

Ecological site F149BY005MA Dry Outwash

Last updated: 5/20/2025
Accessed: 05/25/2025

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.

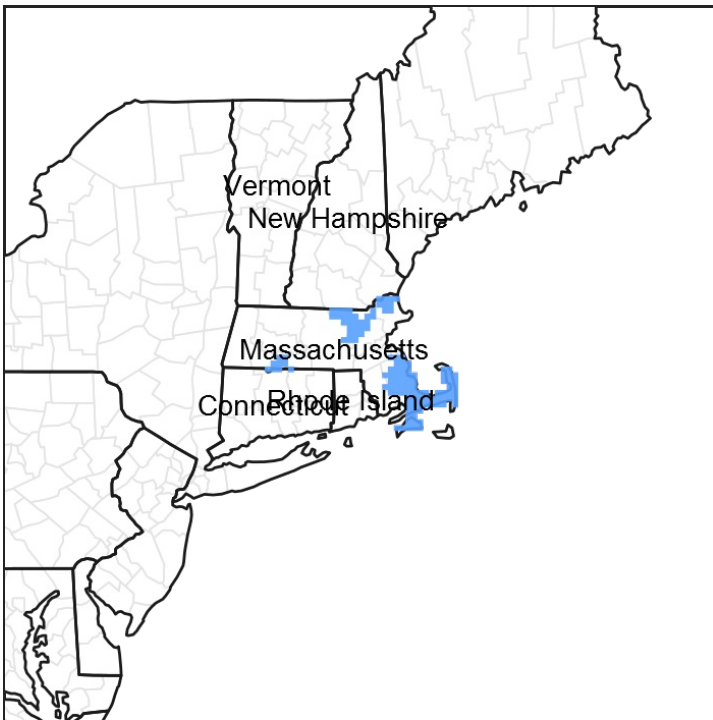


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 149B—Long Island-Cape Cod Coastal Lowland

149B—Long Island-Cape Cod Coastal Lowland

It is mostly an area of nearly level to rolling plains, but it has some steeper hills (glacial moraines). Ridges border the lower plains. The Peconic and Carmans Rivers are on the eastern end of Long Island. The parts of this area in Massachusetts and Rhode Island have no major rivers. This entire area is made up of deep, unconsolidated glacial outwash deposits of sand and gravel. A thin mantle of glacial till covers some of the surface. Some moraines form ridges and higher hills in this area of generally low relief. Sand dunes and tidal marshes are extensive along the coastline.

Classification relationships

USDA-NRCS (USDA, 2006):

Land Resource Region (LRR): S—Northern Atlantic Slope Diversified Farming Region

Major Land Resource Area (MLRA): 149B—Long Island-Cape Cod Coastal Lowland

USDA-FS (Cleland et al., 2007):

Province: 221 Eastern Broadleaf Forest Province

Section: 221A Lower New England

Subsection: 221Ab Cape Cod Coastal Lowland and Islands

Subsection: 221An Long Island Coastal Lowland and Moraine

Ecological site concept

Pitch pine - oak woodland occurring on very well-drained sandy outwash.

Concept summary from (Sneddon, et al. 2010):

The vegetation is a matrix woodland type of the central Pine Barrens from Long Island, New York, north to Cape Cod, Massachusetts. It occurs on very well-drained sandy outwash or moraine deposits. The canopy is dominated by *Pinus rigida* (pitch pine) plus the following oaks in variable proportions: *Quercus coccinea* (scarlet oak), *Quercus velutina* (black oak), *Quercus alba* (white oak), and *Quercus rubra* (northern red oak) and occasionally *Quercus stellata* (post oak). Tall shrubs such as *Quercus ilicifolia* (bear oak) can be sporadic to locally well-developed. Heaths tend to form a dense dwarf-shrub layer, especially *Gaylussacia baccata* (black huckleberry), *Vaccinium angustifolium* (lowbush blueberry), and *Vaccinium pallidum* (Blue Ridge blueberry). *Morella pensylvanica* (northern bayberry) can also commonly occur. The herb layer is often sparse and characterized by *Pteridium aquilinum* (western brackenfern), *Gaultheria procumbens* (eastern teaberry), and *Carex pensylvanica* (Pennsylvania sedge). This mixed conifer-deciduous woodland is a fire-dependent community with a proportion of canopy species dependent on the fire regime.

