



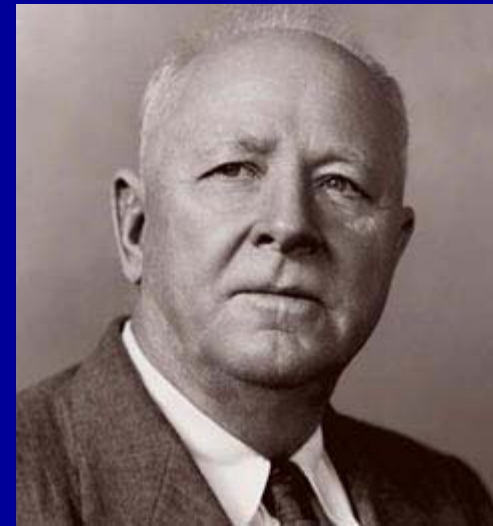
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- U.S. Department of Agriculture
- 1935: Soil Conservation Service (SCS)
- Natural Resources Conservation Service



Hugh Hammond
Bennett

“The father of
soil
conservation”

1930's: Dust Bowl



The Dust Bowl





“Helping People Help the Land”

- NRCSS Goals:
 - high quality, productive soils
 - clean and abundant water
 - healthy plant and animal communities
 - clean air
 - an adequate energy supply
 - working farms and ranchlands
- Provide technical and financial assistance to private landowners to achieve these goals

Envirothon Competition

- Multiple choice/ fill in questions about soils
 - Review all online material
- Soil pit or soil profile
 - Describe soil horizons, color, texture, parent material
- Use Printed RI Soil Survey or Web Soil Survey



Soil Science (Pedology)

The scientific study of soils, including their origins, characteristics, and uses.

- Why Soils?
 - Interpretations – how to best use the land based on the soil resources
 - Wetland indicators
 - Agricultural soils
 - Soil Health/Fertility



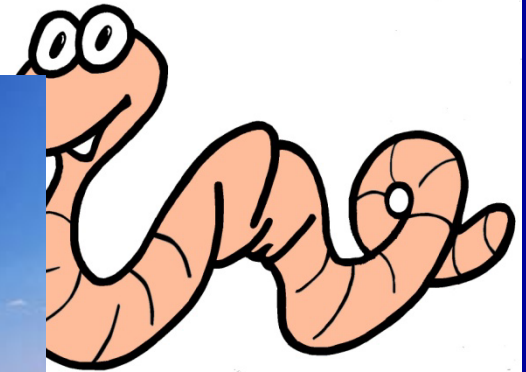
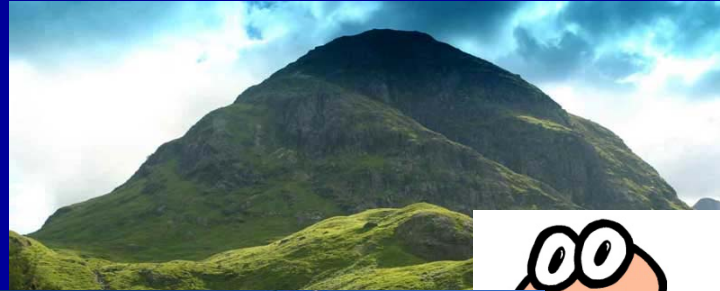
Narragansett Silt Loam – The (Unofficial) State Soil of RI

Learning Objectives for Envirothon

- Recognize soil as an important and dynamic resource.
- Recognize and understand the features of a soil profile
- Describe basic soil properties and soil formation factors
- Understand the origin of soil parent materials
- Identify soil constituents (e.g. clay, organic matter, sand and silt)
- Identify and list soil characteristics (e.g. texture, structure, etc.) and their relation to soil properties.
- Determine basic soil properties and limitations (e.g. mottling and permeability) by observing a soil pit or a soil profile
- Recognize the characteristics of wetland (hydric) soils
- Understand soil drainage classes and know how wetlands are defined
- Understand soil water, its movement, storage, and uptake by plants
- Understand the effects of land use on soils
- Identify types of soil erosion and discuss methods for reducing erosion
- Utilize soil information, including a soil survey

Five factors of soil formation

- Topography
- Organisms
- Climate
- Parent Material
- Time



Parent Materials

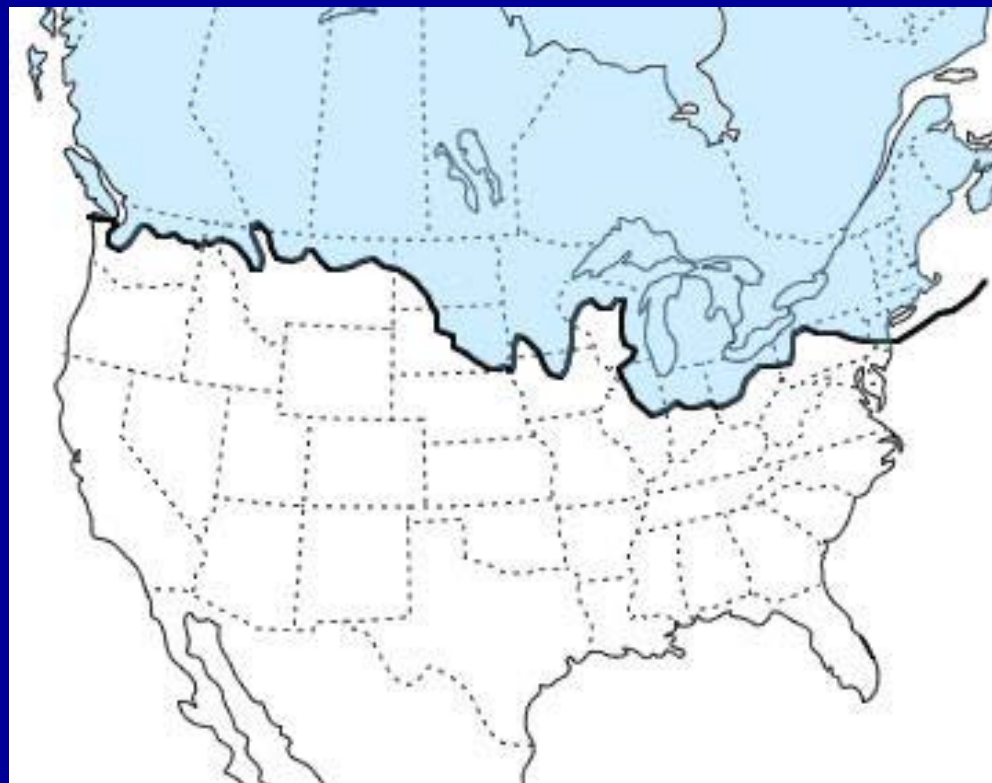
Geologic Material the Soil Formed From (or in).

- Types of minerals.
- Reaction of soil.
- Soil Color.
- Chemical/physical properties



New England Glacial Parent Materials

- Pleistocene Epoch (Ice Age) – 1.8 MYBP to 8 KYBP.
- 4 Major advances.
- Last– Wisconsinan advance covered all of New England to Long Island
- Soil parent materials – glacial & post glacial



Glacial Till

- Unsorted/stratified material deposited beneath and within glacial ice.
- Heterogeneous mixture of all particle sizes (boulder to clay).
- Oldest surficial deposit overlying most bedrock areas.



Till Properties

- Basal (Dense) Till
 - Deposited under glacial ice
 - dense restrictive layer impedes downward water movement.
- Ablation (Loose) Till
 - Deposited with melting ice
- Large angular stones and boulders
- Landforms: Drumlins, moraines, Ice contact



Glacial Fluvial (outwash)

- Sediments deposited by glacial meltwater
- Stratified layers of sand, gravel
- Types: Proglacial and Proximal (ice contact)
- Landforms: Plains, eskers, kames, deltas



Outwash Properties

- Dominantly sand and gravel sized particles
- Rapid water movement, associated with aquifers
- Apparent watertable
- Few limitations for most uses

