USDA Natural Resources Conservation Service

Ecological site F146XY021ME
Marsh

Last updated: 9/27/2024
Accessed: 05/10/2025

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 146X–Aroostook Area

This area is entirely in Maine and it makes up about 1,275 square miles (3,305 square kilometers). Presque Isle is the largest city in the area. Interstate 95 ends in the town of Houlton, at the border with New Brunswick, Canada. Aroostook State Park, Fort Kent Historic Site, and Loring Commerce Center are in this area. The Big Rock ski area is in the middle of this MLRA and is on the highest point, which is Mars Hill Mountain.

Ecological site concept

Marshes are typically species-rich habitats that provide valuable ecosystem services such as flood protection, water quality enhancement, food chain support and carbon sequestration. This site occurs in flat, marshy areas characterized by herbaceous and/or shrubby vegetation with very few trees. The soils are very deep, very poorly-drained, and formed in well-decomposed organic deposits, generally lacking rock and grit throughout the profile. This ecological site requires further study, particularly with regards to the influence of hydrology for distinguishing between the many distinct plant communities that occur on these open marshland soils. The primary drivers of plant community and dynamics are dissolved nutrient levels and hydrology, however specifics about the influence of these drivers on plant community expression and soil properties are poorly understood.

Associated sites

F146XY031ME	**Mucky Peat Bottom** The Mucky Peat Bottom site may occur with this site, often grading into the open Marsh site as wetness increases.
F146XY034ME	**Wet Sandy Bog** The Wet Sandy Bog site may occur in association with the open Marsh site.

Similar sites

F146XY031ME	**Mucky Peat Bottom** The Mucky Peat Bottom site has very similar soils to the Marsh site, but is capable of supporting significant tree cover.

Table 1. Dominant plant species

Tree	(1) *Abies balsamea* (2) *Betula populifolia*
Shrub	(1) *Alnus incana ssp. rugosa* (2) *Cornus sericea*

Herbaceous	(1) *Utricularia macrorhiza* (2) *Schoenoplectus subterminalis*

Physiographic features

This site most commonly occurs in flat, marshy areas where water collects as run-on from surrounding uplands. The water table is almost always at or above the soil surface. Slopes are negligible (0-1 percent), and elevations range from near sea level to around 1,800 feet.

Table 2. Representative physiographic features

Landforms	(1) Marsh (2) Swamp
Runoff class	Negligible to low
Flooding frequency	None
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Frequent
Elevation	10–1,000 ft
Slope	0–1%
Water table depth	0 in
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is characterized by cold, snowy winters, and cool summers. Precipitation is nearly equally distributed throughout the year, with slightly more moisture falling in June-October. During winter months, and sometimes fall and spring, cold winds from the north bring severe weather events. The effects of a relatively short growing season are somewhat mitigated by long summer days associated with the high latitudes of the region.

Table 3. Representative climatic features

Frost-free period (characteristic range)	80-94 days
Freeze-free period (characteristic range)	126-134 days
Precipitation total (characteristic range)	37-42 in
Frost-free period (actual range)	61-107 days
Freeze-free period (actual range)	103-141 days
Precipitation total (actual range)	36-42 in
Frost-free period (average)	85 days
Freeze-free period (average)	127 days
Precipitation total (average)	39 in

