Alberta Biodiversity
Monitoring Institute

www.abmi.ca

Alberta Wall-to-Wall Vegetation Layer Including "Backfilled" Vegetation in Human Footprints (Version 6)

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1 SUMMARY

The Alberta Biodiversity Monitoring Institute (ABMI) tracks changes in biodiversity across the province of Alberta. The Institute provides credible and understandable information on the amount and location of multiple vegetation types to support natural resource management in Alberta.

This document describes the wall-to-wall Vegetation Layer created by the ABMI through the amalgamation of existing information on vegetation, habitat and soil throughout Alberta. The geodatabase includes information describing current vegetation based on a variety of sources and the ABMI 2014 Human Footprint layer[1]. Information describing reference (i.e., pre-human disturbance) vegetation was created by removing human footprint from the landscape and adding the vegetation that was predicted to be present in the absence of human footprint (i.e., human footprint was "backfilled" to native vegetation).

The geodatabase is composed of polygonal information describing:

1. vegetation types including wetlands,
2. moisture regime,
3. year of origin,
4. supplementary wetland information,
5. supplementary soil information for the Grassland and Parkland Natural Regions and Dry Mixedwood Natural Subregion,
6. supplementary larch information for forested areas
7. Natural Region and Natural Subregion
8. hydrologic unit code (HUC)
9. landuse framework
10. Green/White Area, and
11. human footprint polygons present in 2014[1].

2 BACKGROUND ON THE ALBERTA BIODIVERSITY MONITORING INSTITUTE

The ABMI was initiated in 1997 through a broad partnership of industry, government and academia. ABMI is tasked with tracking status and change to biodiversity at local, regional and provincial scales, and providing relevant and objective information to policy makers, scientists and the general public.

The Institute collects information on thousands of terrestrial and aquatic species (mammals, birds, mites, aquatic invertebrates, vascular plants, lichens, and moss), habitat structures, and human footprints at a variety of systematic and targeted sites across Alberta. In addition, human footprint data are compiled across the province and summarized on an ongoing basis. This standardized data collection is designed to reduce duplication and increase cost efficiency for

[1] For details please refer to: Alberta Biodiversity Monitoring Institute. 2017. Human Footprint Inventory 2014 Version 2 Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at: http://ftp.public.abmi.ca/GISData/HumanFootprint/2014/HFI2014_V2_Metadata.pdf

provincial and regional monitoring commitments, and to provide managers with better understanding of cumulative impacts on the environment from multiple industries and human activities.

3 OVERVIEW OF THE VEGETATION LAYERS

The source layers of vegetation used to create the integrated vegetation layer included: Extended Alberta Vegetation Inventory (AVIE)[2], Grassland Vegetation Inventory (GVI)[3], Primary Land and Vegetation Inventory (PLVI)[4], Central Parkland Vegetation Inventory (CPVI)[4], Ecological Land Classifications layers for mountain national parks (MTNP)[5], vegetation layers for Wood Buffalo National Park (WBNP)[5] and Elk Island National Park (EINP)[5] , Phase 1 (Broad Scale) Forest Inventory (Phase 1)[4] , and the Alberta Wall-to-Wall Land Cover polygon vector layer created by the ABMI Remote Sensing Group (ABMI Land Cover)[6] (See Figure 1).

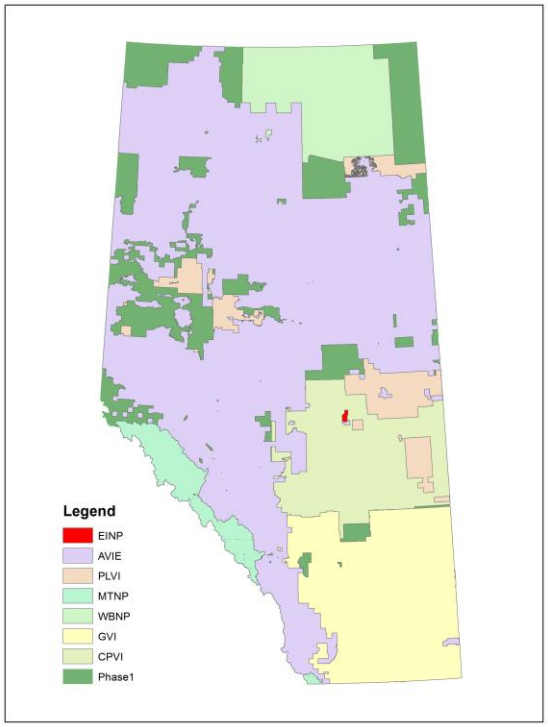

Figure 1 Extent of the major source layers used to create the ABMI Wall-to-Wall Vegetation Layer (Version 6).

[2] Source: Alberta Agriculture and Forestry. Metadata URL: http://www.agric.gov.ab.ca/app21/forestrypage?cat1=Vegetation%20Inventory%20Standards

[3] Source: Government of Alberta. Metadata URL: http://www.albertapcf.org/native-prairie-inventories/gvi

[4] Source: Alberta Environment and Parks. Metadata URL: http://aep.alberta.ca/forms-maps-services/maps/resource-data-product-catalogue/

[5] Source: Parks Canada Agency. Unpublished Data. Reproduced with the permission of Parks Canada Agency. This product was produced by or for the Alberta Biodiversity Monitoring Institute based on data provided by Parks Canada Agency.

[6] The ABMILC layer filename is ABMIw2wLCV2000 (Version 2.1) and may be download from http://www.abmi.ca/home/data/gis-data/land-cover-download.html .

The GIS source layers were modified to:

1) Include information about moisture conditions for each polygon
2) Include information about date of last disturbance (origin date) for each polygon
3) Add supplementary information on:
    i. Water features[7]
    ii. Wetlands features[8]
    iii. Pine when this was not mapped explicitly[9]
    iv. Percentage of larch within each polygon
    v. Soil types for Grassland and Parkland Natural Regions and Dry Mixedwood Natural Subregion

In addition, to create a reference vegetation layer, we re-labeled the polygons of natural habitat that had attributes that did not describe the natural type of vegetation present (e.g. Recent Burn, Flooded or human disturbed outside of ABMI HF2014 polygons), or which were coded as non-linear human disturbances (e.g., cutblocks, cities, mines, industrial sites, agriculture, etc.). We determined the vegetation expected in these polygons based on: A) surrounding vegetation information, B) Phase I information, C) ABMI Land Cover, D) soil information, and D) logical expectation based on the type of disturbance. We also backfilled the human footprint polygons identified in the ABMI HF2014 layer and described the vegetation expected if no human footprint had been present. Polygons composed of linear human footprint features (e.g. roads, rail line, pipelines, transmission lines, seismic lines, etc.) were backfilled with the vegetation type in adjacent polygons.

The following sections describe in detail the various procedures and sources of information used to create the wall-to-wall vegetation layer including the backfilled vegetation in human footprints.

4 VEGETATION LAYERS

4.1 Information from the Extended Alberta Vegetation Inventory (AVIE) and the Vegetation layer in Elk Island National Park (EINP)

4.1.1 Vegetation identification and classification

The Extended AVI layer (AVIE)[2] provided by the Alberta Government in January of 2016 and the Vegetation Thematic Map in EINP[5] created in 1996 were used as base layers (Figure 2). The Vegetation Thematic Map of EINP followed the AVI format, and was appended into the AVIE layer. AVIE information was used where the two layers overlapped; small gaps between the two

[7] The Alberta base features layer contained more detailed data on water polygon features.
[8] The Alberta Merged Wetland Inventory was used. Source: Environment and Parks, Government of Alberta; Metadata URL: http://aep.alberta.ca/forms-maps-services/maps/resource-data-product-catalogue/biophysical.aspx
[9] Alberta Ground Cover Characterization (AGCC) was used. Source: Environment and Parks, Government of Alberta; Metadata URL: http://aep.alberta.ca/forms-maps-services/maps/resource-data-product-catalogue/biophysical.aspx

layers were filled using neighbouring AVIE polygons. The fields present in the attribute table of AVIE but not in the EINP Vegetation Thematic Map were added to make the layers consistent.

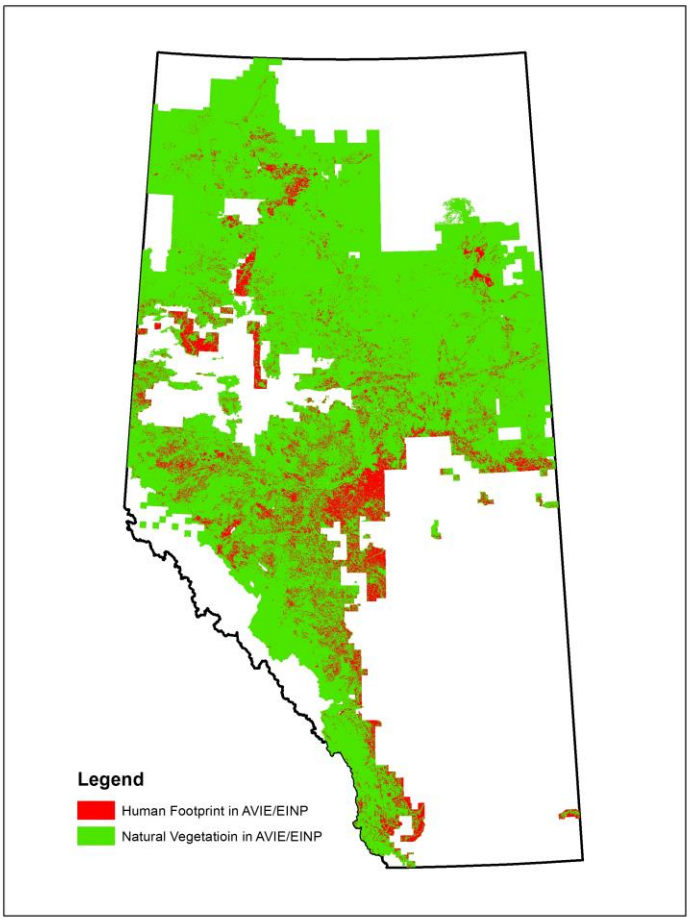

Figure 2 Extent of the Extended Alberta Vegetation Inventory and Elk Island layers showing natural vegetation types and human footprint

Vegetation types were derived from the AVIE and EINP layer according to the rule-set in Table 1. A python script was developed and is available upon request.

Table 1: Definition of vegetation types derived from the AVIE and EINP. Percentages refer to the percent of crown coverage.

Vegetation Type	Description
Lodgepole pine	Stands where Lodgepole pine (Pl) is the leading species in stand and comprise >=80%
Lodgepole pine MixC	Stands where Lodgepole pine (Pl) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Lodgepole pine	Stands where Lodgepole pine (Pl) is the leading species in stand and comprises <80%,

MixCD	and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Lodgepole pine MixDC	Stands where Lodgepole pine (Pl) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% , but deciduous species combined is greater than upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Lodgepole pine MixWet	Stands where Lodgepole pine (Pl) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Jack pine	Stands where Jack pine (Pj) is the leading species in stand and comprise >=80%
Jack pine MixC	Stands where Jack pine (Pj) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Jack pine MixCD	Stands where Jack pine (Pj) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Jack pine MixDC	Stands where Jack pine (Pj) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% , but deciduous species combined is greater than upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Jack pine MixWet	Stands where Jack pine (Pj) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
White-bark pine	Stands where White-bark pine (Pa) is the leading species in stand and comprise >=80%
White-bark pine MixC	Stands where White-bark pine (Pa) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
White-bark pine MixCD	Stands where White-bark pine (Pa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
White-bark pine MixDC	Stands where White-bark pine (Pa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
White-bark pine MixWet	Stands where White-bark pine (Pa) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Limber pine	Stands where Limber pine (Pf) is the leading species in stand and comprise >=80%
Limber pine MixC	Stands where Limber pine (Pf) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Limber pine MixCD	Stands where Limber pine (Pf) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Limber pine MixDC	Stands where Limber pine (Pf) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Limber pine MixWet	Stands where Limber pine (Pf) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Pine spp	Stands where unidentified pine (P) is the leading species in stand and comprise >=80%
Pine spp MixC	Stands where unidentified pine (P) is the leading species in stand and comprise <80%,

	but upland coniferous species combined comprise >=80%
Pine spp MixCD	Stands where unidentified pine (P) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Pine spp MixDC	Stands where unidentified pine (P) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Pine spp MixWet	Stands where unidentified pine (P) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Black spruce	Stands where Black spruce (Sb) is the leading species in stand and comprise >=80%
Black spruce MixC	Stands where Black spruce (Sb) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Black spruce MixCD	Stands where Black spruce (Sb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined
Black spruce MixDC	Stands where Black spruce (Sb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined,
Black spruce MixD	Stands where Black spruce (Sb)) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%
White spruce	Stands where White spruce (Sw) is the leading species in stand and comprise >=80%
White spruce MixC	Stands where White spruce (Sw) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
White spruce MixCD	Stands where White spruce (Sw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
White spruce MixDC	Stands where White spruce (Sw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
White spruce MixWet	Stands where White spruce (Sw) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Engelmann spruce	Stands where Engelmann spruce (Se) is the leading species in stand and comprise >=80%
Engelmann spruce MixC	Stands where Engelmann spruce (Se) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Engelmann spruce MixCD	Stands where Engelmann spruce (Se) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Engelmann spruce MixDC	Stands where Engelmann spruce (Se) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Engelmann spruce MixWet	Stands where Engelmann spruce (Se) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Balsam fir	Stands where Balsam fir (Fb) is the leading species in stand and comprise >=80%

Balsam fir MixC	Stands where Balsam fir (Fb) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Balsam fir MixCD	Stands where Balsam fir (Fb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Balsam fir MixDC	Stands where Balsam fir (Fb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Balsam fir MixWet	Stands where Balsam fir (Fb) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Alpine fir	Stands where Alpine fir (Fa) is the leading species in stand and comprise >=80%
Alpine fir MixC	Stands where Alpine fir (Fa) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Alpine fir MixCD	Stands where Alpine fir (Fa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Alpine fir MixDC	Stands where Alpine fir (Fa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Alpine fir MixWet	Stands where Alpine fir (Fa) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Douglas fir	Stands where Douglas fir (Fd) is the leading species in stand and comprise >=80%
Douglas fir MixC	Stands where Douglas fir (Fd) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Douglas fir MixCD	Stands where Douglas fir (Fd) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Douglas fir MixDC	Stands where Douglas fir (Fd) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Douglas fir MixWet	Stands where Douglas fir (Fd) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Alpine larch	Stands where Alpine larch (La) is the leading species in stand and comprise >=80%
Alpine larch MixC	Stands where Alpine larch (La) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Alpine larch MixCD	Stands where Alpine larch (La) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Alpine larch MixDC	Stands where Alpine larch (La) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%

Alpine larch MixWet	Stands where Alpine larch (La) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Western larch	Stands where Western larch (Lw) is the leading species in stand and comprise >=80%
Western larch MixC	Stands where Western larch (Lw) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Western larch MixCD	Stands where Western larch (Lw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined
Western larch MixDC	Stands where Western larch (Lw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined,
Western larch MixD	Stands where Western larch (Lw) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%
Tamarack	Stands where Tamarack (Lt) is the leading species in stand and comprise >=80%
Tamarack MixC	Stands where Tamarack (Lt) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%
Tamarack MixCD	Stands where Tamarack (Lt) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined
Tamarack MixDC	Stands where Tamarack (Lt) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined,
Tamarack MixD	Stands where Tamarack (Lt) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%
Trembling aspen	Stands where Trembling aspen (Aw) is the leading species in stand and comprise >=80%
Trembling aspen MixD	Stands where Trembling aspen (Aw) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%
Trembling aspen MixDC	Stands where Trembling aspen (Aw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80 but is greater than or equal to upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Trembling aspen MixCD	Stands where Trembling aspen (Aw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Trembling aspen MixWet	Stands where Trembling aspen (Aw) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Balsam poplar	Stands where Balsam poplar (Pb) is the leading species in stand and comprise >=80%
Balsam poplar MixD	Stands where Balsam poplar (Pb) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%
Balsam poplar MixDC	Stands where Balsam poplar (Pb) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80 but is greater than or equal to upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Balsam poplar MixCD	Stands where Balsam poplar (Pb) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
Balsam poplar MixWet	Stands where Balsam poplar (Pb) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%

White birch	Stands where White birch (Bw) is the leading species in stand and comprise >=80%
White birch MixD	Stands where White birch (Bw) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%
White birch MixDC	Stands where White birch (Bw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80 but is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
White birch MixCD	Stands where White birch (Bw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%
White birch MixWet	Stands where White birch (Bw) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%
Shrub	Non-Forested Land (NFL) Classifier = Open Shrub (SO) or Closed Shrub (SC)
Grass/Herb	Non-Forested (NFL) Classifier = Herbaceous Grassland (HG), Herbaceous Forbs (HF), or Bryophytes /Lichens (BR)
Ice/Snow	Naturally Non-Vegetated (NAT_NON) Classifier is Permanent ice/snow (NWI). Note, IceSnow is used for backfilling linear human footprint only.
Rock/Rubble	Naturally Non-Vegetated (NAT_NON) Classifier is Rock barren (NMR). Note, Rock/Rubble is used for backfilling linear human footprint only.
Water	Naturally Non-Vegetated (NAT_NON) Classifier is River (NWR) or Lake (NWL). Note, Water is not used for backfilling.

4.1.2 Water boundaries

The open water polygons from AVIE and EINP (River [NWR] and Lake [NWL]) were combined with more detailed hydro-polygons obtained from the Government of Alberta Base Waterbody Polygon layer[10] and Base Stream and Flow Representation linear layer[11]. Note that the Base Waterbody layer contained polygons of multiple feature types (see Table 2), not all of which were relevant to describe open water. Feature types ISLAND-LAKE, ISLAND-RECUR, ISLAND-RIV and WETLAND were not classified as open water. In addition, the Base Stream and Flow Representation layer was buffered according to Table 3. The resulting open water polygons were stamped onto the base AVIE/EINP layer. This had the effect of overwriting all vegetation types beneath the Base Water layers with Water, and retained the open water polygons from AVIE and EINP that were outside of the Base Water layers.

Table 2: List of feature types (FEATURE_TY) contained within the Government of Alberta Base Waterbody layer, and whether they were used to update the boundaries of open water areas

Feature Type	**Used to Update Open Water Boundaries?**
CANAL-MAJ	Yes
DUGOUT	Yes
ICEFIELD	Yes

[10] The metadata for Alberta Base Waterbody Polygon layer can be found at https://open.alberta.ca/opendata/base-waterbody-polygon

[11] The metadata for Alberta Base Stream and Flow Representation layer can be found at http://open.alberta.ca/dataset/base-stream-and-flow-representation

ISLAND-LAKE	No
ISLAND-RECUR	No
ISLAND-RIV	No
LAGOON	Yes
LAKE-PER	Yes
LAKE-RECUR	Yes
OXBOW-PER	Yes
OXBOW-RECUR	Yes
QUARRY	Yes
RESERVOIR	Yes
RIV-MAJ	Yes
WETLAND	No

Table 3 Buffer sizes (m) used in the base stream linear layer.

Feature Type	Buffer size to each side (m)
AQUEDUCT	1
CANAL	1
DITCH	1
ICEFIELD-REP-PRI	1
OXBOW-RECUR	1
STR-RECUR	1
CANAL-MAJ-REP-SEC	2
OXBOW-PER	2
RIV-MAJ-REP-SEC	2
SPILLWAY	2
CANAL-MAJ-REP-PRI	3
LAKE-REP-PRI	3
RIV-MAJ-REP-PRI	3
FLOW-ARB-DEM	Excluded
FLOW-ARB-MANUAL	Excluded
STR-INDEF	0.5
STR-PER	1.5

4.1.3 Natural polygons where vegetation type was not labeled appropriately

A few polygons of natural habitat had attributes that did not describe the type of vegetation present. These polygons included those where "NAT_NON" was equal to Flooded ('NWF'), Cutbank ('NMC'), Sand ('NMS'), Recent Burn ('NMB') and polygons labeled as human disturbed types but falling outside of the polygons in ABMI 2014 Human Footprint layer.

Four sources of natural vegetation information were used in sequence to determine vegetation type. The first source of information was the type of native vegetation surrounding the polygon in question. If the appropriate information could not be extracted from the first source, then the second source of information (the Phase 1 Alberta Vegetation Inventory layer (Phase 1), also known as the Broad Inventory layer; Section 4.7) was used to determine the vegetation type. If the appropriate information could not be extracted from the second source, then the third source

was used (ABMILC; Appendix 1). If the appropriate information could not be extracted from the third source, then the fourth source was used (i.e., the most common vegetation type in each natural sub-region; Appendix 3).

Additional rules for assigning vegetation type to the naturally disturbed types:

- Flooded (NWF) and Sand (NMS) were converted to non-treed types only,
- Cutbank was converted to treed types only, and
- Recent Burn (NMB) was converted to "Shrub"

Procedures to determine vegetation types follow Figure 3. A "Multipart to Singlepart" GIS operation was run to ensure each polygon had a single unique corresponding record in the attribute table and have the correct size.

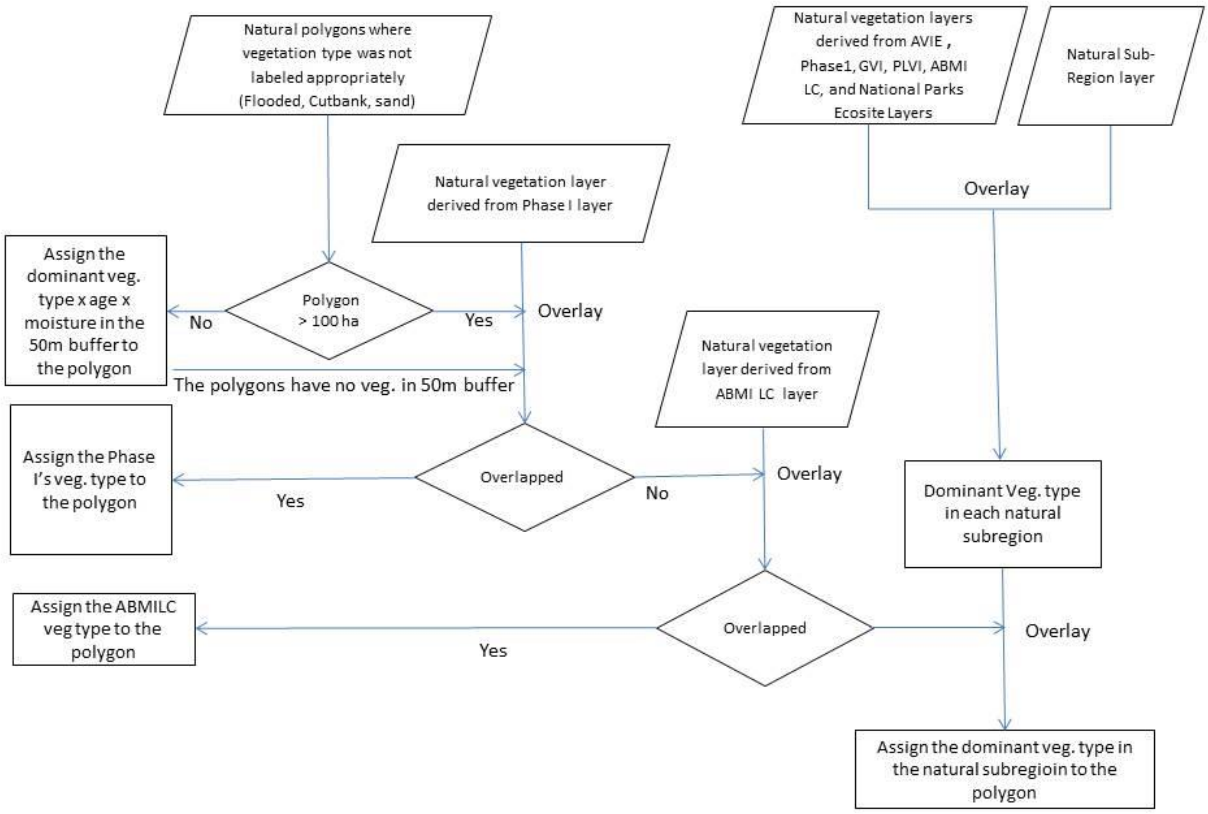

Figure 3 Flow chart illustrating the rule set used in assign vegetation type to natural polygons not labeled appropriately.

4.1.4 Backfilling human disturbed polygons

4.1.4.1 Selecting human disturbed polygons

Most of the human disturbed polygons did not describe the vegetation that was present prior to disturbance. We wished to describe the expected vegetation that would have been present in these human disturbed areas if there had been no human disturbance.

Three categories of human disturbed polygons were selected based on the following rules:

1. Anthropogenic vegetated polygons were selected where "ANTH_VEG" was not blank. This rule had the effect of selecting polygons described as industrial ('CIP' and 'CIW') or agricultural ('CA', 'CP', and 'CPR').
2. Anthropogenic non-vegetated polygons were selected where "ANTH_NON" was not blank. This rule had the effect of selecting polygons described as settlement areas ('ASC' and 'ASR') or industrial development ('AIE', 'AIF', 'AIG', 'AIH', 'AII', and 'AIM').

3. Human disturbed forest polygons were selected where MOD1 or MOD2 was equal to clearcut ('CC'), clearings ('CL'), site improved ('SI'), scarification ('SC'), planted or seeded ('PL'), and thinned ('TH').

The selected polygons were divided into four groups.

Linear human footprint

Linear polygons were identified by selecting: 1) Permanent rights of way; roads, highways, railroads, dam sites, reservoirs ("ANTH_NON" or "UANTH_NON" = 'AIH'), or 2) Pipelines, transmission lines, airstrips, microwave tower sites that have been seeded to perennial grasses ("ANTH_VEG" or "UANTH_VEG"= 'CIP').

Cutblock polygons

Cutblock polygons were derived by clipping the original AVIE/EINP layer (both Red and Green shown in Figure 2) with the cutblock polygons in the ABMI 2014 human footprint layer[1]. Using the cutlbock polygons in the 2014 human footprint layer as the template ensures that old forest types were backfilled into the cutblocks in the final layer.

Polygons which were identified as Cutblock by AVIE/EINP, i.e., MOD1 or MOD2 was equal to clearcut ('CC'), clearings ('CL'), site improved ('SI'), scarification ('SC'), planted or seeded ('PL'), and thinned ('TH'), but falling outside of the 2014 cutblock template were backfilled either with its own information or with the rules in the other human disturbed polygon group (see below).

Peat extraction polygons

Peat polygons were selected where "ANTH_NON" = 'AIE'.

Other human disturbed polygons

All other human disturbed polygons.

4.1.4.2 Backfilling human disturbed polygons

Four sources of natural vegetation information were used in sequence to assign vegetation type when backfilling. The first source of information was based on the type of native vegetation surrounding the polygon to be backfilled. If the appropriate information could not be extracted from the first source, then the second source – Phase 1 Alberta Vegetation Inventory layer (Phase 1) – was used to backfill the polygon. See Section 4.7 for a description of the Phase 1 layer. If the appropriate information could not be extracted from the second source, then the third source – ABMILC – was used to backfill the polygon (see Appendix 1). If the appropriate information could not be extracted from the third source, then the fourth source – the most common vegetation type in each natural sub-region – was used to backfill the polygon (see Appendix 3).

The four types of human disturbed polygons (linear, cutblock, peat, and others) were backfilled according to a group-specific set of procedures and rule sets (Table 4). A "Multipart to Singlepart" GIS operation was run to ensure each polygon had a single unique corresponding record in the attribute table and had the correct size.

Table 4 Backfilling rules for four human footprint types

Human Footprint Type	**Backfilling Rules**
Linear Human Footprint	Any vegetation types could be assigned.
Cutblock	Only old upland forest types (i.e., all Pine, White spruce, Engelmann spruce, all Fir, Trembling aspen, Balsam poplar, White birch with origin year less than 1930) were assigned.
Peat	Only Black spruce, Western larch, Tamarack, and Shrub were assigned. Moisture regime was assigned to wet.
Others	Any vegetation types were assigned.

Backfilling linear features

The linear human-disturbed vegetation types were backfilled using the neighbouring vegetation type, age and moisture information. Each linear polygon was first cut into smaller segments with the "Dice" tool in ArcMap. The neighboring natural vegetation layer was assembled from the natural vegetation layer derived from AVIE and EINP, the backfilled cutblocks, the backfilled peat, and the backfilled other human disturbed polygons (described below). The "eliminate" tool in ArcGIS was repeatedly used until no human-disturbed linear features remained to be backfilled.

Backfilling cutblock polygons

Backfilling cutblocks followed the procedure outlined in Figure 4. In general, if the cutblock polygon had 80+ years old (defined as 'CutYear'-'Origin' year > 80) harvestable forest classes within 50m of the cutblock boundary, it was backfilled with the dominant upland forest class in the neighbouring 50m buffer. Otherwise, it was backfilled with the nearest 80+ years old upland

forest class within 2km. If no 80+ years old upland forest was found from the 2km distance, it was backfilled with the nearest upland forest with any ages within 5km. The 80+ years old upland forest types were defined as: all Pine types, White spruce, Engelmann spruce, all Fir types, Trembling aspen, Balsam poplar, and White birch. Large polygons (> 500 ha) were first cut into smaller polygons with the ArcGIS dice tool before backfilling to avoid a single vegetation type assigned to it. Moisture information from the chosen forest type was also transferred to the backfilled cutblock. Year of Origin information from the chosen forest type was transferred only when the age was older than 80.