Associated sites

F149BY006NY	Well Drained Outwash Well-drained Outwash
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Similar sites

F149BY006NY	Well Drained Outwash Well-drained Outwash
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Table 1. Dominant plant species

Tree	(1) <i>Pinus rigida</i> (2) <i>Quercus coccinea</i>
Shrub	(1) <i>Vaccinium angustifolium</i> (2) <i>Gaylussacia baccata</i>
Herbaceous	(1) <i>Carex pensylvanica</i> (2) <i>Pteridium aquilinum</i>

Physiographic features

The site occurs on upland and outwash plain landforms and is not subject to flooding/ponding.

Table 2. Representative physiographic features

Landforms	(1) Outwash plain > Outwash plain (2) Upland > Ice-contact slope (3) Moraine (4) Glacial lake (relict) (5) Pitted outwash plain (6) Outwash terrace
Runoff class	Negligible to very high
Flooding frequency	None
Ponding frequency	None
Elevation	0–1,000 ft
Slope	0–35%
Water table depth	18–72 in
Aspect	Aspect is not a significant factor

Climatic features

Coastal regions' climate generally considered maritime, experiences a more moderate climate than inland, i.e., cooler summers and warmer winters and delayed onset of spring. However, coastal regions do experience the brunt of extreme weather such as nor'easters and tropical storms, e.g., hurricanes.

Table 3. Representative climatic features

Frost-free period (characteristic range)	149-164 days
Freeze-free period (characteristic range)	192-214 days
Precipitation total (characteristic range)	46-50 in
Frost-free period (actual range)	146-184 days
Freeze-free period (actual range)	190-224 days
Precipitation total (actual range)	44-50 in
Frost-free period (average)	160 days
Freeze-free period (average)	203 days
Precipitation total (average)	48 in

Climate stations used

- (1) EAST WAREHAM [USC00192451], East Wareham, MA
- (2) BRIDGEHAMPTON [USC00300889], Sag Harbor, NY
- (3) HYANNIS [USC00193821], Hyannis, MA
- (4) MINEOLA [USC00305377], Mineola, NY
- (5) PATCHOGUE 2 N [USC00306441], Medford, NY

Influencing water features

N/A

Wetland description

N/A

Soil features

This site consists of very deep, excessively drained sandy soils formed in glaciofluvial deposits. Representative soils are Carver, Eastchop, Evesboro, and Plymouth.

Table 4. Representative soil features

Parent material	(1) Glaciofluvial deposits—granite and gneiss (2) Glaciolacustrine deposits—schist
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Surface texture	(1) Coarse sand (2) Loamy sand (3) Loamy coarse sand (4) Sand (5) Gravelly loamy sand
Family particle size	(1) Sandy over loamy
Drainage class	Well drained to excessively drained
Permeability class	Slow to very rapid
Depth to restrictive layer	72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–9%
Available water capacity (Depth not specified)	2–4 in
Soil reaction (1:1 water) (Depth not specified)	3.5–6
Subsurface fragment volume <=3" (Depth not specified)	5–30%
Subsurface fragment volume >3" (Depth not specified)	0–9%

Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, not yet validated with field work.*]

