USDA Natural Resources
Conservation Service

Ecological site R144AY045RI
Subaqueous Freshwater Mineral Deposits

Last updated: 10/04/2024
Accessed: 05/11/2025

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): 144A–New England and Eastern New York Upland, Southern Part

MLRA 144A: New England and Eastern New York Upland, Southern Part
The eastern half of the eastern part of this MLRA is in the Seaboard Lowland Section of the New England Province of the Appalachian Highlands. The western half of the eastern part and the southeastern half of the western part are in the New England Upland Section of the same province and division. The northwestern half of the western part is in the Hudson Valley Section of the Valley and Ridge Province of the Appalachian Highlands. This MLRA is a very scenic area of rolling to hilly uplands that are broken by many gently sloping to level valleys that terminate in coastal lowlands. Elevation ranges from sea level to 1,000 feet (0 to 305 meters) in much of the area, but it is 2,000 feet (610 meters) on some hills. Relief is mostly about 6 to 65 feet (2 to 20 meters) in the valleys and about 80 to 330 feet (25 to 100 meters) in the uplands.
This area has been glaciated and consists almost entirely of till hills, drumlins, and bedrock-controlled uplands with a mantle of till. It is dissected by narrow glacio-fluvial valleys. The southernmost boundary of the area marks the farthest southward extent of Wisconsinian glaciation on the eastern seaboard. The river valleys and coastal plains are filled with glacial lake sediments, marine sediments, and glacial outwash. The bedrock in the eastern half of the area consists primarily of igneous and metamorphic rocks of early Paleozoic age. Granite is the most common igneous rock, and gneiss, schist, and slate are the most common metamorphic rocks. In the parts of the MLRA in eastern and southeastern New York, Devonian- to Pennsylvanian-age sandstone, shale, and limestone are dominant. Carbonate rocks, primarily dolomite and limestone, are the dominant kinds of bedrock in the part of this MLRA in northwestern Connecticut.

Ecological site concept

The site consists of subaqueous soils permanently submerged beneath 0 to about 3 meters of water on submerged landscapes of freshwater ponds, lakes, and reservoirs. Slope ranges from 0 to 5 percent. Representative soils are Aquapaug, Burlingame, and Shannock.
Aquapaug soils formed in over 100 cm of sandy outwash material. Burlingame soils formed in mixed lacustrine material overlying till. They are typically underlain by supraglacial meltout or lodgement till. Shannock soils formed in a thick mantle of recent lacustrine sediments over glacial lacustrine and/or glaciofluvial sediments.
Areas of this soil are used for recreational fishing, swimming, and aquatic wetland habitat. Vegetation includes waterseed (*Elodea canadensis*), bladderwort (Utricularia spp.), fanwort (*Cabomba caroliniana*), variable milfoil (*Myriophyllum heterophyllum*), white water lily (Nymphaea ordorata), and yellow water lily (Nuphar variegatum).

Similar sites

F144AY037MA	**Moist Dense Till Uplands**

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	(1) *Elodea canadensis*

Physiographic features

This site occurs in low-lying, ponded, freshwater landscapes on outwash plains and till plains.

Table 2. Representative physiographic features

Landforms	(1) Lowland > Outwash plain (2) Till plain
Runoff class	Negligible
Flooding frequency	None
Ponding frequency	Frequent
Elevation	0–567 ft
Slope	0–5%
Water table depth	0 in
Aspect	Aspect is not a significant factor

Climatic features

The Koppen-Geiger climate classification of the area in which this MLRA occurs varies between Dfb (Warm-summer humid continental) in the North, and Dfa (Hot-summer humid continental) in the southern portion of the MLRA. Precipitation is usually uniformly distributed throughout the year. Near the coast, however, it is slightly lower in summer. Precipitation is slightly higher in spring and fall in inland areas. Rainfall occurs as high-intensity, convective thunderstorms during the summer. During the winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. The freeze-free period increases in length to the south.

