

Ecological site F144BY010ME

Coastal Dune (reserved)

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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): 144B—New England and Eastern New York Upland, Northern Part

This major land resource area (MLRA) is in Maine (56 percent), New Hampshire (22 percent), Vermont (14 percent), Massachusetts (6 percent), Connecticut (1 percent), and New York (1 percent). It makes up about 22,728 square miles (58,864 square kilometers). The MLRA consists of a relatively young landscape shaped by the Laurentide Ice Sheet, which covered the region from 35,000 to 10,000 years ago. Rolling hills of dense basal till converge on ridges of shallow bedrock that were scoured by glacial ice. River valleys that were flooded by melting glacial water or seawater house large expanses of glacial outwash and stratified drift in inland areas and, to a lesser extent, glaciomarine and glaciolacustrine sediment deposits in coastal areas. Organic bogs, ablation till, and alluvial flood plains make up the remaining portions of the MLRA. The soils in this region are dominantly Entisols, Spodosols, and Inceptisols. They commonly have a fragipan. The dominant suborders are Ochrepts, Orthods, Aquepts, Fluvents, and Saprist. The soils in the region dominantly have a frigid soil temperature regime with some cryic areas at higher elevation, a udic soil moisture regime, and mixed mineralogy. Most of the land is forested, and 98 percent is privately owned. Significant amounts of forest products are produced including lumber, pulpwood, Christmas trees, and maple syrup. Principal agricultural crops include forage and grains for dairy cattle, potatoes, apples, and blueberries. Wildlife habitat and recreation are important land uses. Stoniness, steep slopes, and poor drainage limit the use of many of the soils. Maritime Coastal Dunes are restricted to Maine's coast.

Classification relationships

USDA-NRCS (USDA 2006): Land Resource Region (LRR): N—East and Central Farming and Forest Region Major Land Resource Area (MLRA): 124—Western Allegheny Plateau USDA-FS (Cleland et al. 2007) Province: 211 - Northeastern Mixed Forest Province (in part – eastern) Section: 211D - Central Maine Coastal and Embayment Subsection: 221Da - Central Maine Embayment Subsection: 211Db - Casco Bay Coast Subsection: 221Dc - Penobscot Coast

Ecological site concept

Additional research and on-site data collection is needed to further develop interpretations for this ecological site. The maritime coastal dune ecological site consists of very deep, excessively drained and poorly developed eolian sands derived from marine deposits. The site occurs on both active and stabilized coastal sand dunes. Representative soil is Dune land. The sandy substrate of this community is typically dry, acidic, and poor in certain plant macronutrients. Only limited herbaceous and woody plants are able to tolerate the exposed, maritime conditions. These low-lying coastal environments are threatened by accelerated sea-level rise.

Associated sites

F144BY009ME	Sandy Beach (reserved) Maritime sandy beaches are found seaward of the eolian maritime coastal dunes
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Table 1. Dominant plant species

Tree	Not specified
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Shrub	Not specified
Herbaceous	(1) <i>Ammophila breviligulata</i> (2) <i>Lathyrus japonicus</i> var. <i>maritimus</i>

Physiographic features

Table 2. Representative physiographic features

Climatic features

The climate is humid and temperate and is characterized by warm summers and cold winters. Precipitation generally is evenly distributed throughout the year. Near the coast, it is slightly lower in summer. In inland areas, it is slightly higher in spring and fall. Rainfall occurs during high-intensity, convective thunderstorms in summer. In winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. Heavy snowfalls commonly occur late in winter. Temperatures and the length of the freeze-free period increase from north to south and closer to the coast.

Table 3 Representative climatic features

Frost-free period (characteristic range)	130-140 days
Freeze-free period (characteristic range)	160-170 days
Precipitation total (characteristic range)	1,190-1,350 mm
Frost-free period (actual range)	130-160 days
Freeze-free period (actual range)	160-190 days
Precipitation total (actual range)	1,170-1,420 mm
Frost-free period (average)	140 days
Freeze-free period (average)	170 days
Precipitation total (average)	1,270 mm

- (1) JONESBORO [USC00174183], Addison, ME
- (2) ACADIA NP [USC00170100], Bar Harbor, ME
- (3) LINCOLN SAN DIST WTP [USC00174683], Blue Hill, ME
- (4) BELFAST [USC00170480], Belfast, ME
- (5) WEST ROCKPORT 1 NNW [USC00179593], Rockport, ME
- (6) PORT CLYDE [USC00176881], Tenants Harbor, ME
- (7) PORTLAND INTL JETPORT [USW00014764], Portland, ME

Influencing water features

Water features are not a regular feature of Coastal Dunes. However, washovers from coastal storms can substantially alter the site.

Soil features

Representative soils are coastal_dune.

Table 4. Representative soil features

Surface texture	(1) Coarse sand
Drainage class	Excessively drained
Soil depth	180 cm
Soil reaction (1:1 water) (Depth not specified)	7.4 – 8.4

Ecological dynamics

Ecological Dynamics

[Caveat: The vegetation information contained in this section 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 et al., 2003). Terrestrial ecological SYSTEMS are specifically defined as a group of plant community types called 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 (FDGC, 2008; USNVC, 2017). Each association will be named by the diagnostic and often dominant species that occupy the different height strata (represented by tree, shrub, and herb layers). 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).

The maritime Coastal Dune ecological site is characterized by a mix of xeric plant communities coinciding Northern Atlantic Coastal Plain Dune and Swale system (CES203.264). The prevailing ecological processes are due to the exposed maritime environment, including frequent salt spray, wind exposure, sand abrasion, high light intensity, overwash, and sand movement. Other disturbances considered as threats include: development and fragmentation, barriers to connectivity to the open ocean, off-road vehicles, trampling, occasional fire, and accelerated sea-level rise. Invasive plants include rugosa rose (*Rosa rugosa*) and beach wormwood (*Artemisia stelleriana*).

Plant community succession on the site coincides with coastal dune succession. Young, active foredunes, are nearest the ocean in the most exposed environments. Interspersed with small to large areas of bare sand, the vegetation on the young dunes is a Northern Beach Dune (CEGL006274) dominated by American beachgrass (*Ammophila breviligulata*). A mid-seral are plant community occurring on more stabilized dunes is the Northern Bayberry Dune Shrubland (CEGL006295) dominated by northern bayberry (*Morella pensylvanica*) and the rare but diagnostic, beach plum (*Prunus maritima*). On older and more stabilized backdunes or secondary dunes, occurs the Pitch Pine Maritime Dune Woodland (CEGL006117) dominated by pitch pine (*Pinus rigida*) and woolly beach heather (*Hudsonia tomentosa*) and northern bayberry (*Morella pensylvanica*).

Additional and more localized vegetation information can be provided by the various State Heritage Programs. Additional insights to the vegetation were provided by Natural Landscapes of Maine: A Guide to Natural Communities and Ecosystems (Grawler and Cutko, 2010).

Beyond the reference state, other ecological states, a Semi-natural State and a Cultural State are often recognized. The Semi-natural State would expect plant communities where ecological processes primarily operate with some conditioning by land management, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants. The Cultural State is a completely converted or transformed state; heavily or completely conditioned by land management, e.g., cultivated lands, pasture/haylands, vineyards, and plantations, etc. Generally, the form of vegetation in the Semi-natural State or the Cultural State is not

able to be specified until field work is conducted.

[*Caveat] The vegetation information presented is representative of complex plant 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.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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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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	08/26/2026
Approved by	
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:
