Marsh response to shallow runnels

NERRS & NEERS Salt Marsh Workshop

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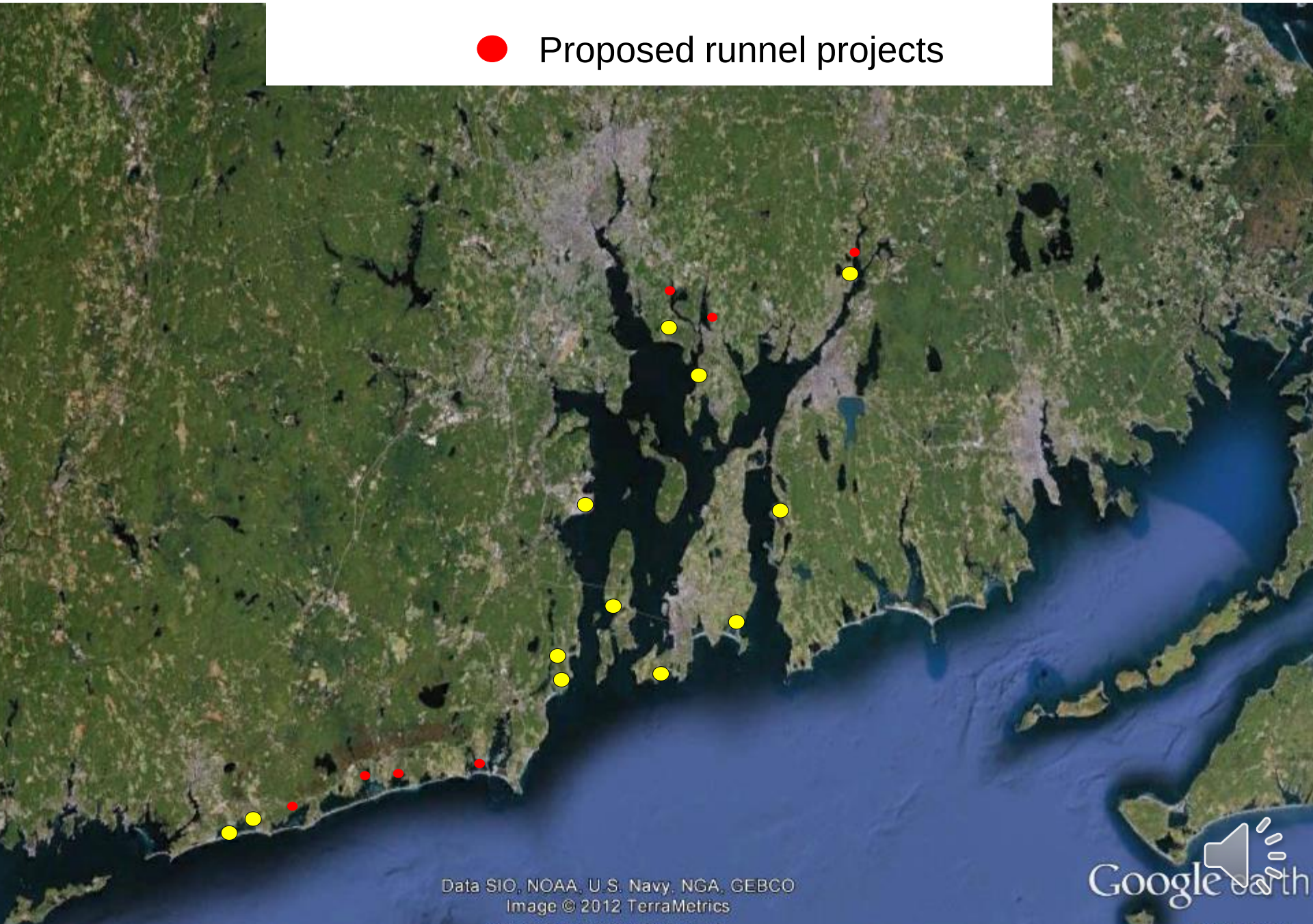
Adaptation Strategies

- In Marsh
  - Drainage enhancement through excavation of shallow creeks or runnels (excavation with low ground pressure excavator or by hand)
  - Elevation enhancement
- Upland
  - Implement activities that facilitate marsh migration
  - Change land use activities that inhibit marsh migration
  - Remove physical barriers i.e. walls


Runnel projects
Proposed runnel projects
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2012 TerraMetrics
Google Earth

