

Stratford point living shoreline: maintaining habitat connectivity surrounding wetlands.

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The Restoration Site, Stratford Pt.



History of the Site

- Remington Arms
 - Gun Club 1920's-1986
 - Lead deposition
- Wetland filled
- Suburban development
- Remediation/Restoration
 - >320 tons removed
- Currently, land has a Conservation Easement, held by the State



First steps of restoration: Make a plan for restoration & management



Problems:

1. Highly disturbed
2. Flat
3. Barren
4. Eroding
5. No soil structure



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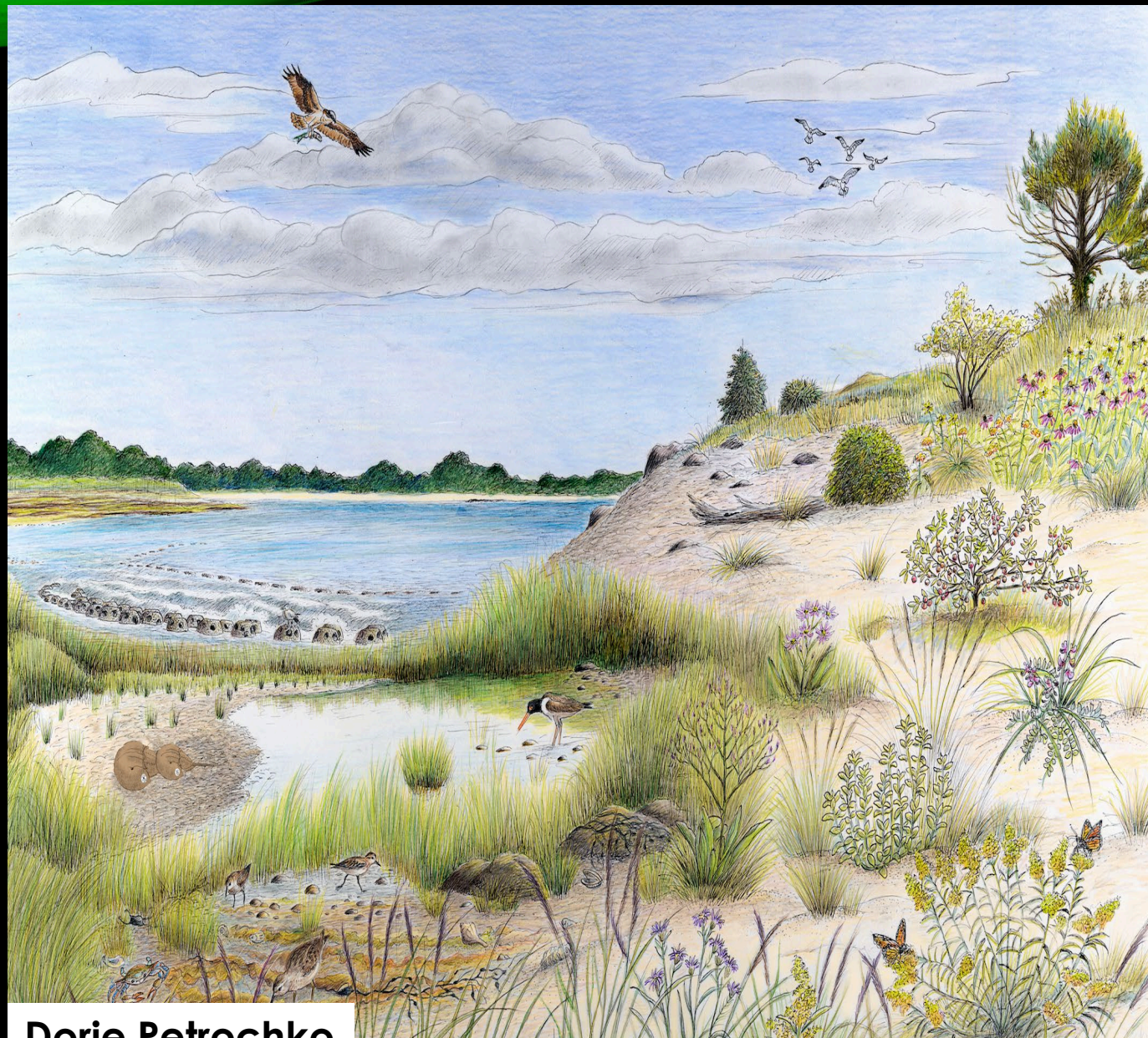
DEPARTMENT OF BIOLOGY

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RESTORATION ECOLOGY S.M.A.R.T. GOALS:

- **Specific**: Goal should clearly capture a desired future condition (Restoration of coastal habitats and erosion control).
 - Wave attenuation = Artificial Oyster Reef--→ Natural Oyster Reef
 - Low Marsh = *Spartina alterniflora* (saltmarsh grass)
 - Wind attenuation = Dune system = Beach grasses/shrubs
 - Soil retention = Grassland Restoration
 - Increase Biodiversity = Coastal Forest Restoration
- **Measurable**: Once goal is set, how much can be done? (sediment accumulation, measure plant growth, biodiversity)
- **Achievable**: Realistic Assumptions? High Risk? (*Adaptive Management!*)
- **Reasonable**: Planning is important; are resources available? Sequencing of phases is extremely important!
- **Time-Bound**: Biological change can be slow (*succession!*); landform change may happen quickly.

Restore Ecosystem Services



Fish &
Wildlife
Habitat

Insect/Bird
Habitat

Slow
erosion/
carbon
capture

increase
sediment
deposition

Lessons learned so far: Wave Attenuation comes first!



Pilot Study of 64 reef balls installed May, 2014 ~150 feet



2015, after planting and 6 inches of sediments accumulated.

November 2016 Reef expansion ~300m 327 reef balls deployed



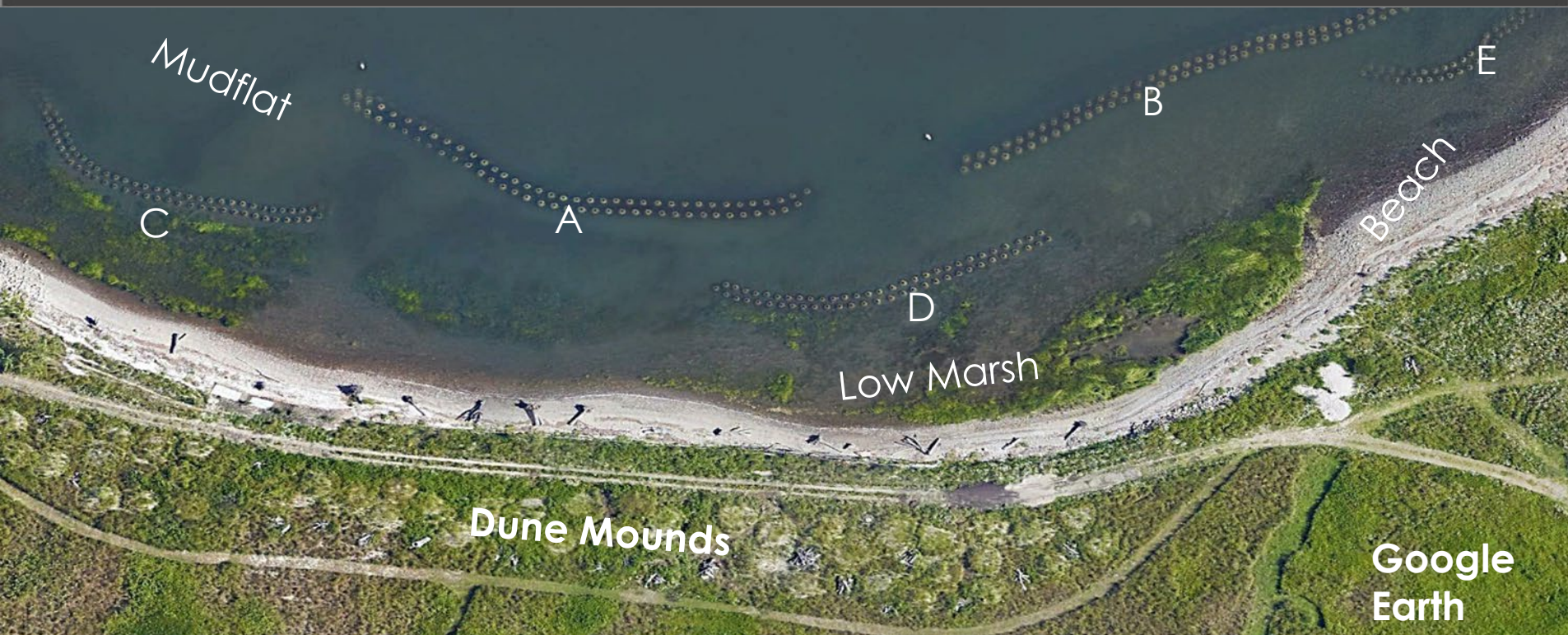
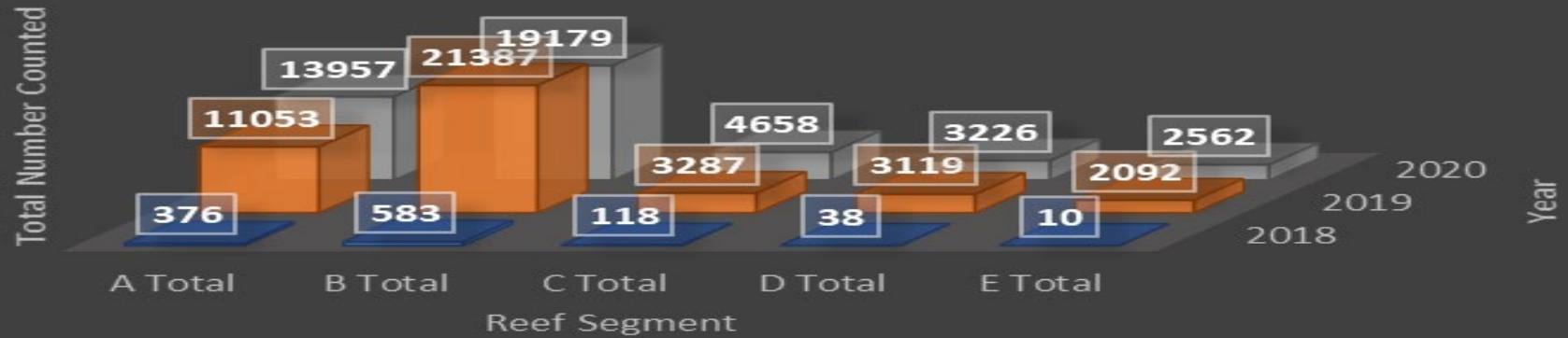