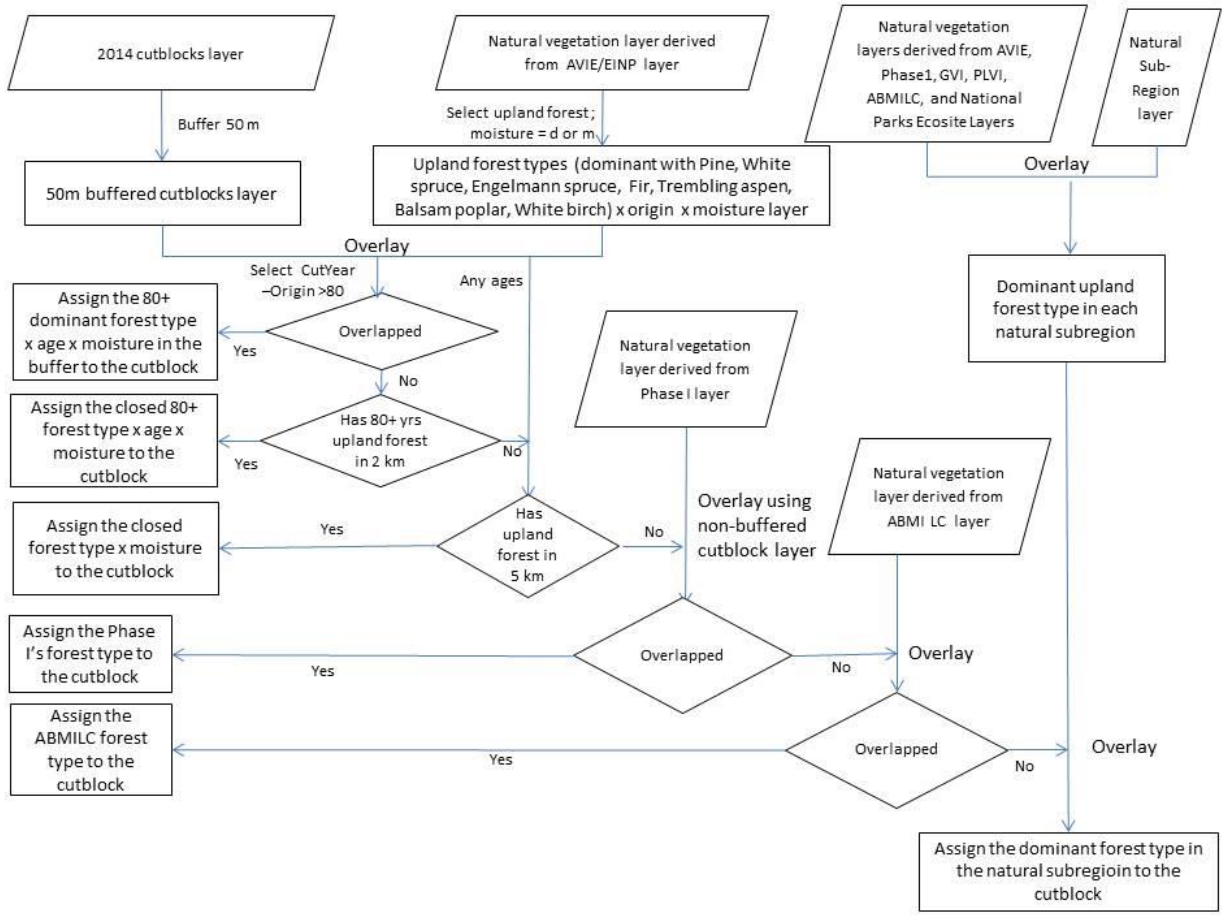

Figure 4 Flow chart illustrating the rule set used in backfilling cutblock polygons with pre-harvest vegetation conditions

Any cutblock polygons, or portions of cutblock polygons (i.e., MOD1 or MOD2 equal to clearcut 'CC', clearings 'CL', site improved 'SI', scarification 'SC', planted or seeded 'PL', and thinned 'TH'), that fell outside of cutblock polygons of the ABMI 2014 Human Footprint layer[1] were considered to be errors. If the area of those polygons was ≥ 1ha they were backfilled with its own vegetation type where possible. Otherwise, they were backfilled with the same rule-set as the "Other disturbed polygons" (see Figure 6 below). The polygons with area < 1ha were

dissolved using the neighbouring vegetation type, age and moisture information. A few narrow and long polygons with MOD1 or MOD2 equal to 'CL' were backfilled with the same procedure as backfilling linear HF features (see above).

Backfilling peat polygons

The peat polygons were backfilled with Black spruce, Larch, or Shrub vegetation types according to the procedure described in Figure 5.

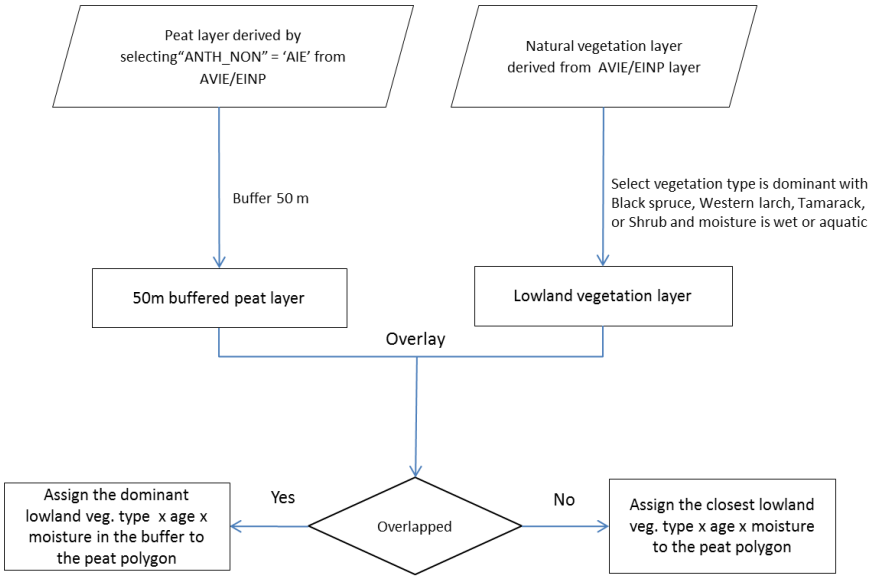

Figure 5 Flow chart illustrating the rule set used in backfilling peat polygons

Backfilling other human disturbed polygons

Backfilling procedures for cutblocks, peat extraction sites and linear features are described above. The procedures for backfilling "other" human disturbed polygons followed similar steps (Figure 6) to those used for cutblocks (i.e., Figure 4) with the exception that:

1) Vegetation type was not constrained to be only old upland forests.

2) The Alberta Merged Wetland Layer with five classes (bog, fen, swamp, marsh, and open water) defined according to the Canadian Wetland Classification System (CWCS) (See Section 5.1 for details) was used as the second source to backfill the wetland types. Any wetland polygon from the Alberta Merged Wetland Layer was retained in these human disturbed polygons and the vegetation type labeled as bog, fen, swamp or marsh, with CWCS type open water relabelled as marsh.

3) Only small polygons (<100 ha) were backfilled from the surrounding polygons. Polygons >100 ha were backfilled directly from the third source, i.e. Phase 1.

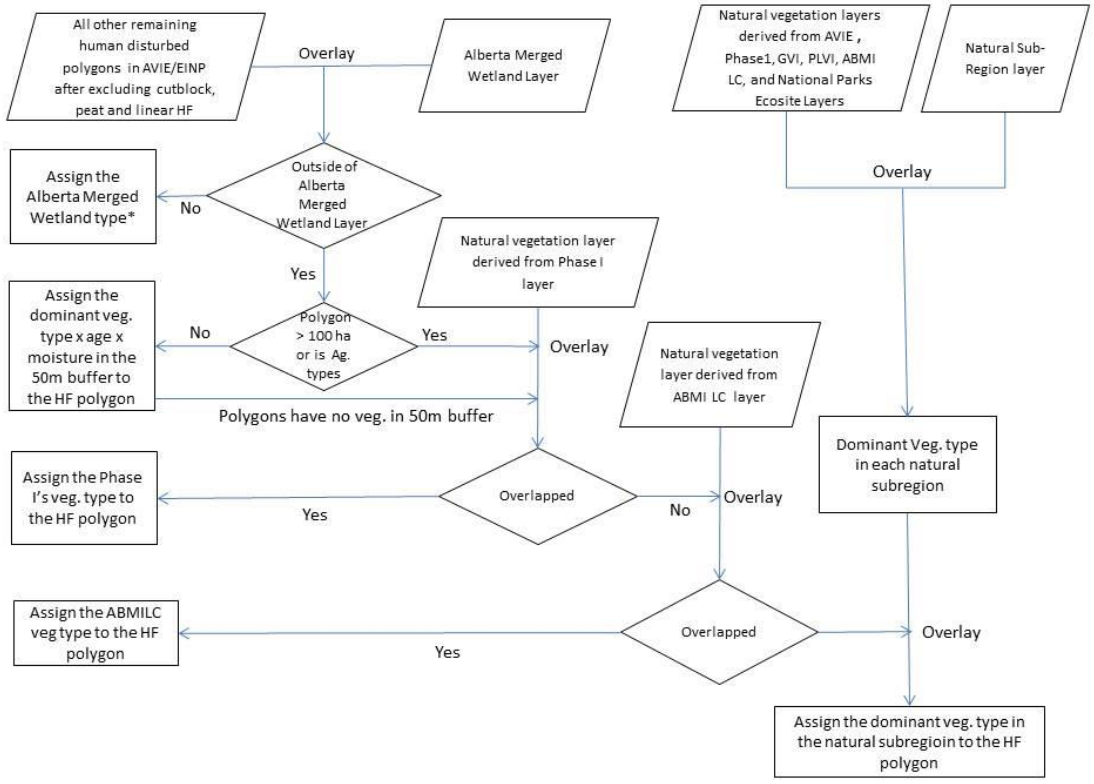

Figure 6 Flow chart illustrating the rule set used in backfilling other human disturbed polygons excluding cutblock, peat and linear types. *Only the Alberta Merged Wetland Layer (CWCS) types bog, fen, swamp, marsh were kept, with open water was relabelled as marsh.

4.1.5 Origin year and origin source

The origin year for each polygon was extracted from the fields ORIGIN, MOD1_YR, MOD2_YR, UMOD1_YR, or UMOD2_YR in the AVIE & EINP layers. In single-layered stands, the ORIGIN field was replaced by MOD1_YR or MOD2_YR if the extent (field MOD1_EXT or MOD2_EXT) indicated the loss of crown closure was ≥ 76% (i.e., values of 4 or 5), and the type (field MOD1 or MOD2) indicated a burn ('BU'), windfall ('WF') or insect kill ('IK'). If both MOD1 and MOD2 met the criteria, the most recent year was used. For horizontal or multilayer stands where the understory was the dominant layer, UMOD1_YR or UMOD2_YR were used with the same rule-set as above. If no origin information could be derived from its own attributes, or if the year in the Origin column was less than 20 years older than MOD1_YR or MOD2_YR where MOD1 or MOD2 is in 'CC', 'CL', 'SC', 'PL', or 'SI', then origin year was assigned from the surrounding polygons in AVIE/EINP together with the vegetation types.

If the image year of AVIE / EINP was older than the wildfire year, and when vegetation type was extracted from the other 3 sources (Phase 1, ABMI Land Cover, and dominant vegetation

type in Natural Subregion), origin year was assigned from the historical wildfire information layer[12].

The historical wildfire layer was originally organized as an overlapped single layer for all years from 1931 to 2015. A non-overlapped layer was created by:

1. First, the ORIGIN_YEAR and ORIGIN_TYPE fields were added to the attribute table of the layer. The ORIGIN_TYPE was coded as "SRD_FIRE" and the value of ORIGIN_YEAR was copied from the field YEAR.
2. Next, the layer was "untangled" into 84 single layers representing each year from 1931 to 2014.
3. The 1931 layer was "stamped" by the 1932 layer[13].
4. The resultant combined layer of 1931-1932 (Step 3 above) was "stamped" by the 1933 layer from Step 2.
5. The general process in 3) and 4) was repeated with each layer being stamped by the layer from the following year. This process ended when the 1930- 2014 combined layer was stamped by the 2015 layer.

A year of '9999' was assigned to polygons with blank Origin in AVIE/EINP and that did not burn between 1931 and 2015 based on historical wildfire information.

The year of origin was stored in the Origin_Year column, and source of polygon origin information (either AVIE / EINP or wildfire layers) was stored in the Origin_Source column.

4.1.6 Moisture regime

The moisture regime in the MOIST_REG field (d-dry, m-mesic, w-wet, and a-aquatic) was extracted from AVIE / EINP for each polygon. If moisture regime information was missing for a polygon then:

- "dry - derived" was assigned if the polygon was classified with vegetation types Lodgepole pine, Jack pine, White-bark pine, Limber pine, Pine spp, Douglas fir, or Rock/Rubble.
- "mesic - derived" was assigned if the polygon was classified with vegetation types White spruce, Engelmann spruce, Balsam fir, Alpine fir, Alpine larch, Trembling aspen, Balsam poplar, White birch, or Snow/Ice.
- "wet -derived" was assigned if the polygon was classified with vegetation types Black spruce, Tamarack or Western larch.

In human-disturbed polygons, moisture regime was assigned based on the surrounding polygons in AVIE/EINP if the polygon was a linear feature, a cutblock, or a peat mine. For other human disturbed polygons, if the Alberta Merged Wetland Inventory indicated a pocket of wetland was present, moisture regime in the pocket was assigned as wet-derived. In areas outside the wetland

[12] Downloadable from: http://wildfire.alberta.ca/wildfire-maps/historical-wildfire-information/spatial-wildfire-data.aspx

[13] The layers were combined using the 'Update' command in ArcGIS.

pockets (note that vegetation was assigned based on Phase 1 or ABMI Land Cover or the dominant vegetation type in Natural Subregion), moisture regime was determined from the soil layer (see Table 13). If these areas did not overlap with the soil layer, moisture regime was determined from the vegetation types (Table 5). For any polygon assigned Pine from AGCC, moisture regime was assigned dry-derived.

Table 5: Moisture regime derived from Phase 1 and ABMI Landcover Layer

Vegetation and wetland type in Phase 1	Moisture Regime
Coniferous	mesic-derived
Deciduous	mesic-derived
Mixedwood	mesic-derived
MuskegMarsh	wet-derived
RockBarren	dry-derived

Vegetation type in ABMI Land Cover	Moisture Regime
Coniferous	mesic-derived
Deciduous	mesic-derived
Mixedwood	mesic-derived
Grass/Herb	dry-derived
Shrub	mesic-derived
Snow/Ice	mesic-derived
Rock/Rubble	dry-derived

4.1.7 Post cleaning

All polygons with area <100 m^2 were amalgamated with neighbouring polygons.

Ten columns were created in the GIS database to describe the vegetation type, moisture conditions, time of last disturbance, original sources of information, and the source and type of information created when backfilling human footprints:

- Veg_Type –Vegetation and wetland classes
- General_Source – **AVIE** was assigned to all polygons created in this section
- PreBackfill_Source – Detailed source where the polygon boundary came from. Values are **AVIE** or **EINP**, or **Hydropoly** for water from Hydro layers, or **ABMIcutblock** for cutblocks.
- Backfill_Required - Type of disturbance being backfilled (with the code “None” when no backfilling was required)
- Backfill_Method - Method used during backfilling (with the code “None” when no backfilling was required)
- PostBackfill_Source - Source of information used in backfilling (with the codes AVIE or EINP or Hydropoly were copied to this column when no backfilling was required)
- Moisture_Reg – Moisture regime categories
- Moisture_Source – Source of moisture regime information
- Origin_Year – Year of last disturbance
- Origin_Source – Source of origin information

4.2 Information from the Primary Land and Vegetation Inventory (PLVI)

4.2.1 Vegetation and wetland identification and classification

The Primary Land and Vegetation Inventory (PLVI)[3] provided by Alberta Government in April of 2016 was used as base layer (Figure 7). The vegetation and wetland types were generated according to the rule-set in Table 6. A python script was developed and is available upon request.

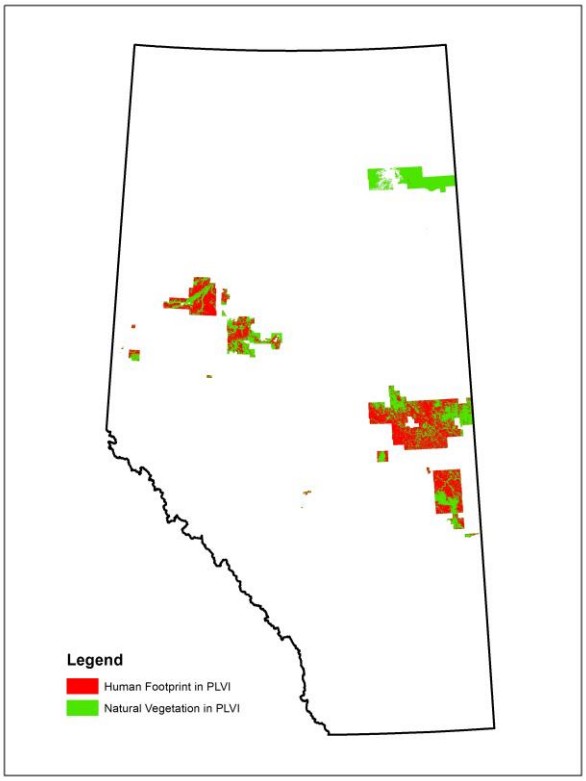

Figure 7 Primary Land and Vegetation Inventory (PLVI) extent showing natural vegetation types and human footprint.

Table 6 Definitions of the vegetation and wetland types derived from the Primary Land and Vegetation Inventory (PLVI). Percentages refer to the percent of crown coverage.

Vegetation Type	Description
Lodgepole pine leading - conifer	Coniferous Percent 1 >= 80% and Leading Species 1 is Lodgepole pine (Pl) and Site Type 1 is forested (FT)
Lodgepole pine leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Lodgepole pine (Pl) and Site Type 1 is forested (FT)
Jack pine leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is jack pine (Pj) and Site Type 1 is forested (FT)
Jack pine leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is jack pine (Pj) and Site Type 1 is forested (FT)
White-bark pine	Coniferous Percent 1 > =80% and Leading Species 1 is White-bark pine (Pa) and

leading - conifer	Site Type 1 is forested (FT)
White-bark pine leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is White-bark pine (Pa) and Site Type 1 is forested (FT)
Limber pine leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Limber pine (Pf) and Site Type 1 is forested (FT)
Limber pine leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Limber pine (Pf) and Site Type 1 is forested (FT)
Black spruce leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Black spruce (Sb) and Site Type 1 is forested (FT)
Black spruce leading - mixedwood	Coniferous Percent 1 comprise 50- 79% and Leading Species 1 is Black spruce (Sb) and Site Type 1 is forested (FT)
White spruce leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is White spruce (Sw) and Site Type 1 is forested (FT)
White spruce leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is White spruce (Sw) and Site Type 1 is forested (FT)
Engelmann spruce leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Engelmann spruce (Se) and Site Type 1 is forested (FT)
Engelmann spruce leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Engelmann spruce (Se) and Site Type 1 is forested (FT)
Balsam fir leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Balsam fir (Fb) and Site Type 1 is forested (FT)
Balsam fir leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Balsam fir (Fb) and Site Type 1 is forested (FT)
Alpine fir leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Alpine fir (Fa) and Site Type 1 is forested (FT)
Alpine fir leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Alpine fir (Fa) and Site Type 1 is forested (FT)
Douglas fir leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Douglas fir (Fd) and Site Type 1 is forested (FT)
Douglas fir leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Douglas fir (Fd) and Site Type 1 is forested (FT)
Alpine larch leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Alpine larch (La) and Site Type 1 is forested (FT)
Alpine larch leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Alpine larch (La) and Site Type 1 is forested (FT)
Western larch leading - conifer	Coniferous Percent 1 > =80% and Leading Species 1 is Western larch (Lw) and Site Type 1 is forested (FT)
Western larch leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Western larch (Lw) and Site Type 1 is forested (FT)
Tamarack leading - conifer	Coniferous Percent 1 >= 80% and Leading Species 1 is Tamarack (Lt) and Site Type 1 is forested (FT)
Tamarack leading - mixedwood	Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Tamarack (Lt) and Site Type 1 is forested (FT)
Trembling aspen leading - deciduous	Coniferous Percent 1 < =20% and Leading Species 1 is Trembling aspen (Aw) and Site Type 1 is forested (FT)
Trembling aspen leading - mixedwood	Coniferous Percent 1 comprise 21- 49% and Leading Species 1 is Trembling aspen (Aw) and Site Type 1 is forested (FT)
Balsam poplar leading - deciduous	Coniferous Percent 1 < =20% and Leading Species 1 is Balsam poplar (Pb) and Site Type 1 is forested (FT)
Balsam poplar leading - mixedwood	Coniferous Percent 1 comprise 21-49% and Leading Species 1 is Balsam poplar (Pb) and Site Type 1 is forested (FT)
White birch leading - deciduous	Coniferous Percent 1 <=20% and Leading Species 1 is White birch (Bw) and Site Type 1 is forested (FT)
White birch leading - mixedwood	Coniferous Percent 1 comprise 21-49% and Leading Species 1 is White birch (Bw) and Site Type 1 is forested (FT)

Alaska birch leading - deciduous	Coniferous Percent 1 < =20% and Leading Species 1 is Alaska birch (Ba) and Site Type 1 is forested (FT)
Alaska birch leading - mixedwood	Coniferous Percent 1 comprise 21-49% and Leading Species 1 is Alaska birch (Ba) and Site Type 1 is forested (FT)
Shrub	Site Type 1 are Open Shrub (OS), Medial Shrub (MS), or Closed Shrub (CS)
Grass/Herb	Site Type 1 is Herbaceous Grass (HG)
TreedBog – Black spruce leading -conifer	Site Type 1 is Treed Bog (WT), and Coniferous Percent 1 > =80% and Leading Species 1 is Black spruce (Sb)
TreedBog – Black spruce leading - mixedwood	Site Type 1 is Treed Bog (WT), and Coniferous Percent 1 comprise 50- 79% and Leading Species 1 is Black spruce (Sb)
TreedBog – No species info	Site Type 1 is Treed Bog (WT), and no species info can be found in Leading Species 1.
ShrubBog	Site Type 1 is Shrub Bog (WS)
TreedFen - Balsam poplar leading - mixedwood	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 comprise 21-49% and Leading Species 1 is Balsam poplar (Pb)
TreedFen - Black Spruce leading – conifer	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 > =80% and Leading Species 1 is Black spruce (Sb)
TreedFen - Black Spruce leading - mixedwood	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 comprise 50- 79% and Leading Species 1 is Black spruce (Sb)
TreedFen - No Species Info	Site Type 1 is Treed Fen (TS), and no species info can be found in Leading Species 1.
TreedFen - Tamarack leading - conifer	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 >= 80% and Leading Species 1 is Tamarack (Lt)
TreedFen - Tamarack leading - mixedwood	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 comprise 50-79% and Leading Species 1 is Tamarack (Lt)
TreedFen - Trembling aspen leading - deciduous	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 < =20% and Leading Species 1 is Trembling aspen (Aw)
TreedFen - White birch leading - deciduous	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 <=20% and Leading Species 1 is White birch (Bw)
TreedFen - White birch leading - mixedwood	Site Type 1 is Treed Fen (TS), and Coniferous Percent 1 comprise 21-49% and Leading Species 1 is White birch (Bw)
ShrubFen	Site Type 1 is Shrub Fens (SF)
GrassFen	Site Type 1 is Grass Fens (GF)
Marsh	Site Type 1 is Marsh (M). Note, this type is used for backfilling linear human footprint only.
Swamp	Site Type 1 is Swamp (SW).
Rock/Rubble	Site Type 1 is Rock (NMR). Note, this type is used for backfilling linear human footprint only.
Ice/Snow	Site Type 1 is Ice (NMI). Note, this type is used for backfilling linear human footprint only.
Water	Site Type 1 is Water (NW) and SitePct1 >=8. Note, Water is not used for backfilling.

4.2.2 Water boundaries

The open water polygons defined in the PLVI layer (i.e., Site Type 1 is Water (NW) and SitePct1 >=8), were combined with more detailed polygons obtained from the Government of Alberta

Base Waterbody Polygon layer and Base Stream and Flow Representation linear layer following the same procedures as in AVIE/EINP layers described in Section 4.1.2. The processing overwrote all vegetation types beneath the Base Water layers with Water, and retained the open water polygons from PLVI that were outside of the Base Water layers.

4.2.3 Natural polygons where vegetation type was not labeled appropriately

A few polygons were labeled as Sand (Site Type1 = NMS) and did not describe the type of vegetation present. In addition, a few polygons labeled as human-disturbed fell outside of the polygons in ABMI 2014 Human Footprint layer.

Four sources of natural vegetation information were used in sequence to determine vegetation type. The first source of information was based on the type of native vegetation surrounding the polygon in question. If the appropriate information could not be extracted from the first source, then the second source – Phase 1 Alberta Vegetation Inventory layer (Phase 1) – was used to assign vegetation type. See section 4.7.1 for a description of the Phase 1 layer. If the appropriate information could not be extracted from the second source, then the third source – ABMILC – was used to assign vegetation type (Appendix 1). If the appropriate information could not be extracted from the third source, then the fourth source – the most common vegetation type in each natural sub-region – was used to assign vegetation type (Appendix 3).

Procedures to assign vegetation types follow Figure 3. A "Multipart to Singlepart" GIS operation was run to ensure each polygon had a single unique corresponding record in the attribute table and have correct area.

4.2.4 Backfilling human-disturbed polygons

4.2.4.1 Selecting human-disturbed polygons

Human-disturbed polygons in PLVI did not describe the vegetation that was present prior to disturbance. We wished to describe the expected vegetation that would have been present in these polygons if no human disturbance had occurred.

The human-disturbed vegetation polygons were identified by selecting polygons in which the field "Land Class1" indicated the land cover was Modified vegetated (MOD) or Developed Non-vegetated (DEV). The selected polygons were divided into 3 groups:

Linear human footprint
Linear polygons were identified by selecting: 1) Transportation surface including roads, highway, airports and rail lines ("Site Type1" = 'AIH'), or 2) Treed clearings or Non-treed clearings including pipelines, transmission lines, airstrips, well sites and numerous geophysical lines ("Site Type1" = 'CIP' or 'CIT').

Cutblock polygons

Cutblock polygons were derived by clipping the original PLVI layer with the cutblock polygons in the ABMI 2014 human footprint layer[1]. Using the cutblock polygons in the 2014 human footprint layer as the template ensured that old growth forest is backfilled to all the cutblocks in the final layer.

Polygons which were identified as Cutblocks by PLVI (i.e., Site Type1 was equal to Recent harvested ('CC') or Regeneration ('CR')), but which fell outside of the 2014 cutblock template, were backfilled either with its own information or according to the rules in the "Other human disturbed polygons" group (see below).

Other human disturbed polygons
All other human disturbed polygons. This group included Annual Crops ("Site Type1" = 'CIP'), Tame Pasture ("Site Type1" = 'CP'), Rough Pasture ("Site Type1" = 'CPR'), Settlement Tracts ("Site Type1" = 'ASC'), or Industrial Tracts ("Site Type1" = 'AII").

4.2.4.2 Backfilling human disturbed polygons

A "Multipart to Singlepart" GIS operation was run to make sure each polygon had a single unique corresponding record in the attribute table.

The non-linear human-disturbed polygons in the PLVI layer were first backfilled using data from its own attribute table if the fields "Site Type 2" or "Site Type 3" indicated natural vegetation types. Only upland vegetation types were used because the wetlands listed in "Site Type 2" or "Site Type 3" were usually just small pockets of wetland within the larger polygon.

Attribute table fields with names ending with "2" (i.e., "Coniferous Percent 2", "Leading Species 2", and "Site Type 2") were first used to generate the natural upland vegetation types by applying the rule set provided in Table 7. Origin year and moisture fields were also backfilled using the same information. Attribute table fields with names ending as 3 (i.e., "Coniferous Percent 3", "Leading Species 3", and "Site Type 3") were used subsequently for the remaining un-backfilled polygons by following the same procedure. Some cutblock polygons (i.e., Site Type1 in 'CC' or 'CR'), had vegetation information in the fields "Leading Species 1" and "Coniferous Percent 1" and this information was used if available.

Table 7: Constraints for backfilling human disturbed polygons with their own attribute data in the Primary Land and Vegetation Inventory (PLVI) layer.

Human Footprint Group	Site Type 1	Constraints
Cutblock	Recent Harvest (CC), Regeneration (CR)	Only Pine, White spruce, Engelmann spruce, Fir, Trembling aspen, Balsam poplar, White birch were assigned from "Leading Species 1", "Leading Species 2", or "Leading Species 3"
Linear Human Footprint	Transportation Surface (AIH), Non-treed Clearings (CIP), Treed Clearings (CIT)	Not backfilled with its own attributes
Other human disturbed polygons	Settlement Tracts (ASC), Industrial Tracts (AII). Note, Annual Crops (CA), Tame Pasture (CP), and Rough Pasture (CPR) were excluded,	Any upland vegetation types could be used for backfilling from Coniferous Percent 2", "Leading Species 2", and "Site Type 2" or from Coniferous Percent 3", "Leading Species 3", and "Site Type 3". Note that forest types from Coniferous Percent 2", "Leading Species 2", and "Site Type 2", or from Coniferous Percent 3", "Leading Species 3", and "Site Type 3"are not used for backfilling in Parkland and Grassland natural regions because forests are uncommon in these regions.

The remaining polygons of the group of cutblock, after backfilled from its own fields, were backfilled with the same procedures as for backfilling the AVIE layer (See Section 4.1.4). Polygons of the linear human footprint group were backfilled using the neighbouring vegetation type information also with the same procedures as for backfilling the AVIE layer. The group of other human disturbed polygons, after backfilled from its own fields, were overwritten (in order of precedence) by: a) Alberta Merged Wetland Inventory for wetland types, b) Phase 1, c) native vegetation from the ABMILC, d) native vegetation from the soil layer, and e) the dominant vegetation type in that natural sub-region with the same procedures as for backfilling the AVIE layer (See Section 4.1.4).