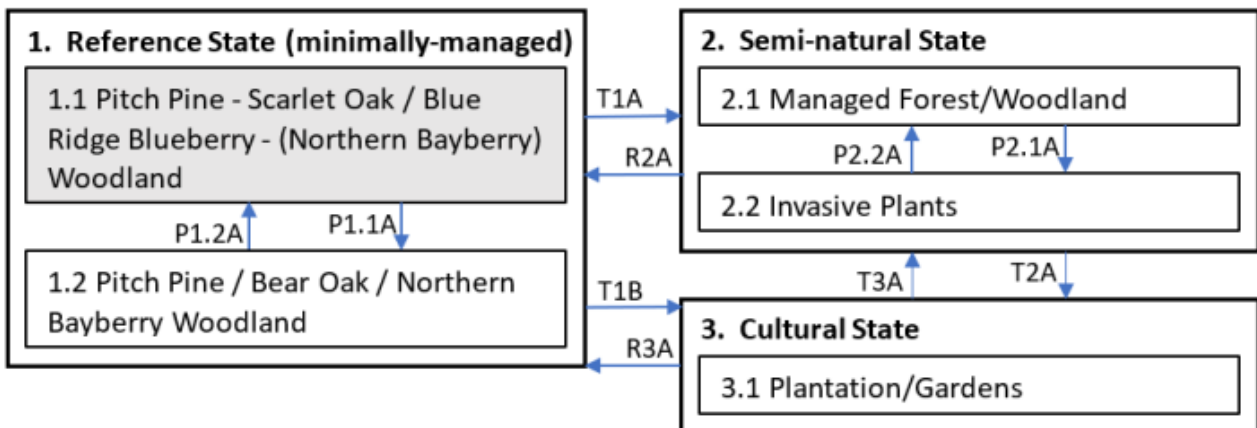
The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer 2003). Terrestrial ecological systems are specifically defined as a group of plant community types (associations) that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. They are intended to provide a classification unit that is readily mappable, often from terrain and remote imagery, and readily identifiable by conservation and resource managers in the field. A given system will typically manifest itself in a landscape at intermediate geographic scales of tens-to-thousands of hectares and will persist for 50 or more years. A vegetation association is a plant community that is much more specific to a given soil, geology, landform, climate, hydrology, and disturbance history. It is the basic unit for vegetation classification and recognized by the US National Vegetation Classification (US FDGC 2008; USNVC 2017). Each association will be named by the diagnostic and often dominant species that occupy the different height strata (tree, shrub, and herb). Within the NatureServe Explorer database, ecological systems are numbered by a community Ecological System Code (CES) and individual vegetation associations are assigned an identification number called a Community Element Global Code (CEGL).

[*Caveat] The information presented is representative of very complex vegetation communities. Key indicator plants and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and geography. The reference plant community is not necessarily the management goal. The drafts of species lists are merely representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site

The Dry Outwash ecological site is characterized by a wide mix of xeric plant communities with coastal affinities from Long Island, New York, north to Cape Cod, Massachusetts. These plant communities coincide with Northern Atlantic Coastal Pitch Pine Barrens system (CES203.269), Northern Atlantic Coastal Plain Dry Oak-Hardwood Forest system (CES203.475), and Northern Atlantic Coastal Plain Heathland and Grassland (CES203.895). The prevailing ecological processes are related to coastal influences, such as a coastal climate and storms, and if within close proximity to the coast, maritime effects of wind exposure, salt spray, and sand movement. This ecological site is influenced by fire. A decadal fire frequency maintains the character of pine barrens, dominated by pitch Pine (*Pinus rigida*), as well as some heathlands and grasslands with characteristic shrubs northern bayberry (*Morella pensylvanica*) kinnikinnik (*Arctostaphylos uva-ursi*), and goldenheathers (*Hudsonia* spp.) with grasses little bluestem (*Schizachyrium scoparium*) or coastal little bluestem (*Schizachyrium littorale*). Longer fire intervals and/or cold-air drainage (frostpockets) will support various oaks (*Quercus*), predominately scrub oak (*Q. ilicifolia*), dwarf chesnut oak (*Q. prinoides*), scarlet oak (*Q. coccinea*), black oak (*Q. velutina*), as well as white oak (*Q. alba*) and chesnut oak (*Q. montana*). Threats include development and fragmentation, fire-suppression, off road vehicles, and invasive plants such as, but not limited to, Morrow's honeysuckle, (*Lonicera morowii*), oriental bittersweet (*Celastrus orbiculatus*), wineberry (*Rubus phoenicolasius*) tree-of-heaven (*Ailanthus altissima*). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]).

