NRCS Natural Resources Conservation Service

An Innovative Key to Ecological Sites for the Hydric Soils of MLRA 143 and 144B

Information Used to Develop the Key

- Maine Soil Catena
  - Parent Material
  - Soil Drainage Class
- NASIS – Geomorphic landform
- Maine Natural Areas Program Wetland Natural Plant Community descriptions
  - Soil and Site Characteristics
  - Landscape location

Information Used to Develop the Key

Cont'd

- Maine Hydrogeomorphic (HGM) Classification System
- National Vegetation Classification (NVC) System
- Local Knowledge
  - Soil Resource Specialists/Soil Scientists
  - Maine Natural Heritage Program Staff
  - Consulting Foresters

STATE OF MAINE SOILS CATENA KEY

The soil catena concept is a useful guide to understand the complex nature of soils that blanket the landscape. A soil catena is a sequence of soil series that extend across relief positions and are developed from similar parent material. Relief influences soil formation primarily through its effect on drainage, runoff, and erosion. The key that follows uses the catena concept by matching parent material and drainage, for each series . This is helpful in identifying the relationship of one series to others. It is intended to be used only as a guide; the Official Series Description should be used to identify the soil being evaluated.

(Series listed in *(Italics)* have a mesic soil temperature regime and are no longer used in Maine.)

(Series listed as ~~strikethrough~~ are from outside MLRA Region R. These series may have different soil properties from what was described when these soils were first identified in Maine.)

PARENT MATERIAL Of the soils catena & selected characteristics of the deepest, best drained member	SOIL DRAINAGE CLASS						
	Excessively Drained	Somewhat Excessively Drained	Well Drained	Moderately Well Drained	Somewhat Poorly Drained	Poorly Drained	Very Poorly Drained
A. Soils formed in Glacial Till							
1. Dark gray fine-grained quartzite, slate, phylitte, and some calcareous sandstone							
a. Coarse-loamy soils			Bangor Penquis[3]	Dixmont	→		
b. Loamy-skeletal soils		Thorndike[2]	Danforth Winnecook[3]	Shirley	→		
c. Coarse-loamy soils formed in lodgement till		Monson[2]	Elliottsville[3]	Chesuncook	Telos	Monarda	Burnham
2. Calcareous dark gray shale, silt-stone, phyllite, and limestone							
a. Fine-loamy soils			Caribou Mapleton[3]	Conant	→	Easton	Washburn*
b. Fine-loamy soils formed in lodgement till				Perham	Daigle	Aurelie	
3. Dark gray limestone and calcareous shale							
a. Coarse-loamy soils	←	(Benson[2])	Linneus[3]				
4. Red sandstone and conglomerate							
a. Loamy soils		Creasey[2]					
5. Fine-grained quartzite, slate, and some granite							
a. Coarse-loamy soils formed in lodgement till			Plaisted	Howland		Monarda	Burnham
6. Mica schist and phyllite with some granite and gneiss							
a. Coarse-loamy soils	Abram[1]	Lyman[2] (Hollis[2])	Berkshire (Charlton) Tunbridge[3]	Sunapee (Sutton)		Lyme (Leicester)	
b. Coarse-loamy soils formed in lodgement till			Marlow (Paxton)	Dixfield Peru (Woodbridge)	Colonel ← (Ridgebury)	Brayton Pillsbury →	Peacham (Whitman)
c. Coarse-loamy soils with a spodic horizon having >6% organic carbon			Hogback[2] Rawsonville[3]				

Red Maple Swamp

State Rank S5

Community Description

Red maple dominates the somewhat open to nearly closed canopy (20-90% closure), sometimes with a relatively large component (up to 40% cover) of balsam fir, red spruce, or northern white cedar. Green ash and yellow birch are common, but rarely abundant, associates. The maples may be widely spaced with multiple trunks and arching crowns. The shrub layer is patchy; winterberry is common and various other shrubs may be locally abundant. The herb layer is well developed and dominated by herbs, with dwarf shrubs <20% of herb cover. Bluejoint and sensitive fern are characteristic herbs. The bryoid layer is usually <35% cover; peat mosses are typical but do not form extensive, deep carpets as they do in peatlands.

Soil and Site Characteristics

Sites occupy mineral soils or well decomposed organic material over mineral soil on flats or gentle slopes in small basins, often on floodplains of streams to small rivers. Soils are typically 30-60 cm deep, loamy to silty in texture, sometimes with well decomposed muck over the mineral fraction, and pH 4.8-5.4.