4.2.5 Origin year and origin source

The origin year of each polygon was derived from the fields Disturbance Year 1, Pioneering Succession Stage 1, and Serial Succession Stage 1. If the field "Disturbance Percent 1" indicated that ≥80% of the area was disturbed, the origin year was copied from the field "Disturbance Year 1". The Origin Years for the remaining polygons were then generated from the field "Pioneering Succession Stage 1", or the field "Seral Succession Stage 1", according to the rules in Table 8 and Table 9.

Table 8: Forest age derived from pioneering tree species successional stage in PLVI

Successional Stage	ORIGIN YEAR
Stand Initiation (SI)	5 years before image year. If no image year, 2010 was used.

Stem Exclusion (SE)	25 years before image year. If no image year, 2010 was used.
Mature (MA)	70 years before image year. If no image year, 2010 was used.
Breakup (BP)	150 years before image year. If no image year, 2010 was used.
No pioneer (XP)	Not Applicable

Table 9: Forest age derived from serial tree species succession stage in PLVI

Successional Stage	**ORIGIN YEAR**
Recruitment (RC)	5 years before image year. If no image year, 2010 was used.
Intermediate (IM)	25 years before image year. If no image year, 2010 was used.
Mature (MT)	70 years before image year. If no image year, 2010 was used.
Climax (CM)	150 years before image year. If no image year, 2010 was used.
No seral (XS)	Not Applicable

In human-disturbed polygons where the expected native vegetation was backfilled, origin year was first assigned from Disturbance Year 2, Pioneering Succession Stage 2, and Serial Succession Stage 2, or from the fields Disturbance Year 3, Pioneering Succession Stage 3, and Serial Succession Stage 3 using the same procedures as when backfilling vegetation type.

If no origin info could be derived from PLVI attributes, origin year was assigned based on the historical wildfire information layer. In addition, if the image year of PLVI was older than the wildfire year, then the historical wildfire history information was used to assign origin year (see Section 4.1.5 for details). If PLVI was blank and there was no wildfire, Year '9999' was assigned to the polygon.

The year of origin was stored in the Origin_Year column, and source of polygon origin information was stored in the Origin_Source column.

4.2.6 Moisture regime

The MOIST_REG field was copied from the field "Map Code 1". Map Codes describe ecological sites, which has both Moisture Regime (2 – Xeric, 3 – Subxeric, 4 – Submesic, 5 – Meisc, 6 – Subhygric, 7 – Hygric, 8 – Subhydric, and 9 - Hydric) and Nutrient Regime (A - Very Poor, B - Poor , C – Med. , D - Rich, and E –Very rich). For more information on Map Codes, refer to the PLVI metadata documents.

If moisture regime information was missing for a polygon, then the moisture regime was assigned based on the vegetation type (Table 10).

Table 10: Moisture regime derived from vegetation type in PLVI.

Vegetation Type	**Moisture regime derived if Map Code 1 is empty**
Lodgepole pine leading - conifer	3-derived
Lodgepole pine leading - mixedwood	3-derived
Jack pine leading - conifer	2-derived
Jack pine leading - mixedwood	3-derived

White-bark pine leading - conifer	2-derived
White-bark pine leading - mixedwood	3-derived
Limber pine leading - conifer	2-derived
Limber pine leading - mixedwood	3-derived
Black spruce leading - conifer	8-derived
Black spruce leading - mixedwood	7-derived
White spruce leading - conifer	5-derived
White spruce leading - mixedwood	5-derived
Engelmann spruce leading - conifer	4-derived
Engelmann spruce leading - mixedwood	5-derived
Balsam fir leading - conifer	6-derived
Balsam fir leading - mixedwood	5-derived
Alpine fir leading - conifer	6-derived
Alpine fir leading - mixedwood	5-derived
Douglas fir leading - conifer	3-derived
Douglas fir leading - mixedwood	4-derived
Alpine larch leading - conifer	7-derived
Alpine larch leading - mixedwood	6-derived
Western larch leading - conifer	8-derived
Western larch leading - mixedwood	7-derived
Tamarack leading - conifer	8-derived
Tamarack leading - mixedwood	7-derived
Trembling aspen leading - deciduous	5-derived
Trembling aspen leading - mixedwood	5-derived
Balsam poplar leading - deciduous	6-derived
Balsam poplar leading - mixedwood	5-derived
White birch leading - deciduous	6-derived
White birch leading - mixedwood	6-derived
Alaska birch leading - deciduous	6-derived
Alaska birch leading - mixedwood	6-derived
Shrub	6-derived
Grass/Herb	6-derived
TreedBog – (vegetation type)	7-derived
ShrubBog	8-derived
TreedFen - (vegetation type)	8-derived
ShrubFen	9-derived
GrassFen	9-derived
Marsh	9-derived
Swamp	6-derived
Rock/Rubble	2-derived
Ice/Snow	6-derived
Water	water

In human-disturbed polygons, moisture regime was first assigned from the backfilled polygon based on the field Map Code 2, or from the field Map Code 3 if the polygon was a linear feature, a cutblock, or a peat mine. For other human disturbed polygons, if the Alberta Merged Wetland Inventory indicated a pocket of wetland was present, moisture regime in the pocket was assigned as wet-derived. In areas outside the wetland pockets (note that vegetation was assigned based on Phase 1 or ABMI Land Cover or the dominant vegetation type in Natural Subregion), moisture

regime was determined from the soil type (Table 13). If the area did not overlap the soil layer, moisture regime was determined based on the vegetation types (See Table 5).

4.2.7 Post cleaning

Polygons with area <100m^2 were amalgamated with neighbouring polygons.

Ten columns were created in the GIS database to describe the source and backfilled information:

- Veg_Type – Vegetation and wetland classes
- General_Source – **PLVI** was assigned to all polygons created in this section
- PreBackfill_Source – Detailed source where the polygon boundary came from. Values are **PLVI**, or **Hydropoly** or **ABMIHF** for cutblocks.
- Backfill_Required - Type of disturbance being backfilled (with the code "None" when no backfilling was required)
- Backfill_Method - Method used during backfilling (with the code "None" when no backfilling was required)
- PostBackfill_Source - Source of information used in backfilling (with the codes PLVI or ABMIHF or Hydropoly were copied to this column when no backfilling was required)
- Moisture_Reg – Moisture categories
- Moisture_Source – Source of moisture information
- Origin_Year – Year of last disturbance
- Origin_Source – Source of origin information

4.3 Information from the Grassland Vegetation Inventory (GVI)

4.3.1 Vegetation and wetland identification and classification

The Grassland Vegetation Inventory layer (GVI)[2] provided by Alberta Government in February of 2015 was used as the base layer.

The GVI layer contained polygon data for southern Alberta (Figure 8). To assist with vegetation classification and backfilling, the GVI "LANDSCAPE_POLYGON" layer was extended by adding additional fields to the attribute table. These 49 additional fields (Table 11) were derived either from the GVI tables "SITES" and "VEGETATION", or the GVI "View_Rangeland" layer.

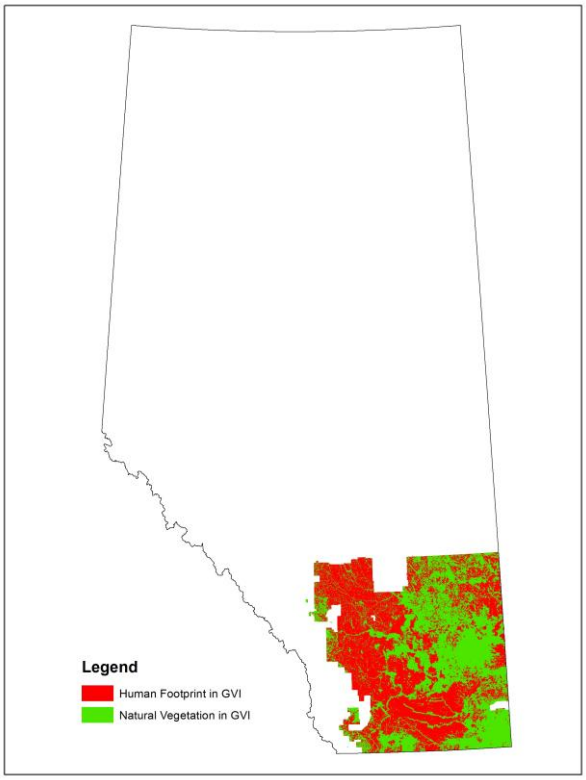

Figure 8 Extent of the Grassland Vegetation Inventory (GVI) in Alberta showing natural vegetation types and human footprint

A "LinkID" field was added to the attribute table of GVI "LANDSCAPE_POLYGON" layer and a unique ID number was assigned to each of the GVI polygons. This "LinkID" was used as a table key to link various derived intermediate tables during processing in Microsoft Access. The "GLOBALID" field in the table was used only to link the "LANDSCAPE_POLYGON" layer with the GVI "View_Rangeland" layer and "SITES" and "VEGETATION" tables in the GVI file geo-database.

Table 11: Fields added to the attribute table of the Grassland Vegetation Inventory (GVI) "LANDSCAPE_POLYGON" layer.

Field Name	**Description**
PctTrees	Percentage of trees coverage in the polygon. Note, the sum of PctTrees, PctShrubs, PctGrass, PctNonVeg and PctWater equals to 100.
PctShrubs	Percentage of shrub coverage in the polygon.
PctGrass	Percentage of grass coverage in the polygon.
PctNonVeg	Percentage of non-vegetation coverage in the polygon.
PctWater	Percentage of water coverage in the polygon.
SumOfEachTreePct	The sum up of the species columns. The value should be 100 or 0 (This field is used for Quality Assurance only)

Con_wetland	Percentage of total trees areal coverage that was Black spruce, Tamarack, Western larch and unidentified Larch.
Con_upland	Percentage of total trees areal coverage that was Pine, White spruce, Engelmann spruce, unidentified spruce, Fir, Subalpine larch, Hemlock, and Western red cedar.
Deciduous	Percentage of total trees areal coverage that was deciduous trees.
Pl	Percentage of total trees areal coverage that was Lodgepole pine.
Pl_Pj	Percentage of total trees areal coverage that was Lodgepole pine and Jack pine
Pj	Percentage of total trees areal coverage that was Jack pine.
Pa	Percentage of total trees areal coverage that was White-bark pine.
Pf	Percentage of total trees areal coverage that was Limber pine.
Pm	Percentage of total trees areal coverage that was Western white pine.
P	Percentage of total trees areal coverage that was unidentified pine.
Sb	Percentage of total trees areal coverage that was Black spruce.
Sw	Percentage of total trees areal coverage that was White spruce.
Se	Percentage of total trees areal coverage that was Engelmann spruce.
Se_Sw	Percentage of total trees areal coverage that was Engelmann spruce and White spruce.
S	Percentage of total trees areal coverage that was unidentified spruce.
Fb	Percentage of total trees areal coverage that was Balsam fir.
Fb_Fa	Percentage of total trees areal coverage that was Balsam fir and Alpine fir.
Fa	Percentage of total trees areal coverage that was Alpine fir.
F	Percentage of total trees areal coverage that was unidentified fir.
Fd	Percentage of total trees areal coverage that was Douglas fir.
Fds	Percentage of total trees areal coverage that was unidentified Douglas fir.
Lw	Percentage of total trees areal coverage that was Western larch.
Lt	Percentage of total trees areal coverage that was Tamarack.
La	Percentage of total trees areal coverage that was Subalpine Larch.
L	Percentage of total trees areal coverage that was unidentified Larch.
Hh	Percentage of total trees areal coverage that was Western Hemlock
Tp	Percentage of total trees areal coverage that was Western red cedar
H	Percentage of total trees areal coverage that was unidentified Hemlock.
Mm	Percentage of total trees areal coverage that was Manitoba maple.
M	Percentage of total trees areal coverage that was unidentified maple.
Bw	Percentage of total trees areal coverage that was White birch.
Ba	Percentage of total trees areal coverage that was Alaska birch.
B	Percentage of total trees areal coverage that was unidentified birch.
PPa	Percentage of total trees areal coverage that was Narrow leaf cottonwood.
PPb	Percentage of total trees areal coverage that was Balsam poplar.
PPd	Percentage of total trees areal coverage that was Plains cottonwood.
PP	Percentage of total trees areal coverage that was unidentified poplar.
Aw	Percentage of total trees areal coverage that was Trembling aspen.
PPx	Percentage of total trees areal coverage that was Lance leaf cottonwood.
Leading_Species	The species with maximum percentage of total trees areal coverage
PctABMIWet	Percentage of ABMI wetland site types coverage in the polygon. The ABMI wetland site types include LenS, LenSP, LenA, LtcS, and LtcH (See Table 13 or ABMI Moisture regime)
PctLtcRLenW	Percentage of site types LtcR and LenW coverage in the polygon.
PctLtcCD	Percentage of site types LtcC and LtcD coverage in the polygon.
PctLtcWet	Percentage of site types LtcS and LtcH coverage in the polygon.
PctLenWet	Percentage of site types LenS, LenSP and LenA coverage in the polygon.
PctHF	Percentage of Human Footprint coverage in the polygon, which is derived from the Native Prairie view.
DomNatSiteType	Dominant Natural site type which had maximum coverage.

The fields for each species were derived from the VEGETATION table and SITES table using the following three steps:

1. First, each row (i.e., one species) of the VEGETATION table in GVI was assigned to one abbreviation name found in Table 11 according to the SPECIES_ID field.
2. Second, the percentage of this species in the GVI polygon was then calculated with the equation ("PCT_OF_CLASS" in the VEGATATION table × "PCT_TREES" in the SITES table × "PCT_OF_Polygon" in the SITES table) / the newly added "PctOfTrees".
3. Finally, the percentage of each tree type on the GVI polygon was derived with a crosstab operation by summing up the percentage of each species (row) on the polygon.

For the dominant natural site type field (Field DomNatSiteType), when there was more than one natural site type with the same maximum coverage, the dominant type was determined manually by an expert with the aid of the ABMI Soil Types layer (Section 5.2).

The vegetation and wetland types in the GVI layer were derived according to the rule set in Table 12. The rule of "greater than 60% of wet area" was used to assign the wetland types (Lentic Tree, Lentic Shrub, Lentic Herb, Alkali, Lotic Tree, Lotic Shrub, and Lotic Herb) because there was a natural break in the data at this percentage. A python script was developed and is available upon request.

Table 12: Definition of vegetation and wetland types derived from the Grassland Vegetation Inventory (GVI). If not specified, percentages in the table refer to the percent of the crown coverage for that species.

Vegetation Type	**Description**
Lodgepole pine	Stands where Lodgepole pine (Pl) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Lodgepole pine MixC	Stands where Lodgepole pine (Pl) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Lodgepole pine MixCD	Stands where Lodgepole pine (Pl) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Lodgepole pine MixDC	Stands where Lodgepole pine (Pl) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Lodgepole pine MixWet	Stands where Lodgepole pine (Pl) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprised 21-79%, and percentage of tree (PctTree) >= 20
Lodgepole x Jack pine	Stands where Lodgepole pine and Jack pine (Pl_Pj) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Lodgepole x Jack pine MixC	Stands where Lodgepole pine and Jack pine (Pl_Pj) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Lodgepole x Jack pine MixCD	Stands where Lodgepole pine and Jack pine (Pl_Pj) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater

	than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Lodgepole x Jack pine MixDC	Stands where Lodgepole pine and Jack pine (Pl_Pj) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Lodgepole x Jack pine MixWet	Stands where Lodgepole pine and Jack pine (Pl_Pj) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Jack pine	Stands where Jack pine (Pj) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Jack pine MixC	Stands where Jack pine (Pj) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Jack pine MixCD	Stands where Jack pine (Pj) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Jack pine MixDC	Stands where Jack pine (Pj) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Jack pine MixWet	Stands where Jack pine (Pj) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
White-bark pine	Stands where White-bark pine (Pa) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
White-bark pine MixC	Stands where White-bark pine (Pa) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
White-bark pine MixCD	Stands where White-bark pine (Pa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
White-bark pine MixDC	Stands where White-bark pine (Pa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
White-bark pine MixWet	Stands where White-bark pine (Pa) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Limber pine	Stands where Limber pine (Pf) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Limber pine MixC	Stands where Limber pine (Pf) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Limber pine MixCD	Stands where Limber pine (Pf) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20

Limber pine MixDC	Stands where Limber pine (Pf) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Limber pine MixWet	Stands where Limber pine (Pf) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Western white pine	Stands where Western white pine (Pm) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Western white pine MixC	Stands where Western white pine (Pm) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Western white pine MixCD	Stands where Western white pine (Pm) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Western white pine MixDC	Stands where Western white pine (Pm) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Western white pine MixWet	Stands where Western white pine (Pm) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Pine spp	Stands where unidentified pine (P) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Pine spp MixC	Stands where unidentified pine (P) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Pine spp MixCD	Stands where unidentified pine (P) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Pine spp MixDC	Stands where unidentified pine (P) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Pine spp MixWet	Stands where unidentified pine (P) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Black spruce	Stands where Black spruce (Sb) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Black spruce MixC	Stands where Black spruce (Sb) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Black spruce MixCD	Stands where Black spruce (Sb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and percentage of tree (PctTree) >= 20
Black spruce MixDC	Stands where Black spruce (Sb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and percentage of tree (PctTree) >= 20
Black spruce	Stands where Black spruce (Sb) is the leading species in stand and comprise <80%, but

MixD	deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
White spruce	Stands where White spruce (Sw) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
White spruce MixC	Stands where White spruce (Sw) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
White spruce MixCD	Stands where White spruce (Sw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
White spruce MixDC	Stands where White spruce (Sw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
White spruce MixWet	Stands where White spruce (Sw) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Engelmann spruce	Stands where Engelmann spruce (Se) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Engelmann spruce MixC	Stands where Engelmann spruce (Se) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Engelmann spruce MixCD	Stands where Engelmann spruce (Se) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Engelmann spruce MixDC	Stands where Engelmann spruce (Se) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Engelmann spruce MixWet	Stands where Engelmann spruce (Se) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Engelmann x White spruce	Stands where Engelmann spruce and White spruce (Se_Sw) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Engelmann x White spruce MixC	Stands where Engelmann spruce and White spruce (Se_Sw) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Engelmann x White spruce MixCD	Stands where Engelmann spruce and White spruce (Se_Sw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Engelmann x White spruce MixDC	Stands where Engelmann spruce and White spruce (Se_Sw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Engelmann x White spruce MixWet	Stands where Engelmann spruce and White spruce (Se_Sw) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20

Spruce spp	Stands where unidentified spruce (S) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Spruce spp MixC	Stands where unidentified spruce (S) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Spruce spp MixCD	Stands where unidentified spruce (S) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Spruce spp MixDC	Stands where unidentified spruce (S) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Spruce spp MixWet	Stands where unidentified spruce (S) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Balsam fir	Stands where Balsam fir (Fb) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Balsam fir MixC	Stands where Balsam fir (Fb) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Balsam fir MixCD	Stands where Balsam fir (Fb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Balsam fir MixDC	Stands where Balsam fir (Fb) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Balsam fir MixWet	Stands where Balsam fir (Fb) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Alpine fir	Stands where Alpine fir (Fa) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Alpine fir MixC	Stands where Alpine fir (Fa) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Alpine fir MixCD	Stands where Alpine fir (Fa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Alpine fir MixDC	Stands where Alpine fir (Fa) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Alpine fir MixWet	Stands where Alpine fir (Fa) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Fir spp	Stands where unidentified fir (F) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20

Fir spp MixC	Stands where unidentified fir (F) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Fir spp MixCD	Stands where unidentified fir (F) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Fir spp MixDC	Stands where unidentified fir (F) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Fir spp MixWet	Stands where unidentified fir (F) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Douglas fir	Stands where Douglas fir (Fd) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Douglas fir MixC	Stands where Douglas fir (Fd) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Douglas fir MixCD	Stands where Douglas fir (Fd) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Douglas fir MixDC	Stands where Douglas fir (Fd) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Douglas fir MixWet	Stands where Douglas fir (Fd) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Douglas fir spp	Stands where unidentified Douglas fir (Fds) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Douglas fir spp MixC	Stands where unidentified Douglas fir (Fds) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Douglas fir spp MixCD	Stands where unidentified Douglas fir (Fds) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Douglas fir spp MixDC	Stands where unidentified Douglas fir (Fds) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Douglas fir spp MixWet	Stands where unidentified Douglas fir (Fds) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Western larch	Stands where Western larch (Lw) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Western larch MixC	Stands where Western larch (Lw) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree

	(PctTree) >= 20
Western larch MixCD	Stands where Western larch (Lw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Western larch MixDC	Stands where Western larch (Lw) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Western larch MixedD	Stands where Western larch (Lw) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Tamarack	Stands where Tamarack (Lt) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Tamarack MixC	Stands where Tamarack (Lt) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Tamarack MixCD	Stands where Tamarack (Lt) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but is greater than or equal to deciduous species combined, and percentage of tree (PctTree) >= 20
Tamarack MixDC	Stands where Tamarack (Lt) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and percentage of tree (PctTree) >= 20
Tamarack MixD	Stands where Tamarack (Lt) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Larch spp	Stands where unidentified larch (L) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Larch spp MixC	Stands where unidentified larch (L) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Larch spp MixCD	Stands where unidentified larch (L) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and percentage of tree (PctTree) >= 20
Larch spp MixDC	Stands where unidentified larch (L) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species combined is greater than upland coniferous species combined, and percentage of tree (PctTree) >= 20
Larch spp MixD	Stands where unidentified larch (L) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Hemlock spp	Stands where unidentified Hemlock (H) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Hemlock spp MixC	Stands where unidentified Hemlock (H) is the leading species in stand and comprise <80%, but upland coniferous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Hemlock spp MixCD	Stands where unidentified Hemlock (H) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80% but greater than or equal to deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Hemlock spp MixDC	Stands where unidentified Hemlock (H) is the leading species in stand and comprises <80%, and upland coniferous species combined comprise <80%, but deciduous species

	combined is greater than upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Hemlock spp MixWet	Stands where unidentified Hemlock (H) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Manitoba maple	Stands where Manitoba maple (Mm) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Manitoba maple MixD	Stands where Manitoba maple (Mm) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Manitoba maple MixDC	Stands where Manitoba maple (Mm) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Manitoba maple MixCD	Stands where Manitoba maple (Mm) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Manitoba maple MixWet	Stands where Manitoba maple (Mm) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Maple spp	Stands where unidentified maple (M) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Maple spp MixD	Stands where unidentified maple (M) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Maple spp MixDC	Stands where unidentified maple (M) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Maple spp MixCD	Stands where unidentified maple (M) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Maple spp MixWet	Stands where unidentified maple (M) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
White birch	Stands where White birch (Bw) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
White birch MixD	Stands where White birch (Bw) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
White birch MixDC	Stands where White birch (Bw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
White birch MixCD	Stands where White birch (Bw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western

	larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
White birch MixWet	Stands where White birch (Bw) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Alaska birch	Stands where Alaska birch (Ba) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Alaska birch MixD	Stands where Alaska birch (Ba) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Alaska birch MixDC	Stands where Alaska birch (Ba) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Alaska birch MixCD	Stands where Alaska birch (Ba) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Alaska birch MixWet	Stands where Alaska birch (Ba) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Birch spp	Stands where unidentified birch (B) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Birch spp MixD	Stands where unidentified birch (B) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Birch spp MixDC	Stands where unidentified birch (B) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Birch spp MixCD	Stands where unidentified birch (B) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Birch spp MixWet	Stands where unidentified birch (B) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Narrow leaf cottonwood	Stands where Narrow leaf cottonwood (PPa) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Narrow leaf cottonwood MixD	Stands where Narrow leaf cottonwood (PPa) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Narrow leaf cottonwood MixDC	Stands where Narrow leaf cottonwood (PPa) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Narrow leaf cottonwood MixCD	Stands where Narrow leaf cottonwood (PPa) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20

Narrow leaf cottonwood MixWet	Stands where Narrow leaf cottonwood (PPa) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Balsam poplar	Stands where Balsam poplar (PPb) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Balsam poplar MixD	Stands where Balsam poplar (PPb) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Balsam poplar MixDC	Stands where Balsam poplar (PPb) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Balsam poplar MixCD	Stands where Balsam poplar (PPb) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Balsam poplar MixWet	Stands where Balsam poplar (PPb) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Plains cottonwood	Stands where Plains cottonwood (PPd) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Plains cottonwood MixD	Stands where Plains cottonwood (PPd) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Plains cottonwood MixDC	Stands where Plains cottonwood (PPd) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Plains cottonwood MixCD	Stands where Plains cottonwood (PPd) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Plains cottonwood MixWet	Stands where Plains cottonwood (PPd) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Poplar spp	Stands where unidentified Poplar (PP) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Poplar spp MixD	Stands where unidentified Poplar (PP) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Poplar spp MixDC	Stands where unidentified Poplar (PP) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, , and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Poplar spp MixCD	Stands where unidentified Poplar (PP) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20

Poplar spp MixWet	Stands where unidentified Poplar (PP) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Trembling aspen	Stands where Trembling aspen (Aw) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Trembling aspen MixD	Stands where Trembling aspen (Aw) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Trembling aspen MixDC	Stands where Trembling aspen (Aw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Trembling aspen MixCD	Stands where Trembling aspen (Aw) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Trembling aspen MixWet	Stands where Trembling aspen (Aw) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Lance leaf cottonwood	Stands where Lance leaf cottonwood (PPx) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Lance leaf cottonwood MixD	Stands where Lance leaf cottonwood (PPx) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Lance leaf cottonwood MixDC	Stands where Lance leaf cottonwood (PPx) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Lance leaf cottonwood MixCD	Stands where Lance leaf cottonwood (PPx) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Lance leaf cottonwood MixWet	Stands where Lance leaf cottonwood (PPx) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Drummond's willow	Stands where Drummond's willow (Sd) is the leading species in stand and comprise >=80%, and percentage of tree (PctTree) >= 20
Drummond's willow MixD	Stands where Drummond's willow (Sd)) is the leading species in stand and comprise <80%, but deciduous species combined comprise >=80%, and percentage of tree (PctTree) >= 20
Drummond's willow MixDC	Stands where Drummond's willow (Sd) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but deciduous species combined is greater than or equal to upland coniferous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20
Drummond's willow MixCD	Stands where Drummond's willow (Sd) is the leading species in stand and comprises <80%, and deciduous species combined comprise <80, but upland coniferous species combined is greater than deciduous species combined, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise <= 20%, and percentage of tree (PctTree) >= 20

Drummond's willow MixWet	Stands where Drummond's willow (Sd) is the leading species in stand but comprises <80%, and wetland conifers (Black spruce + Western larch + Tamarack) combined comprise 21-79%, and percentage of tree (PctTree) >= 20
Other Forest	Stands where percentage of tree (PctTree) >= 20 but without any species composition information
Shrub	PctTree < 20 and PctShrub >= 20
Grass/Herb	PctTree < 20 and PctShrub < 20 and PctNonVeg <80
Bareland	PctTree < 20 and PctShrub < 20 and PctNonVeg>= 80
Badlands/Bedrock	PctTree < 20 and PctShrub < 20 and PctNonVeg>= 80, and Dominant site type is Bdl
Saline lowland	PctTree < 20 and PctShrub < 20 and PctNonVeg>= 80, and Dominant site type is SL
Lentic conifer	PctTree >= 20 and Deciduous <=20 and PctLenWet+PctLtcRLenW>=60
Lentic deciduous	PctTree >= 20 and Deciduous >=80 and PctLenWet+PctLtcRLenW>=60
Lentic mixedwood	PctTree >= 20 and Deciduous is from 21 – 79 and PctLenWet+PctLtcRLenW>=60
Lentic shrub	PctTree < 20 and PctShrub >= 20 and PctLenWet+PctLtcRLenW>=60
Lentic herb	PctTree < 20 and PctShrub < 20 and PctLenWet+PctLtcRLenW>=60
Alkali	PctTree < 20 and PctLenWet+PctLtcRLenW>=60 and DomSiteType =LenA
Lotic conifer	PctTree >= 20 and Dec <=20 and PctLtcWet+PctLtcRLenW>=60
Lotic deciduous	PctTree >= 20 and Dec >=80 and PctLtcWet+PctLtcRLenW>=60
Lotic mixedwood	PctTree >= 20 and Dec is from 21 - 79 and PctLtcWet+PctLtcRLenW>=60
Lotic shrub	PctTree < 20 and and PctShrub >= 20 and PctLtcWet+PctLtcRLenW>=60
Lotic herb	PctTree < 20 and and PctShrub < 20 and PctLtcWet+PctLtcRLenW>=60
Water	PctLtcRLenW>=80

4.3.2 Water boundaries

The open water polygons were first identified with the rule of Lentic – Open water (LenW) + Lotic – River (LtcR) >=80. The open water polygons in GVI were combined with more detailed polygons obtained from the Government of Alberta Base Waterbody Polygon layer and Base Stream and Flow Representation linear layer following the same procedures as in AVIE/EINP layers described in Section 4.1. The processing overwrote all vegetation types beneath the Base Water layers with Water, and kept the open water from GVI that were outside of the Base Water layers.

4.3.3 Natural polygons where vegetation type was not labeled correctly

A mask from the ABMI 2014 human footprint layer was created. This mask was overlaid on GVI and polygons falling outside the mask labeled that were labeled human footprint by GVI were considered to be labeled incorrectly.

For the incorrectly labeled polygons, a “Multipart to Singlepart” GIS operation was run to make sure each polygon had a single unique corresponding record in the attribute table. The corrected natural vegetation type was determined by overlaying these polygons with information from other layers. Information from the ABMI Land Cover was used first. If native vegetation type still was not determined, then information from the Soil layer was used. If native vegetation type still was not determined, then the dominant vegetation type in that Natural Subregion was used.

