree and shrub cover can only constitute <25% surface cover). Bryophytes and some standing water may be present. Note: Herbaceous plants are defined as vascular plants without a woody stem, including ferns, fern allies, grasses, rushes, sedges, reeds, forbs, and grass-like plants.
5	Bryophytes	Area where ≥25% of the vegetation cover is in bryophytes or lichens. (Tree and shrub cover can only constitute <25% surface cover). Herbaceous plants and some standing water may be present. Note: Bryophytes include mosses, liverworts, and hornworts.
6	Aquatic vegetation	An area where aquatic vegetation dominates ≥25% of surface area. Note: aquatic vegetation includes floating or submerged macrophytes not including eelgrass.
7	Macro algae	An area where macro-algae dominate ≥25% of surface area.
8	Eelgrass	An area with marine angiosperms (eelgrass/seagrass) at densities ≥1 shoot/m^2. Note: eelgrasses grow in soft substrates like sandy soils and form large tidal and subtidal meadows in coastal regions
9	Exposed sediment	An area with exposed soil, sand, gravel, or other substrate (≤25% vegetated surface cover of any type). Note: Exposed sediments are often the result of low water conditions (drought, temporary or seasonal fluctuations) or tidal conditions.
10	Exposed bedrock	An area with exposed bedrock (≤25% vegetated surface cover of any type).
11	Water	An area with open water with ≤25% vegetation cover of any kind on the surface.
12	Snow / Ice	Areas covered with snow, ice, glaciers >25% of surface area.
13	Anthropogenic	Areas with development, man-made cover, structures, roads, and/or resource extraction.
14	Other	Any other possible land cover value not explicitly mentioned in this code list.
References: NWWG, 1997; DUC, 2016; BCMFR and BCMOE 2010; and ECCC 2023 (in draft).		

Description: Dominant surficial cover features based on the general physiognomy of the cover rather than on species. Additional codes are added for BC that will be rolled up into the National CNWI "other" (10) code.

Table 17: Hydrological System

Domain	Label	Definition
-1	Not Reported	No information reported.
1	Marine	Wetlands associated with high-energy ocean coastline. Note: Marine habitats are exposed to the waves and currents of the open ocean, and

		the water regimes are determined primarily by the ebb and flow of ocean tides.
2	Estuarine	Wetlands that are usually semi-enclosed by land but have sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land.
3	Riverine	Includes all wetlands contained within or adjacent to a channel, where water is usually flowing
4	Lacustrine	Includes all wetlands within and adjacent to a lake, reservoir, or other body of standing water. Note: Lacustrine waters may be tidal or non-tidal.
5	Palustrine	Includes all inland, non-tidal wetlands found in a depression or basin in which water depth in the deepest part of the basin is ≤2 m at low water or mid-summer. Not adjacent to a lake or other body of standing water or river; active wave-formed or bedrock shoreline features lacking.
8	Non-wetland	The polygon is not a wetland and thus, none this field does not apply.
References: Cowardin et al 1979; DUC, 2016; ECCC 2023 (in draft).		

Description: A description of wetland hydrology, the water source for the wetland, and generally how water moves throughout the ecosystem. Disturbance features (e.g. dams, berms, and dikes) should not be considered, consider the natural source of water that formed the wetland. E.g. a wetland adjacent to a river but separated from the river surface water by a dike/berm should still be coded as "riverine".

Table 18: Hydroperiod

Domain	Label	Definition
-1	Not reported	No information reported.
1	Ephemeral	Surface water or saturated soils at the surface are only present for a short period of time (but is >2 weeks) in the early growing season, or after heavy rains.
2	Temporary	Surface water or saturated soils at the surface are present for a short period of time in the growing season, in most years. I.e., water or saturated soil for **~25%** of frost-free spring-summer-fall days. Soil at the surface is typically **dry** by the end of the summer.
3	Seasonal	Surface water or saturated soils at the surface are present for at least half the growing season in most years. I.e. water or saturated soils for **~50%** of frost-free spring-summer-fall days. Soil at the surface is typically **moist** by the end of the summer *Tidal wetlands: Supratidal wetlands – flood less regularly. These are areas that experience storm surge/splash limit.*
4	Semi-permanent	Surface water or saturated soils at the surface are present for most of the growing season, in most years. I.e., water or saturated soil for **~75%** of frost-free spring-summer-fall days. Soil at the surface is typically quite **moist or wet** by the end of summer

		Tidal wetlands: Inter-tidal wetlands – use in cases where surface is exposed by tides less often than daily and alternatively flooded, exposed at least once daily. Area between the daily mean high and low water line.
5	Permanent	Surface water or saturated soils at the surface are present **throughout** the growing season, in most years. I.e., water present for the **entirety** of frost-free spring-summer-fall days, in most years. *Tidal wetlands: Subtidal – permanently flooded with tidal water. Area below the daily mean low water line*
7	Non-wetland	The polygon is not a wetland and thus, none this field does not apply.
References: Stewart and Kantrud 1971; ESRD 2015; MacKenzie and Moran, 2004. Mitsch et al, 2023.		

Description: Hydroperiod is the seasonal pattern of water level of a wetland and is the wetlands hydrologic signature. It characterizes each type of wetland, and the constancy of its pattern from year to year ensures a reasonable stability for that wetland. It includes the rise and fall of a wetland's surface and subsurface water by integrating all the inflows and outflows. The hydroperiod is also influenced by physical features of the terrain and by proximity to other bodies of water. (Mitsch et al. 2023).

Hydroperiod is assessed in terms of the growing season which generally begins in the spring with green-up and bud-break of native plants and ends in the fall with plant dieback and leaf-drop due to the onset of cold weather. "Frost-free" tables are available online for most of BC which describe plant growing seasons for gardening and agricultural activities which can be a useful guide for determining the growing season for the area. Or see the CNWI BC Field Guide which provides look up tables for frost free growing season dates. BC has a highly varied landscape, for instance; in southern coastal BC, the growing season can be up to 8-9 months each year, whereas in northern central BC the growing season can be as short as 4 months.

***Special Note on Bogs:** Bogs are considered to be saturated where the substrate is saturated (within top 30 cm) for extended periods during the growing season. Low permeability and high-water holding capacity of peat supports stable and persistent soil saturation. Bogs are typically "seasonal" to "permanent".*

Table 19 Tidal

Domain	Label	Definition
-1	Not reported	No information reported.
1	Tidal	Influenced by tides.
2	Non-tidal	Not influenced by tides.
References: DUC, 2016; ECCC 2023 (in draft); BCMFR and BCMOE 2010.		

Description: Wetlands can be influences by tides. Tidal wetlands occur in the subtidal, intertidal, and supratidal zones of the seacoast and estuaries. Tidal water wetlands can extend greater than 2 m below low tide on Canadian Hydrographic charts. Water levels fluctuate typically daily. Wetlands can allow occur adjacent to managed reservoirs.