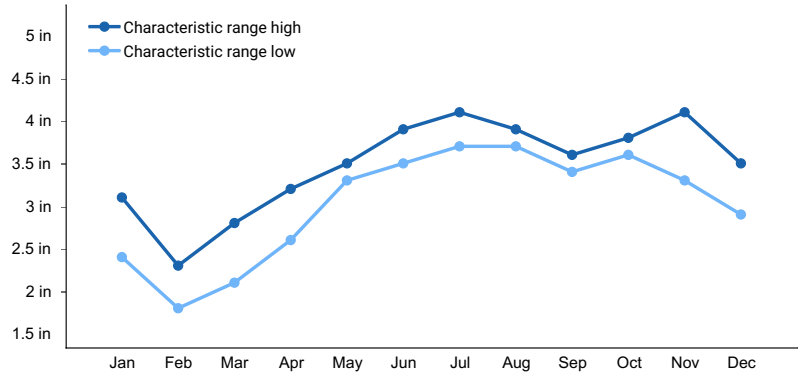


Figure 1. Monthly precipitation range

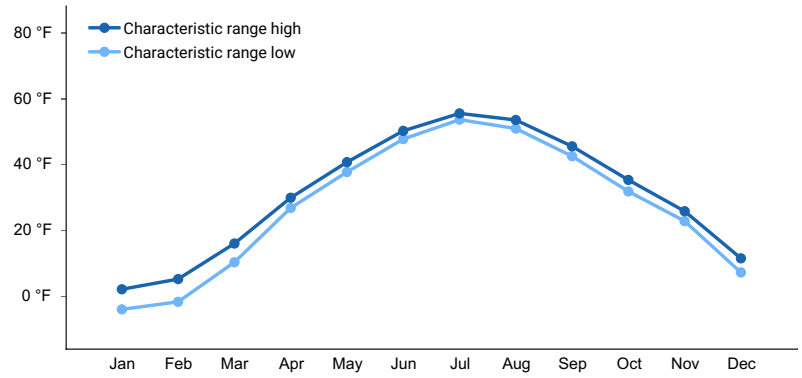


Figure 2. Monthly minimum temperature range

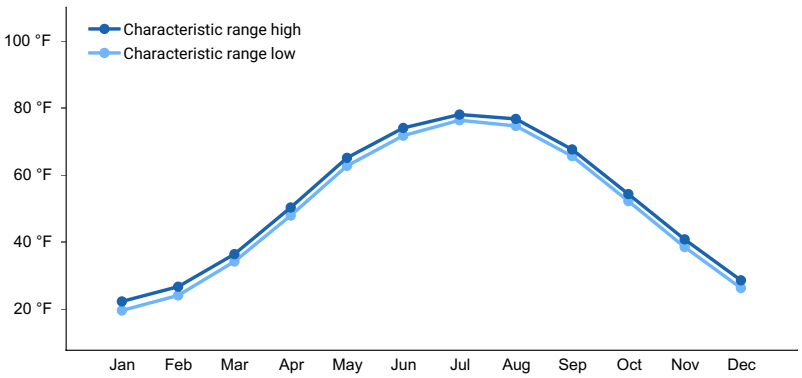


Figure 3. Monthly maximum temperature range

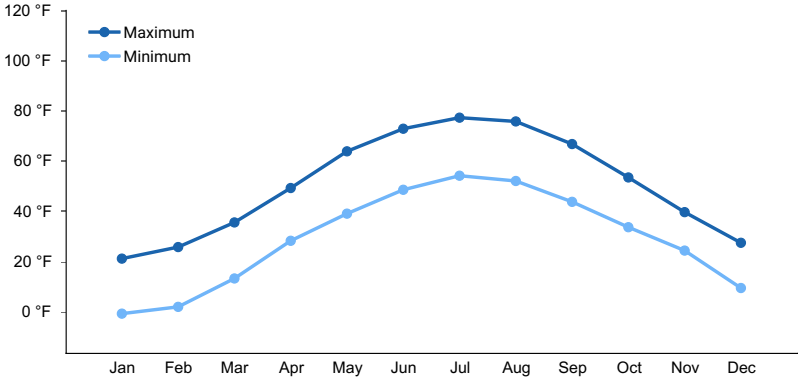


Figure 4. Monthly average minimum and maximum temperature

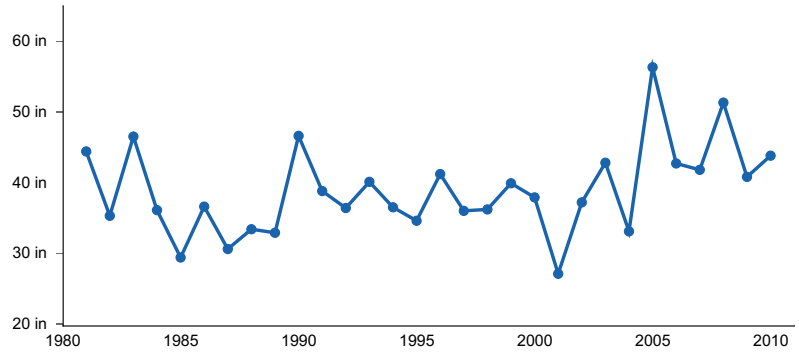


Figure 5. Annual precipitation pattern

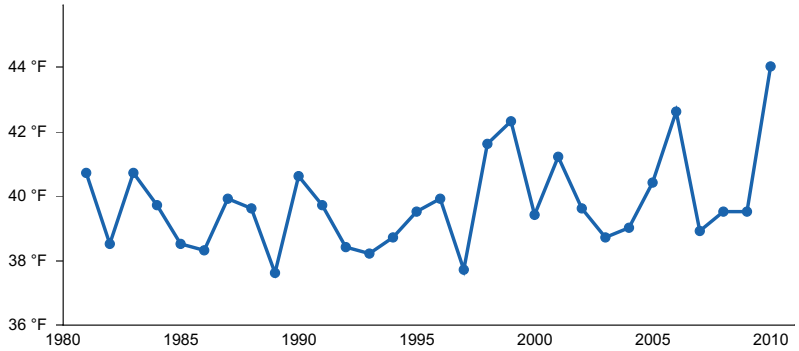


Figure 6. Annual average temperature pattern

Climate stations used

- (1) ALLAGASH [USC00170200], Saint Francis, ME
- (2) FT KENT [USC00172878], Fort Kent, ME
- (3) CARIBOU MUNI AP [USW00014607], Caribou, ME
- (4) HOULTON INTL AP [USW00014609], Houlton, ME
- (5) BRIDGEWATER [USC00170833], Bridgewater, ME
- (6) HOULTON 5N [USC00173944], Houlton, ME
- (7) PRESQUE ISLE [USC00176937], Presque Isle, ME

Influencing water features

This site receives extra moisture from neighboring watersheds, which causes soil saturation throughout the growing season. Differences in ponding depth and duration, along with other hydrologic features (which are poorly understood), influence plant community dynamics on this site. Further study is required to better define the water features that influence this site.

Soil features

The soils of this site are very deep, very poorly-drained and formed in organic deposits of various stages of decomposition. These soils are mostly acidic, are saturated throughout the year, and have high water-holding capacity. Rock fragments and mineral soil materials are negligible or too deep to have significant influence on the vegetation of this site. The soil moisture regime is aquic and the soil temperature regime is frigid.

Table 4. Representative soil features

Parent material	(1) Organic material
Surface texture	(1) Mucky peat
Drainage class	Very poorly drained
Permeability class	Moderate

Soil depth	65 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	7.9–15.99 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	3.6–5.3
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