The Alberta Merged Wetland Inventory Layer had more detailed information for wetlands than GVI. Thus, CWCS types bog, fen, swamp, marsh and open water were intersected into the GVI

layer, and these new polygons were labeled using the CWCS types except that open water was labelled as marsh.

4.3.4 Backfilling human disturbed polygons

The mask from the ABMI 2014 human footprint layer was overlaid on GVI and all GVI polygons falling within were treated as human footprint. A "Multipart to Singlepart" GIS operation was run to make sure each polygon had a single unique corresponding record in the attribute table.

Areas located within the mask were replaced with the vegetation types converted from the Soil layer (see Section 5.2 for detailed information for this layer). The CWCS layer was then overlaid and polygons of bog, fen, swamp, marsh and open water identified. These polygons were labeled based on the type from CWCS with the exception that open water was labeled as marsh.

4.3.5 Origin year and origin source

There was no information about polygon origin in GVI. Therefore the historical wildfire history information was used to assign origin year to each polygon (see Section 4.1.5 for details). Year '9999' was assigned to polygons that did not burn based on historical wildfire information.

4.3.6 Moisture regime

For most polygons, MOIST_REG field was derived from the dominant natural site type in the soil layer (Table 13). For wetland polygons derived from the CWCS layer, MOIST_REG was labeled wet -derived.

Table 13: Conversion from soil / GVI Site Type to the ABMI moisture regime

GVI Site Type	**GVI Code**	**GVI ID**	**Moisture Regime**
Lentic – Temporary	LenT	1	mesic-derived
Lentic – Seasonal	LenS	2	wet-derived
Lentic – Alkali	LenA	3	wet-derived
Lentic - Semi to Permanent	LenSP	4	wet-derived
Lentic - Open water	LenW	5	wet-derived
Lotic – River	LtcR	6	wet-derived
Lotic – Coniferous	LtcC	7	mesic-derived
Lotic – Deciduous	LtcD	8	mesic-derived
Lotic – Shrub	LtcS	9	wet-derived
Lotic – Herbaceous	LtcH	10	wet-derived
Subirrigated	Sb	11	mesic-derived
Overflow	Ov	12	mesic-derived
Clayey	Cy	13	mesic-derived
Loamy	Lo	14	mesic-derived
Sandy	Sy	15	dry-derived

Limy	Li	16	mesic-derived
Sandy	Sa	17	dry-derived
Blowouts/Solonetzic	BlO	18	dry-derived
Choppy Sandhills	CS	19	dry-derived
Thin Breaks	TB	20	dry-derived
Shallow to Gravel	SwG	21	dry-derived
Saline Lowland	SL	22	mesic-derived
Gravel	Gr	23	dry-derived
Badlands /Bedrock	Bdl	24	dry-derived

4.3.7 Post cleaning

Polygons with area <100m^2 were eliminated with the same information as its neighbouring polygon.

Ten columns were created in the GIS database to describe the source and backfilled information:

- Veg_Type – Vegetation and wetland classes
- General_Source – **GVI** was assigned to all polygons created in this section
- PreBackfill_Source – Detailed source where the polygon boundary came from. Values are **GVI**, or **GVI** replaced with **Hydropoly** for water from Hydro layers.
- Backfill_Required - Type of disturbance being backfilled (with the code "None" when no backfilling was required)
- Backfill_Method - Method used during backfilling (with the code "None" when no backfilling was required)
- PostBackfill_Source - Source of information used in backfilling (with the codes GVI or Hydropoly were copied to this column when no backfilling was required)
- Moisture_Reg – Moisture categories
- Moisture_Source – Source of moisture information
- Origin_Year – Year of last disturbance
- Origin_Source – Source of origin information

4.4 Information from the Central Parkland Vegetation Inventory (CPVI)

4.4.1 Vegetation classification

The CPVI layer contained polygon data for central Alberta (Figure 9). Three of the five types from the Field GEN_CLASS within the CPVI layer were converted to the natural vegetation types (Table 14). Water in CPVI layer was excluded and the Human Modified class in CPVI was backfilled.

Table 14: Vegetation types in Central Parkland Vegetation Inventory (CPVI)

Vegetation Type	Field GEN_CLASS in CPVI
Coniferous	N_Conif - all coniferous tree classes from "PNV_CODE" (N_Conif, and Coniferous)
Deciduous	N_Decid - all deciduous tree classes from "PNV_CODE" (N_Decid, Deciduous, and B_Decid)
Grass/Herb	N_Grass - Includes N_Grass and Island classes from "PNV_CODE" field
	Water - Includes Water and Wetland classes from "PNV_CODE"
	Human Modified - where the "PNV_CODE" had equaled " ".

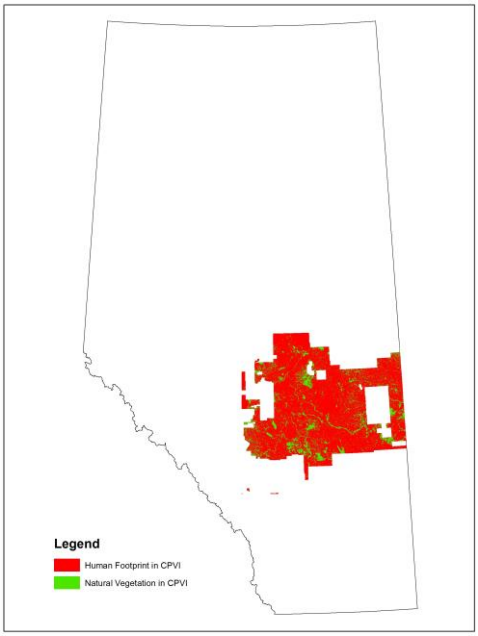

Figure 9 Extent of the Central Parkland Vegetation Inventory (CPVI) in Alberta showing natural vegetation types and human footprint

4.4.2 Pine Information

Information on pine was not available in CPVI. As a result, information from the Alberta Ground Cover Characterization (AGCC)[14] was used to assign pine vegetation types to this area (Figure 10).

1. A pine layer was created by selecting AGCC polygons coded as either '52' or '152'.
2. The boundary of CPVI was used to clip the AGCC pine layer to generate a new raster layer.
3. The clipped AGCC layer was converted from raster format to a vector layer.
4. Polygons >0.5 ha were selected from Step 3 and was clipped with Grassland and Parkland Natural Region boundaries to ensure no pine occurred within those Regions

[14] Source: Alberta Environment and Parks. Metadata URL: http://aep.alberta.ca/forms-maps-services/maps/resource-data-product-catalogue/biophysical.aspx

5. The layer in step 4 was added to the CPVI native vegetation layer. In areas where pine overlapped other native vegetation types, pine was assigned to the polygon.

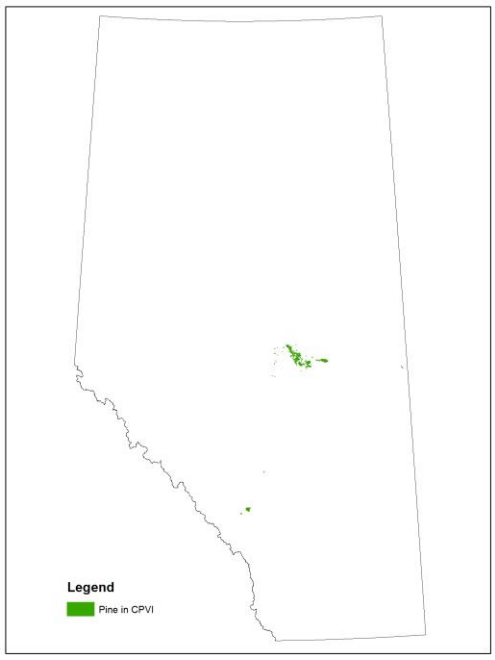

Figure 10 Extent of the pine from AGCC used in CPVI

4.4.3 Water boundaries

The open water polygons from the CPVI layer were not retained. Instead, the more detailed polygons obtained from the Government of Alberta Base Waterbody Polygon layer and Base Stream and Flow Representation linear layer were stamped onto the CPVI layer. The processing overwrote all vegetation types beneath the Base Water layers with Water. Water polygons from the original CPVI that fell outside of AB Base Water layer were reclassified based on neighbouring vegetation using the same procedure as the "linear" group in AVIE.

4.4.4 Natural polygons where vegetation type was not labeled correctly

A mask from the ABMI 2014 human footprint layer was created. This mask was overlaid on CPVI and polygons falling outside the mask that were labeled human footprint by CPVI were considered to be labeled incorrectly.

For the incorrectly labeled polygons, a "Multipart to Singlepart" GIS operation was run to make sure each polygon had a single unique corresponding record in the attribute table. The corrected natural vegetation type was determined by overlaying these polygons with information from other layers. Information from the ABMI Land Cover was used first. If native vegetation type still was not determined, then information from the Soil layer was used. If native vegetation type still was not determined, then the dominant vegetation type in that natural sub-region was used.

The Alberta Merged Wetland Inventory Layer had more detailed information for wetlands than CPVI. Thus, CWCS types bog, fen, swamp, marsh and open water were intersected into the CPVI layer, and these new polygons were labeled using the CWCS types except that open water was labelled as marsh.

4.4.5 Backfilling human disturbed polygons

The mask from the ABMI 2014 human footprint layer was overlaid on CPVI and all CPVI polygons falling within were treated as human footprint. A "Multipart to Singlepart" GIS operation was run to make sure each polygon had a single unique corresponding record in the attribute table.

Areas located within the mask were replaced with the vegetation types converted from the Soil layer (see Section 5.2 and Appendix 2 for detailed information for this layer). The CWCS layer was then overlaid and polygons of bog, fen, swamp, marsh and open water identified. These polygons were labeled based on the type from CWCS with the exception that open water was labeled as marsh.

4.4.6 Origin year and origin source

There was no information about polygon origin in CPVI. Therefore the historical wildfire history information was used to assign origin year to each polygon (see Section 4.1.5 for detail). Year 9999 was assigned to polygons that did not burn based on historical wildfire information.

4.4.7 Moisture regime

For most polygons MOIST_REG field was derived from the dominant natural site type in the soil layer (Table 13). For wetland polygons derived from the CWCS layer, MOIST_REG was labeled wet -derived.

4.4.8 Post cleaning

Polygons with area <100m^2 were eliminated by amalgamating with neighbouring polygons.

Ten columns were created in the GIS database to describe the source and backfilled information:

- Veg_Type – Vegetation and wetland classes
- General_Source – **CPVI** was assigned to all polygons created in this section
- PreBackfill_Source – Detailed source where the polygon boundary came from. Values are **CPVI**, or **CPVI** replaced with **Hydropoly** for water from Hydro layers.
- Backfill_Required - Type of disturbance being backfilled (with the code "None" when no backfilling was required)
- Backfill_Method - Method used during backfilling (with the code "None" when no backfilling was required)
- PostBackfill_Source - Source of information used in backfilling (with the codes CPVI or Hydropoly were copied to this column when no backfilling was required)

- Moisture_Reg – Moisture categories
- Moisture_Source – Source of moisture information
- Origin_Year – Year of last disturbance
- Origin_Source – Source of origin information

4.5 Information from the Wood Buffalo National Park Ecosite (WBNP)

4.5.1 Vegetation and wetland identification and classification

The ecosite layer of Wood Buffalo Nation Park (WBNP) was first converted from the original raster format into a polygon layer (Figure 11). The area that fell in the AVIE extent was then clipped because AVI information (see above) was applied here. The natural vegetation and wetland types in the WBNP ecosite layer were renamed into more general types (Table 15).

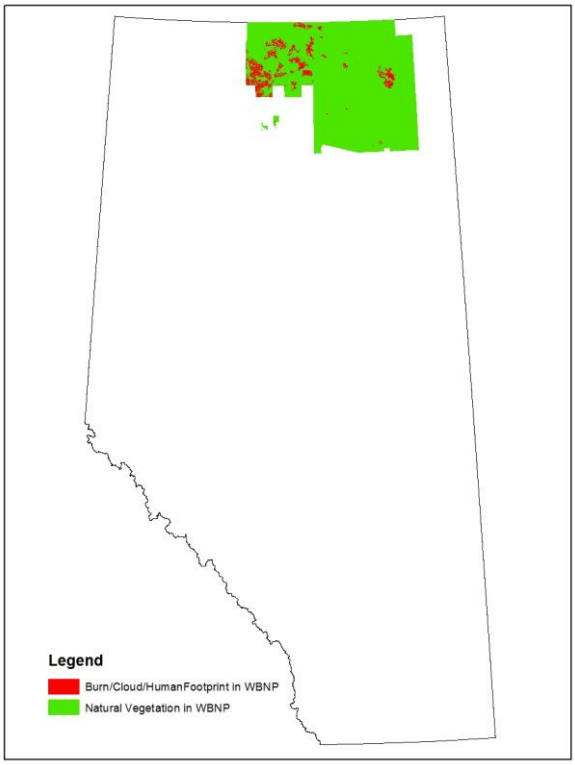

Figure 11 Extent of the Wood Buffalo National Park ecosite layer showing natural vegetation and Burn/Cloud/Human Footprint

Table 15: Crosswalk to convert Wood Buffalo National Park ecosite classes to simpler vegetation and wetland classes and moisture regimes.

Vegetation and wetland Type	Grid code	Ecosite	Moisture Regime derived

Swamp Shrub	5	Wetlands	wet-derived
Mud	6	Mud	wet-derived
Sand	7	Sand	dry-derived
Rock	8	Rock	dry-derived
Black spruce	20	Black Spruce	wet-derived
Jack pine	21	Jack Pine	dry-derived
White spruce	22	White Spruce	mesic-derived
Deciduous	23	Deciduous	mesic-derived
Deciduous	24	Deciduous Dominated	mesic-derived
Fen Shrub Poor	25	Shrubby Poor Fen	wet-derived
Fen Shrub Rich	26	Shrubby Rich Fen	wet-derived
Swamp Shrub	28	Dwarf Birch/Sedge/Willow	wet-derived
Swamp Shrub	29	Willow/Sedge	wet-derived
Swamp Shrub	30	Willow/Reed Grass	wet-derived
Fen Grass	31	Sedge Fen	wet-derived
Fen Grass	32	Reed Grass Fen	wet –derived
Grass/Herb	33	Rare true grasslands on solonetzic or chernozemic soils	dry-derived
Marsh	34	Cattail Wetlands	wet-derived
Marsh	35	Reed Grass Wetlands	wet-derived
Marsh	36	Bullrush na Wetlands	wet-derived
Bog - Black spruce	37	Sb-Pj hygric	wet-derived
Black spruce	38	Sb treed	wet-derived
Bog Tree	39	Treed Bog	wet-derived
Jack pine	40	Pj lichen	dry-derived
Jack pine	41	Pj-Sb	dry-derived
Jack pine	42	Pj-Aw blueberry	dry-derived
White spruce	43	Cranberry Sw	mesic-derived
White spruce	44	Dogwood Sw	mesic-derived
White spruce	45	Horsetail Sw	mesic-derived
White spruce	46	Sw-Pj	mesic-derived
Aspen	47	Aw(Bw) submesic	mesic-derived
Aspen	48	Aw cranberry	mesic-derived
Balsam popular	49	Pb-Aw dogwood	wet-derived
Balsam popular	50	Pb-Aw horsetail	wet-derived
Aspen	51	Aw-Sw blueberry	mesic-derived
Balsam popular	52	Aw-Sw cranberry	wet-derived
Balsam popular	53	Pb-Sw dogwood	wet-derived
Balsam popular	54	Pb-Sw horsetail	wet-derived
Fen Tree Rich	55	Treed rich fen	wet-derived
Fen Tree Poor	56	Treed poor fen	wet-derived
Bog Shrub	57	Shrubby Bog	wet-derived
Jack pine	60	Immature Jack Pine	dry-derived

4.5.2 Water boundaries

The open water polygons from the Wood Buffalo National Park ecosite layer were not kept. Instead, the more detailed polygons obtained from the Government of Alberta Base Waterbody Polygon layer and Base Stream and Flow Representation linear layer were stamped onto the WBNP layer. All vegetation types underlying the new open water boundaries were overwritten

with Water. All open water polygons from the original WBNP layer that fell outside of the new open water boundaries (i.e., from the Government of Alberta Base Layer Database) were reclassified based on the neighbouring vegetation type using the same procedure as the “linear” group in AVIE.

4.5.3 Natural polygons where vegetation type was not labeled appropriately

A few polygons of natural habitat had attributes that did not describe the type of vegetation present. Polygons where Ecosite was equal to Burn, Cloud, Cloud-shadow, and Unclassified were selected and assigned vegetation types based on Table 16. Note that these procedures used vegetation types from Phase 1, ABMI Land Cover, AGCC, and dominant vegetation type in that Natural Subregion.

Table 16: Re-labelling rules for the Wood Buffalo National Park ecosite layer.

Grid code	Ecosite	Backfilling Method
0 and 59	Unclassified	The big polygon masking the no-data area was excluded. Other small polygons were assigned with neighbouring vegetation type as “Linear” group in AVIE
9	Cloud	Assigned vegetation type using the same procedures as assigning natural polygons not labeled appropriately in AVIE
10	Cloud -shadow	Assigned vegetation type using the same procedures as assigning natural polygons not labeled appropriately in AVIE
19	Burn	Assigned vegetation type using the same procedures as assigning natural polygons not labeled appropriately in AVIE

4.5.4 Backfilling human disturbed polygons

The human footprint types in the WBNP ecosite layer were backfilled as described in Table 17.

Table 17: Backfilling rules for Wood Buffalo National Park ecosite layer.

Grid code	Ecosite	Backfilling Method
11	Water	Polygons outside of AB Base Waterbody and buffered Stream line layer were assigned vegetation types using the same procedures as “linear” group in AVIE
12	Urban	Backfilled with the same procedures as "others" group in AVIE
14	Access Major	Backfilled with neighboring vegetation type as “Linear” group in AVIE
16	Agricultural	Backfilled with the same procedures as "others" group in AVIE
18	Cut Block	Backfilled with the same procedures as "cutblock" group in AVIE
19	Burn	Backfilled with the same procedures as "others" group in AVIE
58	Cutlines	Backfilled with neighboring vegetation type as “Linear” group in AVIE

4.5.5 Origin year and origin source

There was no information about polygon origin in WBNP. Therefore the historical wildfire history information was used to assign origin year (see Section 4.1.5 for details). Year 9999 was assigned to polygons that did not burn based on historical wildfire information.

4.5.6 Moisture regime

Data for the MOIST_REG field was derived from the vegetation and wetland types in the ecosite layer. A crosswalk was developed to convert each vegetation and wetland type into a corresponding moisture regime (Table 15). For the polygons assigned vegetation type based on other sources (e.g., Phase 1, ABMI Land Cover, and dominant vegetation type in Natural Subregion), moisture regime was determined from the vegetation types (Table 5). For polygons derived from the Pine layer, moisture regime was assigned to dry-derived.

4.5.7 Post cleaning

Polygons with area <100m^2 were eliminated and amalgamated with neighbouring polygons.

Ten columns were created in the GIS database to describe the source and backfilled information:

- Veg_Type – Vegetation and wetland classes
- General_Source – **WBNP** was assigned to all polygons created in this section
- PreBackfill_Source – Detailed source where the polygon boundary came from. Values are **WBNP**, or **WBNP** replaced with **Hydropoly** for water from Hydro layers, or with **ABMIHF** for cutblocks
- Backfill_Required - Type of disturbance being backfilled (with the code "None" when no backfilling was required)
- Backfill_Method - Method used during backfilling (with the code "None" when no backfilling was required)
- PostBackfill_Source - Source of information used in backfilling (with the codes WBNP or Hydropoly were copied to this column when no backfilling was required)
- Moisture_Reg – Moisture categories
- Moisture_Source – Source of moisture information
- Origin_Year – Year of last disturbance
- Origin_Source – Source of origin information

4.6 Information from the Ecological Land Classification in Rocky Mountain National Parks (MTNP)

4.6.1 Vegetation and wetland identification and classification

The Ecological Land Classification layers of the Banff National Park, Jasper National Park and Waterton Lakes National Park were first combined into a single layer. Each ecosite polygon in the Ecological Land Classification layer had one to three vegetation types. The dominant vegetation type (i.e., the first vegetation code in the vegetation column of the attribute table) was used to assign the polygons into the vegetation and wetland type (Table 18). Un-vegetated ecosite polygons were assigned natural types based on Table 19.

Table 18: Crosswalk to convert Rocky Mountain National Park ecosite classes to simpler vegetation and wetland classes and moisture regimes

Vegetation and wetland Type	Vegetation Code in Ecological Land Classification Map	Description
Douglas fir	C01	Douglas fir/hairy wild rye
White spruce	C02	white spruce/fern moss
Lodgepole pine	C03	lodgepole pine/juniper/bearberry
White spruce	C04	white spruce/prickly rose/horsetail
White spruce	C05	white spruce-Douglas fir/feathermoss
Lodgepole pine	C06	lodgepole pine/buffaloberry/showy aster
Black spruce bog	C08	black spruce-lodgepole pine/willow/sedge
Lodgepole pine	C09	lodgepole pine/dwarf bilberry
Lodgepole pine	C10	lodgepole pine/green alder/feathermoss
Lodgepole pine	C11	lodgepole pine/feathermoss
Engelmann spruce	C12	Engelmann spruce-whitebark pine/false azelea
Engelmann spruce	C13	Engelmann spruce-subalpine fir/feathermoss
Engelmann spruce	C14	Englemann spruce-subalpine fir/false azalea
Engelmann spruce	C15	Englemann spruce-subalpine fir/grouseberry
Aspen	C16	aspen/hairy wild rye-peavine
Balsam popular	C17	balsam poplar/buffaloberry
Lodgepole pine	C18	lodgepole pine/buffaloberry/grouseberry
Lodgepole pine	C19	lodgepole pine/buffaloberry/twinflower
Lodgepole pine	C20	lodgepole pine/false azalea/grouseberry
Engelmann spruce	C21	Engelmann spruce-subalpine fir/tall bilberry/liverwort
Aspen	C22	aspen/hairy wild rye-showy aster
Subalpine larch	C23	subalpine larch-subalpine fir/grouseberry-everlasting
Engelmann spruce	C24	Engelmann spruce-subalpine fir/rock willow/white mountain heather
White spruce	C26	white spruce/buffaloberry/fern moss
White spruce	C27	whitespruce/prickly rose/fern moss
Balsam popular	C28	balsam poplar/horsetail
Lodgepole pine	C29	lodgepole pine/Labrador tea
Engelmann spruce	C30	Englemann spruce-subalpine fir/Labrador tea/crowberry
Engelmann spruce	C31	Englemann spruce-subalpine fir/hairy wild rye-heartleaf arnica-twinflower/feathermoss
Engelmann spruce	C32	Engelmann spruce/horsetail/feathermoss
Engelmann spruce	C33	Engelmann spruce/hairy wild rye
Engelmann spruce	C34	Engelmann spruce-subalpine fir/heather/feathermoss
Lodgepole pine	C35	lodgepole pine-(Engelmann spruce)/crowberry/lichen
Lodgepole pine	C36	lodgepole pine-white spruce/willow/hairy wild rye
White spruce	C37	whitespruce/buffaloberry/feathermoss
Aspen	C60	Populus tremuloides/Amelanchier alnifolia/Heracleum lanatum
Aspen	C61	Populus tremuloides/Rubus parviflorus
Aspen	C62	Populus tremuloides/Symphoricarpos occidentalis
Aspen	C63	Populus tremuloides/Urtica dioica
Douglas fir	C64	Pseudotsuga menziesii/Rubus parviflorus-Thalictrum occidentale-Arnica cordifolia
Lodgepole pine	C65	Pinus contorta/Arnica cordifolia-Spiraea betulifolia
Lodgepole pine	C66	Pinus contorta/Vaccinium membranaceum

Lodgepole pine	C67	Pinus contorta/Vaccinium myrtillus
Subalpine fir	C68	Abies lasiocarpa-(Pinus contorta)/Xerophyllum tenax
Engelmann spruce	C69	Picea engelmannii-Abies lasiocarpa-(Pseudotsuga menziesii)/Arnica cordifolia
Engelmann spruce	C71	Picea engelmannii-Abies lasiocarpa-(Pinus contorta)/Menziesia ferruginea/Arnica
Engelmann spruce	C72	Picea engelmannii-Abies lasiocarpa/Menziesia ferruginea/Vaccinium membranaceum
Engelmann spruce	C74	Picea engelmannii-Abies lasiocarpa/Menziesia ferruginea/fern
Subalpine larch	C75	Larix lyallii/Luzula hitchcockii
Black cottonwood	C76	Populus trichocarpa
Engelmann spruce	C78	Picea engelmannii/Equisetum arvense
Lodgepole pine	C79	Pinus contorta/Calamagrostis rubescens-Aster conspicuus
Herb	H01	mountain avens-snow willow-moss campion
Sedge	H02	black alpine sedge-everlasting
Sedge	H03	sedge-saxifrage
Herb	H04	mountain avens-kobresia-bearberry
Grass/Herb	H05	hairy wild rye-wild strawberry-fireweed
Grass/Herb	H06	junegrass-pasture sage-wild blue flax
Herb	H07	wheatgrass-pasture sage
Herb	H08	yellow dryad-willow herb
Herb	H09	mountain marigold-globeflower
Herb	H10	cottongrass/moss
Sedge fen	H11	water sedge-beaked sedge
Lichen	H12	Saxicolous lichen
Grass/Herb	H13	Richardson needlegrass-junegrass-everlasting
Grass/Herb	H14	hairy wild rye-junegrass-bearberry
Herb	H15	mountain avens-curly sedge
Herb	H16	fleabane-valerian
Grass/Herb	H19	bluebunch wheatgrass-hairy wild rye-showy aster
Herb	H20	spotted saxifrage-hairy wild rye
Grass/Herb	H24	Bromus inermis-Phleum pratense
Grass/Herb	H25	Danthonia spp.-Festuca scabrella-Koeleria macrantha
Grass/Herb	H27	Agropyron spicatum-Festuca scabrella
Grass/Herb	H28	Festuca scabrella-Arctostaphylos uva-ursi
Herb	H31	Senecio triangularis-Erigeron peregrinus
Herb	H37	Polemonium viscosum-Saxifraga spp
Grass	H42	Agropyron spicatum
Shrub	L01	shrubby cinquefoil/bearberry-northern bedstraw
Shrub	L02	juniper-willow
Shrub	L03	Potentilla fruticosa/forb
Shrub	L04	white mountain heather-mountain avens-snow willow
Shrub	L05	heather-everlasting
Shrub	L06	creeping juniper-northern wheatgrass-sedge
Shrub marsh	L07	arctic willow-cinquefoil
Limber pine	O02	limber pine-Douglas fir/juniper/bearberry
White spruce	O03	white spruce/shrubby cinquefoil/bearberry
Engelmann spruce	O04	Englemann spruce-subalpine fir-whitebark pine-lodgepole pine
Douglas fir	O05	Douglas fir/juniper/bearberry
Engelmann spruce bog	O06	Englemann spruce-supalpine fir/willow/ribbed bog moss
Spruce	O07	spruce/arrowgrass-sedge
Engelmann spruce	O09	Engelmann spruce-subalpine fir/valerian-fleabane
Engelmann spruce	O10	Engelmann spruce-subalpine fir/heather

Spruce bog	O11	spruce/Labrador tea/brown moss
Engelmann spruce	O12	Engelmann spruce-subalpine fir/rock willow/alpine bearberry
Engelmann spruce	O14	Engelmann spruce-subalpine fir/rock willow/bracted lousewort
Paper birch	O16	paper birch/bearberry
White spruce	O17	white spruce/juniper/bearberry
Engelmann spruce	O18	Engelmann spruce-subalpine fir/willow/hairy wild rye
Engelmann spruce	O19	Engelmann spruce-subalpine fir/mountain avens
Douglas fir	O25	Pseudotsuga menziesii-Pinus flexilis-Pinus contorta/Arctostaphylos uvaursi-Juniperus communis
Douglas fir	O26	Pseudotsuga menziesii-Pinus contorta/Arctostaphylos uva-ursi-Festuca scabrella
Limber pine	O27	Pinus flexilis/Arctostaphylos uva-ursi
Engelmanns	O28	Picea engelmannii-Abies lasiocarpa-Pinus albicaulis/Shepherdia canadensis
Engelmann spruce	O29	Picea engelmannii-Abies lasiocarpa/Luzula hitchcockii-herb
White bark pine	O30	Pinus albicaulis-Abies lasiocarpa/Luzula hitchcockii-Vaccinium myrtillus
White bark pine	O31	Pinus albicaulis-Picea engelmannii/Dryas octopetala
Subalpine fir	O32	Abies lasiocarpa/Valeriana sitchensis-Pedicularis bracteosa-Thalictrum occidentale
Shrub fen	S01	dwarf birch-shrubby cinquefoil-willow/brown moss
Shrub	S02	subalpine fir-willow
Shrub	S03	dwarf birch-shrubby cinquefoil/needlerush
Shrub	S04	willow-dwarf birch/fleabane
Shrub	S06	willow-green alder/bluebell
Shrub	S07	willow/horsetail
Shrub marsh	S08	willow/cinquefoil
Shrub	S09	dwarf birch-willow/kobresia
Shrub	S10	willow-dwarf birch-shrubby cinquefoil
Shrub	S11	willow/timber oatgrass
Shrub	S12	willow/hairy wild rye
Shrub	S13	Alnus crispa/fern
Shrub	S24	Betula glandulosa-Potentilla fruticosa-Salix spp./Carex spp
Shrub	S25	Salix glauca/herb

Table 19: Un-vegetated ecosite codes in the mountain national parks ecological land classification layer and the natural types assigned

Vegetation Type	Ecosite	Description
Bare	CL	Colluvial landslide, non soil or regosolic soil, sparsely vegetated
Bare	CR	Colluvial rubble, non soil or regosolic soil, unvegetated or sparsely vegetated
Glacier	GL	Glacier, non soil, unvegetated
Rock	M	Recent Moraine, non soil or regosolic soil, unvegetated or sparsely vegetated
Rock	R	Rockland, nonsoil, unvegetated or sparsely vegetated
Bare	RG	Rock Glacier.non soil or regosolic soil, unvegetated or sparsely vegetated
Bare	SC	Recent stream channel, regosolic soil and Gleysolic soil, unvegetated or sparsely vegetated
Rock	T	Talus, non soil or regosolic soil, unvegetated or sparsely vegetated
Water	ZZ	Water
Rock	M+GL	

Rock	R+CR	
Rock	R+GL	
Rock	R+T	
Rock	T+GL	
Rock	T+M	
Rock	T+RG	
Rock	M+R	

4.6.2 Water boundaries

The open water polygons (Ecosite ZZ) in MTNPs were combined with more detailed polygons obtained from the Government of Alberta Base Layers for hydropoly and stream lines. This detailed open water polygon layer was stamped onto the backfilled MTNP layer. The processing overwrote all vegetation types beneath the Base Water layers with Water, and kept the open water from MTNP that were outside of the Base Water layers.