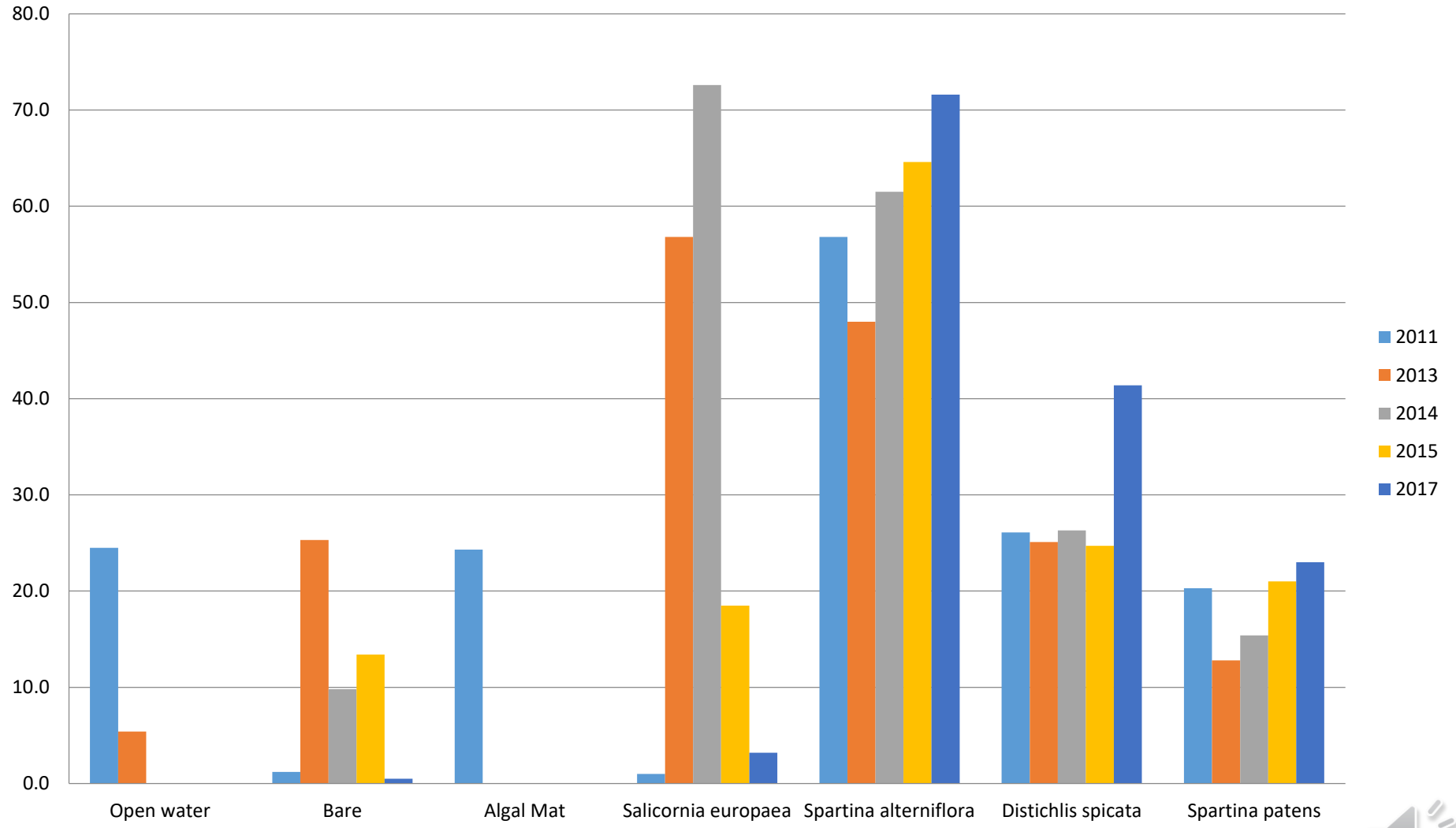
Gooseneck Cove adaptive management

Winnapaug Marsh: Westerly

- conducted spring 2013
- runnel excavation through ditch spoils in grid ditched marsh

Runnels dug through ditch spoils

Winnapaug Marsh vegetation cover



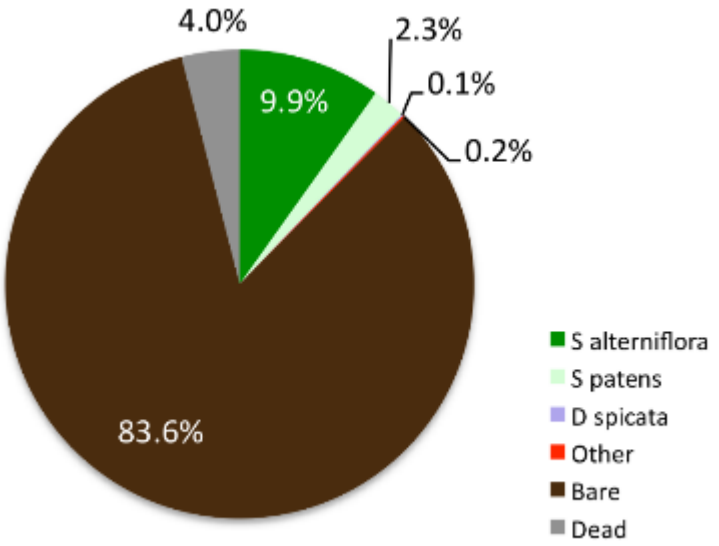
Runnels installed spring 2013

Burdick study, Plum Island

- goal establish a flow path that will allow better drainage from expansive pools