State and transition model

149BY005 – Dry Outwash



Transition	Drivers/practices
T1A, T3A	disturbance, invasive plant establishment
T1B, T2A	cutting, land clearing, plant establishment, wind erosion control
R2A, R3A	herbaceous weed treatment, plant removal, plant establishment, successional management
T3A	abandonment, disturbance, invasive plant establishment
P1.1A	disturbance, greater fire frequency, coastal proximity
P1.2A	succession
P2.1A	invasive plant establishment, succession
P2.2A	invasive plant management

State 1 Reference State (Dry Outwash)

The predominant plant communities of the Dry Outwash ecological site Reference State (minimally-managed) include:

- Pitch Pine - Scarlet Oak Woodland, (Pitch Pine - Scarlet Oak / Hillside Blueberry - (Northern Bayberry) Woodland), [*Pinus rigida* - *Quercus coccinea* / *Vaccinium pallidum* - (*Morella pensylvanica*) Woodland] - CEG006381.
- Coastal Pitch Pine / Bear Oak Barrens, (Pitch Pine / Bear Oak / Northern Bayberry Woodland), [*Pinus rigida* / *Quercus ilicifolia* / *Morella pensylvanica* Woodland] CEG006315

Other associated communities include several fire-dependent communities:

- Northern Dwarf Pine Plains, (Pitch Pine - Bear Oak / Bearberry Scrub), [*Pinus rigida* - *Quercus ilicifolia* / *Arctostaphylos uva-ursi* Scrub] - CEG006097
- Outwash Bear Oak Barrens, (Bear Oak - Dwarf Chinkapin Oak Scrub), [*Quercus ilicifolia* - *Quercus prinoides* Scrub], - CEG006111
- Sandplain Heathland, (Black Huckleberry - Lowbush Blueberry - Bearberry / Shore Little Bluestem Dwarf-shrubland), [*Gaylussacia baccata* - *Vaccinium*

angustifolium - *Arctostaphylos uva-ursi* / *Schizachyrium littorale* Dwarf-shrubland], - CEGLO06066 • Sandplain Grassland, (Northern Bayberry / Shore Little Bluestem - Poverty Oatgrass Shrub Grassland), [*Morella pensylvanica* / *Schizachyrium littorale* - *Danthonia spicata* Shrub Grassland], - CEGLO06067 (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). • Northern Sandplain Grassland, (Lowbush Blueberry / Little Bluestem - Hillside Sedge Shrub Grassland), [*Vaccinium angustifolium* / *Schizachyrium scoparium* - *Carex lucorum* Shrub Grassland], - CEGLO06393