4.6.3 Natural polygons where vegetation type was not labeled appropriately

All native polygons had vegetation type labeled appropriately.

4.6.4 Backfilling human disturbed polygons

A few polygons with ecosite type "P", which represented pits, quarries, and landfill sites, were backfilled with one neighbouring vegetation type chosen by referring to the satellite images. If there was only one neighboring type, that type was used. Otherwise, the dominant type around the polygon was chosen.

4.6.5 Origin year and origin source

There was no information about polygon origin in the MTNP data. Therefore the historical wildfire history information was used to assign origin year (see Section 4.1.5 for details). Year 9999 was assigned to polygons that did not burn based on historical wildfire information.

4.6.6 Moisture regime

Moisture regime was derived from the soil drainage information based on the crosswalk described in Table 20.

Table 20: Conversion from the soil drainage in the mountain national parks ecological land classification layer to moisture regime.

Soil Drainage	Ranges of Drainage	Description	ABMI Moisture Regime
2	2-3	Rapidly Drained	Xeric
3	2-4	Well Drained	Sub-Mesic
4	3-4	Moderately Well Drained	Mesic
5	4-6	Imperfectly Drained	Hygric

6	5-6, 5-7	Poorly Drained	Sub-Hydric
7	6-7	Very Poorly Drained	Hydric

Rock or Bare polygons without drainage information were assigned Xeric-derived. Glacier polygons without drainage information were assigned Mesic-derived.

4.6.7 Post cleaning

Polygons with area <100m^2 were amalgamated with neighbouring polygons.

Ten columns were created in the GIS database to describe the source and backfilled information:

- Veg_Type – Vegetation and wetland classes
- General_Source – **MTNP** was assigned to all polygons created in this section
- PreBackfill_Source – Detailed source where the polygon boundary came from. Values are **MTNP**, or **MTNP** replaced with **Hydropoly** for water from Hydro layers
- Backfill_Required - Type of disturbance being backfilled (with the code "None" when no backfilling was required)
- Backfill_Method - Method used during backfilling (with the code "None" when no backfilling was required)
- PostBackfill_Source - Source of information used in backfilling (with the codes MTNP or Hydropoly were copied to this column when no backfilling was required)
- Moisture_Reg – Moisture categories
- Moisture_Source – Source of moisture information
- Origin_Year – Year of last disturbance
- Origin_Source – Source of origin information

4.7 Information from Phase 1 (Broad Scale) Forest Inventory (Phase 1)

4.7.1 Vegetation and wetland identification and classification

Vegetation outside the extents of AVI/EINP, PLVI, GVI, CPVI, WBNP and MTNP was determined based on Phase1 (Figure 12) and its six natural vegetation types (Table 20).

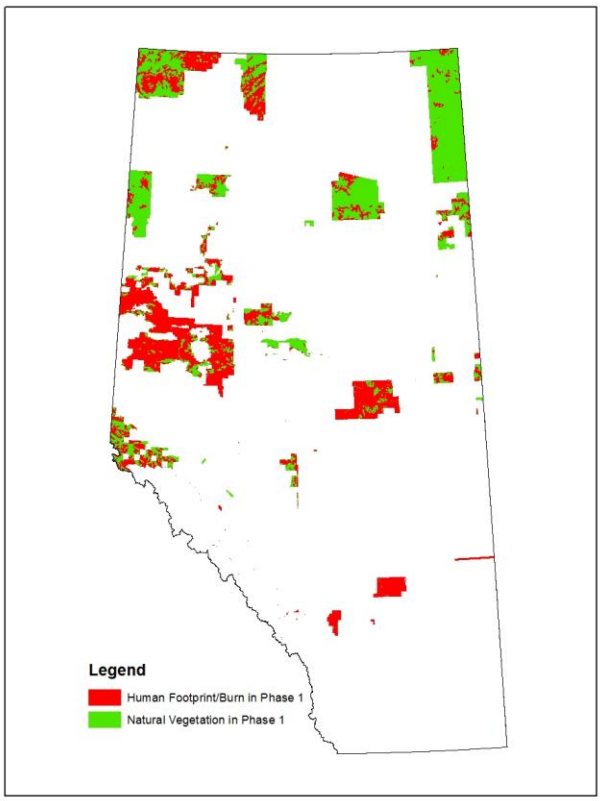

Figure 12 Extent for which Phase 1 was used as the base vegetation source, Natural vegetation and human footprint are shown for these areas.

Table 21 Phase I layer classes and merging rules for the natural vegetation and wetland types.

Vegetation and wetland Type	Phase 1 Class	Description
(Backfilled from other sources)	10	Agriculture and other improved lands
(Determined from other sources)	14	Barren above timberline
(Determined from other sources)	7	Burns - 1941 to 1957 inclusive
Coniferious	2	Coniferous stands over 60’ height
Coniferious	1	Coniferous stands up to 60' height
Deciduous	6	Deciduous stands over 60' height
Deciduous	5	Deciduous stands up to 60' height
(Backfilling from other sources)	15	Indian Reserves
Water	16	Lakes and Rivers
Mixedwood	4	Mixedwood stands over 60' height
Mixedwood	3	Mixedwood stands up to 60' height
MuskegMarsh	11	Muskeg and Marsh
(Does not exist in current extent)	17	National Park
(Determined from other sources)	9	Old burn - productive and non-productive
(Determined from other sources)	8	Old burn and bushland
RockBarren	12	Rock barren

Information on pine was not available for Phase 1 and therefore information from the Alberta Ground Cover Characterization (AGCC; Figure 13) was used to assign pine vegetation types to Phase 1 natural layer using the same procedure as in section 4.4.2.

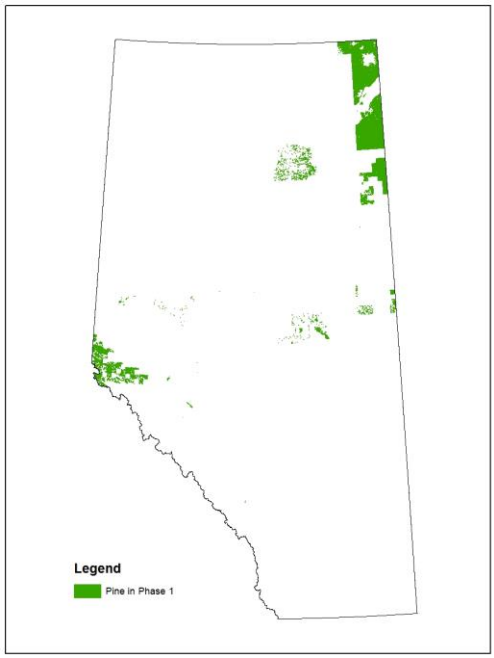

Figure 13 Extent of pine from AGCC used for Phase 1.

4.7.2 Water boundaries

The open water polygons from the Phase 1 layer were not retained. Instead, the more detailed polygons obtained from the Government of Alberta Base Waterbody Polygon layer and Base Stream and Flow Representation linear layer were stamped onto the Phase 1 layer. The processing overwrote all vegetation types beneath the Base Water layers with Water. Water polygons from the original Phase 1 that fell outside of AB Base Water layer were assigned a neighbouring vegetation type using the same procedure as the "linear" group in AVIE.

4.7.3 Natural polygons where vegetation type was not labeled appropriately

Burns (classes 7, 8, and 9) and Barren above timberline (class 14) had attributes that did not describe the type of vegetation present. In addition, human footprint falling outside of ABMI 2014 human footprint layer was an error.

A mask from the ABMI 2014 human footprint layer was created. This mask was overlaid on Phase 1, and any Phase 1 human footprint (Classes 10 and 15) polygons falling outside the mask were identified. In addition, Burns and Barren above timberline polygons were identified.

A “Multipart to Singlepart” GIS operation was run to make sure each polygon had a single unique corresponding record in the attribute table. The corrected natural vegetation type was determined by overlaying these polygons with information from other layers. Information from the ABMI Land Cover was used first. If native vegetation type still was not determined, then information from the Soil layer was used. If native vegetation type still was not determined, then the dominant vegetation type in that natural sub-region was used.

The Alberta Merged Wetland Inventory Layer had more detailed information for wetlands than Phase 1. Thus, CWCS types bog, fen, swamp, marsh and open water were intersected into the Phase 1 layer, and these new polygons were labeled using the CWCS types except that open water was labelled as marsh.

4.7.4 Backfilling human disturbed polygons

The mask from the ABMI 2014 human footprint layer was overlaid on Phase 1, and all Phase 1 polygons falling within were treated as human footprint. A “Multipart to Singlepart” GIS operation was run to make sure each polygon had a single unique corresponding record in the attribute table.

Areas located within the mask were replaced with the vegetation types converted from other layers. Information from the Alberta Merged Wetland Inventory was used first and polygons of bog, fen, swamp, marsh and open water included (with open watre relabeled to marsh). If native vegetation type still was not determined, Information from the ABMI Land Cover was used. If native vegetation type still was not determined, then information from the Soil layer was used. If native vegetation type still was not determined, then the dominant vegetation type in that natural sub-region was used.

For cutblock polygons, only forested types were assigned. For all other polygons any native vegetation type could be assigned.

4.7.5 Origin year and origin source

There was no information about polygon origin in Phase 1. Therefore the historical wildfire history information was used to assign origin year (see Section 4.1.5 for detail). Year 9999 was assigned to polygons that did not burn based on historical wildfire information.

4.7.6 Moisture regime

No moisture regime information was available in Phase 1. If the polygon was derived from the Alberta Merged Wetland Inventory, moisture regime was assigned as wet -derived. For vegetation information derived from ABMI Land Cover, or dominant vegetation type in Natural Subregion), moisture regime was determined based on soil type (Table 13). If the polygon did not overlap the soil layer, the moisture regime was determined based on vegetation types in Table 5. Pine polygons were assigned a MOIST_REG of dry-derived.

4.7.7 Post cleaning

Polygons with area <100m^2 were amalgamated with neighboring polygons.

Ten columns were created in the GIS database to describe the source and backfilled information:

- Veg_Type – Vegetation and wetland classes
- General_Source – **Phase1** was assigned to all polygons created in this section
- PreBackfill_Source – Detailed source where the polygon boundary came from. Values are **Phase1**, or **Phase1** replaced with **Hydropoly** for water from Hydro layers
- Backfill_Required - Type of disturbance being backfilled (with the code "None" when no backfilling was required)
- Backfill_Method - Method used during backfilling (with the code "None" when no backfilling was required)
- PostBackfill_Source - Source of information used in backfilling (with the codes Phase1 or Hydropoly were copied to this column when no backfilling was required)
- Moisture_Reg – Moisture categories
- Moisture_Source – Source of moisture information
- Origin_Year – Year of last disturbance
- Origin_Source – Source of origin information

5 SUPPLEMENTARY INFORMATION

Supplementary data were added to the attribute table for each polygon to aid ABMI analyses. The supplementary data included information on wetland, soil type, presence of larch, Natural Regions and Subregions, and Hydrologic Unit Code (HUC).

5.1 Alberta Merged Wetland Inventory

The Alberta Merged Wetland Inventory[15] (Figure 14) is a polygon layer with five classes of wetland defined according to the Canadian Wetland Classification System (CWCS)[16]: bog, fen, swamp, marsh, and open water.

This layer combined data from four sources:

1. Ducks Unlimited Canada (DUC)-Boreal Enhanced Wetland Classification System (EWC). The minimum mapping unit was 1 ha.
2. Landsat-Canadian Wetland Classification System (CWCS). The minimum mapping unit was 1 ha.
3. SPOT (Systeme Pour l'Observation de la Terre) with wetland types named based on the Grassland Vegetation Inventory (GVI) Lentic Classification system. The minimum mapping unit was 0.04 ha.
4. High resolution (1:15,000 to 1:30,000 scale) air photography. The minimum mapping unit was 0.02 ha.

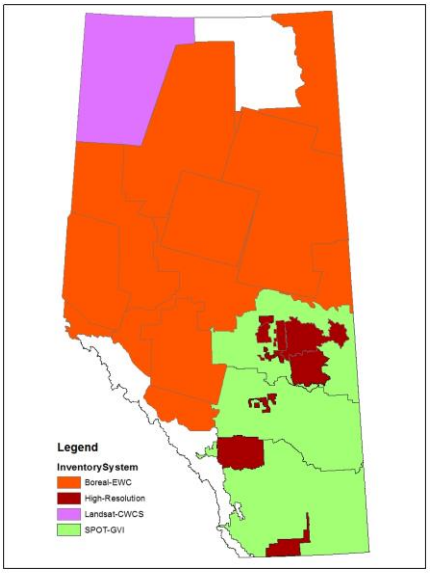

Figure 14 Source of wetlands information contained within the Alberta Merged Wetland Inventory layer.

[15] Source: Environment and Parks, Government of Alberta; Metadata URL: http://aep.alberta.ca/forms-maps-services/maps/resource-data-product-catalogue/biophysical.aspx

[16] National Wetlands Working Group. 1997. The Canadian Wetland Classification System, 2nd Edition. Warner, B.G. and C.D.A. Rubec (eds.), Wetlands Research Centre, University of Waterloo, Waterloo, ON, Canada. 68 p.

The information in the fields of CWCS_Class and Extent of the original layer was stored in the field of CWCS_CLASS and CWCS_EXTENT in the ABMI Vegetation layer respectively.

5.2 Soil Type

A layer that described the soil type in the Grassland, Parkland and Dry Mixedwood Natural Regions/Subregions was created by ABMI[17]. This soil information was used to determine moisture conditions (Table 13) and type of natural vegetation to be backfilled into cultivated and developed areas (Appendix 2). Soil types were named based on GVI site types. Overall, there were six wetland and eighteen natural upland soil types/GVI site types (24 types in total; see Table 21).

Table 22 Soil Types from the Grassland Vegetation Inventory (GVI) layer

Primary Class	Land Sub-Class	Site Type	Description	Soil Type Code
Open Water	Lentic	Standing water	Permanent open standing-water with no emergent vegetation, generally larger than 1.0 ha and >15 cm deep.	LenW
	Lotic	River	Open water of rivers, generally rivers wider than 20 m.	LtcR
Native / Natural Lentic	Lentic	Temporary	Water present <3 weeks (dry by July) <15 cm deep.	LenT
		Seasonal	Water usually present >3 weeks (usually dry by July) >15 cm deep.	LenS
		Alkali	Water present >3 weeks and >15 cm deep	LenA
		Semi-Permanent to Permanent	Throughout the year except during periods of extreme drought (present in autumn in 70% of the years); often occurs adjacent to LenW; includes the march zones; water is generally >15 cm deep; if open water is present it is smaller than 1.0 ha	LenSP
Native / Natural Lotic	Lotic	Coniferous	Coniferous trees with a combined canopy cover of greater than 25%.	LtcC
		Deciduous	Deciduous trees with a combined canopy cover of greater than 25%.	LtcD
		Shrub	Shrubs have a combined cover of at least 10%.	LtcS
		Herbaceous	Herbaceous species (including sedges) have a combined cover of at least 5%.	LtcH
Native / Natural Grassland	Grassland	Subirrigated	Water table is close to surface during growing season, but rarely above. Does not have a defined depressional edge.	Sb
		Overflow	Areas subject to water spreading and sheet flow. Typically on gentle inclines or terraces above the frequent flood zone. For locations where flood frequency is less than once every ten years.	Ov
		Clayey	Clayey-textured soils including silty clay, sandy clay, clay, and heavy clay. Generally >40% clay.	Cy
		Loamy	Includes loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam.	Lo
		Sandy	Sandy-loam-textured soils.	Sy
		Limy	Eroded or immature soils with free lime ($CaCO_3$) at the soil surface. Soil pH generally >7.5.	Li
		Sand	Loamy sand and sand soils, and not with a duned surface.	Sa
		Blowouts/ Solonetzic Order	Areas with Solonetzic (hardpan) soils. The surface may or may not have eroded pits.	BlO
		Choppy Sandhills	Loamy sand and sand soils with a duned land surface.	CS

[17] For details of the layer, please see the descriptions at: http://species.abmi.ca/pages/geospatial/soil-abmi.html

Primary Class	Land Sub-Class	Site Type	Description	Soil Type Code
		Thin Breaks	Areas with bedrock at or near the soil surface. Amount of vegetation is intermediate between Limy and Badlands. TB may include thin, eroded or immature soils on gentle to steep slopes.	TB
		Shallow to Gravel	Soil with 20 to 50 cm of a sandy or loamy surface overlying a gravel or cobble- rich substrate.	SwG
		Saline Lowland	Areas with negligible vegetation due to electrical conductivity (salts) and/or sodium adsorption ratio limitations.	SL
		Gravel	Dominated by gravels or cobbles (>50% coarse fragments). May be covered by a mantle <20 cm thick with some gravels.	Gr
		Badlands/ Bedrock	Nearly barren or barren lands, with exposures of soft rock, hard rock, or surficial geology. Includes steep valley walls.	BdL

The ABMI Soil layer was combined from two sources (Figure 15):

1. A soil polygon layer that has fewer attribute details, but higher spatial resolution (scale 1:50,000) from the Government of Alberta. This higher resolution layer was interpreted from remote sensed images with little or no ground-truthing. This layer was in a geodatabase[18] that provided the soil type information across eleven map units, each with a single layer. The 11 map layers were cleaned and merged into a single layer.
2. The Agricultural Region of Alberta Soil Inventory Database (AGRASID 30)[19]. AGRASID had lower resolution (scale 1:100,000) but provided seamless GIS coverage and relational data files that described the soil landscapes for the agricultural areas of Alberta. The soil types in the areas outside of the boundaries of the higher spatial resolution (#1 above) were derived from AGRASID 30 based on soil name and soil correlation area by Ron McNeil from LandWise Inc[20].

Only natural soil types were included in the ABMI's soil layer. For polygons where natural soil type was missing, ABMI used historical information where possible (McNeil 2014). When historical information was not available ABMI used topography information from the surrounding area to assign natural soil types.

The soil type information was stored in the field of Soil_Type in the ABMI Vegetation layer.

[18] The geodatabase ("GVI_sitetypes_from_soils.gdb") was provided by O. Castelli from SRD in Lethbridge, AB.
[19] Downloaded from: http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/All/sag14653
[20] The crosswalks used to convert AGRASID information to GVI soil type were described in Excel tables and can be found at: http://species.abmi.ca/pages/geospatial/soil-abmi.html

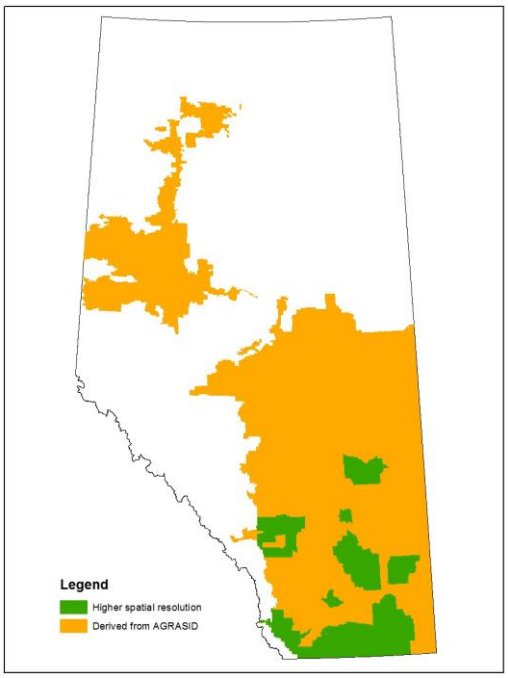

Figure 15 Sources of the Alberta Biodiversity Monitoring Institute soil layer.

5.3 Larch

Information regarding the location of Western larch and Tamarack throughout Alberta was obtained from three sources: AVIE, PLVI, and GVI. Data from the AVIE were preferentially used in areas where it was available. No larch information available in the extent of CPVI, MTNP, WBNP, and Phase 1.

Polygons in the AVIE layer in which PCT_LT>0 or PCT_LW>0 and UPCT_LT>0 or UPCT_LW>0 (if understory was dominant) were selected, and the values were summed. Polygons in the PLVI layer with the LEAD_SP1= Lt or LEAD_SP2=Lt or LEAD_SP3=Lt were selected, and value 8 was coded (i.e., corresponding to a polygon comprised of 80% Larch). Polygons in the extended GVI layer with Lt>0 or Lw>0 or L>0 were selected, and the values were summed.

The selected polygons from AVIE were stamped onto the polygons from PLVI and then on the polygons from GVI to create the combined Larch layer (Figure 16). The information was stored in the field of PCT_L in the ABMI Vegetation layer.

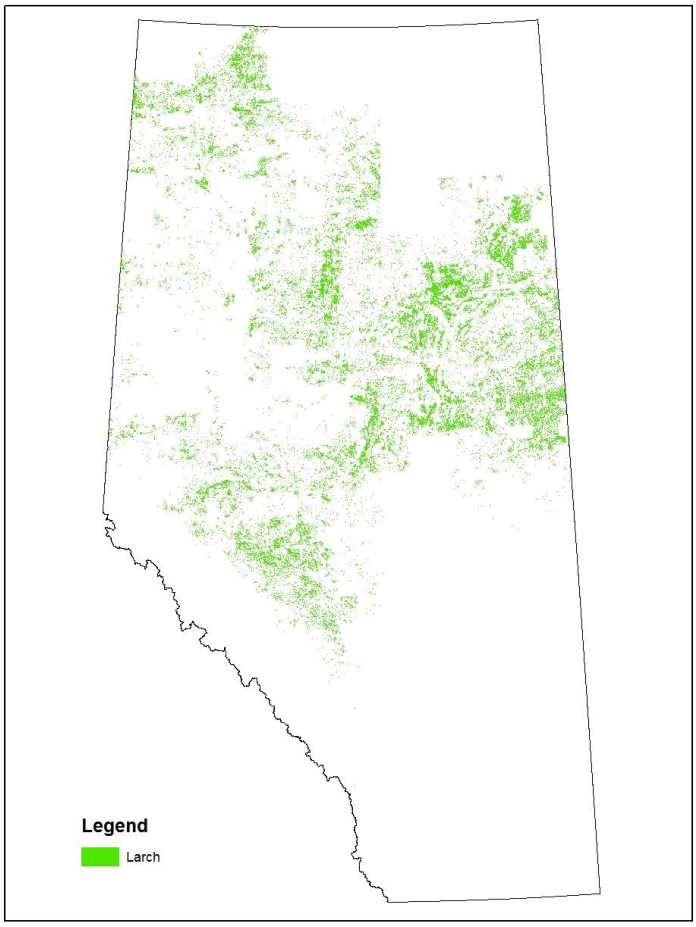

Figure 16 Extent of Larch data from AVIE, PLVI and GVI

5.4 Natural Regions and Subregions

The layer of Natural Regions and Subregions of Alberta (2005; Figure 17)[21] was overlaid on the backfilled layer to assign these values to each polygon. The information in the fields of NSRNAME and NRNAME of the original Natural Regions and Subregions Layer of Alberta were added as new fields in the ABMI Vegetation layer.

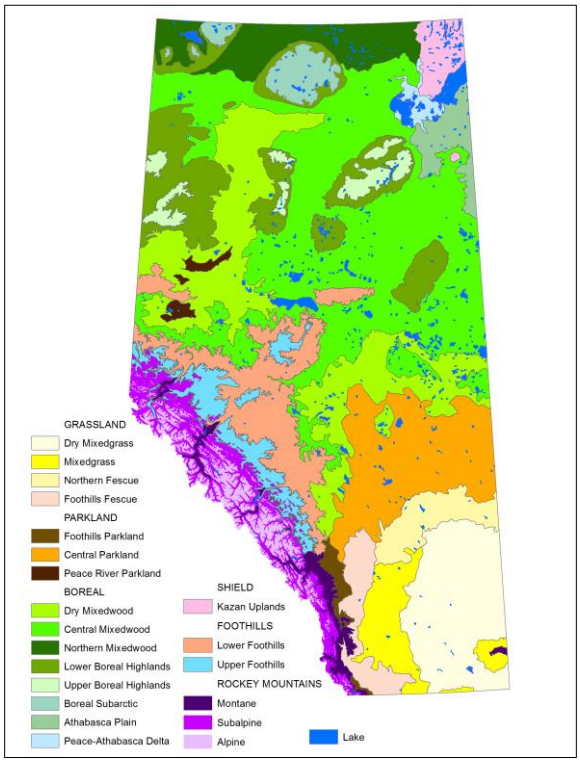

Figure 17 The Natural Regions and Subregions of Alberta.

5.5 Land-Use Framework Regions

The Alberta Land-use Framework Regional Boundary layer[22] (Figure 18) was overlaid on the vegetation layer to assign the land-use framework region name to each polygon. The information was stored in field LUF_NAME in the Vegetation layer.

[21] Source: Alberta Environment and Parks. URL for downloading http://www.albertaparks.ca/albertaparksca/library/downloadable-data-sets/
[22] Source: Alberta Environment and Parks. URL for downloading https://www.landuse.alberta.ca/PlanForAlberta/Pages/default.aspx

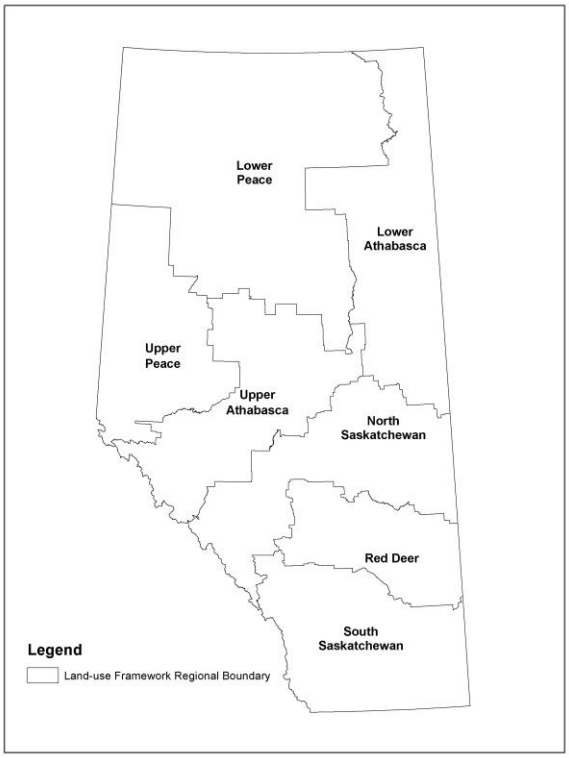

Figure 18 Land-use Framework Regional Boundaries.

5.6 Hydrologic Unit Code (HUC) Watersheds

The layers of Hydrologic Unit Code (HUC) Watersheds of Alberta V2 (2015; Figure 19) represented nested drainage basins based on the United States Geological Survey (USGS) Hydrologic Unit Code with accommodation to reflect the pre-existing Canadian classification system[23]. The HUC8 layer was overlaid on the vegetation layer to assign all levels of HUCs to each polygon.

The information in the fields of HUC_8, and BASIN of the original HUC8 Layer were stored as two new fields with the same name in the vegetation layer.

[23] Source: Alberta Environment and Parks. URL for metadata: http://aep.alberta.ca/forms-maps-services/maps/resource-data-product-catalogue/hydrological.aspx

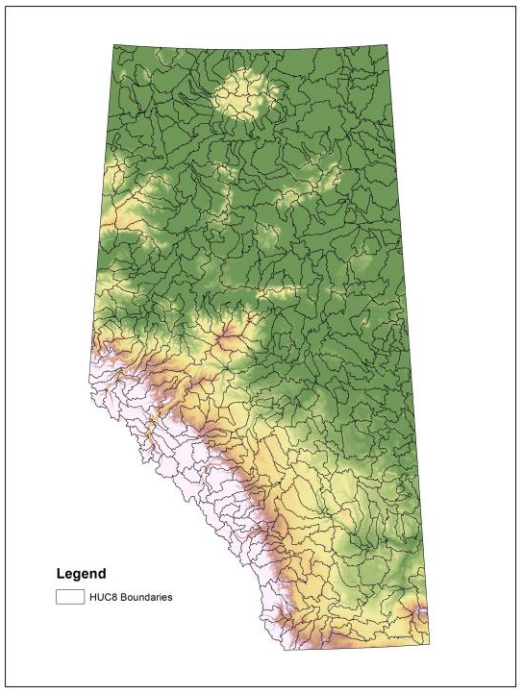

Figure 19 The Hydrologic Unit Code (HUC) Watersheds of Alberta (HUC8, Version 2, 2015).

5.7 Green/White Area

The Green/White Area[24] was extended to cover the whole Alberta. National parks that were outside the original boundary were labeled as Green Area, and a small area in the foothills of southwestern Alberta was included as White Area (Figure 20). The information was stored in field GWA_NAME in the Vegetation layer.