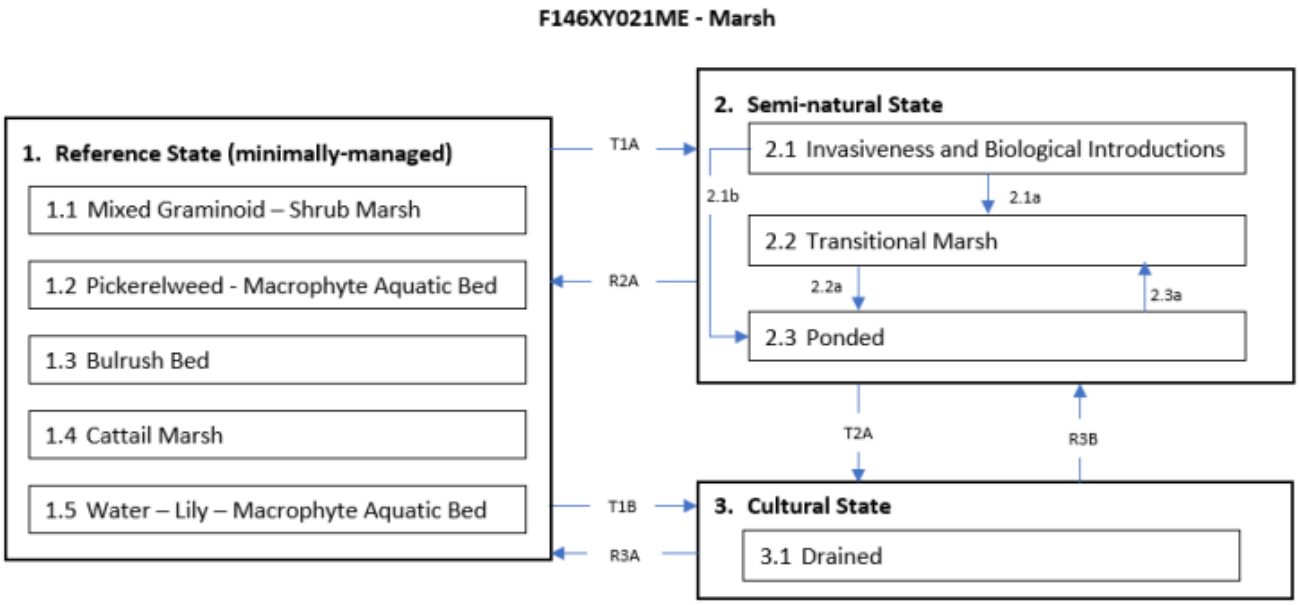
Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, and future projects support validation through field work. *] The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe, 2018 and localized associations provided by the Maine Natural Areas Program (Gawler and Cutko, 2010).

The marsh ecological site includes all open wetlands in MLRA 146. Current soil mapping does not distinguish between significant marsh types, and further research is required to define true wetland site concepts for the MLRA.

These freshwater emergent and/or submergent marshes are dominated by herbaceous vegetation and occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. The herbaceous vegetation does not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. The substrate is typically muck over mineral soil. Marshes are typically species-rich habitats that provide valuable ecosystem services such as flood protection, water quality enhancement, food chain support and carbon sequestration.

State and transition model



Transition	*Drivers/practices*
T1A	hydrologic alteration (natural/anthropogenic), disturbance, increased flooding, drought, climate change
T1B	hydrologic alteration (anthropogenic), mechanical soil disturbance
2.1a, 2.1b	introduction of invasive species/pests/pathogens, soil disturbance, climate change, drought
R2A	restoration, seeding/planting, actively managed for invasiveness and biological introductions, hydrologic alteration
2.2a, 2.3a	hydrologic alteration (obstruction or barrier) increase in annual precipitation or significant flooding events; remediation of hydrologic alteration, drought, warmer annual temperatures (decadal)
T2A	hydrologic alteration, significant drought, potential for agricultural use
R3A, R3B	remediation of hydrologic alteration, increased flooding frequency/duration, planting/seeding, active forest management plan

State 1
Reference State (minimally-managed)

The marsh ecological site includes all open wetlands in MLRA 146. Current soil mapping does not distinguish between significant marsh types, and further research is required to define true wetland site concepts for the MLRA. Freshwater marsh sites occur in closed or open basins that are generally flat and shallow, they are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. Surface water is non-tidal, persistent year-round (saturated to flooded), and ranges from several centimeters to several meters in depth. This ecological site provides a foraging, breeding, nesting habitat for many water-dependent animal populations. Several rare or endangered insects reptile, bird and amphibian species utilize these freshwater marsh habitats.

Characteristics and indicators. These sites are characterized by a variety of emergent , floating, and/or submergent aquatic vegetation species. Deciduous shrubs may be present and scattered, but trees are generally absent on these sites. The substrate is often a mixture of silty organic muck rather than peat.

Resilience management. The major threats to this ecological site are water quality degradation from excess nutrients in runoff and the spread of invasive aquatic plants. Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not result in marsh degradation.