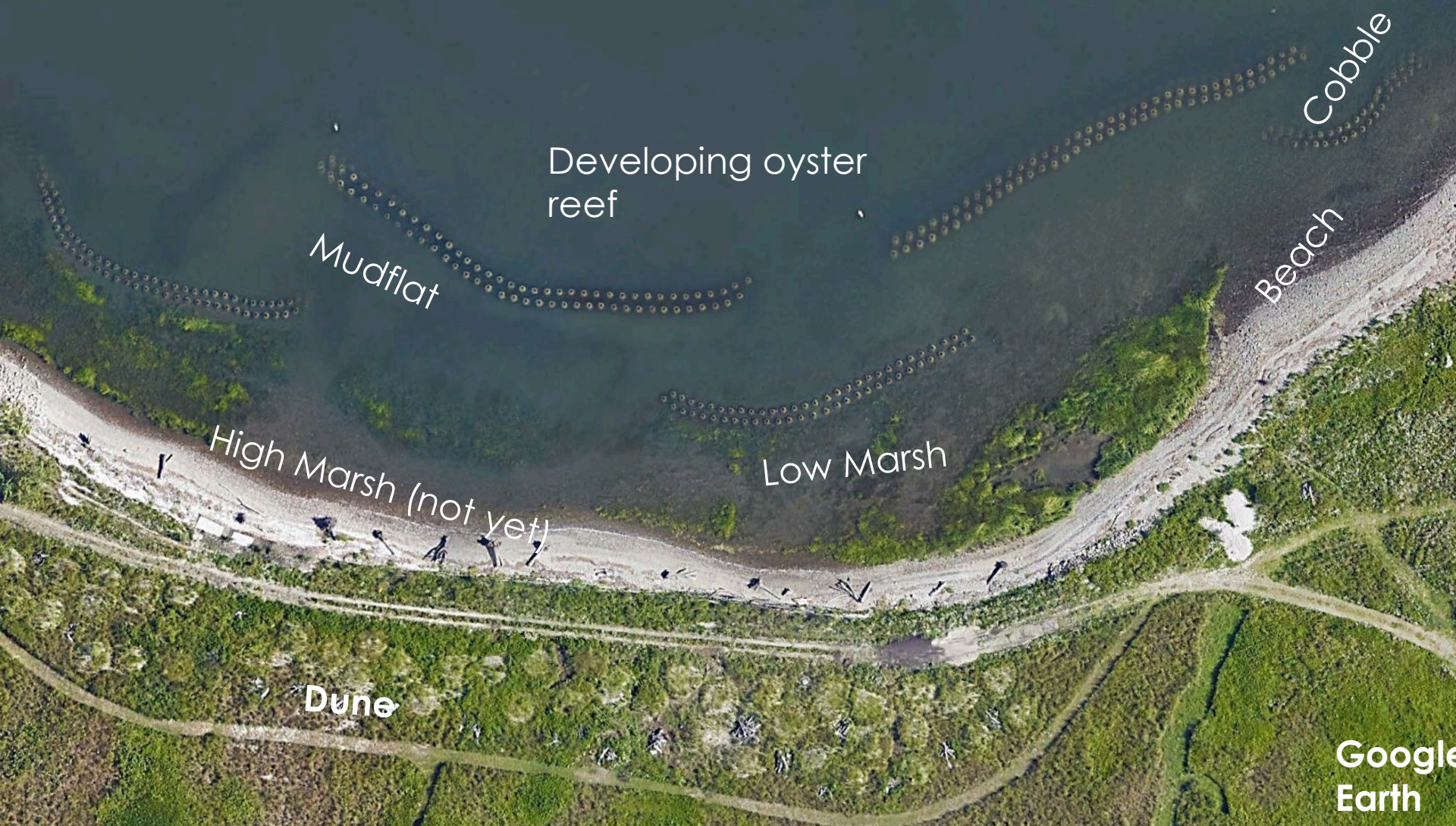
~200 volunteers planting *Spartina* on
Earth Day 2017