Community 1.1

Pitch Pine - Scarlet Oak / Hillside Blueberry - (Northern Bayberry) Woodland

Pitch Pine - Scarlet Oak Woodland, (Pitch Pine - Scarlet Oak / Hillside Blueberry - (Northern Bayberry) Woodland), [*Pinus rigida* - *Quercus coccinea* / *Vaccinium pallidum* - (*Morella pensylvanica*) Woodland] - CEGLO06381. This vegetation is a matrix woodland/low forest comprising the pine-barren lands from Long Island, New York, north to Cape Cod, Massachusetts. Typically, it occurs on very well-drained sandy outwash. The canopy is largely pitch pine (*Pinus rigida*) plus an admixture of oaks (*Quercus*): scarlet oak (*Q. coccinea*), black oak (*Q. velutina*), dwarf chestnut oak (*Q. prinoides*), white oak (*Q. alba*), and northern red oak (*Q. rubra*) and occasionally post oak (*Q. stellata*). Tall shrubs are dominated by bear or scrub oak (*Quercus ilicifolia*) can be sporadic to locally well-developed and northern bayberry (*Morella pensylvanica*) can also commonly occur. Heaths tend to form a dense dwarf-shrub layer, especially black huckleberry (*Gaylussacia baccata*), lowbush blueberry (*Vaccinium angustifolium*), and hillside blueberry (*Vaccinium pallidum*). The herb layer is often sparse and characterized by brackenfern (*Pteridium aquilinum*), eastern teaberry (*Gaultheria procumbens*), and wavy hairgrass (*Deschampsia flexuosa*). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). Cross-referenced plant community concepts (typically by political state): Coastal Forest/Woodland (Swain 2016) [MA] Pitch pine – oak Forest (Edinger et al. 2014) [NY] Pitch pine – oak Forest (Sneddon et al. 2010) [Cape Cod National Seashore]

Community 1.2

Pitch Pine / Bear Oak / Northern Bayberry Woodland

Coastal Pitch Pine / Bear Oak Barrens, (Pitch Pine / Bear Oak / Northern Bayberry Woodland), [*Pinus rigida* / *Quercus ilicifolia* / *Morella pensylvanica* Woodland] CEGLO06315. These pine barren woodlands are characterized by droughty, fire-prone vegetation, sandy soils. Pitch pine (*Pinus rigida*) is the canopy dominant. Bear or scrub oak (*Quercus ilicifolia*) forms a dense shrub layer with occasional dwarf chestnut oak *Quercus prinoides*. Dwarf-shrubs such as black huckleberry (*Gaylussacia baccata*), northern bayberry (*Morella pensylvanica*), hillside blueberry (*Vaccinium pallidum*), and lowbush blueberry (*Vaccinium angustifolium*). Herbs tend to be sparse, although more open areas may support patches of little bluestem (*Schizachyrium scoparium*) shore little bluestem (*Schizachyrium littorale*) and wavy hairgrass (*Deschampsia flexuosa*), or Pennsylvania sedge (*Carex pensylvanica*). Additional scattered herbs include sweetfern

(*Comptonia peregrina*), brackenfern (*Pteridium aquilinum*), earern teaberry (*Gaultheria procumbens*), and kinnikinnik (*Arctostaphylos uva-ursi*). (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). Cross-referenced plant community concepts (typically by political state): Pitch Pine - Scrub Oak Community (Swain 2016) [MA] Pitch Pine - Scrub Oak Barren (Edinger et al. 2014) [NY] Coastal Pitch Pine / Scrub Oak Barren

Pathway P1.1A

Community 1.1 to 1.2

disturbance, greater fire frequency, coastal proximity

Pathway P1.2A

Community 1.2 to 1.1

Succession, Reduced fire frequency

State 2

Semi-natural State

Vegetation on lands somewhat conditioned by land use, e.g., managed native plant communities or invasive plant communities.

Community 2.1

Managed Forest Woodland

Community 2.2

Invasive Plant Community

White poplar (*Populus alba*), winged burningbush (*Euonymus alatus*), Japanese knotweed (*Lonicera japonica*), oriental bittersweet (*Celastrus orbiculatus*)

Pathway P2.1A

Community 2.1 to 2.2

Invasive Plant establishment, succession

Pathway P2.2A

Community 2.2 to 2.1

Invasive Plant Management

Conservation practices

Invasive Plant Species Control

State 3
Cultural State

Landscapes heavily conditioned by land use, e.g., Plantations/gardens

Community 3.1
Plantations/gardens

Transition T1A
State 1 to 2

Disturbance, invasive plant establishment

Conservation practices

Forest Land Management

Transition T1B
State 1 to 3

Cutting, land clearing, plant establishment, wind erosion control

Conservation practices

Brush Management
Land Clearing

Restoration pathway R2A
State 2 to 1

Herbaceous weed treatment, plant removal, plant establishment, successional management