Dominant resource concerns

- Surface water depletion

- Nutrients transported to surface water
- Pesticides transported to surface water
- Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water
- Petroleum, heavy metals, and other pollutants transported to surface water
- Sediment transported to surface water
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 1.1
Mixed Graminoid – Shrub Marsh

This site is very broadly defined and could be subdivided into shrub versus herbaceous types using additional site data and analyses.. This is a heterogeneous wetland type in which herbs and shrubs occur in various assemblages and proportions (herbs 25-95%, shrubs 0-70% cover). Many examples are transitional to other open wetland types and any of a variety of graminoids may be prominent at different sites. The more typical expression is dominated by herbs, with a mixture of graminoids making up at least 50% of the cover, often with a sparse shrub layer. Three-way sedge and yellow loosestrife are typical indicators of this site. Bryophytes are generally minor. Sites are typically on mineral soils (may have a thick organic layer of muck) with soil pH typically between 5.0-6.0. This site is typically flooded early in the growing season and remains saturated (or occasionally flooded) throughout the season. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S5 Secure – At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats. Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not degrade the marshes. Beaver activity often affects these wetlands, and can cause dramatic (although sometimes temporary) changes in dominance. (Gawler and Cutko, 2010)

Dominant plant species

- red maple (*Acer rubrum*), tree
- speckled alder (*Alnus incana ssp. rugosa*), shrub
- redosier dogwood (*Cornus sericea*), shrub
- catberry (*Ilex mucronata*), shrub
- sweetgale (*Myrica gale*), shrub
- leatherleaf (*Chamaedaphne calyculata*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- three-way sedge (*Dulichium arundinaceum*), grass
- earth loosestrife (*Lysimachia terrestris*), other herbaceous

Dominant resource concerns

- Bank erosion from streams, shorelines, or water conveyance channels
- Surface water depletion
- Pesticides transported to surface water
- Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water
- Petroleum, heavy metals, and other pollutants transported to surface water
- Sediment transported to surface water
- Elevated water temperature
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 1.2

Pickerelweed – Macrophyte Aquatic Bed

This ecological site occupies quiet waters along the shores of lakes, ponds, and streams. The substrate is usually mucky and the water ranges from acidic to circumneutral. This shallow water aquatic type is dominated by a mixture of emergent plants, floating plants, and submerged plants suspended in the water column. Pickerelweed, yellow water-lily, and bladderworts are almost always present, and one or more is typically dominant. A variety of pondweed species, bulrushes, bur-reed species, and other aquatics may be present. Total cover ranges from 30-100% and is typically >50%. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S5 Secure – At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats. This aquatic vegetation type is widespread and abundant in Maine. It can be found in the quieter portions of streams and rivers as well as in lakes and ponds. It provides habitat for a variety of water dependent animals. Many examples occur on public lands and private conservation lands; however, this common type is often not documented. The major threats to this community are water quality degradation from excess nutrients in runoff and the spread of invasive aquatic plants such as Eurasian water-milfoil and variable water-milfoil. (Gawler and Cutko, 2010)

Dominant plant species

- pickerelweed (*Pontederia cordata*), other herbaceous
- yellow pond-lily (*Nuphar lutea*), other herbaceous
- swaying bulrush (*Schoenoplectus subterminalis*), other herbaceous
- Oakes' pondweed (*Potamogeton oakesianus*), other herbaceous
- bladderwort (*Utricularia*), other herbaceous

Dominant resource concerns

- Bank erosion from streams, shorelines, or water conveyance channels
- Surface water depletion
- Pesticides transported to surface water
- Petroleum, heavy metals, and other pollutants transported to surface water
- Sediment transported to surface water
- Elevated water temperature
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 1.3
Bulrush Bed

These deepwater marshes have standing water over 15 cm deep all year, except during unusually prolonged low water levels. Bulrush beds are often near inlets and outlets of lakes or along slow moving portions of larger streams and rivers. Tall rushes and other non-persistent graminoids dominate this lakeshore or rivershore community. Aquatic macrophytes may be present, but are not usually abundant. Species richness is often low. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S4 Apparently Secure – At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors. This type appears to be well distributed and secure in Maine. Anecdotal information indicates that the waters of numerous public lands and private conservation lands include these marshes. Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not result in degradation. (Gawler and Cutko, 2010)

Dominant plant species

- hardstem bulrush (*Schoenoplectus acutus*), grass
- softstem bulrush (*Schoenoplectus tabernaemontani*), grass

- bayonet rush (*Juncus militaris*), grass
- chairmaker's bulrush (*Schoenoplectus americanus*), grass