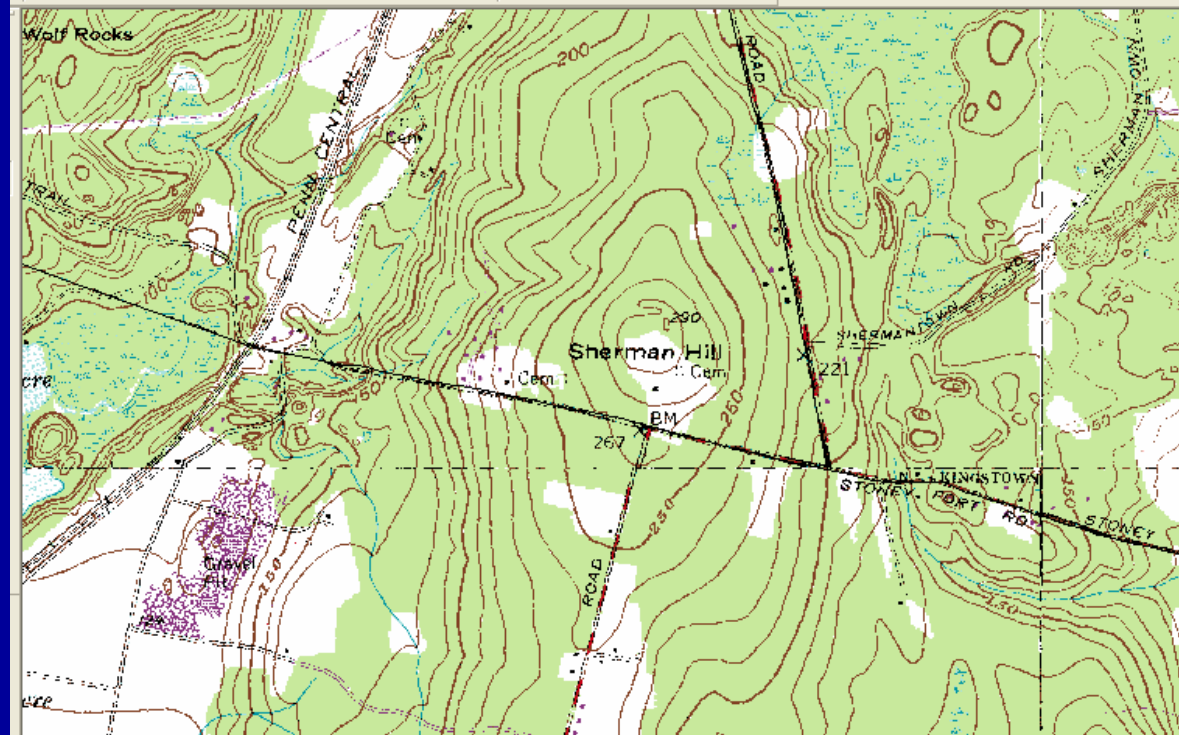


Other parent material

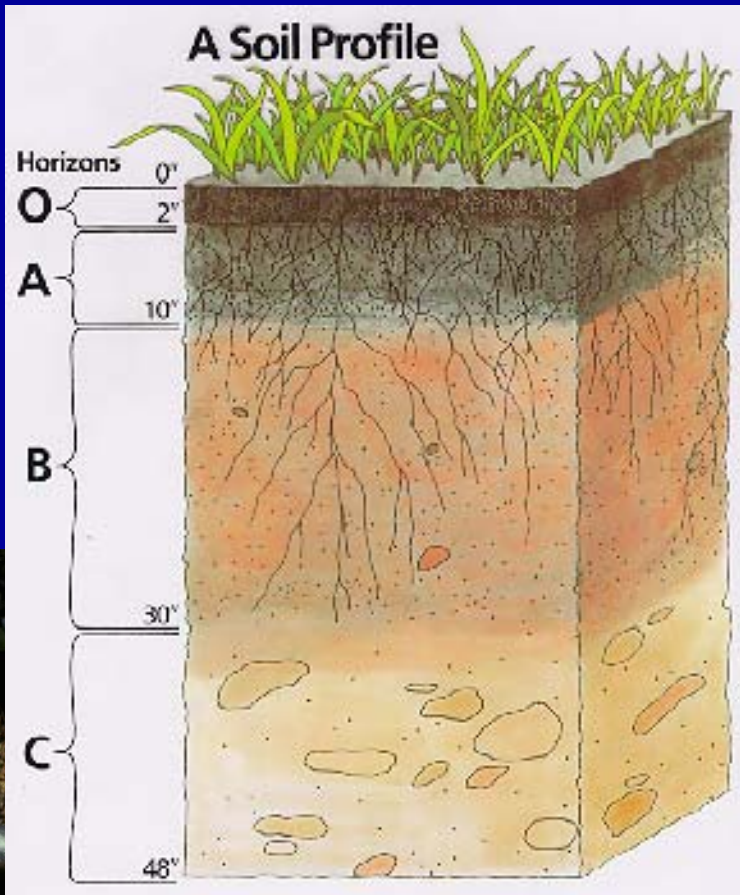
- Laucustrine – Lake
- Volcanic
- Organic
- Loess/Eolian – Moved by the wind
- Colluvium
- Alluvium – Deposited by flowing streams
- Residuim – Weathered bedrock

Landforms

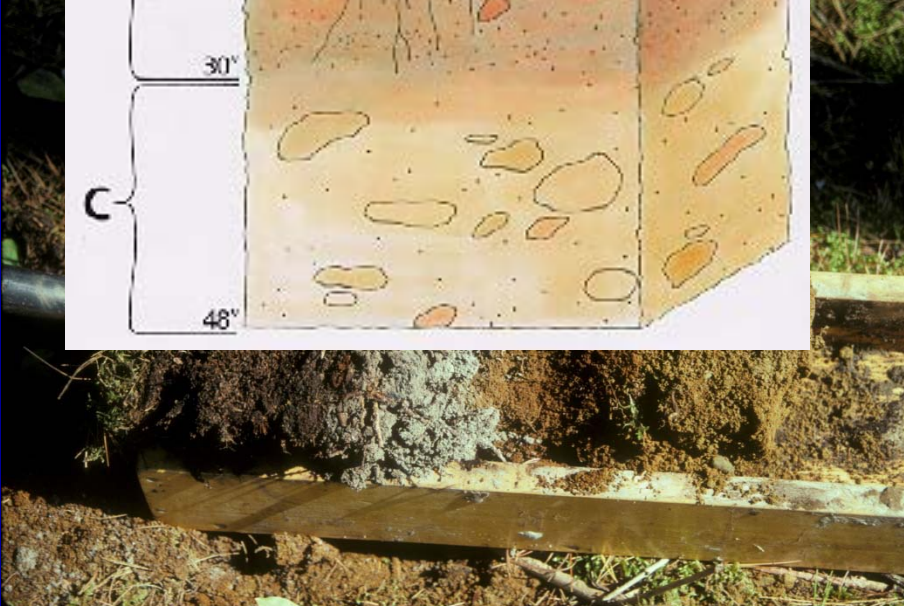
- Topographic Maps
 - Drumlins
 - Outwash Plains
 - Eskers
 - Rivers
 - Wetlands