Conservation practices

Brush Management
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Forest Land Management
Invasive Plant Species Control

Monitoring and Evaluation

Transition T2A

State 2 to 3

Cutting, land clearing, plant establishment, wind erosion control

Conservation practices

Land Clearing
Invasive Plant Species Control
Herbaceous Weed Control

Restoration pathway R3A

State 3 to 1

Herbaceous weed treatment, plant removal, plant establishment, successional management

Conservation practices

Brush Management
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Invasive Plant Species Control
Monitoring and Evaluation
Herbaceous Weed Control

Transition T3A

State 3 to 2

Abandonment, disturbance, invasive plant establishment

Additional community tables

Inventory data references

Site Development and Testing Plan

Future work is needed, as described in a 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.

References

- USNVC [United States National Vegetation Classification]. 2017 (Date accessed). United States National Vegetation Classification Database V2.01. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.
- Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C. Carpenter, and W.H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Coterminous United States. USDA Forest Service, General Technical Report WO-76. Washington, DC. 1–92.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Grawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schultz, K. Snow, and J. Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia..
- Edinger, G.J., D.J. Evans, S. Gebauer, T.J. Howard, D. Hunt, and A. Olivero. 2014. Ecological Communities of New York State, Second Edition: A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY..
- FGDC [Federal Geographic Data Committee]. 2008. National Vegetation Classification Standard, Version 2. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC..
- Greller, A. 1977. A Classification of Mature Forests on Long Island, New York. Bulletin of the Torrey Botanical Club 104:376–382.
- Parshall, T., D.R. Foster, E. Faison, D. MacDonald, and Hansen. 2003. Long-term history of vegetation and fire in pitch pine–oak forests on cape cod, Massachusetts.. Ecology 84:736–748.
- Sneddon, L., R. Zaremba, and M. Adams. 2010. Vegetation classification and mapping at Cape Cod National Seashore, Massachusetts.

Swain, P.C. 2016. Classification of the natural communities of Massachusetts, Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife,.

Other references

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C. Carpenter, and W.H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Coterminous United States. USDA Forest Service, General Technical Report WO-76. Washington, DC.

Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K., Snow, and J. Teague. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia.

Edinger, G.J., Evans, D.J., Gebauer, S., Howard, T.G., Hunt, D.M., and A.M. Olivero, A.M. (eds.). 2014. Ecological Communities of New York State, Second Edition: A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

FGDC [Federal Geographic Data Committee]. 2008. National Vegetation Classification Standard, Version 2. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.

Greller, A. A Classification of Mature Forests on Long Island, New York. Bulletin of the Torrey Botanical Club 104:376–382.

NatureServe 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Accessed: January 2018).

Parshall, T., D.R. Foster, E. Faison, D. MacDonald, and B.C.S. Hansen. 2003. Long-term history of vegetation and fire in pitch pine–oak forests on Cape Cod, Massachusetts. Ecology 84:736–748.

Sneddon, L. A., Zaremba, R. E., and M. Adams. 2010. Vegetation classification and mapping at Cape Cod National Seashore, Massachusetts. Natural Resources Technical Report NPS/NER/NRTR--2010/147. National Park Service, Philadelphia, PA.

Swain, P.C. 2016. Classification of the Natural Communities of Massachusetts. Version 2.0. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. Westborough, MA.

United States Department of Agriculture, Natural Resources Conservation Service, 2006. Land Resource Regions and Major land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

United States Department of Agriculture, Natural Resources Conservation Service, 2015. National Soils Information System (NASIS).

USNVC [United States National Vegetation Classification]. 2017. United States National Vegetation Classification Database, V2.01. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.

Contributors

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Approval

Greg Schmidt, 5/20/2025

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	05/23/2020
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:**
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- 17. Perennial plant reproductive capability:**
-