Table 20 Salinity

Domain	Label	Definition

-1	Not reported	No information reported.
1	Fresh	<0.5 ppt salt.
2	Brackish	0.5 – 30 ppt salt.
3	Saline	>30 ppt salt.
4	Saline or brackish	>0.5 ppt salt.
References: BCMFR and BCMOE 2010; Cowardin et al, 1979; Steward and Kantrud, 1971; ESRD, 2015.		

Description: Salinity is an important characteristic that influences a wetland's plant community structure and composition.

Table 21 Soil Type

Domain	Label	Definition
-1	Not reported	No information reported
1	Organic	Containing an organic horizon at the surface ≥ 40 cm (any texture). *Note: Only use this soil type where texture is not known.*
2	Organic Peatland	Containing an organic horizon at the surface ≥ 40 cm AND most of the soil in the top 40 cm is fibric / mesic (Von Post 1-6).
3	Organic Humic	Containing a surface organic horizon of ≥ 40 cm AND most of the soil in the top 40 cm is humic organics (Von Post 7-10).
4	Organic on Bedrock (shallow)	Containing a surface organic horizon ≥ 40 cm (or shallower) (typically fibric/mesic) AND is underlain by a bedrock layer (typically acidic bedrock material such as limestone). *Note: this soil type is typically only used for certain coastal bogs.*
9	Organic on Water	Containing a surface organic horizon of ≥ 40 cm (typically fibric/mesic) AND underlain by a water layer. *Note: This soil type is typically assigned for a "floating" wetland such as a floating fen or floating bog. There is often water found on above of the organic soil (as well as in the subterrain/below).*
5	Mineral Wetland Soil	Containing mineral soil horizons showing signs of water presence ("hydric signs") in the upper 40 cm (e.g., signs of redox concentrations, redox depletions, gleying, mottling, sulphuric acid odour, permafrost, or organic matter accumulation). *Note: An organic horizon (Of, Om, Oh) may be present, but it is less than 40cm at the surface.*
6	Young Mineral Wetland Soil	Containing mineral soil horizons, in an area that has clear signs of wetland hydrology AND wetland vegetation, but no/faint hydric soil signs in the upper 40 cm (e.g., few signs of redox concentrations, redox depletions, gleying, mottling, sulphuric acid odour, permafrost, or organic matter accumulation). *Note: This soil type includes gravel bars or areas with rapid drainage or disturbed soils that do not show evidence to quality as 'hydric wetland*

		mineral soil', but the area is likely a wetland based on the frequency of flooding, surface water presence, or fluctuating water table.
7	Non-Wetland Soil/Substrate	A soil/substrate that is not a wetland soil (e.g., not mineral wetland or organic soil of any type).
References: NWWG, 1997; Soil Classification Working Group. 1998; BCMFR and BCMOE 2010; MacKenzie and Moran, 2004; MacKenzie, 2012.		

Description: Broad soil categories for the purpose of wetland characterizations.

Table 22 Permafrost

Domain	Label	Definition
-1	Not reported	No information reported.
1	Present	Permafrost present.
2	Absent	Permafrost absent.
References: ECCC 2023 (in draft); BCMFR and BCMOE 2010.		

Description: Ground (soil and/or rock) that remains frozen throughout multiple years.

Table 23 Alpine / Subalpine

Domain	Label	Definition
-1	Not reported	No information reported.
1	Subalpine / alpine	Ecosystems where cold, short growing seasons and harsh winters, in combination, are too extreme for the establishment and growth of trees or erect shrubs. The limited growing season can be the result of cold air or soil temperatures, high incidence of frost during the growing season, extreme winter conditions, or prolonged snow late into the growing season. Snow cover is the primary environmental gradient affecting alpine ecosystems [[considering both winter snow cover (protection from winter weather and soil freezing) and growing season cover (reduction in the effective growing degree days)]]. Soil moisture regime is an important secondary gradient (MacKenzie, 2012).
2	Not alpine/ subalpine	Ecosystems that do not meet the subalpine/alpine definition as defined above.
References: MacKenzie, 2012.		

Description: Identifying wetlands and ecosystems in alpine, or high elevation mountainous terrain.

Table 24 Nutrients

Domain	Label	Definition
-1	Not reported	No information reported.
1	Poor / Very Poor	Nutrient poor with a pH < 5.5. Water sources are low in base cations, with little to no alkalinity and a high concentration of hydrogen ions leading to a poor nutrient status. E.g., Poor fens can be seen as intermediates between bogs and rich fens, and they share elements of both. They are dominated by graminoids,

		with some *Sphagnum* moss cover (usually > 20% surface area). All bogs are nutrient poor.
2	Medium / Rich	Nutrient rich with a pH > 5.5. E.g., Nutrient medium-rich fens are fed by water sources that tend to be alkaline, with a leading to a richer nutrient status. Sedges and brown mosses dominate rich fens; and they tend to contain no or very little *Sphagnum* moss (usually < 20% surface area) or ericaceous shrubs. Most swamps, marshes and shallow waters are nutrient rich.
References: ECCC 2023 (in draft); BCMFR and BCMOE 2010; MacKenzie and Moran, 2004.		

Description: Broad categories of wetlands based on nutrient availability and pH characteristics.

Table 25 Woody Vegetation Canopy Cover (%)

Domain	Label	Definition
-1	Not reported	No information reported.
0	No Woody Veg	No woody vegetation (<1% canopy cover).
1	1 – 10	Woody vegetation has 1 – 10% canopy cover.
2	11 – 25	Woody vegetation has 10 – 25% canopy cover.
3	26 – 50	Woody vegetation has 25 – 50% canopy cover.
4	51 - 75	Woody vegetation has 50-75% canopy cover.
5	76 – 100	Woody vegetation as 75%+ canopy cover.
References: ECCC 2023 (in draft); BCMFR and BCMOE 2010.		

Description: a categorization of the percent canopy coverage of woody vegetation (trees and shrubs) in an area (birds eye view perspective).

Table 26 Woody Vegetation Height (m)

Domain	Label	Definition
-1	Not reported	No information reported.
0	No Woody Veg	No woody vegetation (e.g., <1% canopy cover).
1	<2	Woody vegetation is on average <2m in height.
2	2 – 5	Woody vegetation is on average >2m but <5m in height.
3	5 – 10	Woody vegetation is on average >5m but <10m in height.
4	10 – 25	Woody vegetation is on average >10m, but <25m in height.
5	>25	Woody vegetation is on average >25m in height.
References: ECCC 2023 (in draft); BCMFR and BCMOE 2010.		

Description: a general categorization of the height of woody vegetation (trees and shrubs) in an area.

Table 27 Woody Vegetation Type

Domain	Label	Definition
-1	Not reported	No information reported.
0	No Woody Veg	No woody vegetation (<1% canopy cover).
1	Conifer	Conifer species are >75% of woody vegetation canopy cover.

2	Broadleaved	Broadleaved species are>75% of woody vegetation canopy cover.
3	Mixed	A mixture of conifer and broadleaves species, none are greater than 75% of woody vegetation canopy cover.
References: ECCC 2023 (in draft); BCMFR and BCMOE 2010.		

Description: a general categorization of the type of woody vegetation (trees and shrubs) present in an area (according to needle/lead height.

Table 28 Herbaceous Vegetation Type

Domain	Label	Definition
-1	Not reported	No information reported.
0	No Herbaceous	No herbaceous vegetation.
1	Mixed	A mixture of graminoids, forbs, aquatics, and ferns, none are greater than 50% of herbaceous cover.
2	Forb	Forbs are > 50% of herbaceous cover.
3	Graminoid	Graminoids are > 50% of herbaceous cover. Graminoids are grass-like plants characterized by long, narrow leaves with linear venation and includes grasses, sedges, reeds, rushes, and other related species.
4	Aquatic	Floating or submerged aquatic plants are >50% of herbaceous cover
6	Ferns	Ferns and fern ally species are > 50% of herbaceous cover. Herbaceous area is dominated (>50% surface cover) by fern and fern ally species.
References: ECCC 2023 (in draft); BCMFR and BCMOE 2010.		

Description: a categorization of the type of vascular herbaceous vegetation in an area.

Table 29 Bryophyte or Lichen Vegetation Type

Domain	Label	Definition
-1	Not reported	No information reported.
0	No Bryophytes	No bryophyte vegetation.
1	Moss	Mosses > 50% of the bryophyte/lichen cover.
2	Lichens	Lichens > 50% of the bryophyte/lichen cover.
3	Mixed	A mixture of mosses and lichens (and perhaps also liverworts, hornworts) but neither moss nor lichen greater than 50% of the bryophyte/lichen cover.
References: ECCC 2023 (in draft); BCMFR and BCMOE 2010.		

Description: a categorization of the type of bryophytes or lichen vegetation layer in an area.

Table 30 Impact

Domain	Label	Definition
-1	Not reported	No information reported.
1	Farmed	Soil surface has been mechanically or physically altered for production of crops, but hydrophytes will become re-established if farming is discontinued.

2	Constructed	Soil surface has been mechanically or physically altered by excavation to create an impoundment for holding water. Note: Examples include sewage lagoons, golf course ponds, and dugouts.
3	Burned	Indications that site had been affected by recent fire whether by natural or anthropogenic cause.
4	Cleared	Tree/shrub cover removal in whole or part (excluding linear infrastructure) that can be permanent or temporary.
5	Linear infrastructure	Soil surface has been altered (or the vegetation cover has been removed) due to the construction of the road or other linear infrastructures.
6	No impact	There is no sign of any impact on wetland due to anthropogenic causes.
7	Other	An impact is present but none of the impact categories here apply.
8	Multiple	Two or more impact types identified to a wetland polygon.
9	Undetermined	An impact is reported but cannot be categorized by the impact types in this list.
References: ECCC 2023 (in draft); DUC, 2016.		

Description: Many wetlands have been modified to a large degree. Since the nature of these modifications often greatly influences the character of such habitats, special modifying terms are included to indicate the type of threat, and impact.

Table 31 Global_ID

Domain	Definition
Automatic	Automatically generated.

Description: Global identifier for polygon.

Table 32 Hectare

Domain	Definition
Number field	Calculate the area in hectares for the polygon.

Description: This field demonstrates the area of the polygon in hectares. Table 33 Shape Length

Domain	Definition
Number field (Double)	Calculate the perimeter in meters for the polygon.

Table 34 Shape Area

Domain	Definition
Number field (Double)	Calculate the area in meters squared for the polygon.

4.3 Metadata

Each CNWI BC dataset will have accompanying metadata to describe:

1. Information about the objective of inventory, wetland classification system, partnering organizations and data ownership, and contact details.

2. Documenting the methodology, minimum mapping unit, and imagery details.
3. Wetland classification accuracy and validation details.

Table 35 Metadata for CNWI BC Datasets

No.	Field Name	Required Field	Description
1	SRCE_TITLE	Required	Title provided for the source dataset
2	SRCE_ORG	Required	Name of the organization that provided the source dataset and contact details
3	SOURCE_OBJ	Required	Description of why the inventory was undertaken, e.g., update of an existing wetland inventory, part of a general land-cover inventory, required under policy or legislation
4	PARTNERS	Required	Partnering organizations
5	PROJECTION	Required	Projection of geodatabase
6	COPYRIGHT	Required	Organization holding copyright to the source data
7	PERMISSIONS	Required	Restrictions on use and distribution of data
8	COMPLETION DATE	Required	The date (or year) the organization completed the wetland work (or end of the project period)
9	SOURCE METHODOLOGY	Required	Document fully the methodology / approaches used for delineation or creation of wetland polygons: e.g., ground inventory, high-resolution air photo interpretation, high-resolution satellite imagery, radiometric and ortho-metric correction of images, details on machine learning algorithms, object-based segmentation rules, etc. other. This should include references or links to specification, classification, or methods documents.
10	HECTARE	Required	State the total project area in hectares (ha)
11	HECTARE OF WETANDS	Required	State the total area of wetland polygons in hectares (ha)
11	IMAGE_TYPE	Required	Type of remote sensing data used in the source dataset (e.g., Landsat, Sentinel-2, RADAR, HR Satellite Imagery, Aerial Photos, other)
12	IMAGE_DATE	Required	The date (month/year) of remote sensing data acquisition (provide timestamp for multi-temporal data)

No.	Field Name	Required Field	Description
13	IMAGE_ RESOLUTION	Required	Pixel/cell size of remote sensing data used for delineation or classification (can be multiple values / units if multiple sources are used)
14	MINIMUM MAPPING UNIT (MMU)	Required	Record the size of the smallest wetland feature delineated.
15	SCALE	Required	Map scale is a ratio of the distance on a map to the actual distance of the ground. Report the scale used for wetland polygon mapping & delineation.
16	VALIDATION_ DATE	Required, if validation was performed	The date (or year) that field validation work performed. N/A if no validation performed.
17	VALIDATION_ TYPE	Required, if validation was performed	Describe the methods of field validation. NA if no validation was performed.
18	CONFIDENCE	Optional	It indicates confidence level, confidence interval or confidence score assigned to a wetland feature/polygon (depending on methodological approaches used for the delineation or classification)
19	SOURCE_CLASS_ SYS	Required, if classification system other than CNWI used	Describe the wetland classification systems used. If other than CNWI classification system was used, please, provide the document or the link to the document.
20	SOURCE_CODE	Required, if classification system other than CNWI used	Description of source codes used to describe wetland class and attributes of source classification system (e.g., name of report including codes, hyperlink)
21	CROSSWALK_ORG	Required, if cross-walking was completed	Name of the organization/office performed schema crosswalk into the Canadian National Wetland Schema. N/A if not cross walk was completed.
22	CROSSWALK_ DATE	Required, if cross-walking was completed	The date (or year) that the crosswalk to the Canadian National Wetland Schema is completed. N/A if not cross walk was completed.

5. Types of Data in BC

In BC, there are two types of data collected and incorporated into the CNWI: existing wetland point, and polygon data cross walked to the CNWI-BC , and new wetland point, and polygon data collected for the CNWI BC (See **Figure 3**). Metadata of the source datasets, cross walking methodology and new data mapping and validation are required for submission to the CNWI BC (Section 4.4 and 5.3).

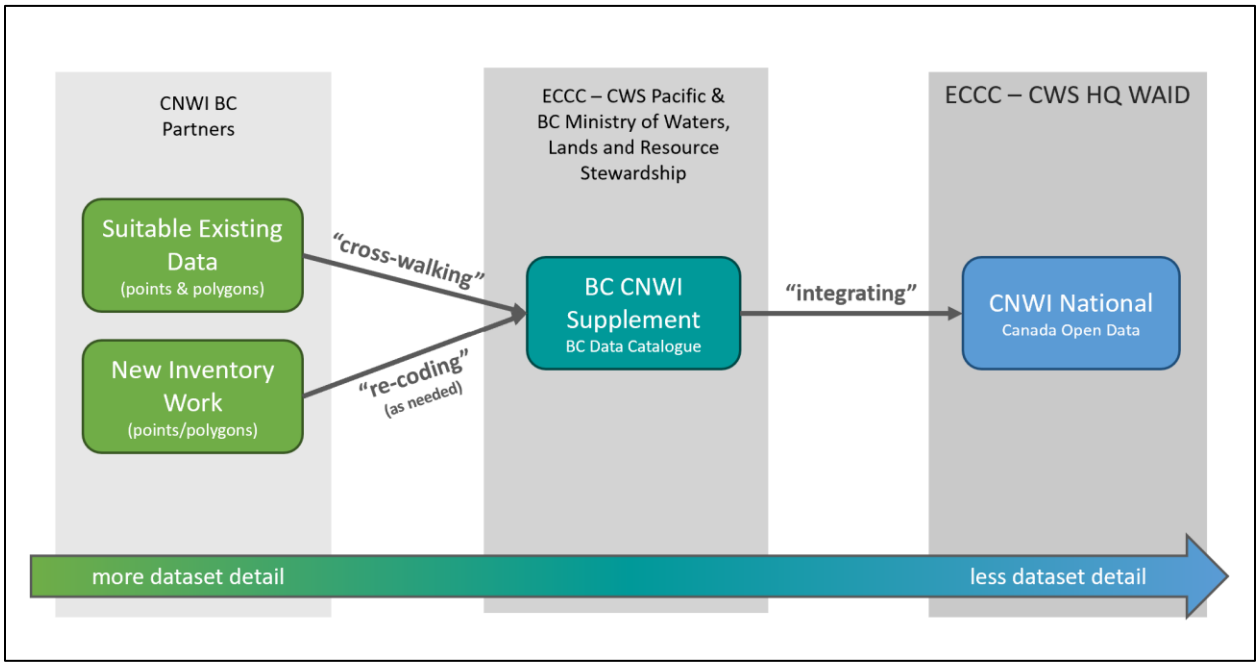

Figure 3. CNWI BC to CNWI National Workflow.

5.1 Cross-Walking Existing Points and Polygons

Where source polygon or point datasets are classified using the Biogeoclimatic Ecosystem Classification (BEC) system in BC (BCMFR and MOE 2010; MacKenzie, 2012), the Wetlands of BC (MacKenzie and Moran,2004) or other BC Land Management Handbooks including regional field guides to ecosystems, the data must be assessed to determine if the source data is 'suitable' and then it must 'cross-walked' to the Canadian Wetland Classification System (NWWG, 1988) and the CNWI BC format for inclusion in the CNWI. Suitable datasets for cross-walking may include Terrestrial Ecosystem Mapping mapped <1:20,000 scale; Wetland Mapping; Sensitive Ecosystem Inventory (SEI), Estuary Mapping. Unsuitable wetland mapping includes TEM mapped at a scale >1:20,000; PEM; TEM mapped from ortho-photos only in high elevation relief areas, BC freshwater atlas polygons, TEM mapping with no/insufficient field validation, etc. ECCC-CWS Pacific works with Government of BC provincial partners and evaluate

existing wetland spatial data and attribute data and determine if its suitable for cross-walking to the CNWI BC .

While both BEC and CWCS classification systems incorporate components of vegetation, soil, and water; each system has a "lens" or primary characteristic with which it frames the classification (CWCS uses soil; BEC uses vegetation). These "lenses" are partially what cause differences in classification terminology. (See **Figure 4**).

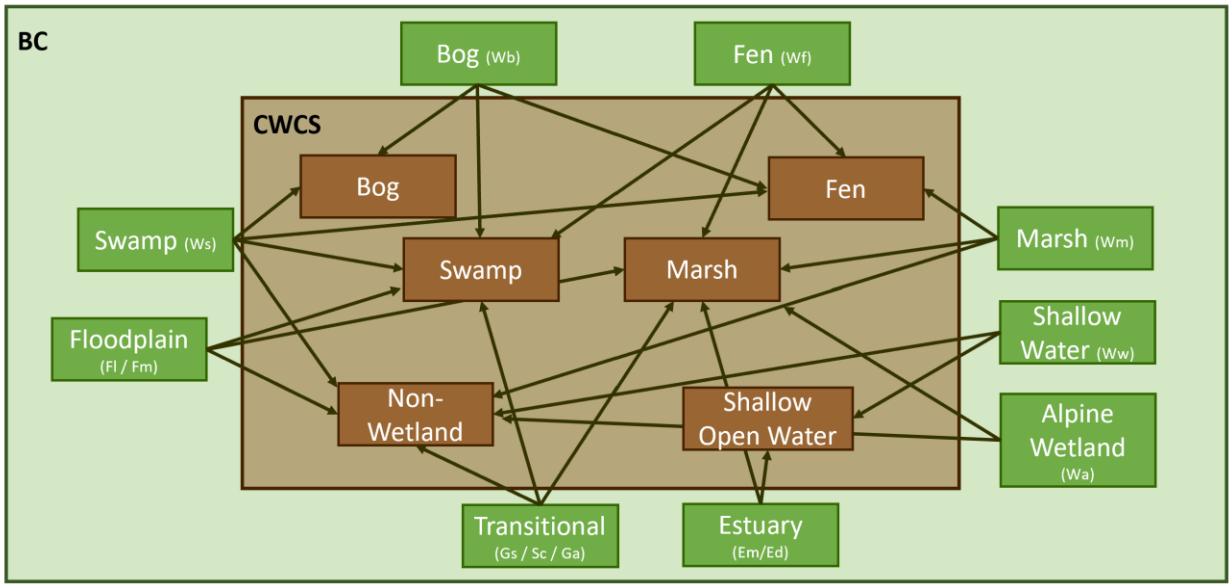

Figure 4. Wetland class crosswalk possibilities from BEC/TEM/TEI to CWCS.