Soil Profile



- Master Horizon Designations:
 - A
 - Mineral horizon colored by organic matter
 - B
 - Mineral horizon that shows evidence of soil formation (color, structure)
 - C
 - Parent material
 - O
 - Organic
 - E
 - Eluvial
 - R
 - Rock



Soil Properties

- Texture
- Color
 - Organic Matter and Iron
- Structure
 - Granular, subangular blocky
- Redox Features
 - Reduction / Oxidation of Iron
 - Evidence of wetness
- Permeability



Soil Properties: Texture

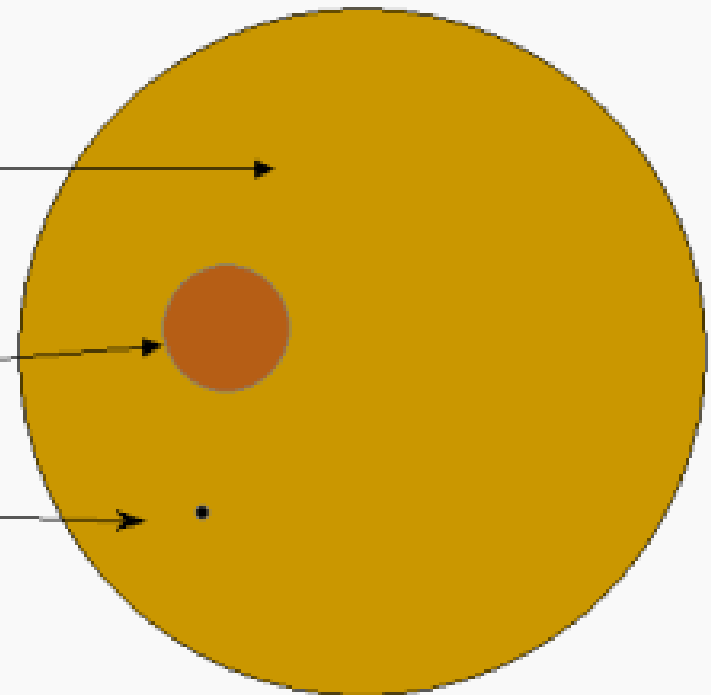
Soil Texture: The relative proportions of sand, silt, and clay particles in a mass of soil (material less than 2mm in size).