Dominant resource concerns

- Bank erosion from streams, shorelines, or water conveyance channels
- Surface water depletion
- Pesticides transported to surface water
- Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water
- Petroleum, heavy metals, and other pollutants transported to surface water
- Sediment transported to surface water
- Elevated water temperature
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 1.4
Cattail Marsh

Cattail marshes often occur in impounded, semi-permanently flooded, and/or nutrient-rich waters, they are generally associated with large basins and adjacent to open water. Standing water persists throughout all or most seasons and substrate is muck or mineral soil rather than peat. Tall marsh vegetation is dominated by cattails and mostly deciduous shrubs. The cattails may be patchy, locally dominant, and grow taller than the other plant species. The dense growth of shrubs and cattails leaves little room for other herbaceous species.. Bryophytes are usually sparse and occur on vegetation hummocks. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S5 Secure – At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats. This community is well distributed statewide and apparently well represented (although not well documented) on public lands and private conservation lands. Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not result in degradation. (Gawler and Cutko, 2010)

Dominant plant species

- common winterberry (*Ilex verticillata*), shrub
- white meadowsweet (*Spiraea alba*), shrub
- broadleaf cattail (*Typha latifolia*), grass

Dominant resource concerns

- Bank erosion from streams, shorelines, or water conveyance channels
- Ponding and flooding
- Surface water depletion
- Pesticides transported to surface water
- Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water
- Petroleum, heavy metals, and other pollutants transported to surface water
- Sediment transported to surface water
- Elevated water temperature
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 1.5
Water-lily – Macrophyte Aquatic Bed

This site is currently broadly defined and may be divisible into two or more types with additional data. These aquatic beds occur in quiet waters at depths mostly between 0.5 and 2.5 m. The substrate is typically a mixture of silty organic muck. Water-lilies or pondweeds are dominant in this floating aquatic vegetation type and submerged aquatic plants are also common and may include bladderworts and pipewort. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S5 Secure – At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats. The major threats to this natural community are water quality degradation from excess nutrients in runoff and the spread of invasive aquatic plants. (Gawler and Cutko, 2010)

Dominant plant species

- largeleaf pondweed (*Potamogeton amplifolius*), other herbaceous
- sevenangle pipewort (*Eriocaulon aquaticum*), other herbaceous
- common bladderwort (*Utricularia macrorhiza*), other herbaceous
- waterlily (*Nymphaea*), other herbaceous

Dominant resource concerns

- Bank erosion from streams, shorelines, or water conveyance channels
- Surface water depletion
- Pesticides transported to surface water
- Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water
- Petroleum, heavy metals, and other pollutants transported to surface water
- Sediment transported to surface water
- Elevated water temperature
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

State 2
Semi-natural State

Shifts in ecological site composition, functionality, and dynamics driven by natural disturbances, processes, and pressures (may have some anthropogenic influences). More research is needed to determine the extent of the Semi-natural state associated with this ecological site.

Community 2.1
Invasiveness and Biological Introductions

Introduction of invasive species, pathogens, and/or pests resulting in shifts in ecological site composition, functionality, and dynamics. More research is needed to determine the extent of these effects on the semi-natural state associated with this ecological site.

Dominant resource concerns

- Organic matter depletion
- Ponding and flooding
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 2.2
Transitional Marsh

Hydrological alteration of sites that can include the removal or addition of dams, barriers, structures, or actions that temporarily or permanently alter watersheds or the fluvial geomorphology of rivers and streams. These actions strongly influence site functions, dynamics, and composition that promote a semi-natural state as opposed to either extremes of hydrological alteration within the reference state and cultural state.

Dominant resource concerns

- Ponding and flooding
- Seasonal high water table
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 2.3
Ponded

Hydrologically-altered. Management of sites can include the addition of dams, barriers, structures, or actions that temporarily or permanently alter watersheds or the fluvial geomorphology of rivers and streams. These actions strongly influence site functions, dynamics, and composition promoting an intended cultural state.

