Tidal Wetlands of Virginia
Historically considered as a wasteland, a breeding ground for diseases, monsters, and other unsavory things.
• Early settlers used rivers as roads and source of food.
Population squeezed into coastal waterways.
Virginia has lost over 50% of it’s tidal wetlands

Contained 2 million acres prior to the 18th Century

Only 1 million left in 21st Century (Odum 1988)

– Why should we care?
Importance of Tidal Wetlands
Function: when an organism provides a service to an ecosystem

Value (aka “service”): when an organism provides a service to humans
Shoreline erosion (storm abatement)
Flood abatement

1 acre of wetland can store 1 to $1.5 \times 10^6$ gallons ($5.7 \times 10^6$ liters) of floodwater.
Fig 1. Basic nitrogen cycle in a tidal salt marsh.
Nutrient cycling

Nitrogen + Oxygen + Hydrogen = Proteins (Life!)
Nutrient cycling

Nitrogen also used to fertilize agriculture. Runoff from agriculture carries large amounts of N to rivers. Large amounts N = Water Pollution

If N goes through wetland first
Only small amounts N enter water from Wetland

Little to No Pollution
Water quality
Habitat
Wetland Losses
• Dry land (upland) coveted for agriculture.

• Wet areas drained to make land more agriculture friendly.

Reclamation!
Major Causes of Wetland Loss and Degradation

*Natural Threats:*
- Erosion
- Subsidence
- Sea level rise
- Droughts
- Hurricanes and other storms
What is a Tidal Wetland?
A wetland is an area where water and soil meet to form a unique set of chemical conditions.

A tidal wetland is a wetland in which the hydrology is driven by the lunar tides.

In Virginia we have salt marshes, oligohaline marshes, tidal freshwater marshes, and tidal freshwater swamps.
Distribution of Virginia’s Wetlands

VIRGINIA GEOLOGY

Commonwealth of Virginia
Department of Mines, Minerals and Energy
Division of Mineral Resources

GEOLOGIC MAP OF VIRGINIA

Coastal Plain
Piedmont
Appalachian Plateau
Valley & Ridge
Blue Ridge
Piedmont

GEOLOGIC PERIODS

Quaternary
Tertiary
Cretaceous
Triassic
Pennsylvanian
Mississippian
Devonian
Ordovician
Cambrian
Precambrian
Rocks of uncertain age

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Spatial Diversity

Estuary/River Profile

Headwater System

Tidal River/Lagoon

Salinity (note: tide range remains constant)

Decrease

Flood

Ebb

Ocean

Tidal Freshwater Marshes

Oligohaline Saltmarshes

Mesohaline Saltmarshes

Polyhaline Saltmarshes
Two Types:

1) Coastal and 2) Inland

1) Coastal (tidal) Wetlands:

- Microtidal (1m or less)
- Mesotidal (1-3m)
- Macrotidal (>3m)
Two high and two low tides of the same height in 24 hours. (East Coast US)

One high and one low tide in a 24 hour period. (Gulf Coast US)

Two high tides and two low tides of differing heights during a 24 hour period. (California)
Hydrology highly variable

Precipitation

Ground water

Evapotranspiration

Soil physical properties
Wetlands have unique attributes

- Presence of water
- Saturated soils
- Hydrophytic vegetation (hydrophytes)
Wetland Plants and Stress
Tidal Marsh Stressors

- Lack of oxygen (anoxia)
- Salt
- Irradiation
- Temperature
Next!