TOTAL NUMBER OF CRASSOSTREA VIRGINICA COUNTED AT STRATFORD POINT

2018 2019 2020





Buying time and planning for inundation:

- Atlantic sea levels rose 5-8 inches from 1900-2014
- By 2050, an additional 6-8 inches more!
- Marsh needs room to migrate landward



SUCCESS! OYSTER REEF & SALTMARSH

- 30-40% Wave Abatement (pilot reef)
- *Spartina alterniflora* doubling in size over one year and average density is equal to reference marsh on Milford Point.
- >30cm Sediment Deposited Behind The Reef In 2 Years
- Lead Is No Longer Exposed Behind The Pilot Reef
- Rockweed, Oysters and Others Surviving On The Reef



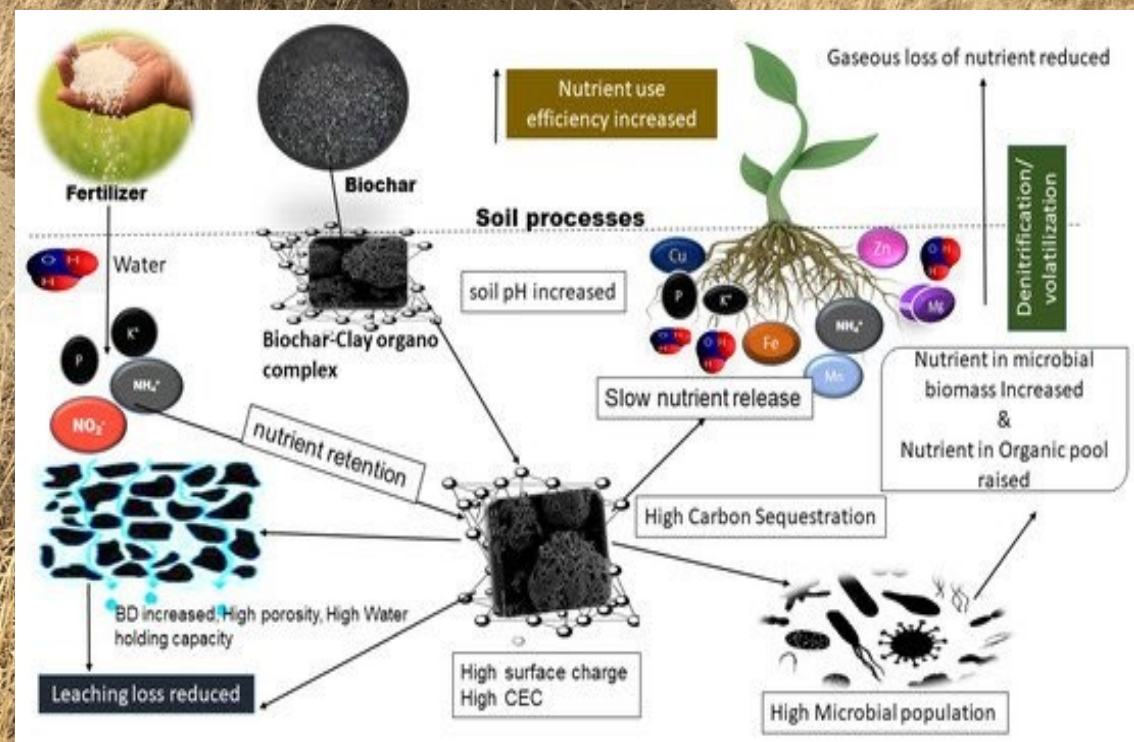
Dune system:

Flat, barren, windy with no shelter

Audubon CT at Stratford Point



April 5, 2018





An aerial photograph of a coastal restoration site. In the foreground, there are several long, curved rows of small, light-colored, cylindrical grass plugs planted in a sandy area. A body of water is visible in the upper left, and a road or path runs along the right side of the site. The background shows more of the coastal landscape with some vegetation and structures.