Very Coarse Sand = 2 to 1 mm

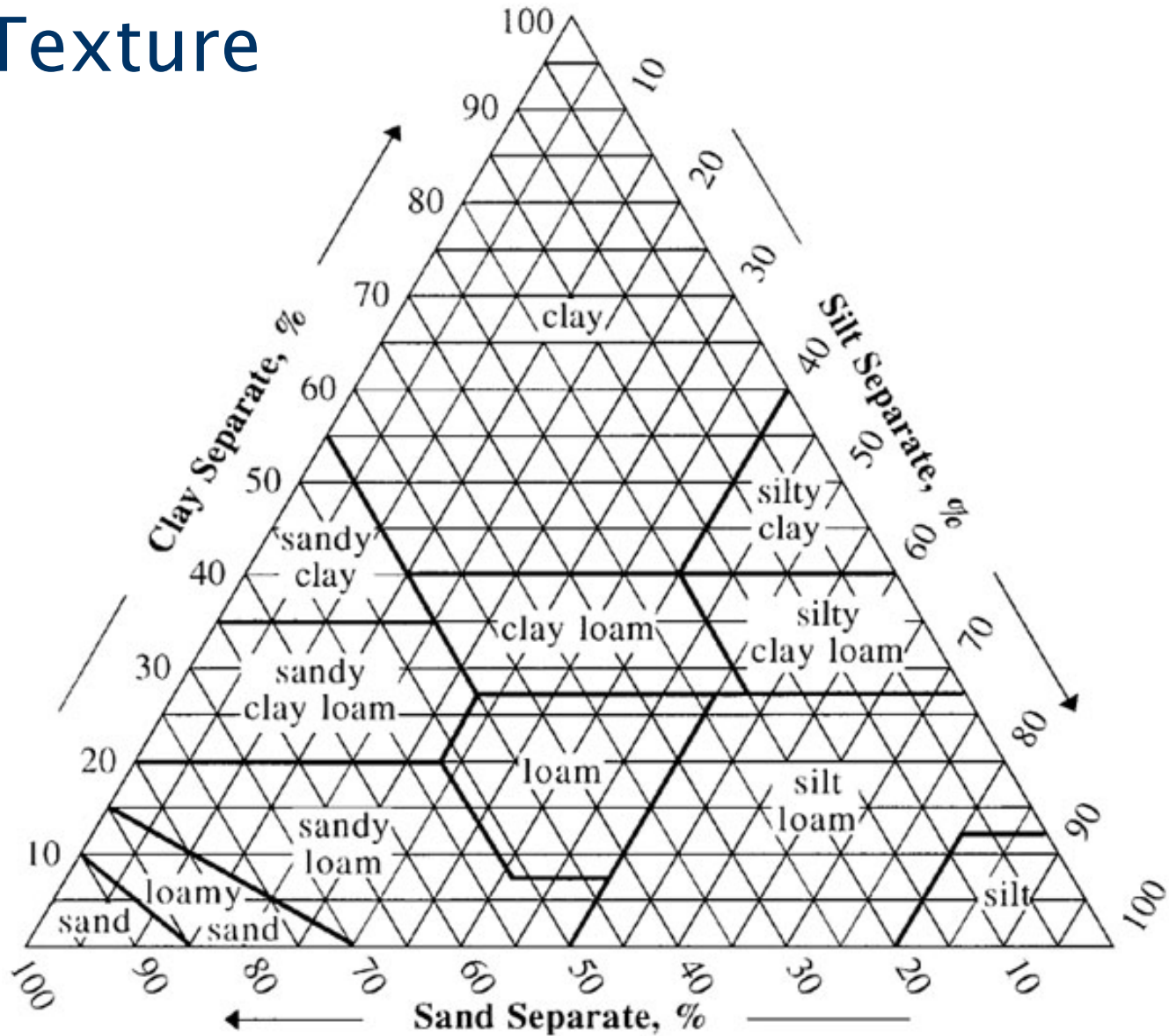
Very Fine Sand = 0.1 to 0.5 mm

Silt = 0.05 to 0.002 mm

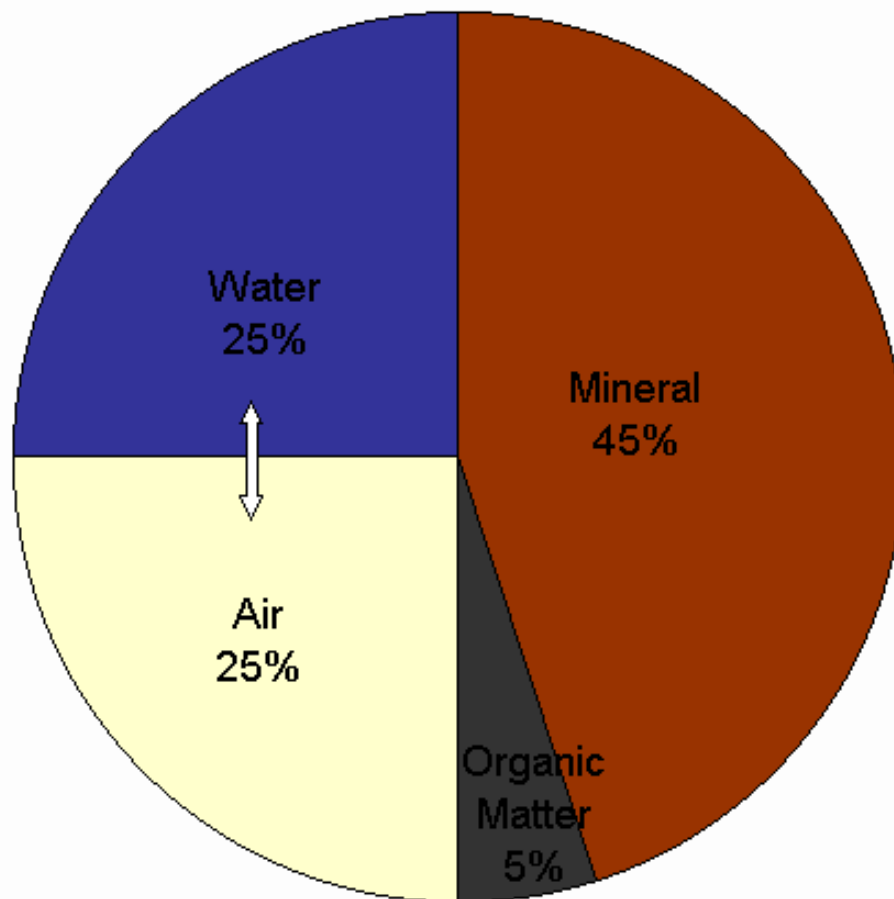
Clay = < 0.002 mm



Soil Texture

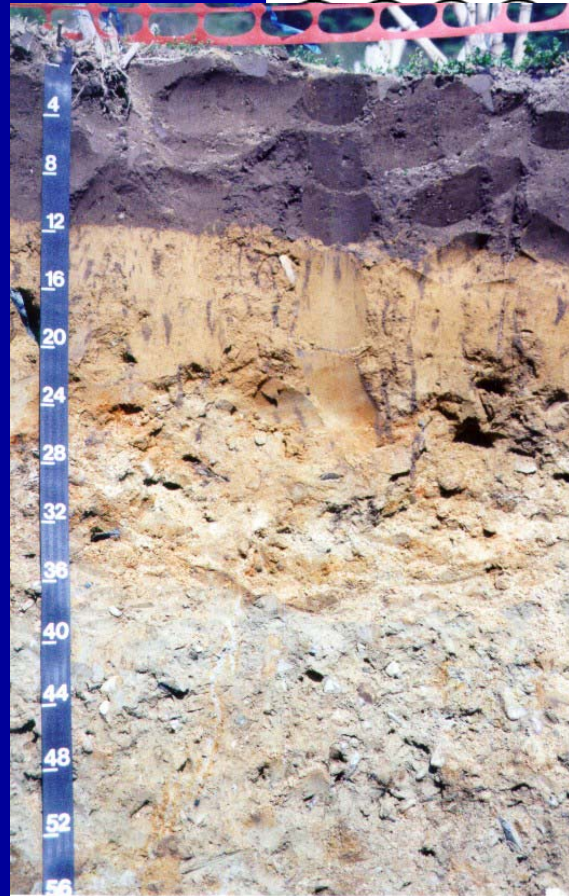
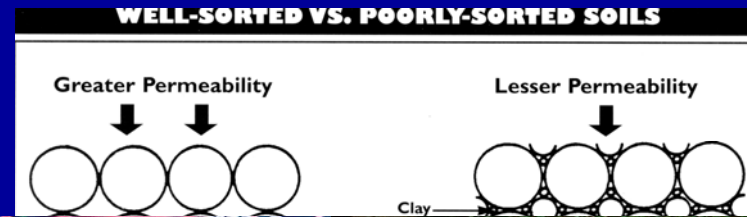


Soil Composition



Water in Soils

- Water movement
 - Influenced by texture, pores, and structure
- Wetland hydrology
 - Hydric Soils
 - Indicators in soil
 - Other wetland indicators



Subaqueous Soils





- Legend**
- Ninigret and Quon landscape units**
- Deep Flood-tidal
 - Dredged Channel
 - Flood-tidal Delta
 - Flood-tidal Delta
 - Flood-tidal Delta
 - Inlet
 - Lagoon Bottom
 - Lagoon Channel
 - Mainland Cove
 - Mainland Slope
 - Relict Inlet Chanr
 - Relict Washover
 - Relict-tidal Inlet
 - Shoal
 - Submerged Mainland Beach
 - Washover Fan Flat
 - Washover Fan Slope

Lagoon Bottom

Lagoon Bottom Landscape Unit: These soils are found in low energy basins and in deep water (1.1 m- 2.0 m). The subaqueous soils of this unit are characterized by greenish black, black, and very dark gray, silty clay loams, silt loams, and very fine sandy loams with high soil fluidity. These soils are finely textured throughout with relatively high (>3.3%) amounts of organic carbon. Thin (5 – 10 cm) sand lenses are very common. Eelgrass rhizomes and fragments, and periwinkle shells, can generally be found throughout the soil profile. Most soils classify as Typic Hydraquents with inclusions of Typic Fluvaquents. Submerged topography is generally flat and undulating, but some eelgrass beds can be hummocky within the unit. Eelgrass cover is high (>50%).

Directions: [To here](#) - [From here](#)