Table 3. Representative climatic features

Frost-free period (characteristic range)	126-145 days
Freeze-free period (characteristic range)	148-186 days
Precipitation total (characteristic range)	43-48 in
Frost-free period (actual range)	116-147 days
Freeze-free period (actual range)	146-188 days
Precipitation total (actual range)	41-52 in
Frost-free period (average)	134 days
Freeze-free period (average)	165 days
Precipitation total (average)	47 in

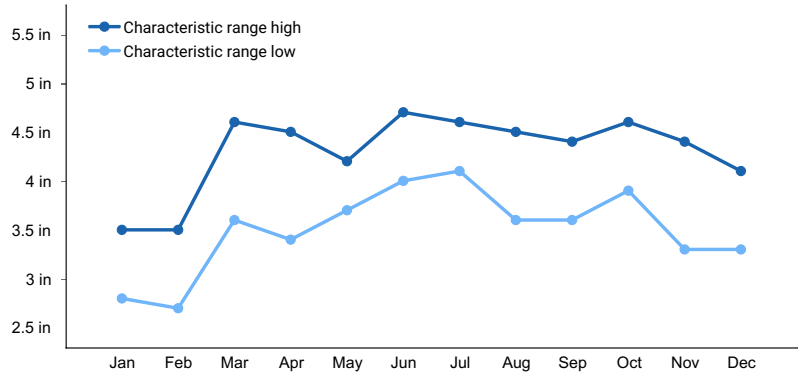

Figure 1. Monthly precipitation range

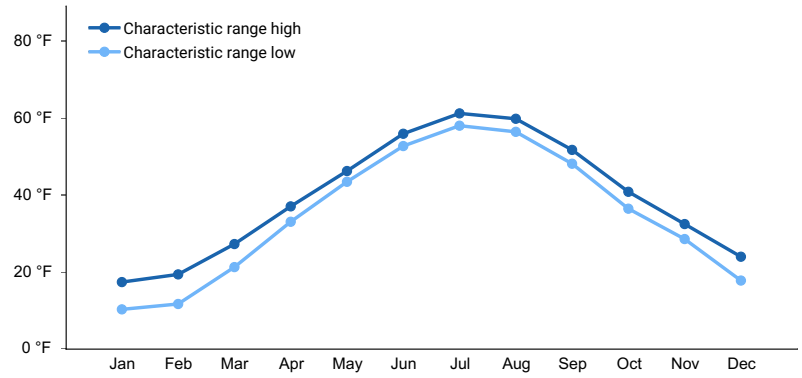

Figure 2. Monthly minimum temperature range

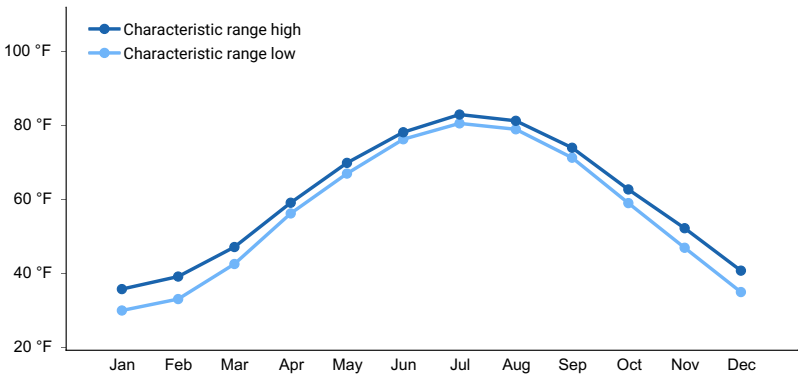

Figure 3. Monthly maximum temperature range

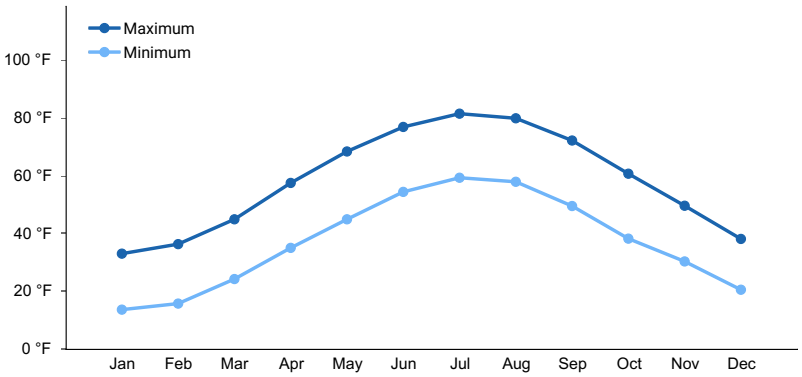

Figure 4. Monthly average minimum and maximum temperature

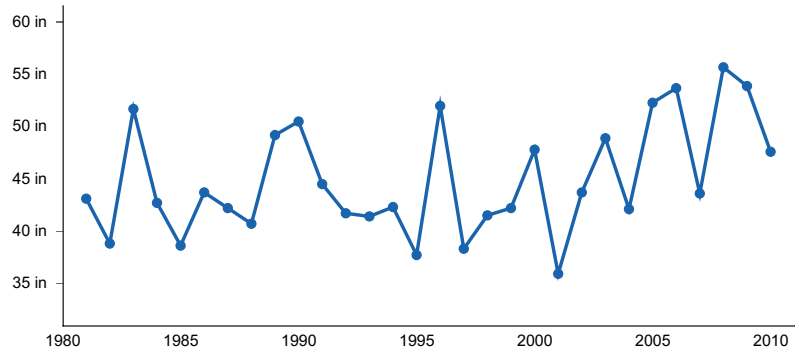

Figure 5. Annual precipitation pattern

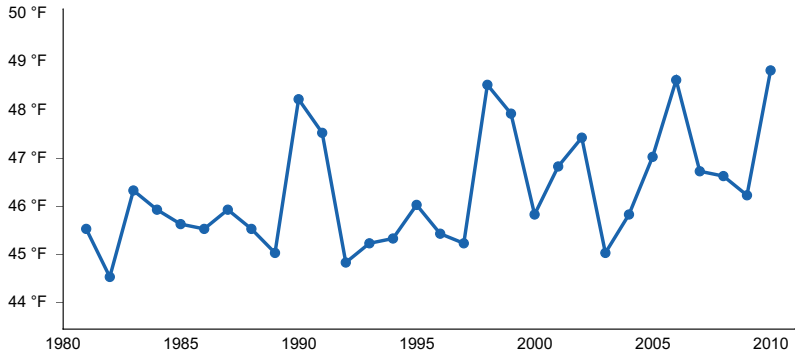

Figure 6. Annual average temperature pattern

Climate stations used

- (1) RUTLAND [USC00436995], Rutland, VT
- (2) GLOVERSVILLE [USC00303319], Gloversville, NY
- (3) ANDOVER AEROFLEX AP [USW00054779], Andover, NJ
- (4) BURLINGTON [USC00060973], Avon, CT
- (5) NEW BEDFORD MUNI AP [USW00094726], New Bedford, MA
- (6) DURHAM 2 SSW [USW00054795], Durham, NH
- (7) ORANGE MUNI AP [USW00054756], Orange, MA

Influencing water features

Subaqueous soils differ from subaerial, or terrestrial, soils by having perennial water on the soil surface. These soils occur in shallow freshwater and marine environments, such as ponds, lakes, and the subtidal areas of estuaries and tidal embayments.