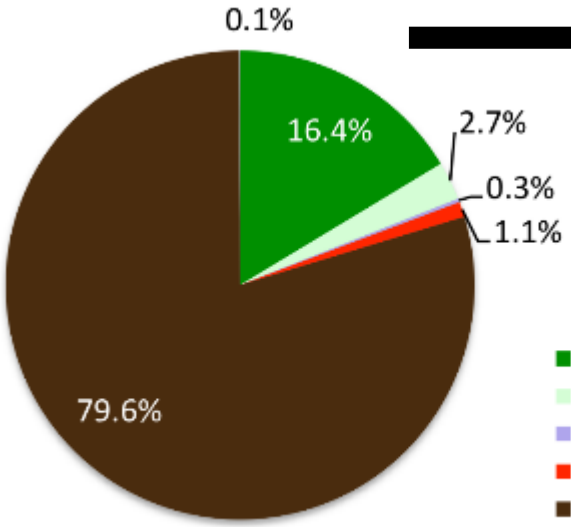
Vegetation Cover At Pool Edge (North Pool)

Pre Runnel:

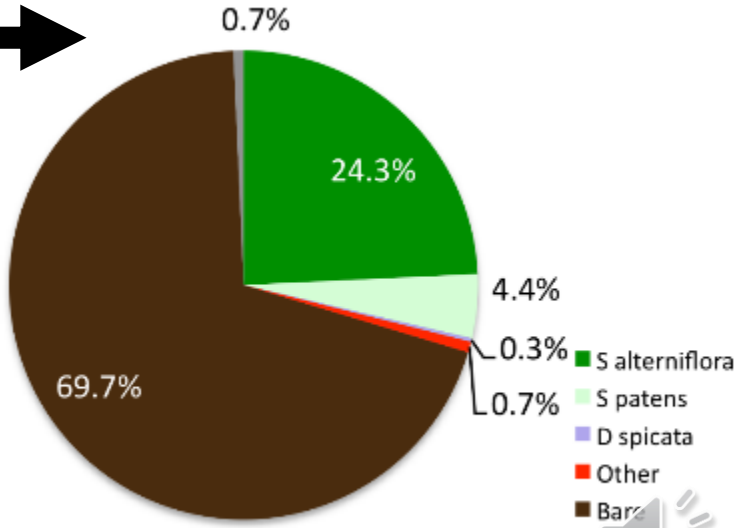


Spring 2015

Post:



Fall 2015



Summer 2016

Jacobs Point adaptation project, Warren

- Conducted 2015 and 2016
- Shallow ponded water, recent vegetation die-off

93 ft

2014 aerial imagery

Jacobs Point adaptation post runnel excavation

- Revegetation of bare and impounded water areas
- Degradation not extensive prior to runnel excavation