Dominant resource concerns

- Ponding and flooding
- Seasonal high water table
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Pathway 2.1a
Community 2.1 to 2.2

introduction of invasive species/pests/pathogens, soil disturbance, climate change, drought

Pathway 2.1b
Community 2.1 to 2.3

introduction of invasive species/pests/pathogens, soil disturbance, climate change, drought

Pathway 2.2a
Community 2.2 to 2.3

hydrologic alteration (obstruction or barrier), increase in annual precipitation (decadal) or increase in significant flooding events.

Conservation practices

Dam, Diversion
Pond
Dam
Rock Barrier
Monitoring and Evaluation

Pathway 2.3a
Community 2.3 to 2.2

remediation of hydrologic alteration (obstruction or barrier removed), increase in drought over several years, warmer annual temperatures (decadal)

Conservation practices

Riparian Herbaceous Cover
Riparian Forest Buffer
Obstruction Removal
Drainage Water Management
Wetland Wildlife Habitat Management
Early Successional Habitat Development/Management
Wetland Restoration
Wetland Enhancement
Floodproofing
Riparian Buffers - Vegetative
Native Plant Community Restoration and Management
Shallow water habitat
Monitoring and Evaluation
Drainage water management

State 3
Cultural State

Shifts in ecological site composition, functionality, and dynamics that are primary driven by anthropogenic disturbances and pressures (may have some associated natural influences). More research is needed to determine the extent of the cultural state associated with this ecological site.

Community 3.1
Drained

Cultural state used for plantations, cultivated cropland, pastures, or hayland primarily formed by hydrological alteration.

Dominant resource concerns

- Compaction
- Organic matter depletion
- Aggregate instability
- Surface water depletion
- Ground water depletion
- Naturally available moisture use
- Pesticides transported to surface water
- Pesticides transported to ground water
- Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water
- Pathogens and chemicals from manure, biosolids, or compost applications transported to ground water
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Transition T1A
State 1 to 2

hydrologic alteration (natural/anthropogenic), soil disturbance, increased flooding, drought, climate change

Transition T1B
State 1 to 3

hydrologic alteration (anthropogenic), mechanical soil disturbance

Restoration pathway R2A
State 2 to 1

restoration, seeding/planting, actively managed for invasiveness and biological introductions, remediation of hydrologic alteration

Conservation practices

Obstruction Removal
Drainage Water Management
Wetland Wildlife Habitat Management
Early Successional Habitat Development/Management
Wetland Restoration
Wetland Enhancement
Floodproofing
Riparian Buffers - Vegetative
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Forest Land Management
Invasive Plant Species Control
Pathogen Management
Invasive Species Pest Management
Precision Pest Control Application
Shallow water habitat
Establish pollinator habitat
Biological suppression and other non-chemical techniques to manage brush, weeds and invasive species
Biological suppression and other non-chemical techniques to manage herbaceous weeds invasive species
Monitoring and Evaluation
Establish pollinator and/or beneficial insect habitat

Transition T2A
State 2 to 3

hydrologic alteration, significant drought, potential for agricultural use

Restoration pathway R3A
State 3 to 1

remediation of hydrologic alteration, increased flooding frequency/duration, active restoration management

Conservation practices

Obstruction Removal
Wetland Wildlife Habitat Management
Wetland Restoration
Wetland Creation
Wetland Enhancement
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Restoration of Compacted Soils
Monitoring and Evaluation

Restoration pathway R3B
State 3 to 2

remediation of hydrologic alteration, increased flooding frequency/duration, active restoration management

Conservation practices

Obstruction Removal
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Restoration of Compacted Soils

Additional community tables

Inventory data references

Future work is needed, as described in a future project plan, to validate the information presented in this provisional ecological site description. Future work includes field sampling, data collection and analysis by qualified vegetation ecologists and soil scientists. As warranted, annual reviews of the project plan can be conducted by the Ecological Site Technical Team. A final field review, peer review, quality control, and quality assurance reviews of the ESD are necessary to approve a final document.

Other references

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Contributors

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Approval

Nels Barrett, 9/27/2024

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Nels Barrett, Nick Butler, and Carl Bickford provided considerable review of this ecological site concept.

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Approved by	Nels Barrett
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