[24] Source: Alberta Environment and Parks. URL for download: http: //www.altalis.com/products/base/20k_base_features.html

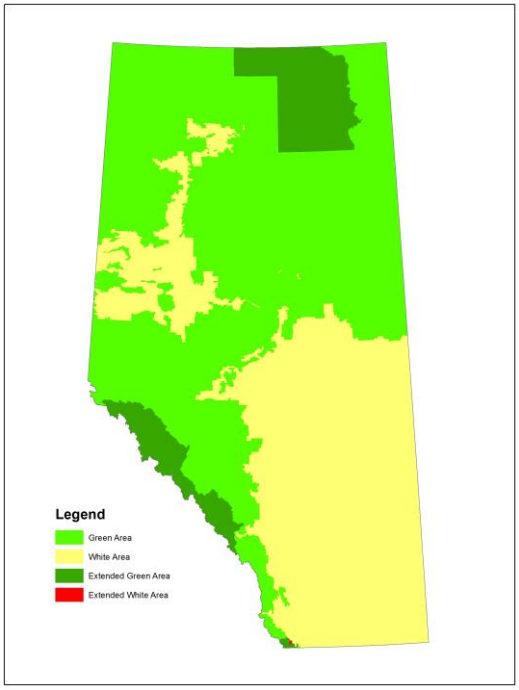

Figure 20 Extended Green/White Area of Alberta

5.8 Generalized Habitat Type

For internal analysis, ABMI developed a rule-set to create the generalized habitat types from the columns of Veg_Type, Moisture_Reg, PreBackfill_Source, and CWCS_Class. The total 29 habitat types are stored in the column of Combined. These habitat types are: Alkali, AlpineLarch, Bare, Decid, Fir, GraminoidFen, GrassHerb, Marsh, Mixedwood, Pine, Shrub, ShrubbyBog, ShrubbyFen, ShrubbySwamp, SnowIce, Spruce, TreedBog-BSpr, TreedFen-BSpr, TreedFen-Decid, TreedFen-Larch, TreedFen-Mixedwood, TreedSwamp-Conif, TreedSwamp-Decid, TreedSwamp-Fir, TreedSwamp-Forest, TreedSwamp-Mixedwood, TreedSwamp-Spruce, TreedWetland-Mixedwood, and Water.

The rules describing how generalized habitat types were derived are described in APPENDIX 4.

6 HUMAN FOOTPRINT

Human footprint refers to the areas of Alberta that have lost their natural vegetation cover (permanently or temporarily) due to human activities (e.g., cities, roads, agricultural land, industrial areas, forestry, seismic lines, or surface mining). The ABMI created a GIS polygon layer that contained all human footprints in Alberta up to December 31, 2014 (i.e., ABMI 2014 Human Footprint Layer; Version 1)[25]. This layer was assembled from 21 human footprint sub-layers; each representing one single group of human footprint types. Human footprint information was stored in the Field FEATURE_TY.

The 21 human foot print sub-layers were combined into 8 broad human footprint groups (Table 23). These 8 human footprint groups sometimes overlapped each other, and thus each of the group was "stamped" as an individual layer in the ABMI Vegetation layer creating 2 additional fields for each group, one for the human footprint type and one for the year created. Total 16 fields were created for the 8 human footprint groups. For example, for Type CUTBLOCK, it was stored in the Field MineCFOAgCutblock, and the harvest year was stored in the Field Year_MineCFOAgCutblock.

Table 23 Eight groups combined from 21 ABMI 2014 Human Footprint Sub-layers

HF Group	HF Sub-Layer
HydroHF	Reservoirs
	Borrow Pits, Sumps, Dugouts and Lagoons
	Canals
RoadRail	Non-Vegetated Impermeable Surfaces (Roads)
	Rail Lines Hard Surface
	Vegetated Surfaces of Roads, Trails and Railways
	Disturbed Vegetation (Less than 100m to the roads)
MineCFOAgCutblock	Mine Sites
	CFO and other High Density Livestock
	Cultivation
	Cut Blocks
IndHighLowWindM	Industrial Sites
	Wind Generation Facility
Well	Well Sites (Energy) ACTIVE
	Well Sites (Energy) ABANDONED
LandFRecRes	Landfill
	Recreation and Other Vegetated Facilities
	Urban and Rural Residential
	Disturbed Vegetation (Greater than 100m to the roads)
TransPipe	Transmission Lines
	Pipelines
Cutline	Seismic Lines

[25] The ABMI Human Footprint Layers may be download at: http://www.abmi.ca/home/data/gis-data/human-footprint-download.html?scroll=true

7 ATTRIBUTE TABLE DEFINITIONS

The ABMI Vegetation layer is available in two versions: 1) Vegetation only, 2) Vegetation + HF. Each version is with two formats: a) a single layer that spans all of Alberta, and b) a tiled version.

Veg_Type

Definition: Backfilled vegetation and wetland classes

Values: Categorical; Lodgepole pine, Lodgepole pine MixC, Lodgepole pine MixCD, Lodgepole pine MixDC, Lodgepole pine MixWet, Lodgepole x Jack pine, Lodgepole x Jack pine MixC, Lodgepole x Jack pine MixCD, Lodgepole x Jack pine MixDC, Lodgepole x Jack pine MixWet, Jack pine, Jack pine MixC, Jack pine MixCD, Jack pine MixDC, Jack pine MixWet, White-bark pine, White-bark pine MixC, White-bark pine MixCD, White-bark pine MixDC, White-bark pine MixWet, Limber pine, Limber pine MixC, Limber pine MixCD, Limber pine MixDC, Limber pine MixWet, Western white pine, Western white pine MixC, Western white pine MixCD, Western white pine MixDC, Western white pine MixWet, Pine spp, Pine spp MixC, Pine spp MixCD, Pine spp MixDC, Pine spp MixWet, Black spruce, Black spruce MixC, Black spruce MixCD, Black spruce MixDC, Black spruce MixD, White spruce, White spruce MixC, White spruce MixCD, White spruce MixDC, White spruce MixWet, Engelmann spruce, Engelmann spruce MixC, Engelmann spruce MixCD, Engelmann spruce MixDC, Engelmann spruce MixWet, Engelmann x White spruce, Engelmann x White spruce MixC, Engelmann x White spruce MixCD, Engelmann x White spruce MixDC, Engelmann x White spruce MixWet, Spruce spp, Spruce spp MixC, Spruce spp MixCD, Spruce spp MixDC, Spruce spp MixWet, Balsam fir, Balsam fir MixC, Balsam fir MixCD, Balsam fir MixDC, Balsam fir MixWet, Alpine fir, Alpine fir MixC, Alpine fir MixCD, Alpine fir MixDC, Alpine fir MixWet, Fir spp, Fir spp MixC, Fir spp MixCD, Fir spp MixDC, Fir spp MixWet, Douglas fir, Douglas fir MixC, Douglas fir MixCD, Douglas fir MixDC, Douglas fir MixWet, Douglas fir spp, Douglas fir spp MixC, Douglas fir spp MixCD, Douglas fir spp MixDC, Douglas fir spp MixWet, Western larch, Western larch MixC, Western larch MixCD, Western larch MixDC, Western larch MixD, Tamarack, Tamarack MixC, Tamarack MixCD, Tamarack MixDC, Tamarack MixD, Larch spp, Larch spp MixC, Larch spp MixCD, Larch spp MixDC, Larch spp MixD, Hemlock, spp, Hemlock spp MixC, Hemlock spp MixCD, Hemlock spp MixDC, Hemlock spp MixWet, Manitoba maple, Manitoba maple MixD, Manitoba maple MixDC, Manitoba maple MixCD, Manitoba maple MixWet, Maple spp, Maple spp MixD, Maple spp MixDC, Maple spp MixCD, Maple spp MixWet, White birch, White birch MixD, White birch MixDC, White birch MixCD, White birch MixWet, Alaska birch, Alaska birch MixD, Alaska birch MixDC, Alaska birch MixCD, Alaska birch MixWet, Birch spp, Birch spp MixD, Birch spp MixDC, Birch spp MixCD, Birch spp MixWet, Narrow leaf cottonwood, Narrow leaf cottonwood MixD, Narrow leaf cottonwood MixDC, Narrow leaf cottonwood MixCD, Narrow leaf cottonwood MixWet, Balsam poplar, Balsam poplar MixD, Balsam poplar MixDC, Balsam poplar MixCD, Balsam poplar MixWet, Plains cottonwood, Plains cottonwood MixD, Plains cottonwood MixDC, Plains cottonwood MixCD, Plains cottonwood MixWet, Poplar spp, Poplar spp MixD, Poplar spp MixDC, Poplar spp MixCD, Poplar spp MixWet, Trembling aspen,

Trembling aspen MixD, Trembling aspen MixDC, Trembling aspen MixCD, Trembling aspen MixWet, Lance leaf cottonwood, Lance leaf cottonwood MixD, Lance leaf cottonwood MixDC, Lance leaf cottonwood MixCD, Lance leaf cottonwood MixWet, Drummond's willow, Drummond's willow MixD, Drummond's willow MixDC, Drummond's willow MixCD, Drummond's willow MixWet, Shrub, Grass/Herb, Badlands/Bedrock, Saline lowland, Lentic MixCifer, Lentic MixDiduous, Lentic mixedwood, Lentic Shrub, Lentic Herb, Alkali, Lotic MixCifer, Lotic MixDiduous, Lotic mixedwood, Lotic Shrub, Lotic Herb, Water, Coniferous, Deciduous, Mixedwood, MuskegMarsh, Swamp Shrub, Mud, Sand, Rock, Fen Shrub Poor, Fen Shrub Rich, Fen Grass, Marsh, Bog-Black spruce, Bog Tree, Herb, Sedge, Lichen

General_Source

Definition: General source layer for the vegetation information
Values: Categorical. AVIE, PLVI, GVI, CPVI, WBNP, MTNP, Phase1

PreBackfill_Source

Definition: Detailed source layer for the vegetation information
Values: Categorical. AVIE, EINP, GVI, PLVI, CPVI, WBNP, MTNP, Phase1, ABMILC, SOIL, Hydro, ABMICutblock, AGCCPine

Backfill_Required

Definition: Type of disturbance being backfilled
Values: Categorical. CIP, CIW, CA, CP, CPR, ASC, ASR, AIE, AIF, AIG, AIH, AII, AIM, CC, CL, SI, SC, PL, TH, NWF, NMC, NMS, NMB, CR from AVIE and PLVI. HFGt20Pct from GVI, HF from CPVI and Phase1. 0, 59, 9, 10, 11, 12, 14, 16, 18, 19, 58 from WBNP. P from MTNP. Cutblock2014 from HF2014. CWCS for the polygons from Alberta Merged Wetland Layer. With the code “None” when no backfilling was required.

Backfill_Method

Definition: Method used during backfilling
Values: Categorical. Dom80YrsOlderUplandForInBuf50m, DomInBuf50m, Nearest80YrsOlderUplandForIn2km, NearestUplandFor, DomLowlandIn2km, NearestLowlandIn2km, NearestNonTreeTypeIn2km, OwnVegType, SiteType1, SiteType2, SiteType3, FromOtherSourceLayer. With the code “None” when no backfilling was required

PostBackfill_ Source

Definition: Source of information used in backfilling
Values: Categorical. AVIE, EINP, GVI, PLVI, CPVI, WBNP, MTNP, CWCS, Phase1, ABMILC, Soil, DomInNatSub, DomUpForInNatSub.

Moisture_Reg

Definition: Moisture regime information from AVIE, EINP, PLVI, MTNP, and those derived from GVI site type, Soil type and vegetation type
Values: Categorical values. a, m, w, d, a-derived, m-derived, w-derived, d-derived from AVIE and EINP. Xeric, Sub-Mesic, Mesic, Hygric, Sub-Hydric, Hydric from MTNP.

dry-derived, mesic-derived, wet-derived from WBNP, GVI site type and Soil type. 1A, 2B, 3B, 3C, 3D, 4C, 5B, 5C, 5D, 6D, 6E, 7B, 7C, 7D, 9B, 9C, 9D, 9E, 2-derived, 3-derived, 4-derived, 5-derived, 6-derived, 7-derived, 8-derived, 9-derived from PLVI. Water from Hydropoly, wet-derived from Alberta Merged Wetland Layer.

Moisture_Source

Definition: Data source for Moisture_Reg field.

Values: Categorical values are: AVIE, AVIE_Cut2014, AVIE_Neighbor, EINP, PLVI, PLVI-MapCode2, PLVI-MapCode3, PLVI_Cut2014, GVI, MTNP, MTNP_Cut2014, Soil, Hydro, AGCCPine, CWCS, and Vegetation (To indicate the value is derived from vegetation type)

Origin_Year

Definition: Year of last known disturbance in which vegetation age would have been reset to zero.

Values: Integers between 1582 and 2015, and 9999. The value 9999 was assigned to area that does not have information on the year of last disturbance or is not a forest stand.

Origin_Source

Definition: Data source for Origin_Year field.

Values: Categorical. SRD_Fire, PLVI, PLVI-DIST1, PLVI-POIN1, PLVI-SERAL1, PLVI-PNR2, PLVI-SER2, PLVI-PNR3, PLVI-SER3, AVIE_Cut2014_DomIn50m, AVIE_Others_DomIn50m, AVIE_Cut2014_NearestIn2km, AVIE_mod1, AVIE_mod2, AVIE_Origin, AVIE_UMod1, AVIE_Cut_Origin20YrsOlderThanMod1, AVIE_Other_bk, AVIE_Peat_DomIn50m, AVIE_RecentBurn_PhotoYear, AVIE_umod1. Note that for polygons where Origin_Year could not be determined from the source layers, ABMI was listed as the Origin_Source and 9999 was noted in the Origin_Year.

CWCS_Class

Definition: Alberta merged wetland types.

Values: Categorical. Marsh, Open Water, Bog, Fen, Swamp

CWCS_Extent

Definition: Extent field from the Alberta merged wetland layer.

Values: Categorical; ALP, BVRR, CAM, CW, ERS, GP, HOL, INDHRT, IRC, LA, LOU, LP, LPE, MRR, PLE, PLW, PMB, RND, ROC, SPOT_CNTRL, SPOT_NORTH, SPOT_SOUTH, STRTH, TOF, TOFX, UA, UP, UTI, VER, WET.

Soil_Type

Definition: Soil type based on GVI and AGRASID data.

Values: Categorical; BdL, BlO, CS, Cy, Gr, Len, LenA, LenS, LenSP, LenT, LenW, Li, Lo, Ltc, LtcC, LtcD, LtcH, LtcR, LtcS, Ov, Sa, Sb, SL, SwG, Sy, TB

PCT_L

Definition: Percentage of Western larch and Tamarack based on canopy cover

Values: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

NSRNAME

Definition: Natural sub-region name
Values: Categorical. Alpine, Athabasca Plain, Boreal Subarctic, Central Mixedwood, Central Parkland, Dry Mixedgrass, Dry Mixedwood, Foothills Fescue, Foothills Parkland, Kazan Uplands, Lower Boreal Highlands, Lower Foothills, Mixedgrass, Montane, Northern Fescue, Northern Mixedwood, Peace-Athabasca Delta, Peace River Parkland, Subalpine, Upper Boreal Highlands, Upper Foothills

NRNAME

Definition: Natural region name
Values: Categorical. Boreal, Canadian Shield, Foothills, Grassland, Parkland, Rocky Mountain

LUF_NAME

Definition: Landuse framework region name
Values: Categorical. Lower Peace, Lower Athabasca, Upper Peace, Upper Athabasca, North Saskatchewan, Red Deer, South Saskatchewan

HUC_8

Definition: HUC 8 Code
Values: Categorical. 8 digits HUC Code from 02010101 to 25010301

BASIN

Definition: The 18 basin names HUC 8 located
Values: Categorical. ATHABASCA, BATTLE, BEAVER, BUFFALO, CHURCHILL, FONTAS, HAY, KAKISA, LAKE ATHABASCA, MILK, NORTH SASKATCHEWAN, PEACE, PETITOT, RED DEER, SLAVE, SOUNDING, SOUTH SASKATCHEWAN, TALTSON

GWA_NAME

Definition: The Green or White Area
Values: Categorical. Green Area, White Area

Combined

Definition: The generalized habitat types
Values: Categorical. Alkali, AlpineLarch, Bare, Decid, Fir, GraminoidFen, GrassHerb, Marsh, Mixedwood, Pine, Shrub, ShrubbyBog, ShrubbyFen, ShrubbySwamp, SnowIce, Spruce, TreedBog-BSpr, TreedFen-BSpr, TreedFen-Decid, TreedFen-Larch, TreedFen-Mixedwood, TreedSwamp-Conif, TreedSwamp-Decid, TreedSwamp-Fir, TreedSwamp-Forest, TreedSwamp-Mixedwood, TreedSwamp-Spruce, TreedWetland-Mixedwood, Water.

FEATURE_TY

Definition: Human footprint types.

Values: Categorical. AIRP-RUNWAY, BORROWPIT-DRY, BORROWPIT-WET, BORROWPITS, CAMP-INDUSTRIAL, CAMPGROUND, CANAL, CFO, CLEARING-UNKNOWN, CLEARING-WELLPAD-UNCONFIRMED, COUNTRY-RESIDENCE, CROP, CULTIVATION_ABANDONED, CUTBLOCK, DISTURB_VEG, DUGOUT, FACILITY-OTHER, FACILITY-UNKNOWN, FRUIT-VEGETABLES, GOLFCOURSE, GREENSPACE, GRVL-SAND-PIT, INTERCHANGE-RAMP, LAGOON, LANDFILL, LOW-IMPACT-SEISMIC, MILL, MINES-COAL, MINES-OILSANDS, MINES-PITLAKE, MISC-OIL-GAS-FACILITY, OIL-GAS-PLANT, OPEN-PIT-MINE, PEAT, PIPELINE, PRE-LOW-IMPACT-SEISMIC, RECREATION, RESERVOIR, RESIDENCE_CLEARING, RIS-AIRP-RUNWAY, RIS-BORROWPITS, RIS-CAMP-INDUSTRIAL, RIS-CLEARING-UNKNOWN, RIS-DRAINAGE, RIS-FACILITY-OPERATIONS, RIS-FACILITY-UNKNOWN, RIS-MINES-OILSANDS, RIS-OILSANDS-RMS, RIS-OVERBURDEN-DUMP, RIS-PIPELINE, RIS-PLANT, RIS-RECLAIM-READY, RIS-RECLAIMED-CERTIFIED, RIS-RECLAIMED-PERMANENT, RIS-RECLAIMED-TEMP, RIS-ROAD, RIS-SOIL-REPLACED, RIS-SOIL-SALVAGED, RIS-TAILING-POND, RIS-TANK-FARM, RIS-TRANSMISSION-LINE, RIS-UTILITIES, RIS-WASTE, RIS-WELL, RIS-WINDROW, RLWY-ABANDONED, RLWY-DBL-TRACK, RLWY-MLT-TRACK, RLWY-SGL-TRACK, RLWY-SPUR, ROAD-GRAVEL-1L, ROAD-GRAVEL-2L, ROAD-PAVED-1L, ROAD-PAVED-2L, ROAD-PAVED-3L, ROAD-PAVED-4L, ROAD-PAVED-5L, ROAD-PAVED-6L, ROAD-PAVED-7L, ROAD-PAVED-DIV, ROAD-PAVED-UNDIV-1L, ROAD-PAVED-UNDIV-2L, ROAD-PAVED-UNDIV-4L, ROAD-UNCLASSIFIED, ROAD-UNIMPROVED, ROAD-UNPAVED-1L, ROAD-UNPAVED-2L, ROAD-WINTER-ACCESS, ROUGH_PASTURE, RUNWAY, RURAL-RESIDENCE, SUMP, SURROUNDING-VEG, TAILING-PILE, TAILING-POND, TAME_PASTURE, TRAIL, TRAIL-ATV, TRANSFER_STATION, TRANSMISSION-LINE, TRUCK-TRAIL, URBAN-INDUSTRIAL, URBAN-RESIDENCE, VEGETATED-EDGE-RAILWAYS, VEGETATED-EDGE-ROADS, WELL-ABAND, WELL-BIT, WELL-CASED, WELL-CLEARED-DRILLED, WELL-CLEARED-NOT-DRILLED, WELL-DRILLED-OTHER, WELL-GAS, WELL-OIL, WELL-OTHER, WINDMILLS

HydroHF

Definition: Human footprint types in Hydrological human footprint group.
Values: Categorical: BORROWPIT-DRY, BORROWPIT-WET, BORROWPITS, CANAL, DUGOUT, LAGOON, RESERVOIR, RIS-BORROWPITS, SUMPS.

YEAR_HydroHF

Definition: year information in hydrological human footprint group.
Values: NULL/Integers.

RoadRail

Definition: Human footprint types in Road and rail group.
Values: Categorical: AIRP-RUNWAY, INTERCHANGE-RAMP, RIS-AIRP-RUNWAY, RIS-ROAD, RLWY-ABANDONED, RLWY-DBL-TRACK, RLWY-MLT-TRACK, RLWY-SGL-TRACK, RLWY-SPUR, ROAD-GRAVEL-1L, ROAD-

GRAVEL-2L, ROAD-PAVED-1L, ROAD-PAVED-2L, ROAD-PAVED-3L, ROAD-PAVED-4L, ROAD-PAVED-5L, ROAD-PAVED-6L, ROAD-PAVED-7L, ROAD-PAVED-DIV, ROAD-PAVED-UNDIV-1L, ROAD-PAVED-UNDIV-2L, ROAD-PAVED-UNDIV-4L, ROAD-UNCLASSIFIED, ROAD-UNIMPROVED, ROAD-UNPAVED-1L, ROAD-UNPAVED-2L, ROAD-WINTER-ACCESS, TRAIL-ATV, TRUCK-TRAIL, VEGETATED-EDGE-RAILWAYS, VEGETATED-EDGE-ROADS

YEAR_RoadRail

Definition: year information in Road and rail group.
Values: NULL/Integers.

MineCFOAgCutblock

Definition: Human footprint types in group of mine, CFO, agriculture and cutblock.
Values: Categorical: AGRICULTURE_DISTURB_VEG, CFO, CROP, CULTIVATION_ABANDONED, CUTBLOCK, FRUIT-VEGETABLES, GRVL-SAND-PIT, MINES-COAL, MINES-OILSANDS, MINES-PITLAKE, OPEN-PIT-MINE, PEAT, RIS-DRAINAGE, RIS-MINES-OILSANDS, RIS-OILSANDS-RMS, RIS-OVERBURDEN-DUMP, RIS-RECLAIM-READY, RIS-RECLAIMED-CERTIFIED, RIS-RECLAIMED-PERMANENT, RIS-RECLAIMED-TEMP, RIS-SOIL-REPLACED, RIS-SOIL-SALVAGED, RIS-TAILING-POND, RIS-WASTE, RIS-WINDROW, ROUGH_PASTURE, TAILING-PILE, TAILING-POND, TAME_PASTURE.

YEAR_MineCFOAgCutblock

Definition: year information in group of mine, CFO, agriculture and cutblock.
Values: NULL/Integers.

IndHighLowWindM

Definition: Human footprint types in High and low density industry and Windmill group.
Values: Categorical: CAMP-INDUSTRIAL, CLEARING-UNKNOWN, CLEARING-WELLPAD-UNCONFIRMED, FACILITY-OTHER, FACILITY-UNKNOWN, MILL, MISC-OIL-GAS-FACILITY, OIL-GAS-PLANT, RIS-CAMP-INDUSTRIAL, RIS-CLEARING-UNKNOWN, RIS-FACILITY-OPERATIONS, RIS-FACILITY-UNKNOWN, RIS-PLANT, RIS-TANK-FARM, RIS-UTILITIES, URBAN-INDUSTRIAL, WINDMILLS.

YEAR_IndHighLowWindM

Definition: year information in High and low density industry and Windmill group.
Values: NULL/Integers.

Well

Definition: Human footprint types in wells group.
Values: Categorical: RIS-WELL, WELL-ABAND, WELL-BIT, WELL-CASED, WELL-CLEARED-DRILLED, WELL-CLEARED-NOT-DRILLED, WELL-DRILLED-OTHER, WELL-GAS, WELL-OIL, WELL-OTHER.

YEAR_Well

Definition: year information in wells group.
Values: NULL/Integers.

LandFRecRes

Definition: Human footprint types in group of landfill, recreation, and residence.
Values: Categorical: CAMPGROUND, COUNTRY-RESIDENCE, GOLFCOURSE, GREENSPACE, LANDFILL, RECREATION, RESIDENCE_CLEARING, RUNWAY, RURAL-RESIDENCE, SURROUNDING-VEG, TRANSFER_STATION, URBAN-RESIDENCE.

YEAR_LandFRecRes

Definition: year information in group of landfill, recreation, and residence.
Values: NULL/Integers.

TransPipe

Definition: Human footprint types in transmission line and pipeline group.
Values: Categorical: PIPELINE, RIS-PIPELINE, RIS-TRANSMISSION-LINE, TRANSMISSION-LINE.

YEAR_ TransPipe

Definition: year information in transmission line and pipeline group.
Values: NULL/Integers.

Cutline

Definition: Human footprint types in Cutline group.
Values: Categorical: LOW-IMPACT-SEISMIC, PRE-LOW-IMPACT-SEISMIC, TRAIL

YEAR_Cutline

Definition: year information in Cutline group.
Values: NULL/Integers.

APPENDIX 1 Natural Vegetation Derived From ABMI Land Cover

Information from ABMI Land Cover was used to assign vegetation type where AVIE, GVI, PLVI, CPVI, National Parks, and Phase 1 information did not identify the natural vegetation type within a polygon. Note that these vegetation types were also used to backfill some human footprint types (see each section above for details).

Seven natural vegetation types were selected from ABMI Land Cover Layer (Figure 21 and Table 24). Exposed land was not used since this included human disturbed polygons. Water was not used since more detailed hydro-polygons were present in the Government of Alberta Base Waterbody Polygon layer and Base Stream and Flow Representation linear layer. Natural vegetation types in ABMI Land Cover layer falling in the ABMI HF 2014 were ignored. The linear gaps resulted from removing linear HFs were assigned native vegetation types based on nibbling from the neighbours.

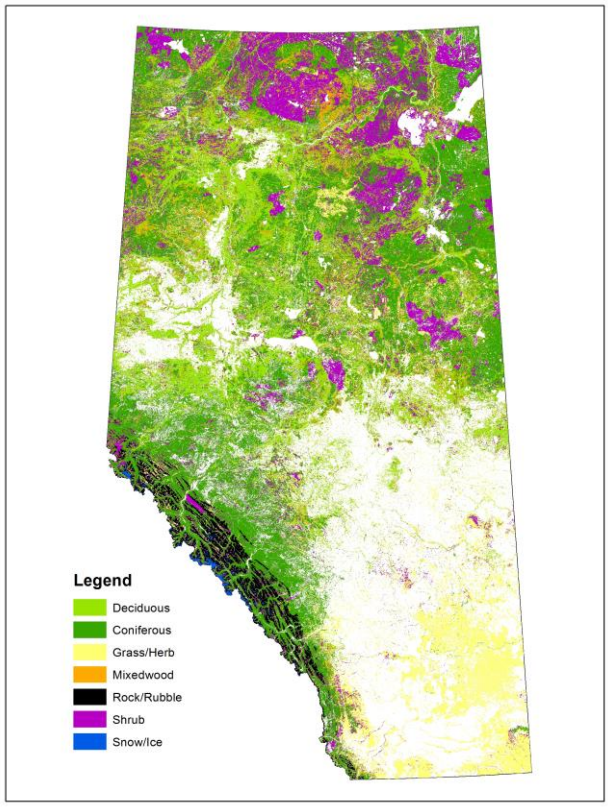

Figure 21 Natural vegetation types derived from the ABMI Land Cover layer

Table 24 ABMI Land Cover layer classes and the derived natural vegetation types

Natural Vegetation Types	LC	LcType
(Not used)	20	Water
Snow/Ice	31	Snow/Ice
Rock/Rubble	32	Rock/Rubble
(Not used)	33	Exposed land
	34	Developed
Shrub	50	Shrubland
Grass/Herb	110	Grassland
	120	Agriculture
Coniferous	210	Coniferous forest
Deciduous	220	Broadleaf forest
Mixedwood	230	Mixed forest

APPENDIX 2 Vegetation derived from ABMI Soil Type

A crosswalk was developed to assign the most common expected natural vegetation type to each of the soil type in each of the three Natural Regions/Subregions (Table 25). These estimates of vegetation type were very coarse; on average they are correct throughout the sub-region, but at the polygon level often are incorrect. These vegetation types were used when AVIE, PLVI, GVI, CPVI, WBNP, MTNP, Phase 1, and ABMILC did not identify the natural vegetation types within the polygons. Note that these vegetation types were also used to backfill some human footprint types (see each section above for details).

Table 25 Rule set used to assign vegetation based on soil type.

Natural Region	Vegetation_Type	Corresponding Soil Type(s)
Grassland	Coniferous	LtcC
	Deciduous	LtcD, Ltc
	Shrub	Ov, Sb, TB
	Lentic Shrub	LenSP, Len
	Lotic Shrub	LtcS
	Grass/Herb	BdL, BlO, CS, Cy, Gr, Li, Lo, SL, Sa, SwG, Sy
	Lentic Grass/Herb	LenS, LenT, LenW
	Lotic Grass/Herb	LtcH, LtcR
	Alkali	LenA
Parkland	Coniferous	LtcC
	Deciduous	BdL, Gr, Li, Lo, LtcD, Ov, Sa, Sb, SwG, Sy, Ltc
	Shrub	CS, Cy, TB, LtcS
	Lentic Shrub	LenS, LenSP, Len
	Grass/Herb	BlO
	Lentic Grass/Herb	LenW, LtcR
	Alkali	LenA
Dry Mixedwood and Lower Foothills	Coniferous	LtcC
	Deciduous	BlO, CS, LtcD, TB
	Mixedwood	BdL, Cy, Gr, Li, Lo, LctR, Ov, Sa, Sb, SwG, Sy, Ltc
	Lentic Shrub	LenSP, Len
	Lentic Grass/Herb	LenW

APPENDIX 3 Dominant Vegetation Type in Each Natural Sub-Region

Dominant vegetation type in the natural sub-region was used to assign vegetation type where AVIE, PLVI, GVI, CPVI, WBNP, MTNP, Phase 1, ABMILC and Soil information did not identify the natural vegetation types within the polygons. Note that these vegetation types were also used to backfill some human footprint types (see each section above for details).