Individuals with extensive experience with the source classification system (e.g. BCMFR and MOE 2010; MacKenzie and Moran, 2004; MacKenzie, 2012, etc.) will be tasked with completing the BEC/TEM/TEI – CNWI cross-walking process for submission to the CNWI BC publication. Guidance to support the cross-walking process are forthcoming and will be detailed in other resources.

5.2 New Wetland Points

New wetland points are collected using the field validation protocols described in Section 5. The final new wetland point products should be submitted to CWS Pacific in both the original plot format (e.g. CNWI Filed forms with photo and field form attachments), and the CNWI BC standard, using the standardized pre-coded domains and definitions described in Section 4.3. A template point spatial file (.gdb) with the pre-coded fields and domains is available from CWS Pacific.

5.3 New Wetland Polygons

New wetland polygon datasets are created by a three-step process:

1. **Mapping** polygons of wetland and ecosystem boundaries from suitable imagery sources,
2. **Field** validation to confirm classes and attributes of a sample of wetland polygons, and
3. **Classifying** all polygons in the spatial dataset following the CNWI BC standard, using the standardized pre-coded domains and definitions.

Mapping wetland classes require a professional to use GIS software to interpret imagery using their own field observations or information recorded at field data points to draw boundaries between wetland classes and upland areas; this process is also termed photo signature interpretation. Ultimately, the quality of available imagery will determine the possible level of detail for a new mapping product (See Table 4). A finer image resolution (e.g. <0.5m) will yield a more accurate and detailed product, particularly when mapped at a finer mapping scale is also used (e.g. 1:5,000). The type, year, seasonality, resolution, and availability of imagery is important to consider when conducting new mapping. Wetland mapping for the CNWI in BC is suggested to be mapped at a scale of 1:5,000 - 1:10,000 which thus requires ~<0.5m resolution imagery. If available, other types of imagery and data sources will also affect, potentially improve, the quality of the final product. For example, LiDAR can produce a fine scaled Digital Elevation Model (DEM) which is useful for interpreting topographic features, and drones flown at low elevation can yield very high resolution 2D or 3D imagery which would improve the mapping interpretation. Additional guidance for the process to map wetlands from imagery in BC can be found in the CWS Pacific prepared guidance document (Andrew, 2024).

Table 36 Relationship of Imagery Resolution to Project Mapping Scale and Polygon Size

Imagery Resolution (m)	Recommended Project Mapping Scale	Recommended Zoom Scale	Recommended Detailed Polygon Zoom Scale	Recommended Minimum Polygon Size (ha)	Recommended Minimum Feature Width (m)
=< 0.5	1:5,000	1:2,500	1:2,000	0.1	5
0.5	1:10,000	1:5,000	1:4,000	0.5-1*	10*
=< 1.0	1:20,000	1:10,000	1:7,000	2.0*	20*

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Field validation should be conducted between May to September during the growing season. Validation of tidal wetlands should occur at low tide to ensure the entire ecosystem is visible. Field plots should also be located strategically in ecosystems that are difficult to interpret using the imagery.

Developing a sampling plan, with potential sampling locations based on the completed polygons, prior to field work is highly recommended. The number of wetland field validation plots required for a project (survey level intensity) depends on the number of potential wetland polygons in the project area, and the goal of the project. The types of field validation (e.g. quantitative vs qualitative), survey level intensity and field scenarios are described in in Section 5. Field programs to support the CNWI in BC should be implemented according to the CWS Pacific guidance, standards, and field forms. The field plot outputs (e.g. CNWI Plot forms with photo and Soil / Veg Data Sheets), should be submitted to CWS Pacific.

Classification of the polygon product should occur after all field plot validation has been completed. This is an opportunity to re-draw ecosystem and wetland boundaries based on field validation results. This is also the stage where all wetland polygons are attributed, based on the results of field plots in a subset of the polygons. The final new mapping polygon product should be submitted in the CNWI BC standard, using the standardized pre-coded domains and definitions described in section 4.3. A template polygon spatial file (.gdb) with the pre-coded fields and domains is available from CWS Pacific.

6. Field Validation in BC

Fieldwork is appropriate for projects mapped at 1:5,000 to 1:10,000 scales with the goal of distributing field-verified plots strategically across the entire project are a to facilitate photo interpretation of remaining polygons. This is a key step of the process, as it provides a metric of the accuracy for the final map product. Field plots should also be located strategically in ecosystems that are difficult to interpret using the imagery. Developing a sampling plan, with potential sampling locations based on the completed polygons, prior to field work is highly recommended.

CNWI BC uses a three-level system for characterizing field data i) Quantitative Ground Plots, ii) Qualitative Ground Plots, and iii) Air Based Qualitative Plots.

6.1 Types of Field Validation

6.1.1 Quantitative Ground Plots

Quantitative Ground Plots are completed where the class of the wetland is not obvious, not known, needs to be verified, or it is the first instance of that wetland type observed in the project area. This plot requires a user to be present in the plot location for data collection. **Vegetation and soil data sheets ARE REQUIRED** and should be attached to the CNWI BC Wetland Field Form in the ESRI Survey123 or Field

Maps form via a high resolution, clear photo. The GPS point should align vegetation plot center and soil profile location, at least 15m from the edge of the wetland.

This is typically equivalent to a "Full Plot" (i.e., FS882 field form). Depending on the project type and field survey requirements data collection can include Site, Soil, Vegetation, Mensuration, Wildlife Habitat, Tree Attributes and Coarse Woody Debris forms.

6.1.2 Qualitative Ground Plot

Qualitative Ground Plots are completed where the class of the wetland is obvious to the surveyor (e.g., the vegetation includes only obligate wetland plants and clear wetland hydrology indicators are present), or it is a wetland type that has already been surveyed by a Quantitative Ground Plot in the project vicinity and thus is well understood and easily recognizable. These assessments are also completed where time is limited or where access restrictions limit physical travel to the wetland site (e.g. fast-moving water, cliff, private lands restrictions, etc.)