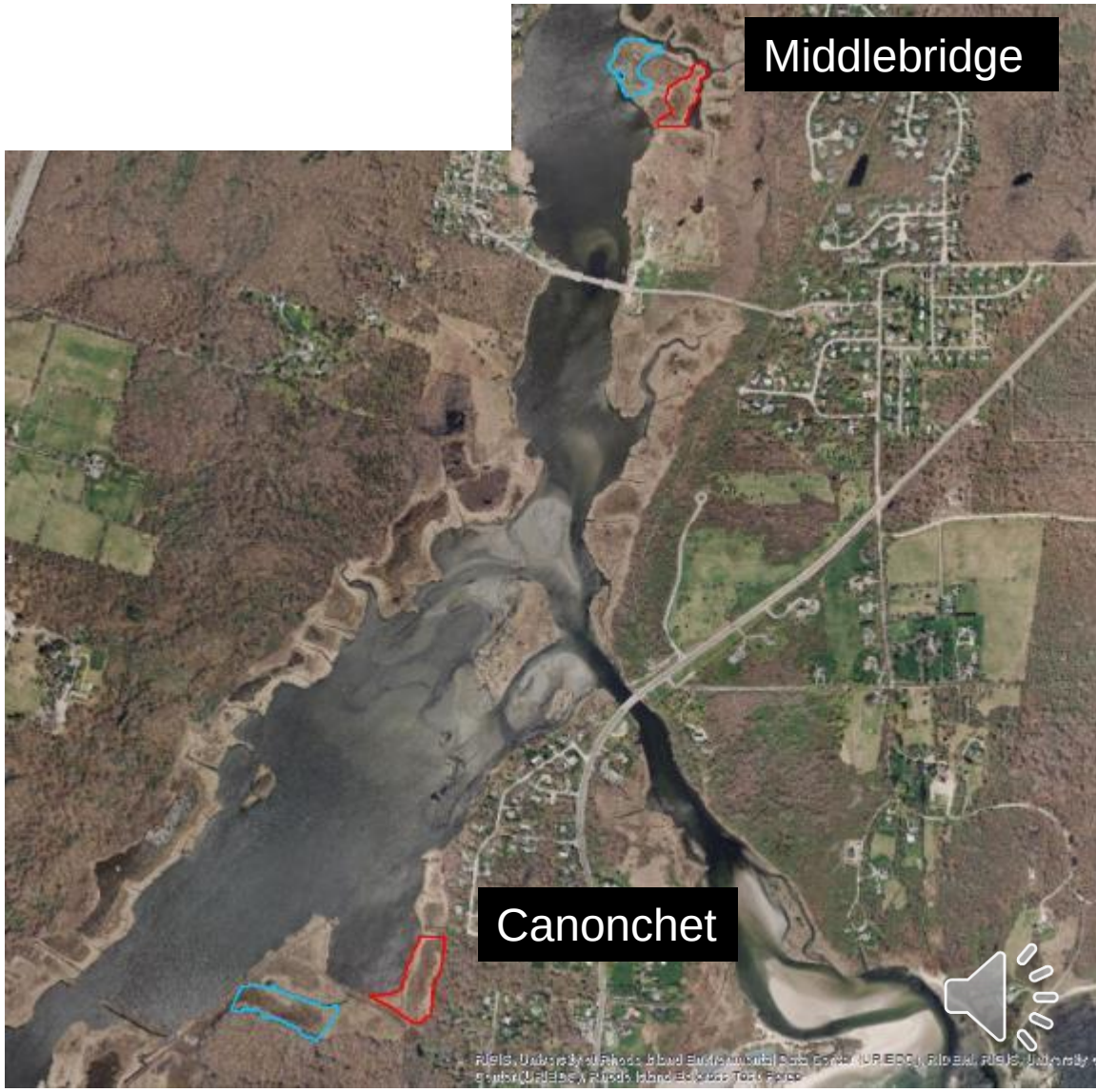
After 2 growing seasons

2016 aerial imagery

Narrow River Salt Marsh Adaptation Monitoring

-goal to assess effects of runnels on marsh function

- Parameters include vegetation (point intercept method)
- Pore water salinity
- Water level
- Avian use



Middlebridge:
marsh elevation 0.2’ - 1.4’ (Avg: 0.9’)

2012

2016

Canonchet:
marsh elevation: 0.9 -1.6 (Avg: 1.3’)