Grass plugs (2") from Pinelands Nursery

American Beach Grass (*Ammophila breviligulata*)

Seaside Goldenrod (*Solidago sempervirens*)

Indian-grass (*Sorghastrum nutans*)

Big Bluestem (*Andropogon gerardii*)

Beach Plum (*Prunus maritima*)

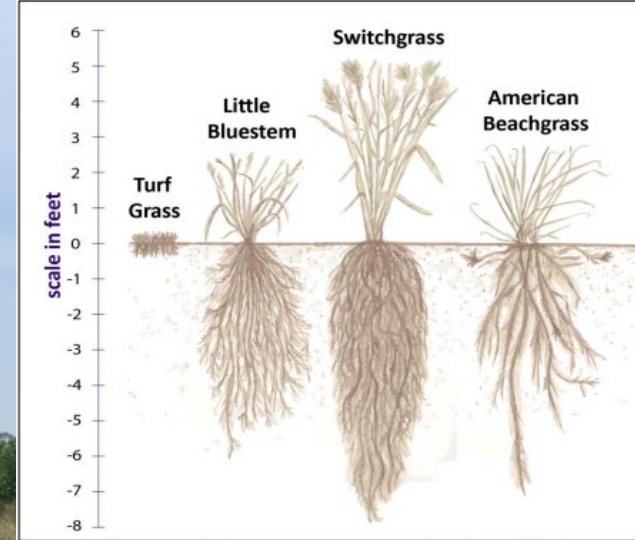
Groundsel/salt bush (*Baccharis halimifolia*)

April 23, 2018





June 2018



Turf grass has a very shallow root system compared to these other plants recommended for erosion control. (Figure redrawn from illustration by Dede Christopher of the Tennessee Valley Authority, Benefits of Riparian Zones)

July 2018



July 2019



July 2021





April, 2017



June, 2017



June, 2018





June, 2021



Red Osier dogwood
Arrowwood
Serviceberry
Fringe tree
Common Elderberry
Red Cedar Tree
Eastern redbud
Tupelo
Basswood
Pin oak
Magnolia
Hackberry



Joe pye weed, *Eutrochium purpureum*

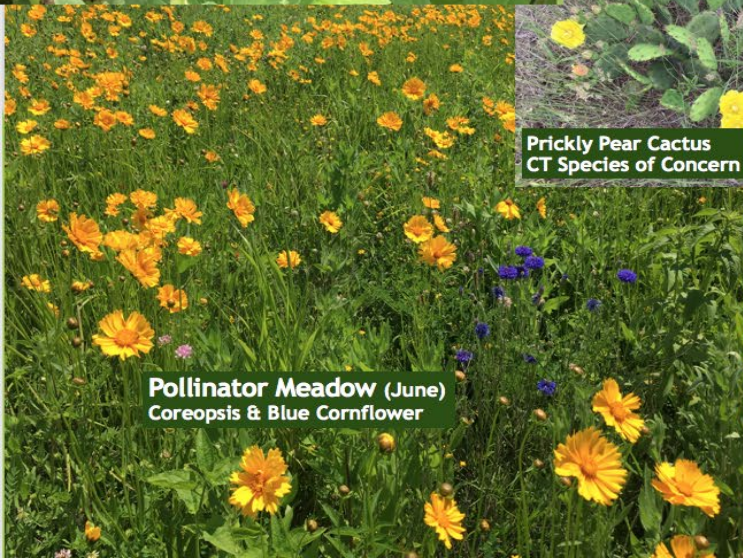


July, 2021





54 Butterfly species observed & 41 Bee Species.



TO DATE:

- 372 Reef Balls placed
- ~20,000 Marsh Grass (*Spartina*) plugs
- 35 species of trees and shrubs
- 800 individual woody plants
- 50 species of native wildflowers/grasses
- 1000's of seeds





Coastal Grassland

- Increased connectivity to other habitats on the site
- Increasing bird diversity
- Increasing insect diversity

**Invasive plant
species!**

Constant problem!



**ADAPTIVE
MANAGEMENT
REQUIRED**





**Before Restoration =
flat & barren & vulnerable**

**After = Habitat
Structure =
Biodiversity =
Resiliency**





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THANK YOU

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