This plot can be completed 15 m from the edge of the wetland, using the CNWI BC Wetland Field Form in the ESRI Survey123 or Field Maps applications. Alternatively, the CNWI BC Wetland Field Form can be completed edge of a wetland or from a vantage point at a distance (e.g., from a road/viewing structuring observing a wetland with binoculars, drone, etc.), using the Field Maps application and the offline map location selection option to place the plot in the correct location. **Vegetation and soil data sheets are <u>not</u> required for qualitative plots.**

This is typically equivalent to a Site Visit Form (SIVI - FS1333).

6.1.3 Qualitative Air Based Plot

Qualitative Air-based Plots are completed when the surveyor is viewing the wetland from a drone or helicopter. This data is typically collected where the class of the wetland is obvious to the surveyor (e.g., the vegetation includes only obligate wetland plants and clear wetland hydrology indicators are present), or it is a wetland type that has already been surveyed by the Quantitative/Qualitative Ground Plots in the project vicinity and thus is well understood and easily recognizable. These assessments are also completed where time is limited or where access restrictions limit physical travel to the wetland site (e.g. fast-moving water, cliff, private lands restrictions, etc.)

For Air-Based Plots, the plot GPS locations should be corrected to the appropriate wetland location using the "offline maps" satellite imagery in the ESRI Field Maps application. **Vegetation and soil data sheets are not required for qualitative air-based plots.**

Table 37 Types of CNWI BC Plot Validation

Type of Plot	Soil & Veg Data Sheets Required?	ESRI Data Collector Application
Quantitative Ground	Yes	Survey123 or Field Maps
Qualitative Ground	*No*	Survey123 or Field Maps Field Maps preferred when completing plot from distance (correct location using offline imagery).
Qualitative Air	*No*	Survey123 or Field Maps Field Maps preferred when completing plot from distance (correct location using offline imagery).

6.2 Survey Level Intensity

Survey intensity is a measure of sampling density. In BC, the term survey intensity level (SIL) is a standard used to describe the level of sampling density required for Terrestrial Ecosystem Mapping (RISC 2023). SIL is calculated as the percentage of polygons that have been inspected in the field or based on the density of field inspections on an area basis (hectares per field inspection; RISC 2023). The concept of SIL has been adapted for CNWI use in BC.

SIL for wetland specific mapping completed for the CNWI in BC should be determined based on the project size, objectives, and end uses. The amount of field work required to meet the selected SIL is one of the key determinants of the overall cost of the mapping. Therefore, it is important to choose the SIL and mapping scales on a project basis to meet the management goals of the project. The guidelines in Table 5 2 were derived from Standard for Terrestrial Ecosystem Mapping in British Columbia (RISC 1998).

Because wetland mapping is typically confined to limited areas (versus mapping a whole landscape), the use of the hectares/inspection metric is less useful for assessing SIL. For smaller areas, the polygon inspection rate may be more useful. Table 5 2 provides some preliminary suggestions for wetland SIL for

the CNWI in BC. The number of wetland plots required should be determined on a project basis to ensure sampling is efficient but still gathers the data required to accurately attribute the final polygons and meet the required end uses of the data.

Table 38 Field Plot Survey Level Intensity (SIL) Guidelines for CNWI BC New Mapping Projects

Project Goal[1]	Project Uses	% of Wetland Polygons Inspected	Plot Ratio Quantitative: Qualitative	Suggested Scales	Range of Study Area (ha)
Detailed Wetland Mapping	Restoration, management planning, conservation lands, parks	51-100	10:90	1:5,000	1-10,000
Landscape Wetland Mapping	Wetland inventory with limited management objectives	15-50	10:90	1:10,000-1:20,000	10,000-500,000

[1]*Plot Ratios, Scales, and Range of Study area are preliminary suggestions. These should be refined based on CWS staff input and consultation with wetland survey crews.*

6.3 Field Validation Scenarios

Table 37 provides some advice on when to use which type of wetland validations plot.

Table 39 Example Scenarios for CNWI BC Field Validation

#	Scenario	Example	Recommended Validation Method	Alternate Method 1	Alternate Method 2 (least preferred)
1	For an area that is very "transitional," or with faint indicators of wetland hydrology, vegetation, soil or where the surveyor has low confidence in the wetland classification.	An area that has mostly facultative vegetation, hydric soil indicators are faint, and it is not immediately obviously if the area is a wetland or upland. E.g., is it a meadow or marsh? Swamp or mesic forest?	Quantitative Ground Assessment	Quantitative Ground Assessment	n/a
2	For a wetland class that has not been yet assessed in the project.	First time seeing a fen in the project.	Quantitative Ground Assessment	If time constraints or difficult access - Qualitative Ground Assessment.	If time constraints or difficult access - Qualitative Air Based Assessment.

#	Scenario	Example	Recommended Validation Method	Alternate Method 1	Alternate Method 2 (least preferred)
3	For a wetland class that has been assessed in this project area during this survey, but the surface cover, hydroperiod, soil type, and/or hydrological system are *quite different.*	Second time seeing a swamp in the project. But the first one was shrubby surface cover and next to a river, and this swamp is treed and in a basin.	Quantitative Ground Assessment	If time constraints or difficult access - Qualitative Ground Assessment.	If time constraints or difficult access - Qualitative Air Based Assessment.
4	For a wetland class that has been assessed in this project area during this survey, and the surface cover, hydroperiod, soil type, and/or hydrological system are *fairly similar* to the original.	Observing a new fen, and it looks remarkably similar to the first fen observed (which had a quantitative ground assessment) but the new fen has slightly different herbaceous vegetation.	Qualitative Ground Assessment.	If time constraints or difficult access – Qualitative Air Based Assessment.	n/a
5	Completed the required ratio for #Quantitative Plots: #study plots and are not seeing any new wetland classes or notable features.	Seeing more repeating marshes & swamps in an area that has already been well sampled with quantitative assessments.	Qualitative Ground Assessment.	If time constraints or difficult access – Qualitative Air Based Assessment.	n/a
6	For an area with all obligate or facultative-wet vegetation that is a classic, obvious wetland.	Classic cattail marsh. Lilypad pond, etc.	Qualitative Ground Assessment.	If time constraints or difficult access – Qualitative Air Based Assessment.	n/a

Additional field guides and supporting documents for collecting field validation data are available in other documents.

6.4 Metadata

Each CNWI BC field validation dataset will have accompanying metadata broadly grouped into three categories:

1. Information about the objective of the inventory, wetland classification system, partnering organizations and data ownership, and contact details.
2. Documenting the methodology, field survey dates, and technical field equipment details.
3. Wetland cross-walking information, and imagery comparison (if applicable).