2012

2016

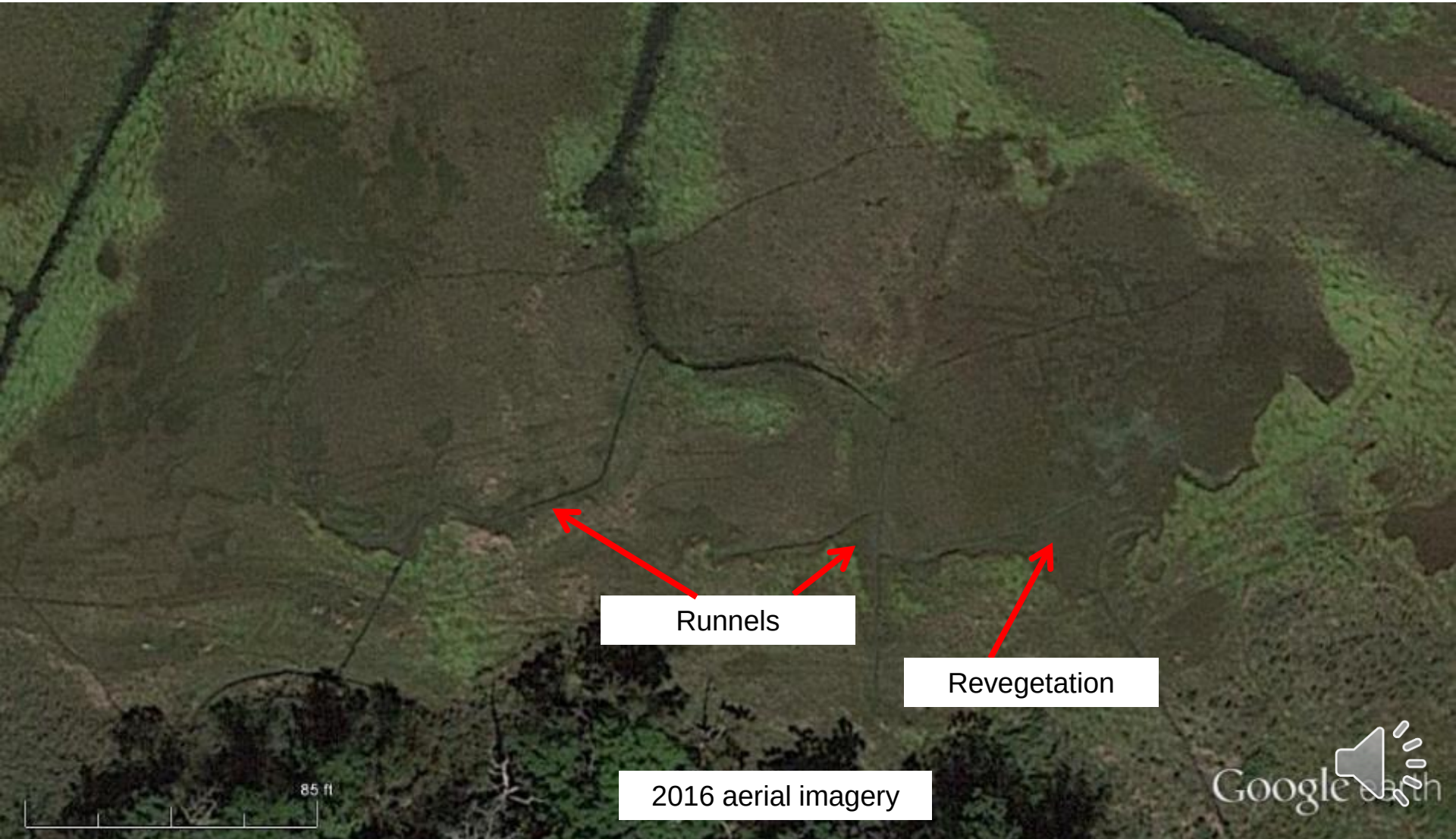
Narrow River adaptation

Impounded water

2014 aerial imagery

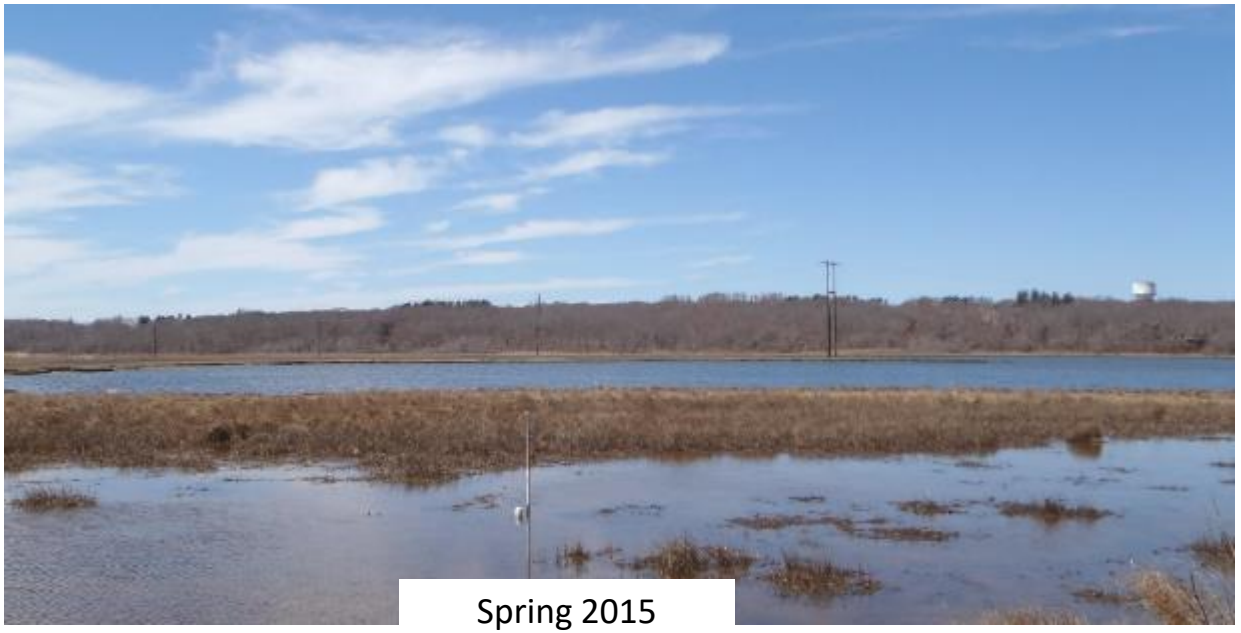
Runnel excavation

- occurred spring of 2015 and 2016 by low ground pressure excavator and by hand
- runnel depth varied from 6-12” wide and 6 -12” deep
- Revegetation of impounded water areas predominately with *Spartina alterniflora*
- Runnels lead up to freshwater wetland and upland where marsh migration occurring