Diagnostics

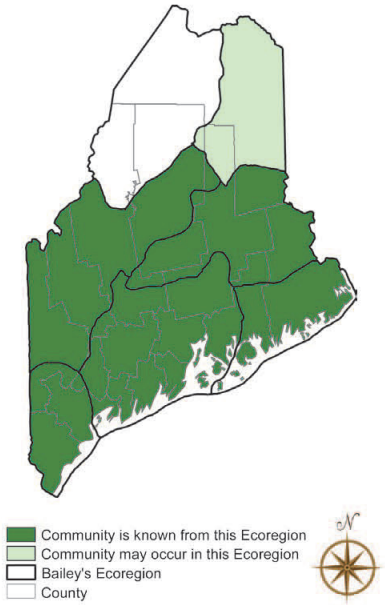
These are mineral soil wetlands in which red maple dominates the canopy or is co-dominant with conifers other than black spruce or larch. The seasonally flooded soils usually remain saturated through the growing season.

Red Maple Flowers

Similar Types

Red Maple Wooded Fens are similar, but either occur in association with large peatlands or occupy small somewhat peaty basins; they do not occur on mineral soils. Some small Northern White Cedar Swamps and Spruce - Fir - Cinnamon Fern Forests, particularly along the coast, include a fair amount of red maple but have cedar or spruce/fir, respectively, as the most abundant canopy species. Silver Maple Floodplain Forests are dominated by silver maple and generally occur along larger rivers, but the two types can intergrade on some floodplains.

Location Map



Red Maple Swamp

Conservation, Wildlife, and Management Considerations

Maintaining the hydrologic integrity of these stream drainages with upland buffers is key. These swamps typically have had few conflicting uses, although some have been recently harvested. ATV use has been observed at some sites.

Red maple swamps often provide habitat in which spotted turtles hibernate. If wet Sphagnum hummocks are present, four-toed salamanders may breed in this community. Examples that occur on floodplains of streams and small rivers may contain wood turtles, which overwinter in the stream channel and forage in the floodplain. The silver-haired bat often roosts in riparian habitats in trees with loose bark. The northern waterthrush is a common associate of this community type. In the southern part of the state, the Louisiana waterthrush and yellow-throated vireo may be associates if the canopy is closed or nearly so.

Distribution

Statewide, but most common in the southern half of state. Extends southward and southwestward from Maine; eastward distribution unknown.

Landscape Pattern: Large Patch

Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

Canopy
Balsam fir
Gray birch
Northern white cedar
Red maple*
Red spruce

Sapling/shrub
Arrowwood*
Balsam fir
Gray birch*
Red spruce
Speckled alder*
Winterberry*

Herb
Bluejoint*
Flat-topped white aster*
Interrupted fern
Tussock sedge
Royal fern*
Sensitive fern*

Bryoid
Sphagnum mosses*

Associated Rare Plants

Smooth winterberry holly
Spicebush
Swamp saxifrage
Swamp white oak
Sweet pepper-bush

Associated Rare Animals

Spotted turtle
Wood turtle

Examples on Conservation Lands You Can Visit

- Kennebunk Plains Preserve – York Co.
- Mt Agamenticus – York Co.
- Steep Falls Wildlife Management Area – Cumberland Co.
- Waterboro Barrens Preserve – York Co.

DRAFT - MAINE HYDROGEOMORPHIC WETLAND SUBCLASSES and THEIR PARAMETERS – *DRAFT* (2/13/12)