Table 40 Metadata for CNWI BC Validation Plots

Attribute	Description	Requirement
Organization	Name of organization that provided the ground-truth dataset, and contact details	Required
Title	Title provided for the ground-truth dataset	Required
Objective	Description of why this ground-truth data collection survey was undertaken, e.g., training/testing/validation samples for ML-based wetland inventory; validation of aerial photo interpretation-based wetland inventory, improving existing wetland inventory, etc.	Required
Land Tenure	Land tenure of where data collected, i.e., private lands, public lands, municipal lands, etc.	Optional
Partners	Partnering organizations	Required
Copyright	Organizations holding copyright to the ground-truth dataset	Required
Permissions	Restriction on use and distribution of the data	Required
Completion Date	The date (or year) the organization completed the wetland ground-truth data collection work	Required
Methodology	Document the methodology used for collection of ground-truth data. If some attributes, for example, geometry of the measurement plots or homogenous units being assessed were derived using RS imagery or ancillary sources (e.g., LiDAR), include information about the source data (e.g., image type, image date, resolution, approach to delineate plot boundary, etc.).	Required
GPS Details	Model and accuracy of GPS unit used for recording coordinates	Required
Camera	Resolution, height of tripod or camera, photo type (e.g., 360 degrees, facing direction, drone-view), etc.	Required, if photos taken
Classification System	Classification schema used for delineation or classification of wetlands in field. If other than the CNWI's field-based classification system was used, include the document or the link to the document.	Required
Crosswalk Organization	If an alternate classification schema was used and cross-walked into the CNWI's field-based classification system, provide the name of the organization/office that performed the crosswalk.	Required / Not Applicable

Crosswalk Date	The date (or year) that the wetland source classification schema crosswalk to the CNWI's field-based classification system was completed.	Required / Not Applicable
Comparison with Image	Provide general information if any discrepancies were noticed between observations on site and image data (image data could be source or used for validation or both)	Optional
Additional Information	Additional comments about wetland area including disturbances, soil, hydrology, vegetation, wildlife, etc.	Optional

7. Classification Keys

7.1 Wetland Class Key

This key assists with determining wetland class, soil type, and nutrient type.

Does the wetland contain organic or mineral soil? If organic, is it peatland or humic?		
1	Is the area a land that is saturated with water long enough to promote wetland or aquatic processes as indicated by A) poorly drained soils, B) hydrophytic vegetation and C) various kinds of biological activity which are adapted to a wet environment?	Yes – Wetland Go to 2 No – Upland Go to 17
2	Does the area contain a surficial organic soil horizon with a depth typically >40 cm? Organic soil: soils containing >30% organic matter by weight (>17% organic carbon). Field tests to determine organic soil: examining colour, texture, weight & malleability.	Yes – **Organic Wetland** Go to 3 No – Mineral Wetland Go to 9 Not sure – Go to 12
3	Is the dominant organic soil texture in the top 40 cm fibric or mesic? Fibric organic soil texture is defined by: Von Post ranking 1-4. Mesic organic soil texture is defined by: Von Post ranking 5-6. Humic organic soil texture is defined by: Von Post ranking 7-10.	Yes – **Peatland** Go to 4 No – Go to 6 Not sure – Go to 12
What type of peatland?		
4	Is the area ombrogenous* AND with a surface level or raised above surrounding terrain AND contains acidic waters where pooling is found (pH<4.8) AND sphagnum moss dominates the ground cover AND with a surficial organic soil horizon >40 cm deep, with a dominant organic soil texture of fibric (Von Post 1-4)? *Ombrogenous: receiving water only from precipitation, fog, snowmelt. I.e., NOT connected to surface water, runoff waters or groundwater.	Yes – **Bog** No – Go to 5
5	Is the area minerogenous* AND with ground cover of mosses and/or graminoids AND with a surficial organic soil horizon >40 cm deep, with a dominant organic soil texture of fibric-mesic (Von Post 1-6)? Nutrient poor to rich. (pH 4.8-5.5+) *Minerogenous: water inputs from streams, runoff, overland flows, ground water connection as well as from precipitation, fog, and snowmelt.	Yes – **Fen** Go to 5.1 No – Go to 6
5.1	Is the area <20% covered with sphagnum moss AND with uncommon ericaceous shrubs AND nutrient rich with a pH>5.5? If it is not possible to confirm pH or nutrients, the polygon should be classified as 5. Fen.	Yes – **Rich Fen** No – Go to 5.2

5.2	Does the area have >20% surface area covered with sphagnum moss AND contains ericaceous shrubs/trees, AND is nutrient poor with a pH <4.8-5.5? If it is not possible to confirm pH or nutrients, the polygon should be classified as 5. Fen.	Yes – **Poor Fen** No – Return to 1
What type of humic organic wetland?		
6	Is the area dominated by trees or shrubs with ≥25% canopy cover? Periodic or persistent surface water may occur with water levels that can fluctuate seasonally and annually.	Yes –**Swamp (Oh soil)** No – Go to 7
7	Is the area dominated by herbaceous vegetation covering > 25% of surface area AND is trees and shrubs cover <25% each? Vegetation can occur randomly or in distinct zones of parallel or concentric patterns. Often periodically inundated by standing or slowing moving water.	Yes –**Marsh (Oh soil)** No – Go to 8
8	Is the area dominated by open water or exposed sediment >25% of surface area AND with <25% surface cover each of trees, shrubs, herbaceous vegetation, bryophytes, or other above-water vegetation? Aquatic vegetation, aquatic algae, hydrophytes, eelgrass, and/or biofilm can be present in any amount. Water when present is typically <2m deep during mid-summer or low tide but can vary.	Yes –**Shallow Open Water (Oh soil)** No – Return to 1
What type of mineral wetland?		
9	Is the area dominated by trees and/or shrubs with ≥25% canopy cover AND does the area contain a surficial organic soil horizon <40cm? Periodic or persistent surface water may occur with water levels that can fluctuate seasonally and annually.	Yes –**Swamp (Mineral soil)** No – Go to 10
10	Is the area dominated by herbaceous vegetation covering > 25% of surface area AND is trees and shrubs cover <25% each AND does the area contain a surficial organic soil horizon <40cm? Vegetation can occur randomly or in distinct zones of parallel or concentric patterns. Often periodically inundated by standing or slowing moving water.	Yes –**Marsh (Mineral Soil)** No – Go to 11
11	Is the area dominated by open water or exposed sediment >25% of surface area AND with <25% surface cover each of trees, shrubs, herbaceous vegetation, bryophytes, or other above-water vegetation AND does the area contain a surficial organic soil horizon <40cm? Aquatic vegetation, algae, hydrophytes, eelgrass, and/or biofilm can be present in any amount. Water when present is typically <2m deep during mid summer or low tide but can vary.	Yes – **Shallow Open Water (Mineral Soil)** No – Return to 1
When soil type is <u>not known</u>		
12	Is the area a peatland AND ombrogenous AND raised or level with the surrounding terrain AND dominated by sphagnum moss / bryophyte ground cover?	Yes – **Bog** No – Go to 13