2016 aerial imagery

Narrow River adaptation: pre and post conditions

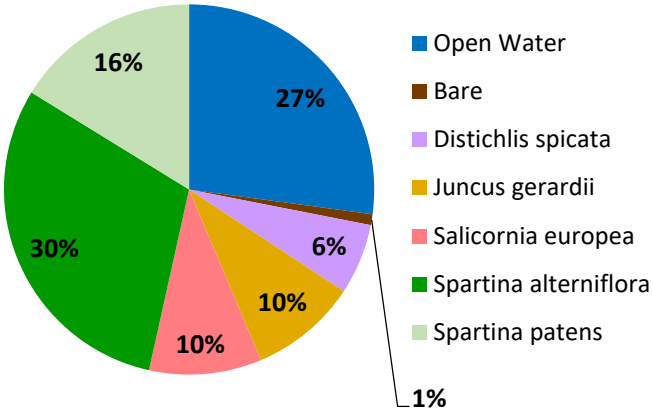


Spring 2015

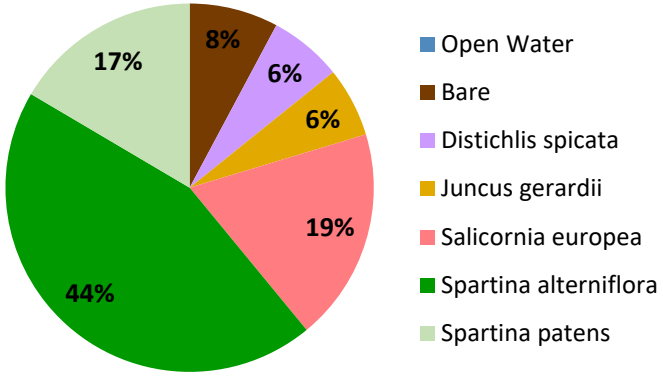
Fall 2016

Narrow River Middlebridge Impact

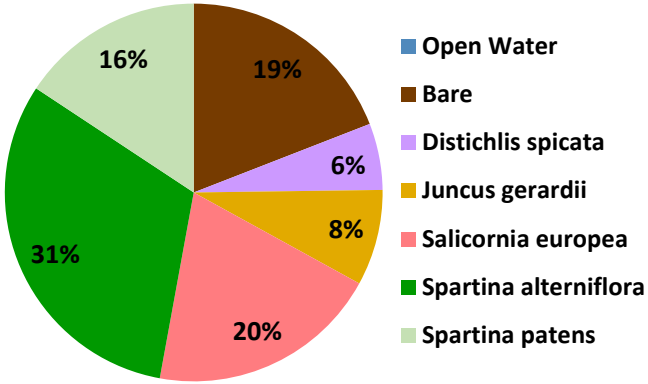
2014 pre runnel