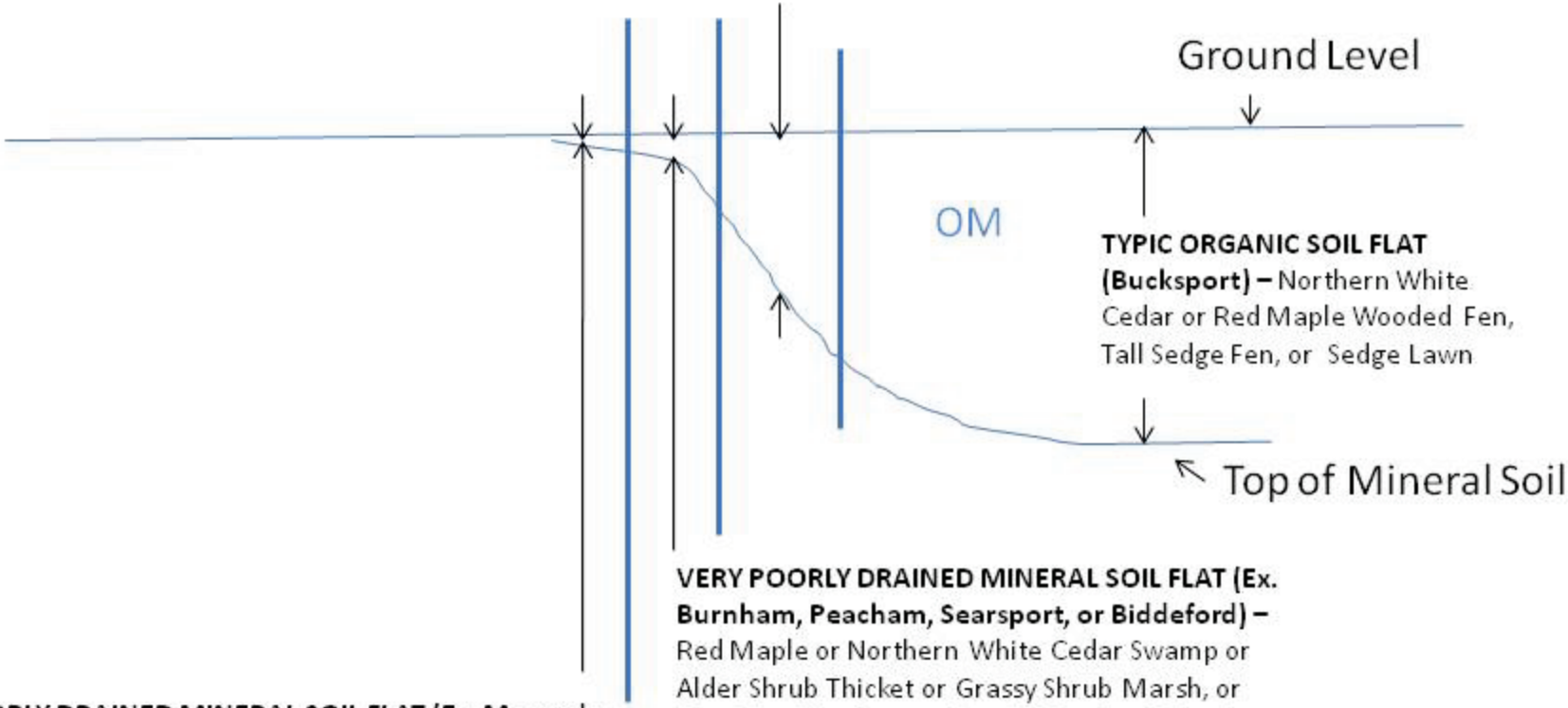
HGM SUBCLASSES	GEOMORPHIC SETTING	WATER SOURCE Precipitation Upstream / upslope flow Groundwater TRANSPORT VECTOR Atmospheric Lateral/near surface Phreatic -upward from H2O table	HYDRODYNAMICS: Primarily lateral bi-directional Primarily lateral uni-directional Strong vertical fluctuations	WATER CHEMISTRY Salinity / Turbidity / humic-fluvic / conductivity SOIL PROPERTIES Organic content Particle size distribution	POSSIBLE SOIL SERIES or MISCELLANEOUS UNITS*
RIVERINE-NONPERENNIAL Associated with intermittent or ephemeral streams. [Alder shrub thicket, Black ash swamp, red maple swamp]	Upland till plains, coastal lowlands, and river valleys.	WATER SOURCE: Precipitation; upstream / upslope flow. TRANSPORT VECTOR: Atmospheric; lateral/near surface.	Primarily lateral uni-directional.	Non-saline, somewhat turbid; humic acids are main soil OC source, humic and fulvic acids are dissolved OM. Organic carbon content drops with depth from 40% to about 1%. Generally sandy to fine silty family particle size class, 5-35% rock fragments.	**PD:** Kinsman, Charles (Limerick); SPD: Cornish; MWD: Lovewell
RIVERINE- UPPER PERENNIAL Associated with perennial streams in areas of high groundwater levels. Lose surface water to channel after flooding. Wooded/scrub-shrub/emergent vegetation.	Active Floodplains [Alder floodplain, Silver Maple floodplain forest, Hardwood river terrace forest]	WATER SOURCE: Precipitation Upstream / upslope flow TRANSPORT VECTOR: Atmospheric; lateral/near surface/overland flow.	Primarily lateral uni-directional	Non-saline, somewhat turbid Irregular decrease in organic carbon content. Generally sandy to fine silty family particle size class.	**PD:** Charles, Mixed Alluvial Land Pd, Rumney; **VPD:** Medomak, Riverwash
RIVERINE-TIDAL Influenced by the tides but not saline. [Freshwater Tidal Marsh]	Floodplains somewhat inland from coastal salt marshes. Glaciomarine plains adjacent to salt marshes.	WATER SOURCE: Precipitation;upstream /upslope flow TRANSPORT VECTOR: Atmospheric;lateral/near surface/overland	Primarily lateral bi-directional	Salinity is <5ppt. Somewhat turbid; humic acids are main soil OC source, humic and fulvic acids are dissolved OM.Irregular decrease in organic carbon content. Generally sandy to fine silty particle size.	**VPD:** Biddeford
TIDAL FRINGE Coastal salt marshes and estuaries. [Spartina Saltmarsh, Mixed Saltmarsh, Brackish Tidal Marsh]	Frequently flooded coastal salt marshes and estuaries	WATER SOURCE: Tides, precipitation TRANSPORT VECTOR: Lateral/near surface/overland and atmospheric.	Primarily lateral bi-directional	Saline Somewhat turbid Irregular decrease in organic carbon content and generally fine silty particle size.	**VPD:** Gouldsboro, Sulfaquents, Sulfihemists

Visualization Tools

- Cross-sectional diagrams used to visualize Soil & Plant Community landscape positions
- State & Transition Model (STM) Diagrams used to visualize natural plant community relationships to each other

POORLY TO VERY POORLY DRAINED MINERAL SOIL TO ORGANIC SOIL NPC DIAGRAM for MMA 12-8

TERRIC ORGANIC SOIL FLAT (Wonsqueak) – Atlantic White Cedar or Pitch Pine Wooded Bog, Mt Holly-Alder Wooded or Sweetgale Mixed Shrub Fen, or Shrubby Cinquefoil-Sedge Circumneutral Fen, or Tussock Sedge Meadow

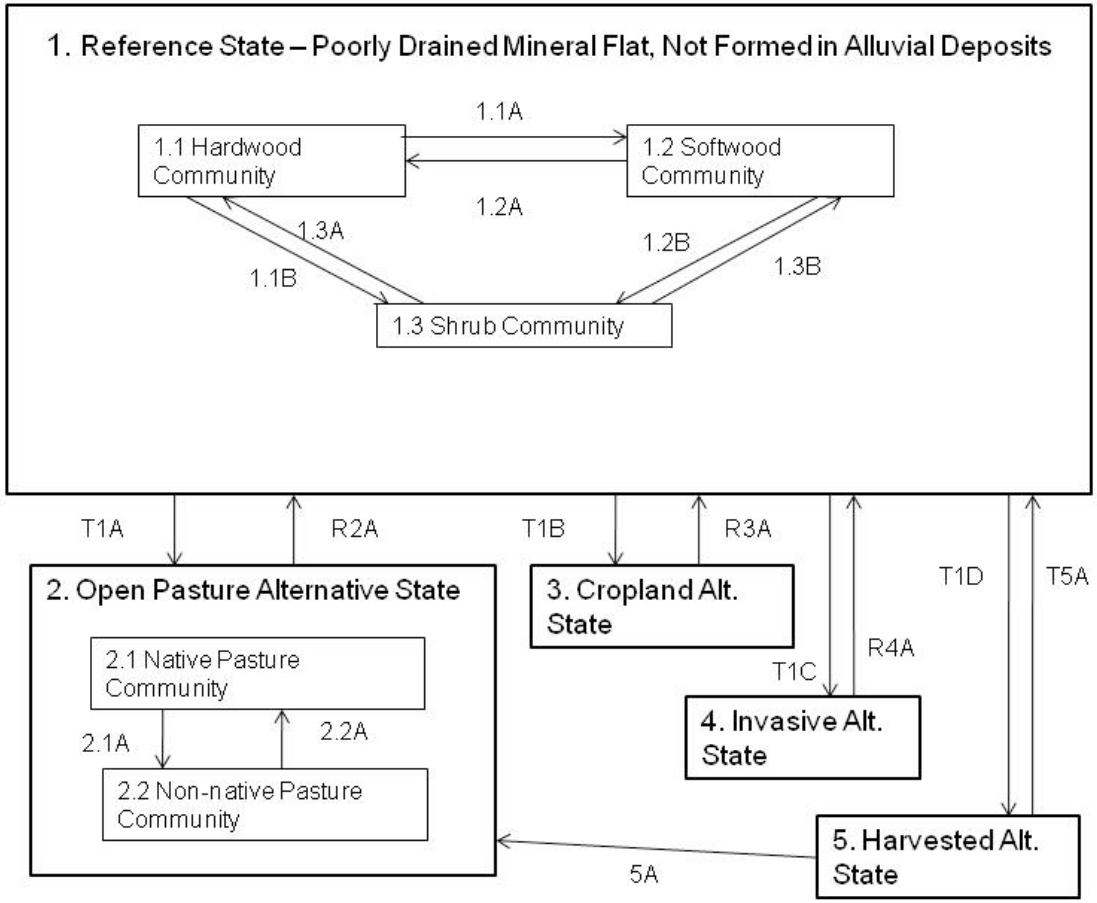


TYPIC ORGANIC SOIL FLAT (Bucksport) – Northern White Cedar or Red Maple Wooded Fen, Tall Sedge Fen, or Sedge Lawn

VERY POORLY DRAINED MINERAL SOIL FLAT (Ex. Burnham, Peacham, Searsport, or Biddeford) – Red Maple or Northern White Cedar Swamp or Alder Shrub Thicket or Grassy Shrub Marsh, or Bluejoint Meadow, or Cattail Marsh or Bulrush Aquatic Bed

POORLY DRAINED MINERAL SOIL FLAT (Ex. Monarda, Brayton, Scantic, or Swanville) – Spruce-Fir Wet Flat, Red Maple or Northern White Cedar Swamp, or Alder Floodplain

MMA 12-8 POORLY DRAINED MINERAL FLAT, NOT FORMED IN ALLUVIAL DEPOSITS STM



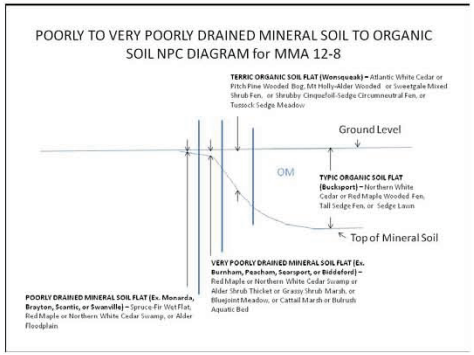
LEGEND

T1A, T1B	Subsurface Drain
R2A, R3A	Drain removal
R4A, 1.1C, 1.2C, 1.3C, 2.2A	Brush Management
R2A, R3A, R4A, 1.4A, 1.4B, 1.4C, 2..2A	Vegetation Planting
T1C, 2.1A	Tree/Shrub Invasion
T1D, 1.1A, 1.2A, 1.3A, 1.1B, 1.2B, 1.3B, 1.1C, 1.2C, 1.3C	Tree Harvesting