The dominant natural upland vegetation type and forest type were derived for each Natural Subregion (Table 26) by overlaying of the Natural Subregion on vegetation polygons from AVIE, PLVI, GVI, CPVI, WBNP, MTNP, Phase 1, and ABMLC. The vegetation type and upland forest type with the maximum area in each Natural Subregion was determined.

Table 26 Dominant vegetation type and upland forest type in each Natural Subregion (used for backfilling human footprint types.

NSRName	Vegetation Type	Upland Forest Type
Alpine	Rock/Rubble	Engelmann spruce
Athabasca Plain	Pine	Pine
Boreal Subarctic	Shrub	Coniferous
Central Mixedwood	Black spruce	Trembling aspen
Central Parkland	Deciduous	Deciduous
Dry Mixedgrass	Grass/Herb	Trembling aspen
Dry Mixedwood	Mixedwood	Mixedwood
Foothills Fescue	Grass/Herb	Trembling aspen
Foothills Parkland	Deciduous	Deciduous
Kazan Uplands	Pine	Pine
Lower Boreal Highlands	Black Spruce	Trembling aspen
Lower Foothills	Trembling aspen	Trembling aspen
Mixedgrass	Grass/Herb	Balsam poplar
Montane	Lodgepole pine	Lodgepole pine
Northern Fescue	Grass/Herb	Deciduous
Northern Mixedwood	Black Spruce	Jack pine
Peace River Parkland	Shrub	Deciduous
Peace-Athabasca Delta	Marsh	Balsam popular
Subalpine	Lodgepole pine	Lodgepole pine
Upper Boreal Highlands	Black spruce	Coniferous
Upper Foothills	Lodgepole pine	Lodgepole pine

APPENDIX 4 Rules describing how Generalized Habitat Type was developed

The rule-set to create generalized habitat type from the fields of Veg_Type, Moisture_Reg and preBackfill_Source is described in Table 27. In cases where wetland information in the Field CWCS was required (tese cases are indicated in Table27), the following rule set was applied.

1. If 'Pct_of_Larch' > 0 and 'Combined'="TreedBog-BSpr" → set 'Combined' value to "TreedFen-Larch")
2. If 'Combined'="TreedWetland-Mixedwood":
    a. If CWCS_Class = "Fen" → set 'Combined' to "TreedFen-Mixedwood"
    b. If CWCS_Class = "Bog" → set 'Combined' to " TreedBog-BSpr"
    c. If CWCS_Class = "Swamp" → set 'Combined' to "TreedSwamp-Mixedwood"
3. If Combined = "GraminoidWetland":
    a. If CWCS_Class = "Bog" → set 'Combined' to "ShrubbyBog"
    b. If CWCS_Class = "Marsh" → set 'Combined' to "Marsh"
    c. If CWCS_Class = "Fen" → set 'Combined' to "GraminoidFen"
    d. If CWCS_Class is NOT Bog/Marsh/Fen → set 'Combined' to "Marsh"
4. If Combined = "ShrubbyWetland":
    a. If CWCS_Class = "Fen" → set 'Combined' to "ShrubbyFen"
    b. If CWCS_Class = "Bog" → set 'Combined' to "ShrubbyBog"
    c. If CWCS_Class is NOT Bog/Fen → set 'Combined' to "ShrubbySwamp"
5. If Combined = "Muskeg":
    a. If CWCS_Class = "Fen" → set 'Combined' to "GraminoidFen"
    b. If CWCS_Class is NOT Swamp/Fen/Bog AND PostBackfill_Source is NOT "WBNP" → set 'Combined' to "GraminoidFen"
    c. If CWCS_Class = "Fen" AND PostBackfill_Source = "Phase1" → set 'Combined' to "TreedFen-BSpr"
    d. If CWCS_Class is NOT "Fen" AND PostBackfill_Source = "Phase1" → set 'Combined' to "TreedBog-BSpr"
    e. If none of the above → set 'Combined' to "TreedFen-BSpr"

Table 27 Crosswork for creating the generalized habitat type

Veg_Type	Moisture_Reg	preBackfill_Source	Combined	need_CWCS
Alaska birch leading - deciduous	5D	PLVI	Decid	
Alkali	wet-derived	CPVI	Alkali	
Alkali	wet-derived	GVI	Alkali	
Alkali	wet-derived	Phase1	Alkali	
Alpine fir MixC	d	ABMICutblock	Fir	
Alpine fir MixC	d	AVIE	Fir	
Alpine fir MixC	m	ABMICutblock	Fir	
Alpine fir MixC	m	AVIE	Fir	
Alpine fir MixC	w	AVIE	TreedSwamp-Fir	
Alpine fir MixCD	d	AVIE	Mixedwood	
Alpine fir MixCD	m	AVIE	Mixedwood	

Alpine fir MixWet	d	AVIE	TreedSwamp-Fir	
Alpine fir MixWet	m	AVIE	TreedSwamp-Fir	
Alpine fir	d	ABMICutblock	Fir	
Alpine fir	d	AVIE	Fir	
Alpine fir	m	ABMICutblock	Fir	
Alpine fir	m	AVIE	Fir	
Alpine fir	w	AVIE	TreedSwamp-Fir	
Alpine larch MixC	d	AVIE	AlpineLarch	
Alpine larch MixC	m	ABMICutblock	AlpineLarch	
Alpine larch MixC	m	AVIE	AlpineLarch	
Alpine larch	d	AVIE	AlpineLarch	
Alpine larch	m	AVIE	AlpineLarch	
Aspen	Hygric	MTNP	Decid	
Aspen	Mesic	ABMICutblock	Decid	
Aspen	Mesic	MTNP	Decid	
Aspen	mesic-derived	WBNP	Decid	
Aspen	Sub-Mesic	ABMICutblock	Decid	
Aspen	Sub-Mesic	MTNP	Decid	
Aspen	Xeric	MTNP	Decid	
Badlands/Bedrock	dry-derived	GVI	Bare	
Balsam fir leading - conifer	5D	PLVI	Fir	
Balsam fir leading - conifer	7D	PLVI	TreedSwamp-Fir	
Balsam fir leading - mixedwood	5C	PLVI	Mixedwood	
Balsam fir leading - mixedwood	5D	PLVI	Mixedwood	
Balsam fir leading - mixedwood	7D	PLVI	TreedSwamp-Mixedwood	
Balsam fir MixC	d	ABMICutblock	Fir	
Balsam fir MixC	d	AVIE	Fir	
Balsam fir MixC	dry-derived	AVIE	Fir	
Balsam fir MixC	m	ABMICutblock	Fir	
Balsam fir MixC	m	AVIE	Fir	
Balsam fir MixC	mesic-derived	AVIE	Fir	
Balsam fir MixC	w	AVIE	TreedSwamp-Fir	
Balsam fir MixC	w-derived	AVIE	TreedSwamp-Fir	
Balsam fir MixC	wet-derived	AVIE	TreedSwamp-Fir	
Balsam fir MixCD	d	AVIE	Mixedwood	
Balsam fir MixCD	m	ABMICutblock	Mixedwood	
Balsam fir MixCD	m	AVIE	Mixedwood	
Balsam fir MixCD	w	AVIE	TreedSwamp-Mixedwood	
Balsam fir MixCD	w-derived	AVIE	TreedSwamp-Mixedwood	
Balsam fir MixDC	m	AVIE	Mixedwood	
Balsam fir MixWet	m	AVIE	TreedSwamp-Fir	
Balsam fir MixWet	w	AVIE	TreedSwamp-Fir	
Balsam fir MixWet	w-derived	AVIE	TreedSwamp-Fir	
Balsam fir	d	ABMICutblock	Fir	
Balsam fir	d	AVIE	Fir	
Balsam fir	m	ABMICutblock	Fir	
Balsam fir	m	AVIE	Fir	
Balsam fir	mesic-derived	AVIE	Fir	
Balsam fir	mesic-derived	GVI	Fir	
Balsam fir	w	AVIE	TreedSwamp-Fir	
Balsam fir	w-derived	AVIE	TreedSwamp-Fir	
Balsam poplar leading - deciduous	5C	PLVI	Decid	
Balsam poplar leading - deciduous	5D	PLVI	Decid	
Balsam poplar leading - deciduous	6D	PLVI	Decid	
Balsam poplar leading - deciduous	7C	PLVI	TreedSwamp-Decid	
Balsam poplar leading - deciduous	7D	PLVI	TreedSwamp-Decid	
Balsam poplar leading - mixedwood	5C	PLVI	Mixedwood	
Balsam poplar leading - mixedwood	5D	PLVI	Mixedwood	

Balsam poplar leading - mixedwood	6D	PLVI	Mixedwood	
Balsam poplar leading - mixedwood	7D	PLVI	TreedSwamp-Mixedwood	
Balsam poplar MixCD	d	AVIE	Mixedwood	
Balsam poplar MixCD	m	ABMICutblock	Mixedwood	
Balsam poplar MixCD	m	AVIE	Mixedwood	
Balsam poplar MixCD	mesic-derived	GVI	Mixedwood	
Balsam poplar MixCD	w	AVIE	TreedSwamp-Mixedwood	
Balsam poplar MixCD	w-derived	AVIE	TreedSwamp-Mixedwood	
Balsam poplar MixD	d	ABMICutblock	Decid	
Balsam poplar MixD	d	AVIE	Decid	
Balsam poplar MixD	dry-derived	AVIE	Decid	
Balsam poplar MixD	dry-derived	GVI	Decid	
Balsam poplar MixD	m	ABMICutblock	Decid	
Balsam poplar MixD	m	AVIE	Decid	
Balsam poplar MixD	m	EINP	Decid	
Balsam poplar MixD	mesic-derived	AVIE	Decid	
Balsam poplar MixD	mesic-derived	GVI	Decid	
Balsam poplar MixD	w	AVIE	TreedSwamp-Decid	
Balsam poplar MixD	w	EINP	TreedSwamp-Decid	
Balsam poplar MixD	w-derived	AVIE	TreedSwamp-Decid	
Balsam poplar MixD	wet-derived	AVIE	TreedSwamp-Decid	
Balsam poplar MixD	wet-derived	GVI	TreedSwamp-Decid	
Balsam poplar MixDC	d	ABMICutblock	Mixedwood	
Balsam poplar MixDC	d	AVIE	Mixedwood	
Balsam poplar MixDC	dry-derived	AVIE	Mixedwood	
Balsam poplar MixDC	dry-derived	GVI	Mixedwood	
Balsam poplar MixDC	m	ABMICutblock	Mixedwood	
Balsam poplar MixDC	m	AVIE	Mixedwood	
Balsam poplar MixDC	mesic-derived	AVIE	Mixedwood	
Balsam poplar MixDC	mesic-derived	GVI	Mixedwood	
Balsam poplar MixDC	w	AVIE	TreedSwamp-Mixedwood	
Balsam poplar MixDC	w-derived	AVIE	TreedSwamp-Mixedwood	
Balsam poplar MixDC	wet-derived	AVIE	TreedSwamp-Mixedwood	
Balsam poplar MixWet	m	AVIE	TreedSwamp-Decid	
Balsam poplar MixWet	w	AVIE	TreedSwamp-Decid	
Balsam poplar	a	AVIE	TreedSwamp-Decid	
Balsam poplar	d	AVIE	Decid	
Balsam poplar	dry-derived	AVIE	Decid	
Balsam poplar	dry-derived	GVI	Decid	
Balsam poplar	m	ABMICutblock	Decid	
Balsam poplar	m	AVIE	Decid	
Balsam poplar	m	EINP	Decid	
Balsam poplar	mesic-derived	AVIE	Decid	
Balsam poplar	mesic-derived	GVI	Decid	
Balsam poplar	w	AVIE	TreedSwamp-Decid	
Balsam poplar	w	EINP	TreedSwamp-Decid	
Balsam poplar	w-derived	AVIE	TreedSwamp-Decid	
Balsam poplar	wet-derived	AVIE	TreedSwamp-Decid	
Balsam poplar	wet-derived	GVI	TreedSwamp-Decid	
Balsam popular	Mesic	MTNP	Decid	
Balsam popular	wet-derived	WBNP	TreedSwamp-Decid	
Bare	Xeric	MTNP	Bare	
Bare	Xeric-derived	MTNP	Bare	
Bareland	dry-derived	GVI	Bare	
Bareland	mesic-derived	GVI	Bare	
Bareland	wet-derived	GVI	Bare	

Birch spp	mesic-derived	GVI	Decid	
Black cottonwood	Hygric	MTNP	TreedSwamp-Decid	
Black cottonwood	Mesic	MTNP	Decid	
Black cottonwood	Sub-Hydric	MTNP	TreedSwamp-Decid	
Black Spruce leading - conifer	3B	PLVI	TreedBog-BSpr	
Black spruce leading - conifer	3B	PLVI	TreedBog-BSpr	
Black Spruce leading - conifer	5B	PLVI	TreedBog-BSpr	
Black spruce leading - conifer	5B	PLVI	TreedBog-BSpr	
Black Spruce leading - conifer	7B	PLVI	TreedBog-BSpr	
Black spruce leading - conifer	7B	PLVI	TreedBog-BSpr	
Black Spruce leading - conifer	7C	PLVI	TreedBog-BSpr	
Black spruce leading - conifer	7C	PLVI	TreedBog-BSpr	
Black Spruce leading - mixedwood	7B	PLVI	TreedBog-BSpr	
Black spruce leading - mixedwood	7B	PLVI	TreedBog-BSpr	
Black Spruce leading - mixedwood	7C	PLVI	TreedBog-BSpr	
Black spruce leading - mixedwood	7C	PLVI	TreedBog-BSpr	
Black spruce MixCD	d	AVIE	TreedBog-BSpr	
Black spruce MixCD	m	AVIE	TreedBog-BSpr	
Black spruce MixCD	w	AVIE	TreedBog-BSpr	
Black spruce MixCD	w	EINP	TreedBog-BSpr	
Black spruce MixCD	w-derived	AVIE	TreedBog-BSpr	
Black spruce MixDC	d	AVIE	TreedBog-BSpr	
Black spruce MixDC	dry-derived	AVIE	TreedBog-BSpr	
Black spruce MixDC	dry-derived	GVI	TreedBog-BSpr	
Black spruce MixDC	m	AVIE	TreedBog-BSpr	
Black spruce MixDC	mesic-derived	AVIE	TreedBog-BSpr	
Black spruce MixDC	mesic-derived	GVI	TreedBog-BSpr	
Black spruce MixDC	w	AVIE	TreedBog-BSpr	
Black spruce MixDC	w	EINP	TreedBog-BSpr	
Black spruce MixDC	w-derived	AVIE	TreedBog-BSpr	
Black spruce	d	AVIE	TreedBog-BSpr	
Black spruce	dry-derived	AVIE	TreedBog-BSpr	
Black spruce	dry-derived	GVI	TreedBog-BSpr	
Black spruce	m	AVIE	TreedBog-BSpr	
Black spruce	mesic-derived	AVIE	TreedBog-BSpr	
Black spruce	w	AVIE	TreedBog-BSpr	
Black spruce	w	EINP	TreedBog-BSpr	
Black spruce	w-derived	AVIE	TreedBog-BSpr	
Black Spruce	w-derived	AVIE	TreedBog-BSpr	
Black spruce	wet-derived	AVIE	TreedBog-BSpr	
Black Spruce	wet-derived	AVIE	TreedBog-BSpr	
Black spruce	wet-derived	CPVI	TreedBog-BSpr	
Black spruce	wet-derived	Phase1	TreedBog-BSpr	
Black spruce	wet-derived	PLVI	TreedBog-BSpr	
Black spruce	wet-derived	WBNP	TreedBog-BSpr	
Bog - Black spruce	wet-derived	WBNP	TreedBog-BSpr	
Bog Shrub	wet-derived	WBNP	ShrubbyBog	
Bog Tree	wet-derived	WBNP	TreedBog-BSpr	
Bog	wet-derived	AVIE	TreedBog-BSpr	
Bog	wet-derived	CPVI	TreedBog-BSpr	
Bog	wet-derived	Phase1	TreedBog-BSpr	
Bog	wet-derived	PLVI	TreedBog-BSpr	
Coniferous	dry-derived	AVIE	Spruce	
Coniferous	dry-derived	CPVI	Spruce	
Coniferous	dry-derived	Phase1	Spruce	
Coniferous	Mesic	ABMICutblock	Spruce	
Coniferous	mesic-derived	AVIE	Spruce	
Coniferous	mesic-derived	CPVI	Spruce	
Coniferous	mesic-derived	GVI	Spruce	
Coniferous	mesic-derived	Phase1	Spruce	
Coniferous	mesic-derived	PLVI	Spruce	

Coniferous	mesic-derived	WBNP	Spruce	
Coniferous	w-derived	AVIE	TreedSwamp-Conif	
Coniferous	wet-derived	AVIE	TreedSwamp-Conif	
Coniferous	wet-derived	CPVI	TreedSwamp-Conif	
Coniferous	wet-derived	Phase1	TreedSwamp-Conif	
Deciduous		PLVI	Decid	
Deciduous	dry-derived	AVIE	Decid	
Deciduous	dry-derived	CPVI	Decid	
Deciduous	dry-derived	GVI	Decid	
Deciduous	dry-derived	Phase1	Decid	
Deciduous	dry-derived	PLVI	Decid	
Deciduous	mesic-derived	AVIE	Decid	
Deciduous	mesic-derived	CPVI	Decid	
Deciduous	mesic-derived	EINP	Decid	
Deciduous	mesic-derived	GVI	Decid	
Deciduous	mesic-derived	Phase1	Decid	
Deciduous	mesic-derived	PLVI	Decid	
Deciduous	mesic-derived	WBNP	Decid	
Deciduous	w-derived	AVIE	TreedSwamp-Decid	
Deciduous	wet-derived	AVIE	TreedSwamp-Decid	
Deciduous	wet-derived	CPVI	TreedSwamp-Decid	
Deciduous	wet-derived	Phase1	TreedSwamp-Decid	
Deciduous	wet-derived	PLVI	TreedSwamp-Decid	
Douglas fir MixC	d	ABMICutblock	Fir	
Douglas fir MixC	d	AVIE	Fir	
Douglas fir MixC	dry-derived	AVIE	Fir	
Douglas fir MixC	m	ABMICutblock	Fir	
Douglas fir MixC	m	AVIE	Fir	
Douglas fir MixC	w	AVIE	TreedSwamp-Fir	
Douglas fir MixC	wet-derived	AVIE	TreedSwamp-Fir	
Douglas fir MixCD	d	ABMICutblock	Mixedwood	
Douglas fir MixCD	d	AVIE	Mixedwood	
Douglas fir MixCD	dry-derived	GVI	Mixedwood	
Douglas fir MixCD	m	ABMICutblock	Mixedwood	
Douglas fir MixCD	m	AVIE	Mixedwood	
Douglas fir MixCD	w	AVIE	TreedSwamp-Mixedwood	
Douglas fir MixDC	m	AVIE	Mixedwood	
Douglas fir MixWet	m	AVIE	TreedSwamp-Fir	
Douglas fir	d	ABMICutblock	Fir	
Douglas fir	d	AVIE	Fir	
Douglas fir	dry-derived	AVIE	Fir	
Douglas fir	dry-derived	GVI	Fir	
Douglas fir	m	ABMICutblock	Fir	
Douglas fir	m	AVIE	Fir	
Douglas fir	Mesic	ABMICutblock	Fir	
Douglas fir	Mesic	MTNP	Fir	
Douglas fir	mesic-derived	AVIE	Fir	
Douglas fir	Sub-Mesic	ABMICutblock	Fir	
Douglas fir	Sub-Mesic	MTNP	Fir	
Douglas fir	wet-derived	AVIE	TreedSwamp-Fir	
Douglas fir	Xeric	MTNP	Fir	
Engelmann spruce MixC	d	ABMICutblock	Spruce	
Engelmann spruce MixC	d	AVIE	Spruce	
Engelmann spruce MixC	m	ABMICutblock	Spruce	
Engelmann spruce MixC	m	AVIE	Spruce	
Engelmann spruce MixC	w	AVIE	TreedSwamp-Spruce	
Engelmann spruce MixCD	d	AVIE	Mixedwood	
Engelmann spruce MixCD	m	ABMICutblock	Mixedwood	
Engelmann spruce MixCD	m	AVIE	Mixedwood	
Engelmann spruce MixCD	w	AVIE	TreedSwamp-	

			Mixedwood	
Engelmann spruce MixCD	w-derived	AVIE	TreedSwamp-Mixedwood	
Engelmann spruce MixWet	m	AVIE	TreedSwamp-Spruce	
Engelmann spruce MixWet	w	AVIE	TreedSwamp-Spruce	
Engelmann spruce MixWet	w-derived	AVIE	TreedSwamp-Spruce	
Engelmann spruce	d	ABMICutblock	Spruce	
Engelmann spruce	d	AVIE	Spruce	
Engelmann spruce	Hygric	MTNP	TreedSwamp-Spruce	
Engelmann spruce	m	ABMICutblock	Spruce	
Engelmann spruce	m	AVIE	Spruce	
Engelmann spruce	Mesic	ABMICutblock	Spruce	
Engelmann spruce	Mesic	MTNP	Spruce	
Engelmann spruce	mesic-derived	Phase1	Spruce	
Engelmann spruce	Sub-Hydric	MTNP	TreedSwamp-Spruce	
Engelmann spruce	Sub-Mesic	ABMICutblock	Spruce	
Engelmann spruce	Sub-Mesic	MTNP	Spruce	
Engelmann spruce	w	AVIE	TreedSwamp-Spruce	
Engelmann spruce	w-derived	AVIE	TreedSwamp-Spruce	
Engelmann spruce	Xeric	ABMICutblock	Spruce	
Engelmann spruce	Xeric	MTNP	Spruce	
Fen Grass	wet-derived	WBNP	GraminoidFen	
Fen Shrub Poor	wet-derived	WBNP	ShrubbyFen	
Fen Shrub Rich	wet-derived	WBNP	ShrubbyFen	
Fen Tree Poor	wet-derived	WBNP	TreedFen-Larch	
Fen Tree Rich	wet-derived	WBNP	TreedFen-Larch	
Fen	wet-derived	AVIE	TreedFen-Larch	
Fen	wet-derived	CPVI	TreedFen-Larch	
Fen	wet-derived	EINP	TreedFen-Larch	
Fen	wet-derived	GVI	TreedFen-Larch	
Fen	wet-derived	Phase1	TreedFen-Larch	
Fen	wet-derived	PLVI	TreedFen-Larch	
Glacier	Mesic-derived	MTNP	SnowIce	
Grass/Herb	2B	PLVI	GrassHerb	
Grass/Herb	3B	PLVI	GrassHerb	
Grass/Herb	3C	PLVI	GrassHerb	
Grass/Herb	3D	PLVI	GrassHerb	
Grass/Herb	4C	PLVI	GrassHerb	
Grass/Herb	5C	PLVI	GrassHerb	
Grass/Herb	5D	PLVI	GrassHerb	
Grass/Herb	6E	PLVI	GrassHerb	
Grass/Herb	7C	PLVI	GraminoidWetland	x
Grass/Herb	7D	PLVI	GraminoidWetland	x
Grass/Herb	a	AVIE	GraminoidWetland	x
Grass/Herb	a	EINP	GraminoidWetland	x
Grass/Herb	d	AVIE	GrassHerb	
Grass/Herb	d	EINP	GrassHerb	
Grass/Herb	dry-derived	AVIE	GrassHerb	
Grass/Herb	dry-derived	CPVI	GrassHerb	
Grass/Herb	dry-derived	GVI	GrassHerb	
Grass/Herb	dry-derived	Phase1	GrassHerb	
Grass/Herb	dry-derived	PLVI	GrassHerb	
Grass/Herb	dry-derived	WBNP	GrassHerb	
Grass/Herb	m	AVIE	GrassHerb	
Grass/Herb	m	EINP	GrassHerb	
Grass/Herb	Mesic	MTNP	GrassHerb	
Grass/Herb	mesic-derived	AVIE	GrassHerb	
Grass/Herb	mesic-derived	CPVI	GrassHerb	
Grass/Herb	mesic-derived	EINP	GrassHerb	
Grass/Herb	mesic-derived	GVI	GrassHerb	
Grass/Herb	mesic-derived	Phase1	GrassHerb	

Grass/Herb	mesic-derived	PLVI	GrassHerb	
Grass/Herb	Sub-Mesic	MTNP	GrassHerb	
Grass/Herb	w	AVIE	GraminoidWetland	x
Grass/Herb	w	EINP	GraminoidWetland	x
Grass/Herb	w-derived	AVIE	GraminoidWetland	x
Grass/Herb	wet-derived	AVIE	GraminoidWetland	x
Grass/Herb	wet-derived	CPVI	GraminoidWetland	x
Grass/Herb	wet-derived	GVI	GraminoidWetland	x
Grass/Herb	wet-derived	Phase1	GraminoidWetland	x
Grass/Herb	Xeric	MTNP	GrassHerb	
GrassFen	9B	PLVI	GraminoidFen	
GrassFen	9C	PLVI	GraminoidFen	
GrassFen	9D	PLVI	GraminoidFen	
Herb	Hydric	MTNP	GraminoidWetland	x
Herb	Mesic	MTNP	GrassHerb	
Herb	Sub-Hydric	MTNP	GraminoidWetland	x
Herb	Sub-Mesic	MTNP	GrassHerb	
Herb	Xeric	MTNP	GrassHerb	
Ice/Snow	mesic-derived	AVIE	SnowIce	
Ice/Snow	wet-derived	AVIE	SnowIce	
Jack pine leading - conifer	3B	PLVI	Pine	
Jack pine leading - conifer	3C	PLVI	Pine	
Jack pine leading - conifer	5B	PLVI	Pine	
Jack pine leading - conifer	5C	PLVI	Pine	
Jack pine leading - conifer	7B	PLVI	Pine	
Jack pine leading - mixedwood	3B	PLVI	Mixedwood	
Jack pine leading - mixedwood	3C	PLVI	Mixedwood	
Jack pine leading - mixedwood	5B	PLVI	Mixedwood	
Jack pine leading - mixedwood	5C	PLVI	Mixedwood	
Jack pine leading - mixedwood	7B	PLVI	Mixedwood	
Jack pine MixC	d	AVIE	Pine	
Jack pine MixC	m	ABMICutblock	Pine	
Jack pine MixC	m	AVIE	Pine	
Jack pine MixC	w	AVIE	Pine	
Jack pine MixC	w-derived	AVIE	Pine	
Jack pine MixCD	d	ABMICutblock	Mixedwood	
Jack pine MixCD	d	AVIE	Mixedwood	
Jack pine MixCD	m	ABMICutblock	Mixedwood	
Jack pine MixCD	m	AVIE	Mixedwood	
Jack pine MixCD	w	AVIE	Mixedwood	
Jack pine MixCD	w-derived	AVIE	Mixedwood	
Jack pine MixDC	m	ABMICutblock	Mixedwood	
Jack pine MixDC	m	AVIE	Mixedwood	
Jack pine MixDC	w	AVIE	Mixedwood	
Jack pine MixWet	d	AVIE	Pine	
Jack pine MixWet	m	AVIE	Pine	
Jack pine MixWet	w	AVIE	Pine	
Jack pine MixWet	w-derived	AVIE	Pine	
Jack pine	d	ABMICutblock	Pine	
Jack pine	d	AVIE	Pine	
Jack pine	dry-derived	WBNP	Pine	
Jack pine	m	ABMICutblock	Pine	
Jack pine	m	AVIE	Pine	
Jack pine	w	AVIE	Pine	
Jack pine	w-derived	AVIE	Pine	
Lentic conifer	wet-derived	GVI	TreedSwamp-Conif	
Lentic deciduous	wet-derived	GVI	TreedSwamp-Decid	
Lentic Grass/Herb	mesic-derived	GVI	GraminoidWetland	x
Lentic Grass/Herb	mesic-derived	Phase1	GraminoidWetland	x
Lentic Grass/Herb	water-derived	PLVI	GraminoidWetland	x
Lentic Grass/Herb	wet-derived	AVIE	GraminoidWetland	x

Lentic Grass/Herb	wet-derived	CPVI	GraminoidWetland	x
Lentic Grass/Herb	wet-derived	GVI	GraminoidWetland	x
Lentic Grass/Herb	wet-derived	Phase1	GraminoidWetland	x
Lentic Grass/Herb	wet-derived	PLVI	GraminoidWetland	x
Lentic herb	mesic-derived	GVI	GraminoidWetland	x
Lentic herb	wet-derived	GVI	GraminoidWetland	x
Lentic mixedwood	wet-derived	GVI	TreedSwamp-Mixedwood	
Lentic Shrub		PLVI	ShrubbyWetland	x
Lentic shrub	mesic-derived	GVI	ShrubbyWetland	x
Lentic Shrub	wet-derived	AVIE	ShrubbyWetland	x
Lentic Shrub	wet-derived	CPVI	ShrubbyWetland	x
Lentic shrub	wet-derived	GVI	ShrubbyWetland	x
Lentic Shrub	wet-derived	Phase1	ShrubbyWetland	x
Lentic Shrub	wet-derived	PLVI	ShrubbyWetland	x
Limber pine MixC	d	AVIE	Pine	
Limber pine MixC	dry-derived	GVI	Pine	
Limber pine MixC	m	AVIE	Pine	
Limber pine MixCD	d	AVIE	Mixedwood	
Limber pine MixCD	m	AVIE	Mixedwood	
Limber pine	d	AVIE	Pine	
Limber pine	m	AVIE	Pine	
Lodgepole pine leading - conifer	3C	PLVI	Pine	
Lodgepole pine leading - conifer	5B	PLVI	Pine	
Lodgepole pine leading - conifer	5C	PLVI	Pine	
Lodgepole pine leading - conifer	5D	PLVI	Pine	
Lodgepole pine leading - mixedwood	5C	PLVI	Mixedwood	
Lodgepole pine MixC	d	ABMICutblock	Pine	
Lodgepole pine MixC	d	AVIE	Pine	
Lodgepole pine MixC	dry-derived	GVI	Pine	
Lodgepole pine MixC	m	ABMICutblock	Pine	
Lodgepole pine MixC	m	AVIE	Pine	
Lodgepole pine MixC	mesic-derived	GVI	Pine	
Lodgepole pine MixC	w	AVIE	Pine	
Lodgepole pine MixC	w-derived	AVIE	Pine	
Lodgepole pine MixCD	d	ABMICutblock	Mixedwood	
Lodgepole pine MixCD	d	AVIE	Mixedwood	
Lodgepole pine MixCD	dry-derived	GVI	Mixedwood	
Lodgepole pine MixCD	m	ABMICutblock	Mixedwood	
Lodgepole pine MixCD	m	AVIE	Mixedwood	
Lodgepole pine MixCD	mesic-derived	GVI	Mixedwood	
Lodgepole pine MixCD	w	AVIE	Mixedwood	
Lodgepole pine MixCD	w-derived	AVIE	Mixedwood	
Lodgepole pine MixDC	m	ABMICutblock	Mixedwood	
Lodgepole pine MixDC	m	AVIE	Mixedwood	
Lodgepole pine MixDC	w	AVIE	Mixedwood	
Lodgepole pine MixWet	d	AVIE	Pine	
Lodgepole pine MixWet	m	AVIE	Pine	
Lodgepole pine MixWet	w	AVIE	Pine	
Lodgepole pine MixWet	w-derived	AVIE	Pine	
Lodgepole pine	d	ABMICutblock	Pine	
Lodgepole pine	d	AVIE	Pine	
Lodgepole pine	dry-derived	AVIE	Pine	
Lodgepole pine	dry-derived	CPVI	Pine	
Lodgepole pine	dry-derived	GVI	Pine	
Lodgepole pine	dry-derived	Phase1	Pine	
Lodgepole pine	Hydric	MTNP	Pine	
Lodgepole pine	Hygric	MTNP	Pine	
Lodgepole pine	m	ABMICutblock	Pine	
Lodgepole pine	m	AVIE	Pine	
Lodgepole pine	Mesic	ABMICutblock	Pine	

Lodgepole pine	Mesic	MTNP	Pine	
Lodgepole pine	mesic-derived	GVI	Pine	
Lodgepole pine	Sub-Mesic	ABMICutblock	Pine	
Lodgepole pine	Sub-Mesic	MTNP	Pine	
Lodgepole pine	w	AVIE	Pine	
Lodgepole pine	w-derived	AVIE	Pine	
Lodgepole pine	wet-derived	AVIE	Pine	
Lodgepole pine	Xeric	ABMICutblock	Pine	
Lodgepole pine	Xeric	MTNP	Pine	
Lotic conifer	mesic-derived	GVI	TreedSwamp-Conif	
Lotic conifer	wet-derived	GVI	TreedSwamp-Conif	
Lotic deciduous	mesic-derived	GVI	TreedSwamp-Decid	
Lotic deciduous	wet-derived	GVI	TreedSwamp-Decid	
Lotic Grass/Herb	wet-derived	AVIE	GraminoidWetland	x
Lotic Grass/Herb	wet-derived	CPVI	GraminoidWetland	x
Lotic Grass/Herb	wet-derived	GVI	GraminoidWetland	x
Lotic Grass/Herb	wet-derived	Phase1	GraminoidWetland	x
Lotic herb	dry-derived	GVI	GraminoidWetland	x
Lotic herb	mesic-derived	GVI	GraminoidWetland	x
Lotic herb	wet-derived	GVI	GraminoidWetland	x
Lotic shrub	dry-derived	GVI	ShrubbyWetland	x
Lotic shrub	mesic-derived	GVI	ShrubbyWetland	x
Lotic shrub	wet-derived	GVI	ShrubbyWetland	x
Manitoba maple	mesic-derived	GVI	Decid	
Marsh	9E	PLVI	Marsh	
Marsh	wet-derived	AVIE	Marsh	
Marsh	wet-derived	CPVI	Marsh	
Marsh	wet-derived	EINP	Marsh	
Marsh	wet-derived	GVI	Marsh	
Marsh	wet-derived	Phase1	Marsh	
Marsh	wet-derived	PLVI	Marsh	
Marsh	wet-derived	WBNP	Marsh	
Mixedwood		PLVI	Marsh	
Mixedwood	dry-derived	AVIE	Mixedwood	
Mixedwood	dry-derived	CPVI	Mixedwood	
Mixedwood	dry-derived	GVI	Mixedwood	
Mixedwood	dry-derived	Phase1	Mixedwood	
Mixedwood	dry-derived	PLVI	Mixedwood	
Mixedwood	mesic-derived	AVIE	Mixedwood	
Mixedwood	mesic-derived	CPVI	Mixedwood	
Mixedwood	mesic-derived	EINP	Mixedwood	
Mixedwood	mesic-derived	GVI	Mixedwood	
Mixedwood	mesic-derived	Phase1	Mixedwood	
Mixedwood	mesic-derived	PLVI	Mixedwood	
Mixedwood	mesic-derived	WBNP	Mixedwood	
Mixedwood	w-derived	AVIE	TreedWetland-Mixedwood	
Mixedwood	wet-derived	AVIE	TreedWetland-Mixedwood	
Mixedwood	wet-derived	CPVI	TreedWetland-Mixedwood	
Mixedwood	wet-derived	GVI	TreedWetland-Mixedwood	
Mixedwood	wet-derived	Phase1	TreedWetland-Mixedwood	
Mixedwood	wet-derived	PLVI	TreedWetland-Mixedwood	
Mud	wet-derived	WBNP	Bare	
MuskegMarsh	dry-derived	AVIE	Muskeg	x
MuskegMarsh	dry-derived	Phase1	Muskeg	x
MuskegMarsh	mesic-derived	AVIE	Muskeg	x
MuskegMarsh	mesic-derived	CPVI	Muskeg	x

MuskegMarsh	mesic-derived	Phase1	Muskeg	x
MuskegMarsh	w-derived	AVIE	Muskeg	x
MuskegMarsh	wet-derived	AVIE	Muskeg	x
MuskegMarsh	wet-derived	CPVI	Muskeg	x
MuskegMarsh	wet-derived	Phase1	Muskeg	x
MuskegMarsh	wet-derived	PLVI	Muskeg	x
MuskegMarsh	wet-derived	WBNP	Muskeg	x
Narrow leaf cottonwood MixD	dry-derived	GVI	Decid	
Narrow leaf cottonwood MixD	mesic-derived	GVI	Decid	
Narrow leaf cottonwood MixD	wet-derived	GVI	TreedSwamp-Decid	
Narrow leaf cottonwood	dry-derived	GVI	Decid	
Narrow leaf cottonwood	mesic-derived	GVI	Decid	
Other Forest	dry-derived	GVI	Decid	
Other Forest	mesic-derived	GVI	Decid	
Other Forest	wet-derived	GVI	TreedSwamp-Forest	
Pine spp MixC	d	ABMICutblock	Pine	
Pine spp MixC	d	AVIE	Pine	
Pine spp MixC	m	ABMICutblock	Pine	
Pine spp MixC	m	AVIE	Pine	
Pine spp MixC	mesic-derived	AVIE	Pine	
Pine spp MixC	mesic-derived	GVI	Pine	
Pine spp MixC	w	AVIE	Pine	
Pine spp MixC	wet-derived	AVIE	Pine	
Pine spp MixCD	d	ABMICutblock	Mixedwood	
Pine spp MixCD	d	AVIE	Mixedwood	
Pine spp MixCD	dry-derived	GVI	Mixedwood	
Pine spp MixCD	m	ABMICutblock	Mixedwood	
Pine spp MixCD	m	AVIE	Mixedwood	
Pine spp MixCD	mesic-derived	GVI	Mixedwood	
Pine spp MixCD	w	AVIE	TreedSwamp-Mixedwood	
Pine spp MixCD	wet-derived	AVIE	TreedSwamp-Mixedwood	
Pine spp MixDC	d	AVIE	Mixedwood	
Pine spp MixDC	m	ABMICutblock	Mixedwood	
Pine spp MixDC	m	AVIE	Mixedwood	
Pine spp MixWet	d	AVIE	Pine	
Pine spp MixWet	m	AVIE	Pine	
Pine spp MixWet	w	AVIE	Pine	
Pine spp	d	ABMICutblock	Pine	
Pine spp	d	AVIE	Pine	
Pine spp	dry-derived	GVI	Pine	
Pine spp	m	ABMICutblock	Pine	
Pine spp	m	AVIE	Pine	
Pine spp	mesic-derived	GVI	Pine	
Pine spp	w	AVIE	Pine	
Pine spp	w-derived	AVIE	Pine	
Pine	dry-derived	AGCCPine	Pine	
Pine	dry-derived	Phase1	Pine	
Pine	dry-derived	WBNP	Pine	
Plains cottonwood MixD	mesic-derived	GVI	Decid	
Plains cottonwood	dry-derived	GVI	Decid	
Plains cottonwood	mesic-derived	GVI	Decid	
Poplar spp MixD	mesic-derived	GVI	Decid	
Poplar spp MixDC	dry-derived	GVI	Mixedwood	
Poplar spp MixDC	mesic-derived	GVI	Mixedwood	
Poplar spp	dry-derived	GVI	Decid	
Poplar spp	mesic-derived	GVI	Decid	
Poplar spp	wet-derived	GVI	TreedSwamp-Decid	
Rock/Rubble	1A	PLVI	Bare	
Rock/Rubble	dry-derived	AVIE	Bare	

Rock/Rubble	dry-derived	GVI	Bare	
Rock/Rubble	dry-derived	Phase1	Bare	
Rock/Rubble	dry-derived	PLVI	Bare	
Rock/Rubble	mesic-derived	AVIE	Bare	
Rock/Rubble	mesic-derived	PLVI	Bare	
Rock/Rubble	w-derived	AVIE	Bare	
Rock/Rubble	wet-derived	AVIE	Bare	
Rock/Rubble	wet-derived	PLVI	Bare	
Rock	dry-derived	WBNP	Bare	
Rock	Xeric-derived	MTNP	Bare	
RockBarren	dry-derived	Phase1	Bare	
RockBarren	dry-derived	WBNP	Bare	
Saline lowland	mesic-derived	GVI	Alkali	
Sand	dry-derived	WBNP	Bare	
Sedge fen	Hydric	MTNP	GraminoidFen	
Shrub fen	Sub-Hydric	MTNP	ShrubbyFen	
Shrub marsh	Hygric	MTNP	ShrubbySwamp	
Shrub marsh	Sub-Hydric	MTNP	ShrubbySwamp	
Shrub	3B	PLVI	Shrub	
Shrub	3C	PLVI	Shrub	
Shrub	4C	PLVI	Shrub	
Shrub	5B	PLVI	Shrub	
Shrub	5C	PLVI	Shrub	
Shrub	5D	PLVI	Shrub	
Shrub	6C	PLVI	Shrub	
Shrub	6D	PLVI	Shrub	
Shrub	6E	PLVI	Shrub	
Shrub	7B	PLVI	ShrubbyWetland	x
Shrub	7C	PLVI	ShrubbyWetland	x
Shrub	7D	PLVI	ShrubbyWetland	x
Shrub	a	AVIE	ShrubbyWetland	x
Shrub	d	AVIE	Shrub	
Shrub	d	EINP	Shrub	
Shrub	dry-derived	AVIE	Shrub	
Shrub	dry-derived	CPVI	Shrub	
Shrub	dry-derived	GVI	Shrub	
Shrub	dry-derived	Phase1	Shrub	
Shrub	dry-derived	PLVI	Shrub	
Shrub	Hydric	MTNP	ShrubbyWetland	x
Shrub	m	AVIE	Shrub	
Shrub	m	EINP	Shrub	
Shrub	Mesic	MTNP	Shrub	
Shrub	mesic-derived	AVIE	Shrub	
Shrub	mesic-derived	CPVI	Shrub	
Shrub	mesic-derived	EINP	Shrub	
Shrub	mesic-derived	GVI	Shrub	
Shrub	mesic-derived	Phase1	Shrub	
Shrub	mesic-derived	PLVI	Shrub	
Shrub	mesic-derived	WBNP	Shrub	
Shrub	Sub-Hydric	MTNP	ShrubbyWetland	x
Shrub	Sub-Mesic	MTNP	Shrub	
Shrub	w	AVIE	ShrubbyWetland	x
Shrub	w	EINP	ShrubbyWetland	x
Shrub	w-derived	AVIE	ShrubbyWetland	x
Shrub	wet-derived	AVIE	ShrubbyWetland	x
Shrub	wet-derived	CPVI	ShrubbyWetland	x
Shrub	wet-derived	GVI	ShrubbyWetland	x
Shrub	wet-derived	Phase1	ShrubbyWetland	x
Shrub	Xeric	MTNP	Shrub	
ShrubBog	9B	PLVI	ShrubbyBog	
ShrubFen	9C	PLVI	ShrubbyFen	

ShrubFen	9D	PLVI	ShrubbyFen	
Snow/Ice	mesic-derived	Phase1	SnowIce	
Spruce bog	Hydric	MTNP	TreedBog-BSpr	
Spruce bog	Sub-Hydric	MTNP	TreedBog-BSpr	
Spruce spp MixCD	dry-derived	GVI	TreedSwamp-Mixedwood	
Spruce spp MixCD	mesic-derived	GVI	TreedSwamp-Mixedwood	
Spruce spp	dry-derived	GVI	TreedBog-BSpr	
Spruce spp	mesic-derived	GVI	TreedBog-BSpr	
Subalpine fir	Mesic	MTNP	Fir	
Subalpine fir	Sub-Mesic	MTNP	Fir	
Subalpine larch	Mesic	MTNP	AlpineLarch	
Subalpine larch	Sub-Mesic	MTNP	AlpineLarch	
Swamp Shrub	wet-derived	WBNP	ShrubbySwamp	
Swamp	9B	PLVI	ShrubbySwamp	
Swamp	wet-derived	AVIE	ShrubbySwamp	
Swamp	wet-derived	CPVI	ShrubbySwamp	
Swamp	wet-derived	EINP	ShrubbySwamp	
Swamp	wet-derived	GVI	ShrubbySwamp	
Swamp	wet-derived	Phase1	ShrubbySwamp	
Swamp	wet-derived	PLVI	ShrubbySwamp	
Tamarack leading - conifer	7C	PLVI	TreedFen-Larch	
Tamarack leading - conifer	7D	PLVI	TreedFen-Larch	
Tamarack leading - mixedwood	7C	PLVI	TreedFen-Larch	
Tamarack MixCD	d	AVIE	TreedFen-Mixedwood	
Tamarack MixCD	m	AVIE	TreedFen-Mixedwood	
Tamarack MixCD	w	AVIE	TreedFen-Mixedwood	
Tamarack MixCD	w-derived	AVIE	TreedFen-Mixedwood	
Tamarack MixDC	m	AVIE	TreedFen-Mixedwood	
Tamarack MixDC	w	AVIE	TreedFen-Mixedwood	
Tamarack	a	AVIE	TreedFen-Larch	
Tamarack	m	AVIE	TreedFen-Larch	
Tamarack	w	AVIE	TreedFen-Larch	
Tamarack	w-derived	AVIE	TreedFen-Larch	
TreedBog - Black Spruce leading - conifer	9B	PLVI	TreedBog-BSpr	
TreedBog - Black Spruce leading - conifer	9C	PLVI	TreedBog-BSpr	
TreedBog - Black Spruce leading - mixedwood	9B	PLVI	TreedBog-BSpr	
TreedBog - No species info	9B	PLVI	TreedBog-BSpr	
TreedFen - Balsam poplar leading - mixedwood	9C	PLVI	TreedFen-Decid	
TreedFen - Black Spruce leading - conifer	9C	PLVI	TreedFen-BSpr	
TreedFen - Black Spruce leading - conifer	9D	PLVI	TreedFen-BSpr	
TreedFen - Black Spruce leading - mixedwood	9C	PLVI	TreedFen-BSpr	
TreedFen - No Species Info	9C	PLVI	TreedFen-Larch	
TreedFen - No Species Info	9D	PLVI	TreedFen-Larch	
TreedFen - Tamarack leading - conifer	9C	PLVI	TreedFen-Larch	
TreedFen - Tamarack leading - conifer	9D	PLVI	TreedFen-Larch	
TreedFen - Tamarack leading - mixedwood	9C	PLVI	TreedFen-Larch	
TreedFen - Tamarack leading - mixedwood	9D	PLVI	TreedFen-Larch	
TreedFen - Trembling aspen leading - deciduous	5C	PLVI	TreedFen-Decid	
TreedFen - White birch leading - deciduous	9C	PLVI	TreedSwamp-Decid	
TreedFen - White birch leading - mixedwood	9C	PLVI	TreedFen-Decid	

Trembling aspen leading - deciduous	3C	PLVI	Decid	
Trembling aspen leading - deciduous	4C	PLVI	Decid	
Trembling aspen leading - deciduous	5C	PLVI	Decid	
Trembling aspen leading - deciduous	5D	PLVI	Decid	
Trembling aspen leading - deciduous	6D	PLVI	Decid	
Trembling aspen leading - deciduous	7C	PLVI	TreedSwamp-Decid	
Trembling aspen leading - deciduous	7D	PLVI	TreedSwamp-Decid	
Trembling aspen leading - mixedwood	3C	PLVI	Mixedwood	
Trembling aspen leading - mixedwood	4C	PLVI	Mixedwood	
Trembling aspen leading - mixedwood	5C	PLVI	Mixedwood	
Trembling aspen leading - mixedwood	5D	PLVI	Mixedwood	
Trembling aspen leading - mixedwood	6D	PLVI	Mixedwood	
Trembling aspen leading - mixedwood	7D	PLVI	TreedSwamp-Mixedwood	
Trembling aspen MixCD	d	ABMICutblock	Mixedwood	
Trembling aspen MixCD	d	AVIE	Mixedwood	
Trembling aspen MixCD	dry-derived	GVI	Mixedwood	
Trembling aspen MixCD	m	ABMICutblock	Mixedwood	
Trembling aspen MixCD	m	AVIE	Mixedwood	
Trembling aspen MixCD	m	EINP	Mixedwood	
Trembling aspen MixCD	mesic-derived	EINP	Mixedwood	
Trembling aspen MixCD	mesic-derived	GVI	Mixedwood	
Trembling aspen MixCD	w	AVIE	TreedSwamp-Mixedwood	
Trembling aspen MixCD	w-derived	AVIE	TreedSwamp-Mixedwood	
Trembling aspen MixCD	wet-derived	AVIE	TreedSwamp-Mixedwood	
Trembling aspen MixD	d	ABMICutblock	Decid	
Trembling aspen MixD	d	AVIE	Decid	
Trembling aspen MixD	d	EINP	Decid	
Trembling aspen MixD	dry-derived	AVIE	Decid	
Trembling aspen MixD	dry-derived	GVI	Decid	
Trembling aspen MixD	m	ABMICutblock	Decid	
Trembling aspen MixD	m	AVIE	Decid	
Trembling aspen MixD	m	EINP	Decid	
Trembling aspen MixD	mesic-derived	AVIE	Decid	
Trembling aspen MixD	mesic-derived	GVI	Decid	
Trembling aspen MixD	w	AVIE	TreedSwamp-Decid	
Trembling aspen MixD	w	EINP	TreedSwamp-Decid	
Trembling aspen MixD	w-derived	AVIE	TreedSwamp-Decid	
Trembling aspen MixD	wet-derived	AVIE	TreedSwamp-Decid	
Trembling aspen MixD	wet-derived	GVI	TreedSwamp-Decid	
Trembling aspen MixDC	d	ABMICutblock	Mixedwood	
Trembling aspen MixDC	d	AVIE	Mixedwood	
Trembling aspen MixDC	dry-derived	AVIE	Mixedwood	
Trembling aspen MixDC	dry-derived	GVI	Mixedwood	
Trembling aspen MixDC	m	ABMICutblock	Mixedwood	
Trembling aspen MixDC	m	AVIE	Mixedwood	
Trembling aspen MixDC	m	EINP	Mixedwood	
Trembling aspen MixDC	mesic-derived	AVIE	Mixedwood	
Trembling aspen MixDC	mesic-derived	GVI	Mixedwood	
Trembling aspen MixDC	w	AVIE	TreedSwamp-Mixedwood	
Trembling aspen MixDC	w-derived	AVIE	TreedSwamp-Mixedwood	
Trembling aspen MixDC	wet-derived	AVIE	TreedSwamp-Mixedwood	
Trembling aspen MixWet	d	AVIE	TreedSwamp-Decid	
Trembling aspen MixWet	dry-derived	GVI	TreedSwamp-Decid	
Trembling aspen MixWet	m	AVIE	TreedSwamp-Decid	
Trembling aspen MixWet	m	EINP	TreedSwamp-Decid	

Trembling aspen MixWet	mesic-derived	GVI	TreedSwamp-Decid	
Trembling aspen MixWet	w	AVIE	TreedSwamp-Decid	
Trembling aspen MixWet	w-derived	AVIE	TreedSwamp-Decid	
Trembling aspen	d	ABMICutblock	Decid	
Trembling aspen	d	AVIE	Decid	
Trembling aspen	dry-derived	AVIE	Decid	
Trembling aspen	dry-derived	GVI	Decid	
Trembling aspen	m	ABMICutblock	Decid	
Trembling aspen	m	AVIE	Decid	
Trembling aspen	m	EINP	Decid	
Trembling aspen	mesic-derived	ABMICutblock	Decid	
Trembling aspen	mesic-derived	AVIE	Decid	
Trembling aspen	mesic-derived	CPVI	Decid	
Trembling aspen	mesic-derived	EINP	Decid	
Trembling aspen	mesic-derived	GVI	Decid	
Trembling aspen	mesic-derived	Phase1	Decid	
Trembling aspen	mesic-derived	PLVI	Decid	
Trembling aspen	w	AVIE	TreedSwamp-Decid	
Trembling aspen	w	EINP	TreedSwamp-Decid	
Trembling aspen	w-derived	AVIE	TreedSwamp-Decid	
Trembling aspen	wet-derived	AVIE	TreedSwamp-Decid	
Water	dry-derived	AVIE	Water	
Water	mesic-derived	AVIE	Water	
Water	mesic-derived	EINP	Water	
Water	Water	AVIE	Water	
Water	Water	Hydro	Water	
Water	Water	MTNP	Water	
Water	Water	PLVI	Water	
Water	Water	WBNP	Water	
Water	wet-derived	AVIE	Water	
Water	wet-derived	EINP	Water	
Water	wet-derived	GVI	Water	
Western larch	w	AVIE	TreedFen-Larch	
White birch leading - deciduous	5C	PLVI	Decid	
White birch leading - deciduous	5D	PLVI	Decid	
White birch leading - deciduous	7C	PLVI	TreedSwamp-Decid	
White birch leading - deciduous	7D	PLVI	TreedSwamp-Decid	
White birch leading - mixedwood	5C	PLVI	Mixedwood	
White birch leading - mixedwood	5D	PLVI	Mixedwood	
White birch leading - mixedwood	6D	PLVI	Mixedwood	
White birch leading - mixedwood	7D	PLVI	TreedSwamp-Mixedwood	
White birch MixCD	m	ABMICutblock	Mixedwood	
White birch MixCD	m	AVIE	Mixedwood	
White birch MixCD	w	AVIE	TreedSwamp-Mixedwood	
White birch MixD	d	AVIE	Decid	
White birch MixD	m	ABMICutblock	Decid	
White birch MixD	m	AVIE	Decid	
White birch MixD	m	EINP	Decid	
White birch MixD	mesic-derived	AVIE	Decid	
White birch MixD	w	AVIE	TreedSwamp-Decid	
White birch MixD	w-derived	AVIE	TreedSwamp-Decid	
White birch MixDC	d	AVIE	Mixedwood	
White birch MixDC	m	ABMICutblock	Mixedwood	
White birch MixDC	m	AVIE	Mixedwood	
White birch MixDC	w	AVIE	TreedSwamp-Mixedwood	
White birch MixDC	w-derived	AVIE	TreedSwamp-Mixedwood	
White birch MixWet	m	AVIE	TreedSwamp-Decid	
White birch MixWet	w	AVIE	TreedSwamp-Decid	

White birch MixWet	w	EINP	TreedSwamp-Decid	
White birch MixWet	w-derived	AVIE	TreedSwamp-Decid	
White birch	d	AVIE	Decid	
White birch	m	ABMICutblock	Decid	
White birch	m	AVIE	Decid	
White birch	m	EINP	Decid	
White birch	w	AVIE	TreedSwamp-Decid	
White birch	w	EINP	TreedSwamp-Decid	
White birch	w-derived	AVIE	TreedSwamp-Decid	
White birch	wet-derived	AVIE	TreedSwamp-Decid	
White Spruce leading - conifer	3C	PLVI	Spruce	
White Spruce leading - conifer	5C	PLVI	Spruce	
White Spruce leading - conifer	5D	PLVI	Spruce	
White Spruce leading - conifer	7C	PLVI	TreedSwamp-Spruce	
White Spruce leading - conifer	7D	PLVI	TreedSwamp-Spruce	
White Spruce leading - mixedwood	3C	PLVI	Mixedwood	
White Spruce leading - mixedwood	5C	PLVI	Mixedwood	
White Spruce leading - mixedwood	5D	PLVI	Mixedwood	
White Spruce leading - mixedwood	6D	PLVI	Mixedwood	
White Spruce leading - mixedwood	7C	PLVI	TreedSwamp-Mixedwood	
White Spruce leading - mixedwood	7D	PLVI	TreedSwamp-Mixedwood	
White spruce MixC	d	ABMICutblock	Spruce	
White spruce MixC	d	AVIE	Spruce	
White spruce MixC	dry-derived	GVI	Spruce	
White spruce MixC	m	ABMICutblock	Spruce	
White spruce MixC	m	AVIE	Spruce	
White spruce MixC	mesic-derived	GVI	Spruce	
White spruce MixC	w	AVIE	TreedSwamp-Spruce	
White spruce MixC	w-derived	AVIE	TreedSwamp-Spruce	
White spruce MixCD	d	ABMICutblock	Mixedwood	
White spruce MixCD	d	AVIE	Mixedwood	
White spruce MixCD	dry-derived	AVIE	Mixedwood	
White spruce MixCD	dry-derived	GVI	Mixedwood	
White spruce MixCD	m	ABMICutblock	Mixedwood	
White spruce MixCD	m	AVIE	Mixedwood	
White spruce MixCD	m	EINP	Mixedwood	
White spruce MixCD	mesic-derived	AVIE	Mixedwood	
White spruce MixCD	mesic-derived	GVI	Mixedwood	
White spruce MixCD	w	AVIE	TreedSwamp-Mixedwood	
White spruce MixCD	w	EINP	TreedSwamp-Mixedwood	
White spruce MixCD	w-derived	AVIE	TreedSwamp-Mixedwood	
White spruce MixCD	wet-derived	AVIE	TreedSwamp-Mixedwood	
White spruce MixCD	wet-derived	GVI	TreedSwamp-Mixedwood	
White spruce MixDC	d	AVIE	Mixedwood	
White spruce MixDC	dry-derived	GVI	Mixedwood	
White spruce MixDC	m	ABMICutblock	Mixedwood	
White spruce MixDC	m	AVIE	Mixedwood	
White spruce MixDC	m	EINP	Mixedwood	
White spruce MixDC	mesic-derived	GVI	Mixedwood	
White spruce MixDC	w	AVIE	TreedSwamp-Mixedwood	
White spruce MixDC	w-derived	AVIE	TreedSwamp-Mixedwood	
White spruce MixWet	d	AVIE	TreedSwamp-Spruce	
White spruce MixWet	dry-derived	GVI	TreedSwamp-Spruce	
White spruce MixWet	m	AVIE	TreedSwamp-Spruce	

White spruce MixWet	mesic-derived	GVI	TreedSwamp-Spruce	
White spruce MixWet	w	AVIE	TreedSwamp-Spruce	
White spruce MixWet	w-derived	AVIE	TreedSwamp-Spruce	
White spruce	d	ABMICutblock	Spruce	
White spruce	d	AVIE	Spruce	
White spruce	dry-derived	AVIE	Spruce	
White spruce	dry-derived	GVI	Spruce	
White spruce	m	ABMICutblock	Spruce	
White spruce	m	AVIE	Spruce	
White spruce	m	EINP	Spruce	
White spruce	Mesic	ABMICutblock	Spruce	
White spruce	Mesic	MTNP	Spruce	
White spruce	mesic-derived	GVI	Spruce	
White spruce	mesic-derived	WBNP	Spruce	
White spruce	Sub-Hydric	MTNP	TreedSwamp-Spruce	
White spruce	Sub-Mesic	MTNP	Spruce	
White spruce	w	AVIE	TreedSwamp-Spruce	
White spruce	w	EINP	TreedSwamp-Spruce	
White spruce	w-derived	AVIE	TreedSwamp-Spruce	
White spruce	wet-derived	AVIE	TreedSwamp-Spruce	
White spruce	Xeric	MTNP	Spruce	
White-bark pine MixC	d	ABMICutblock	Pine	
White-bark pine MixC	d	AVIE	Pine	
White-bark pine MixC	m	AVIE	Pine	
White-bark pine	d	AVIE	Pine	
White-bark pine	m	AVIE	Pine	