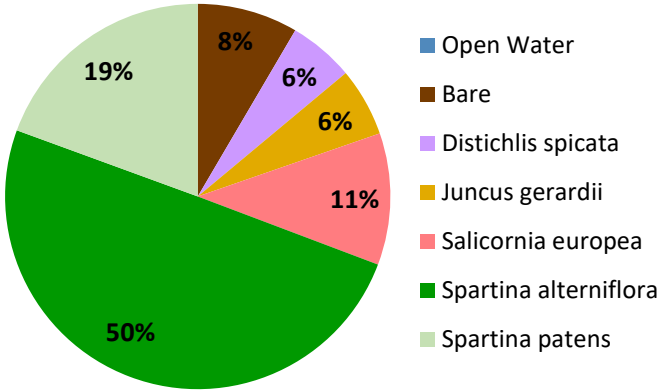
2016 post runnel



2015 during runnel creation

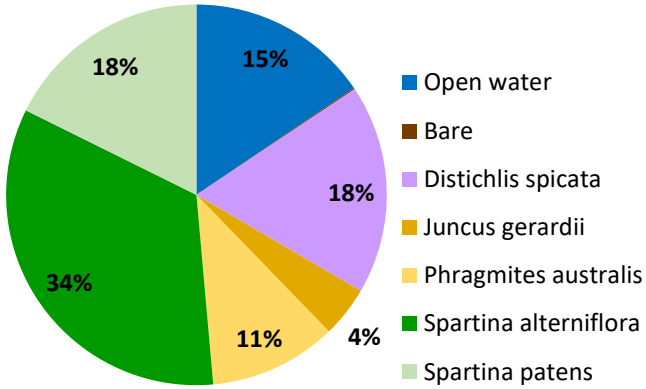


2017 post runnel

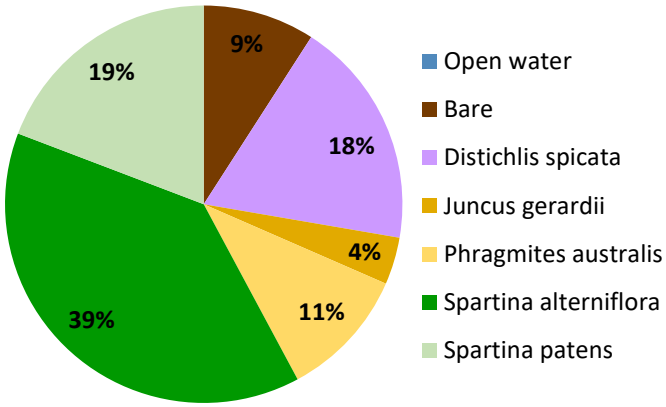


Narrow River Canonchet Impact

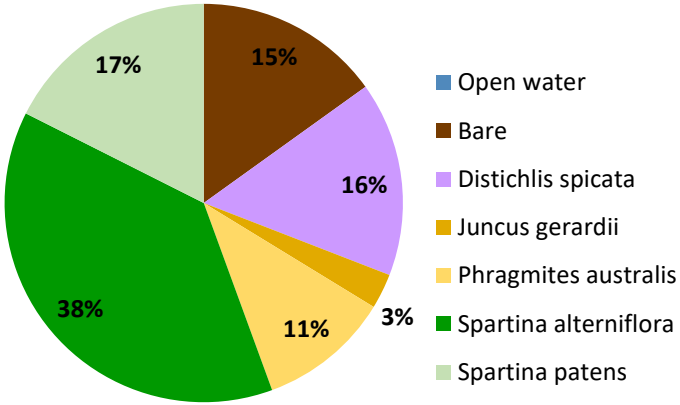