T1A, T1B	Land Clearing
R5A	Natural Regeneration

The Wetland ESD Key

1. Mineral **or** Organic Soil
2. Reference **or** Alternative State
3. Mineral – Formed **or** not formed in alluvial deposits
4. Poorly drained **or** very poorly drained soils
5. Located on nonperennial riverine/mineral flat sites **or** in smaller patches on slopes/upper hilltops, open or semi-closed, or closed depressions, as inclusions in other forest types
6. NVC Ecosystems
7. Description of Natural Plant Community, including Cowardin Classification and SAF Forest Type name, where available

DRAFT MMA 12-8 WETLAND ESD KEY [by Soil Properties then HGM/Landscape Location]



1. MINERAL SOIL REFERENCE STATES – Go to **5**

2. MINERAL SOIL ALTERNATIVE STATES – Go to **8**

3. ORGANIC SOIL REFERENCE STATES – Go to **9**

4. ORGANIC SOIL ALTERNATIVE STATES – Go to **10**

5. MINERAL SOIL REFERENCE STATES [Poorly and Very Poorly Drained, Frequently Flooded Non-hydric, or Miscellaneous Units]

5.A. NOT FORMED IN ALLUVIAL DEPOSITS – Go to **5.A.1**

5.B. FORMED IN ALLUVIAL DEPOSITS – Go to **6.**

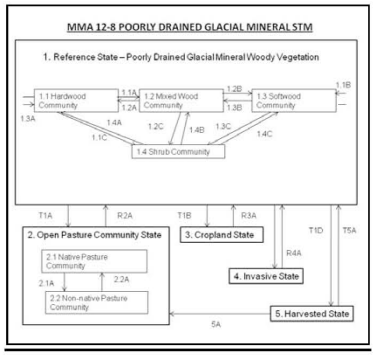
5.C. MISCELLANEOUS UNITS – Go to **7.**

5.A.1. NOT FORMED IN ALLUVIAL DEPOSITS REFERENCE STATES

5.A.1. POORLY DRAINED [Brayton, Kinsman, (Leicester), Monarda, Naskeag, Naumburg, Pillsbury, Roundabout, (Raynham), Scantic, Swanton, Swanville, (Walpole)] – Go to **5.A.1.a**

5.A.2. VERY POORLY DRAINED [Biddeford, Burnham, (Halsey), Peacham, (Whitman), Searsport, (Scarboro), (Washburn), Whately] – Go to **5.A.2.a**

5.A.1.a. NOT FORMED IN ALLUVIAL DEPOSITS, POORLY DRAINED MINERAL SOILS [Brayton, Kinsman, (Leicester), Monarda, Naskeag, Naumburg, Pillsbury, Roundabout, (Raynham), Scantic, Swanton, Swanville, (Walpole)]



LEGEND

T1A, T1B	Subsurface Drain
R2A, R3A	Drain removal
R4A, 1.1C, 1.2C, 1.3C, 2.2A	Brush Management
R2A, R3A, R4A, 1.4A, 1.4B, 1.4C, 2..2A	Vegetation Planting
T1C, 2.1A	Tree/Shrub Invasion
T1D, 1.1A, 1.2A, 1.3A, 1.1B, 1.2B, 1.3B, 1.1C, 1.2C, 1.3C	Tree Harvesting
T1A, T1B	Land Clearing
R5A	Natural Regeneration

5.A.1.a. LOCATED ON NONPERENNIAL RIVERINE [Kinsman] **OR MINERAL FLAT SITES** [Brayton, Kinsman, (Leicester), Monarda, Naumburg, Pillsbury, (Raynham), Roundabout, Scantic, Swanton, Swanville, (Walpole)] – Go to **1)**

5.A.1.b. LOCATED IN SMALLER PATCHES ON SLOPES/UPPER HILLTOPS [Brayton, Monarda, Naumburg, (Ridgebury), Scantic]**, OPEN OR SEMI-CLOSED DEPRESSIONS-** [Brayton, Kinsman, Naumburg, (Walpole)],

1) <u>NONPERENNIAL RIVERINE OR MINERAL FLAT REFERENCE STATES</u>

1a) Northern Appalachian (Laurentian?)-Acadian Conifer-Hardwood Acidic Swamp

1a1) Located on less than 30 cm of moist (only seasonally flooded in spring) organic material over mineral soil on level to gently sloping low flats or along drainages and dominated by Spruce species and understory is greater than 75% mosses with sparse shrubs and herbs –

Spruce-Fir Wet Flat [Spruce-fir-cinnamon fern forest] [Palustrine Needle-leaved Evergreen and Deciduous Forested Wetland (PFO4/2); Red Spruce - Balsam Fir: SAF33]

1a2) located on 30-60 cm of saturated, well decomposed organic matter (muck) over loamy or silty mineral soil, seasonally flooded on flats or gentle slopes in small basins or floodplains of streams and small rivers and dominated by Red Maple, and understory with well developed herb layer, few shrubs –

Red Maple Swamp [Red Maple-Sensitive Fern Swamp] [Palustrine Broad-leaved Deciduous Forested Wetlands (PFO1); Red Maple: SAF108]

1b) Laurentian-Acadian Alkaline Conifer-Hardwood Swamp

1b1) Located on less than 50 cm of peat on level basins along stream flowages or the perimeter of ponds and dominated by Northern White Cedar, and understory is greater than 30% herbs with a carpet of mosses –

Northern White Cedar Swamp [Palustrine Needle-leaved Evergreen Forested Wetlands (PF04); Northern White Cedar: SAF37]

1c) Laurentian-Acadian Wet Meadow-Shrub Swamp

1c1) Located on mineral soil, along medium to large, moderate to high energy riverbanks that are seasonally flooded and subject to ice scour, and dominated (> 30% cover) by Alder species, especially Speckled alder and a mixture of grasses and herbs. Heath shrubs and peat moss are absent or sparse –

Alder Floodplain {Palustrine Broad-leaved Deciduous Scrub/Shrub and Forested Wetland, Seasonally Flooded (PSS/FO1C)(Cowardin Code)}

QUESTIONS?

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