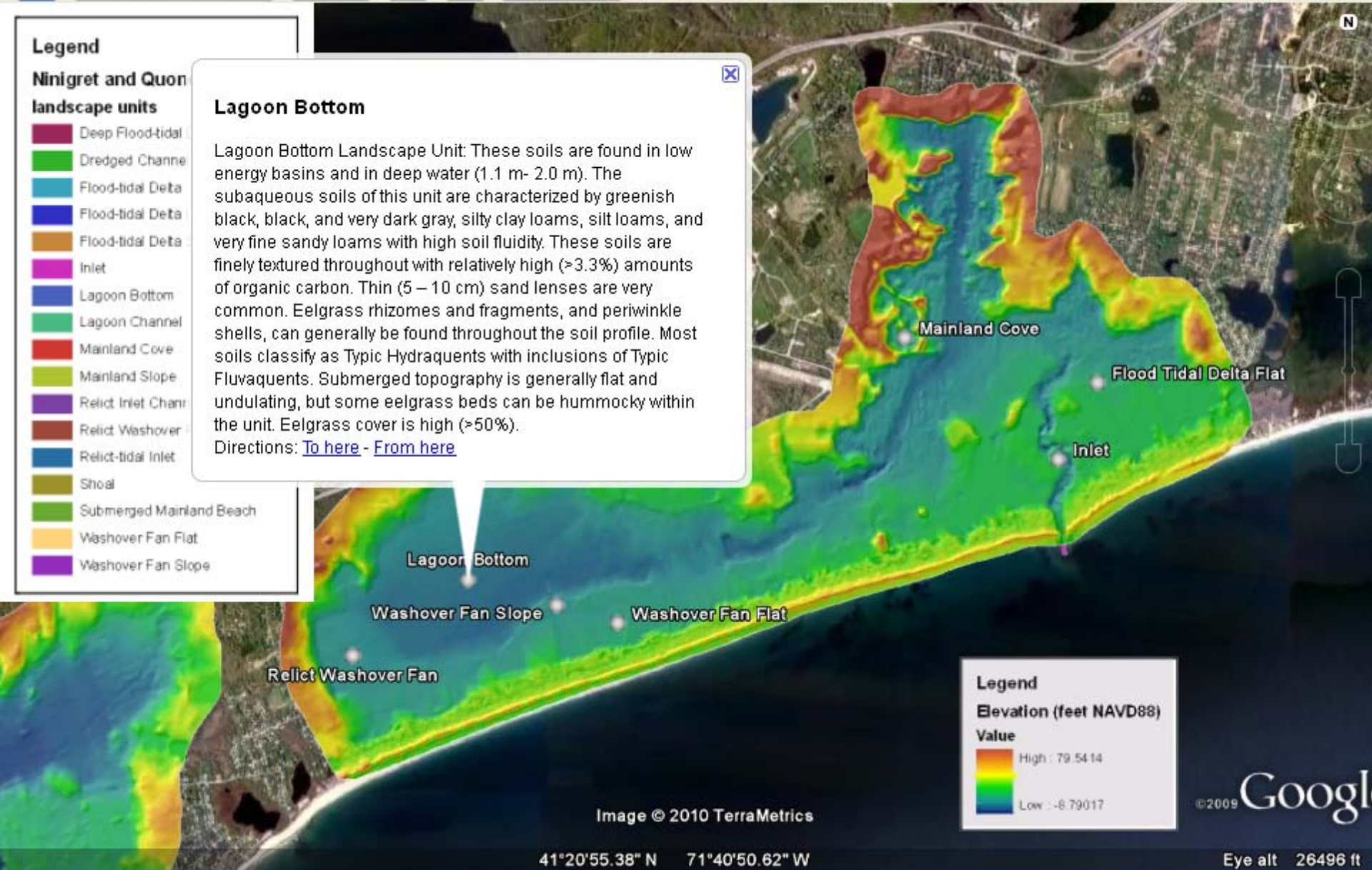


Image © 2010 TerraMetrics

41°20'55.38" N 71°40'50.62" W

©2009 Google

Eye alt 26496 ft

Fly To Find Businesses Directions

Fly to e.g., Hotels near JFK

Places Add Content

- Subaqueous Soil Data
File shows the location and hyperlinks to subaqueous soil
- RI MapCoast Data.kmz
Visit www.mapcoast.org for more information.
- Point Judith Bottom Videos
- Soil Landscape Map Units
- Bathymetry
- Subaqueous Soil Data
File shows the location and hyperlinks to subaqueous soil

Layers

- Primary Database
- Borders and Labels
- Places
- Panoramic Photos
- Roads
- 3D Buildings
- Ocean
- Street View
- Weather
- Gallery
- Global Awareness
- More
- Terrain



Pt_Judith_1

MAPCOAST
THE MAPPING PARTNERSHIP FOR COASTAL SOILS AND SEDIMENTS

Video from Bottom of Point Judith Pond, RI

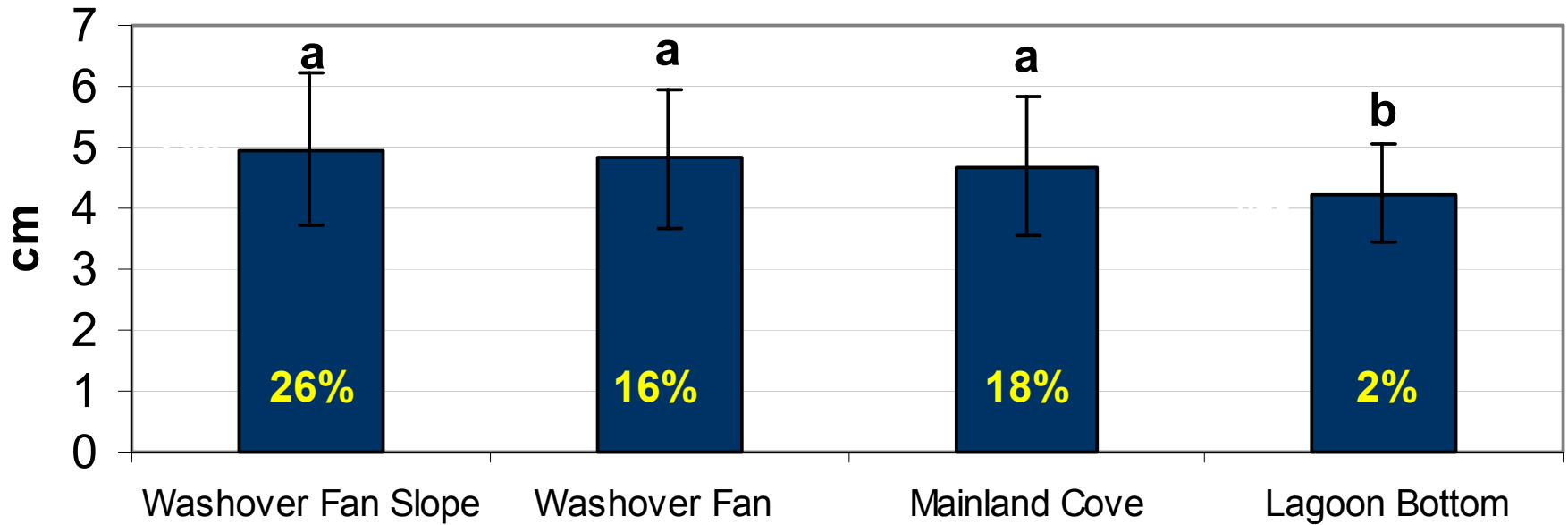
Bottom type consists of mud with macroalgae, shells, and numerous animal borrows. Soils consist of highly fluid silty material (Pishagqua Soils) in a low energy basin. Water depth is -6.5 feet (NAVD-88).