13	Is the area a peatland AND minerogenous AND with ground cover of bryophyte and/or herbaceous graminoid cover? (May contain trees/shrubs)	Yes – **Fen** No – Go to 14
14	Is the wetland dominated by trees with ≥25% canopy cover or shrubs with ≥25% surface area coverage? Periodic or persistent surface water may occur with water levels that can fluctuate seasonally and annually.	Yes – **Swamp** No – Go to 15
15	Is the wetland dominated by herbaceous vegetation covering > 25% of surface area and trees and shrubs cover <25% of the surface area? Vegetation can occur randomly or in distinct zones of parallel or concentric patterns. Often periodically inundated by standing or slowing moving water.	Yes - **Marsh** No – Go to 16
16	Is the wetland dominated by open water or exposed sediment with <25% of the surface cover occupied by above water vegetation such as trees, shrubs, herbaceous vegetation and/or bryophytes? Aquatic vegetation, algae, hydrophytes, eelgrass, and/or biofilm maybe present in any amount. Water when present is typically <2m dep during mid summer or low tide but can vary.	Yes – **Shallow Open Water** No – Go to 17
When "No" was answered to all		
17	The area is NOT saturated with water long enough to promote wetland or aquatic processes as indicated by A) poorly drained soils, B) hydrophytic vegetation and C) various kinds of biological activity which are adapted to a wet environment.	**Upland**

7.2. Surface Cover

The key follows a hierarchy of surface cover types in a 30 m^2 homogeneous patch: tree > shrub > woody > herbs > bryophytes > aquatic vegetation > eelgrass > macro algae > exposed sediment > exposed bedrock > open water > anthropogenic > other. This key provides guidance for coding surface cover; woody vegetation type, herbaceous vegetation type, and bryophyte vegetation type categories are shown in parentheses.

Woody Vegetation		
1	Is >25% of the surface area covered by trees? Trees are woody vegetation greater than 5 meters in height. *Note: if unable to discern height; code to "Woody".*	Yes – **Treed** Go to 1.1 No – Go to 2 Unsure – Go to 3.
1.1	Are the trees composed of >75% conifer species?	Yes – **Treed (Conifer)** No – Go to 1.2
1.2	Are the trees composed of >75% broad-leaved species?	Yes – **Treed (Broadleaf)** No – **Treed (Mixed)**
2	Is >25% of the surface area covered by shrubs? Shrubs are woody vegetation less than 5 meters in height.	Yes – **Shrub** Go to 2.1 No – Go to 3.

	Note: if unable to discern height; code to "Woody".	
2.1	Are the shrubs composed of >75% conifer species?	Yes – **Shrub (Conifer)** No – Go to 2.2
2.2	Are the shrubs composed of >75% broad-leaved species?	Yes – **Shrub (Broadleaf)** No – **Shrub (Mixed)**
3	Is >25% of the surface area covered by woody vegetation with canopy cover?	Yes – **Woody** No – Go to 4
Ground Vegetation		
4	Is > 25% of the ground covered by vegetation (i.e., bryophytes, lichen and/or herbaceous vegetation)?	Yes – Go to 5 No – Go to 7
5	Is >25% of the ground vegetation covered by herbaceous species? (e.g., grasses, rushes sedges, reeds, ferns, fern allies, grass-like plants, and forbs)	Yes – **Herbaceous** – Go to 5.1 No – Go to 6
5.1	Does the herbaceous cover consist of ≥50% forbs?	Yes – **Herbaceous (Forb)** No – Go to 5.2
5.2	Does the herbaceous cover consist of ≥50% graminoid species? (e.g., reeds, rushes, sedges, grasses, etc.)	Yes –**Herbaceous (Graminoid)**
5.3	Does the herbaceous cover consist of ≥50% ferns and fern allies?	Yes – **Herbaceous (Fern)** No - **Herbaceous (Mixed)**
6	Is >25% ground surface covered by bryophytes (mosses, liverworts, hornworts) and/or lichens?	Yes – **Bryophyte** No – Got to 7
6.1	Is the bryophyte layer dominated >50% by moss?	Yes – **Bryophyte (Moss)** No – Go to 6.2
6.2	Is the bryophyte layer dominated >50% by lichens?	Yes – **Lichen** No – **Bryophyte (Mixed)**
Aquatic and Exposed		
7	Is >25% of the surface area covered with floating or submerged aquatic vegetation?	Yes – **Aquatic Vegetation** No – Go to 8
8	Is the surface area covered with water or exposed sediment with eelgrass (e.g., *Zostera marina, Ruppia maritima*) at densities >1 shoot /m^2?	Yes – **Eelgrass** No – Go to 10
9	Is >25% of the surface area covered with macro algae?	Yes – **Macro Algae** No – Go 9
10	Is the surface area dominated with exposed sediment with <25% vegetation cover of any type and no eelgrass? Exposed sediment is sand, silt, clay, gravel or small boulders, or other particle inorganic substrates. <u>Note:</u> un-vegetated intertidal areas should always be coded to exposed sediment or exposed bedrock as opposed to open water regardless of the high of the tide at the time of survey.	Yes – **Exposed Sediment** No – Go to 11
11	Is the surface area dominated with exposed bedrock with <25% vegetation cover of any type and no eelgrass? <u>Note:</u> un-vegetated intertidal areas should always be coded to exposed sediment or exposed bedrock as opposed to open water regardless of the high of the tide at the time of survey.	Yes – **Exposed Bedrock** No – Go to 12

12	Is the surface area dominated with open water with <25% vegetation surface cover and no eelgrass?	Yes – **Water** No – Go to 13
13	Is the surface area dominated with snow, ice, glaciers with <25% vegetation surface cover?	Yes – **Snow/Ice** No – Go to 14
Other		
14	Is the surface area in a non-natural state – e.g., covered with roads, buildings, structures, resource extraction (mines), parking lots, etc.	Yes – **Anthropogenic** No – Go to 15
15	Is the surface area covered by other vegetation or ground cover types not explicitly included above?	Yes – **Other**

7.3 Hydrological System Key

1	Is the wetland located on a high-energy oceanic coastline?	Yes – **Marine** No – Go to 2
2	Is the wetland located in a semi-enclosed area with sporadic access to open ocean but at least occasionally is diluted by freshwater runoff from the land?	Yes – **Estuarine** No – Go to 3
3	Is the wetland within or adjacent to a channel, where the water is usually flowing?	Yes – **Riverine** No – Go to 4
4	Is the wetland within or adjacent to a lake or reservoir or other standing body of water?	Yes – **Lacustrine** No – Go to 5
5	All remaining wetlands should be found in a basin or depression.	Yes – **Palustrine** No – Return to start

Note: Disturbance features (e.g. dams, berms, dikes, etc.) should NOT be considered when determining the hydrological system. Consider the natural source of water that formed and is contributing water to the wetland. E.g. a wetland adjacent to a river but separated from the typical surface flow of the river by a dike/berm should still be coded as “riverine”.

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