Wetland description

National Wetland Classification (Cowardin et al., 1979):

System: Lacustrine

Subsystem: Littoral

Class: Unconsolidated Bottom/Shore, Aquatic Bed, Emergent

Subclass: Cobble-Gravel, Sand, Mud, Algal, Rooted/Floating Vascular, Organic, Persistent/Non-persistent

Water Regime: Permanently Flooded

Soil features

The site consists of subaqueous soils permanently submerged beneath 0 to about 6 feet of water on submerged landscapes of freshwater ponds, lakes, and reservoirs. Slope ranges from 0 to 5 percent. Surface textures include loamy sand, sandy loam, and mucky fine sandy loam. Drainage class is subaqueous. Representative soils are Aquapaug, Burlingame, and Shannock.

Table 4. Representative soil features

Parent material	(1) Fluviomarine deposits (2) Till (3) Lacustrine deposits (4) Outwash
Surface texture	(1) Loamy sand (2) Sandy loam (3) Mucky fine sandy loam
Family particle size	(1) Coarse-loamy
Drainage class	Subaqueous
Permeability class	Slow
Depth to restrictive layer	72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–9%
Available water capacity (Depth not specified)	3–5 in
Soil reaction (1:1 water) (Depth not specified)	3.4–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–40%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Vegetation includes waterweed (Elodea Canadensis), bladderwort (Utricularia spp.), fanwort (*Cabomba caroliniana*), variable milfoil (*Myriophyllum heterophyllum*), white water lily (Nymphaea ordorata), and yellow water lily (Nuphar variegatum).

State and transition model

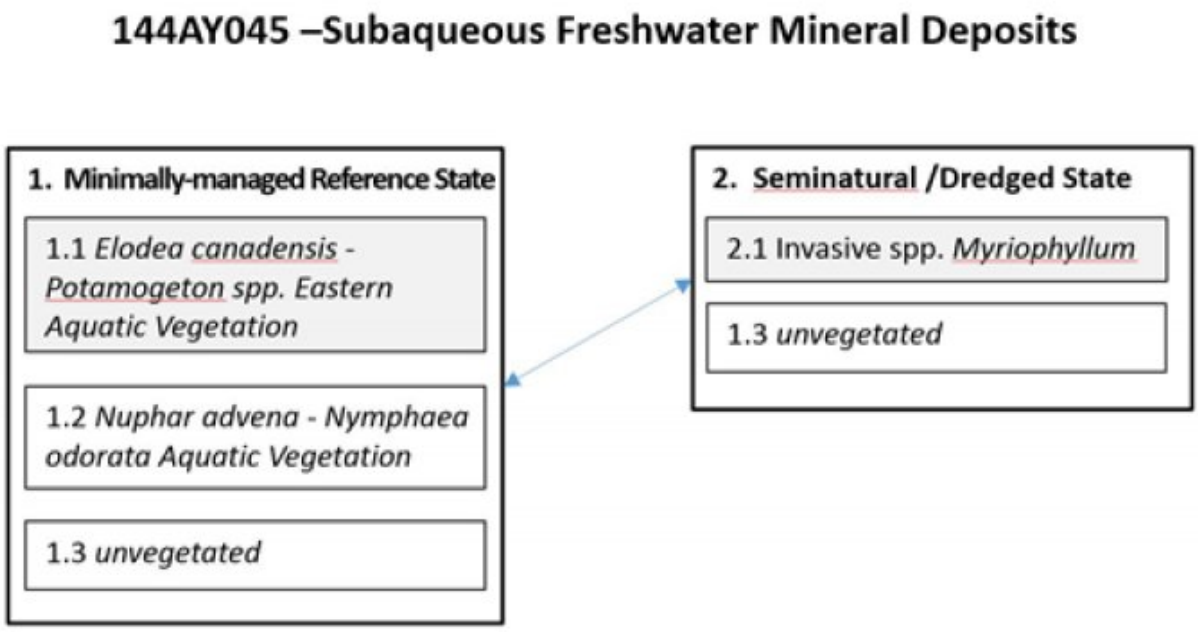

Figure 7. STM_144AY045_Subaqueous_Freshwater_Mineral_Deposit

Transition	Drivers/practices
T1-2	Dredging
R2-1	Fill and aquatic planting

Figure 8. STM_144AY045_Subaqueous_Freshwater_Mineral_Deposit

State 1
Minimally-managed reference state

Vegetation includes waterweed (Elodea Canadensis), bladderwort (Utricularia spp.), fanwort (*Cabomba caroliniana*), variable milfoil (*Myriophyllum heterophyllum*), white water lily (Nymphaea ordorata), and yellow water lily (Nuphar variegatum).

Community 1.1
Elodea canadensis - Potamogeton spp. eastern aquatic vegetation

Community 1.2
Nuphar advena - Nymphaea odorata aquatic vegetation

Community 1.3
Unvegetated

State 2
Semi-natural / dredged state

Community 2.1
Invasive spp. myriophyllum

Community 2.2
unvegetated

Transition T1A
State 1 to 2

Dredging

Restoration pathway R2A
State 2 to 1

Fill and aquatic planting

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

REFERENCES

Bradley, M.P. and Stolt, M.H., 2003. Subaqueous soil-landscape relationships in a Rhode Island estuary. Soil Science Society of America Journal, 67(5)_1487-1495.

Ditzler, C.A., Ahrens, R.J., Rabenhorst, M.C., Stolt, M., Hipple, K., and Turenne, J. s.d. Classification, Mapping, and Interpretation of Subaqueous Soils. Unpubl. Manuscript.

Stolt, M., Bradley, M., Turenne, J., Payne, M., Scherer, E., Cicchetti, G., Shumchenia, E., Guarinello, M., King, J., Boothroyd, J. and Oakley, B., 2011. Mapping shallow coastal ecosystems: a case study of a Rhode Island lagoon. Journal of Coastal Research, 27(6A)_1-15.

Contributors

Joshua Hibit

Approval

Greg Schmidt, 10/04/2024

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.

Author(s)/participant(s)	
Contact for lead author	
Date	05/11/2025
Approved by	Greg Schmidt
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:**

---

17. **Perennial plant reproductive capability:**