[Open in Windows Media Player](#) [MapCoast Website](#)

Directions: [To here](#) - [From here](#)

41°24'08.82" N 71°29'30.55" W elev 0 ft Eye alt 18837 ft

Ninigret Pond Mean Oyster Length (cm) October 2008

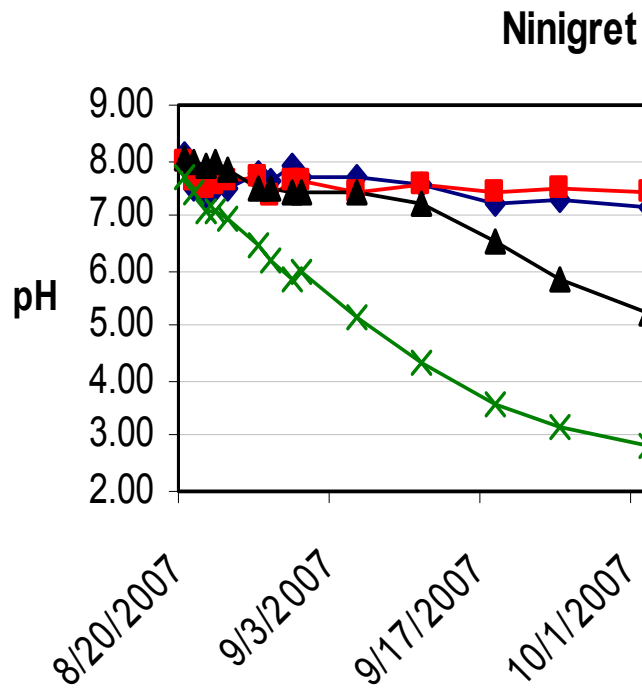


After one growing season more than 25% of the Washover Fan Slope oysters were within 15 mm of legal size or were legal sized.

Only 2% of the lagoon bottom oysters were within 15 mm of legal size.

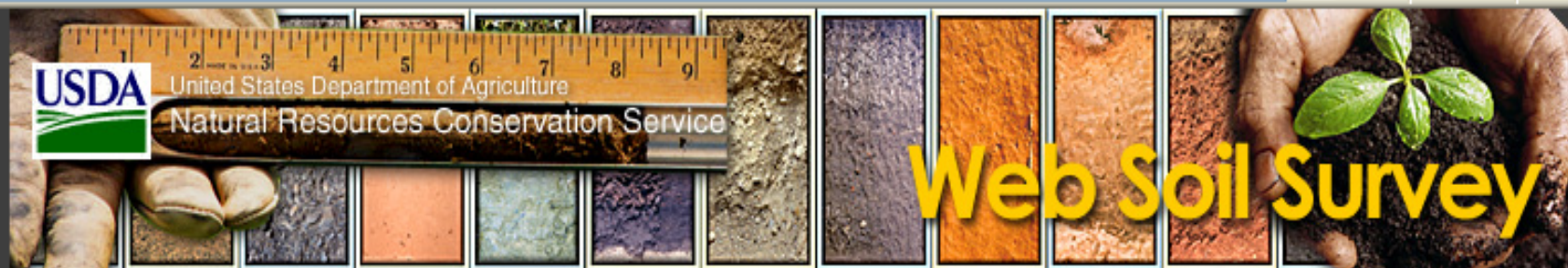
Dredge materials

- Acid sulfate soil potential



Using Soil Survey

- Paper soil survey
 - Mapped at 1:15,840 scale
 - 2.5 acre minimum map unit
 - 1 mile = 4 inches
 - Published in 1981
 - Field work done in 1950s and 1960s
- Web Soil Survey
 - Can access all states data in one place
 - For RI: Same base data and scale 1:15,840
 - Attributes updated more recently
 - “Official” Soils Data


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The simple yet powerful way to access and use soil data.

Welcome to Web Soil Survey (WSS)



Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

Three Basic Steps

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Announcements/Events

- [Web Soil Survey 2.1 has been released! View description of new features.](#)

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Soils

Volunteer and Intern Opportunities with
NRCS