2014 pre runnel



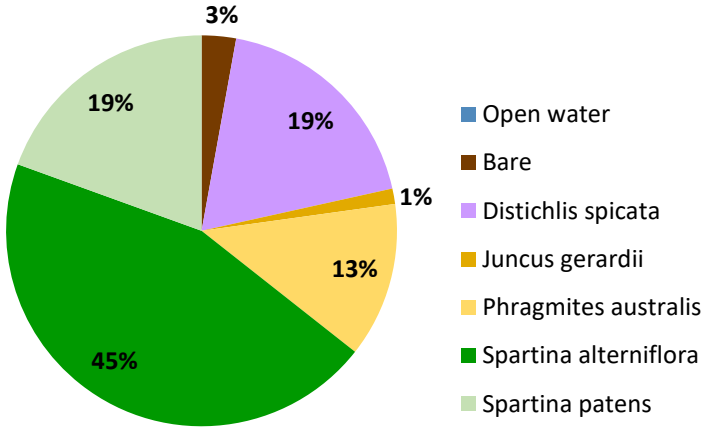
2016 post runnel



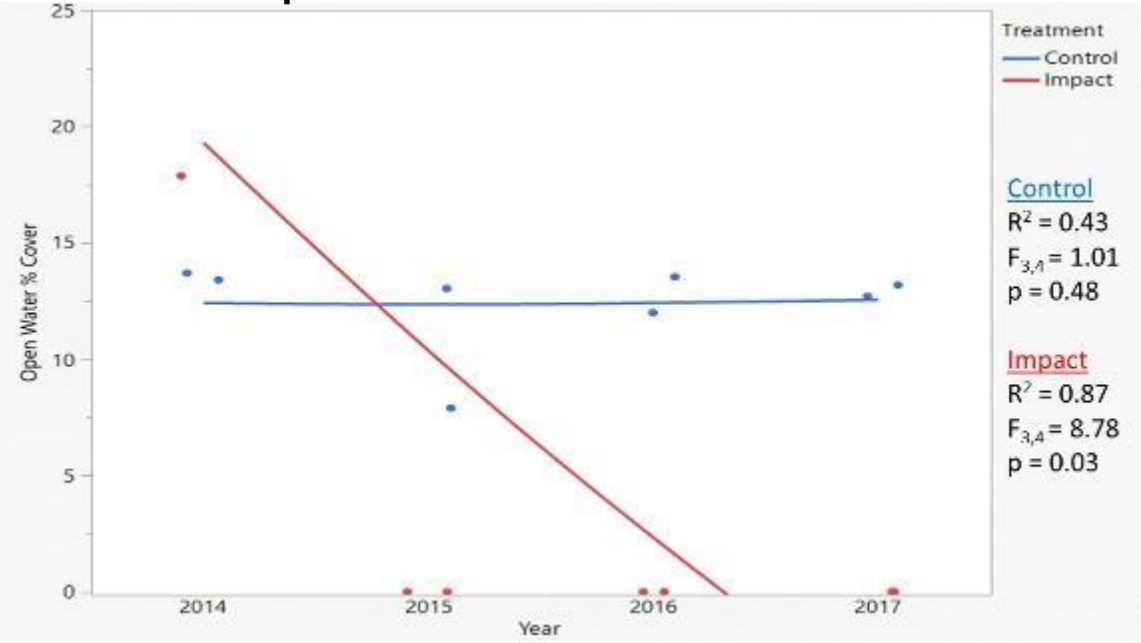
2015 during runnel creation



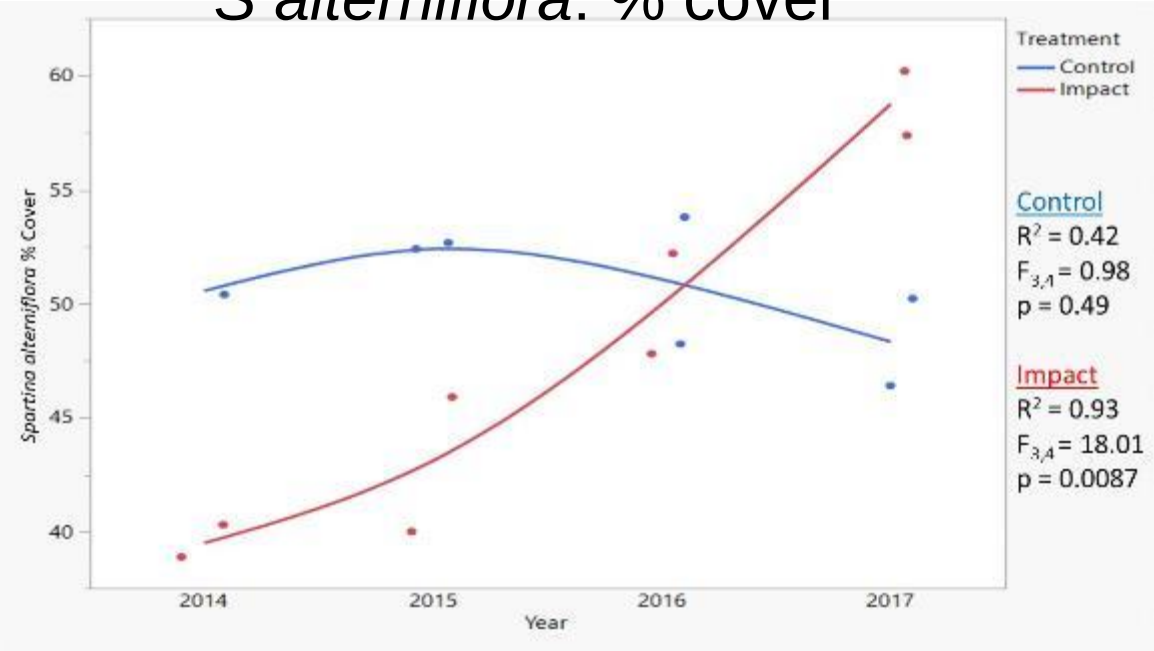
2017 post runnel

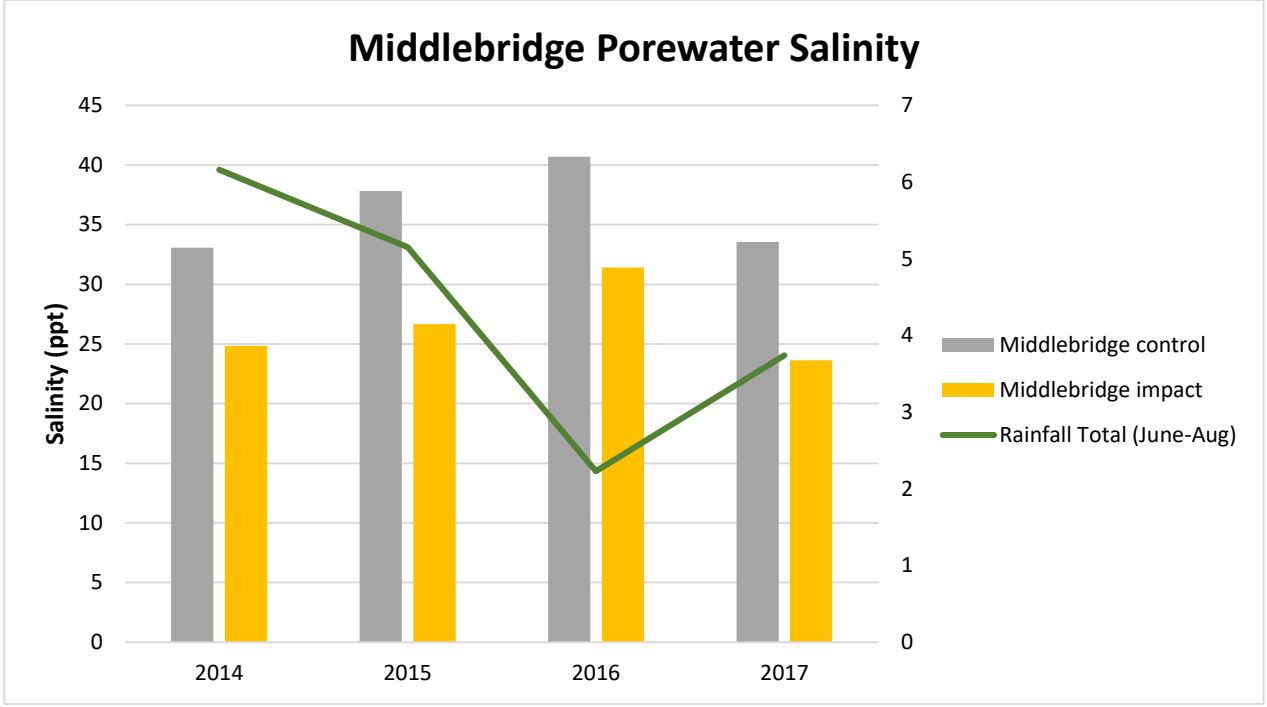


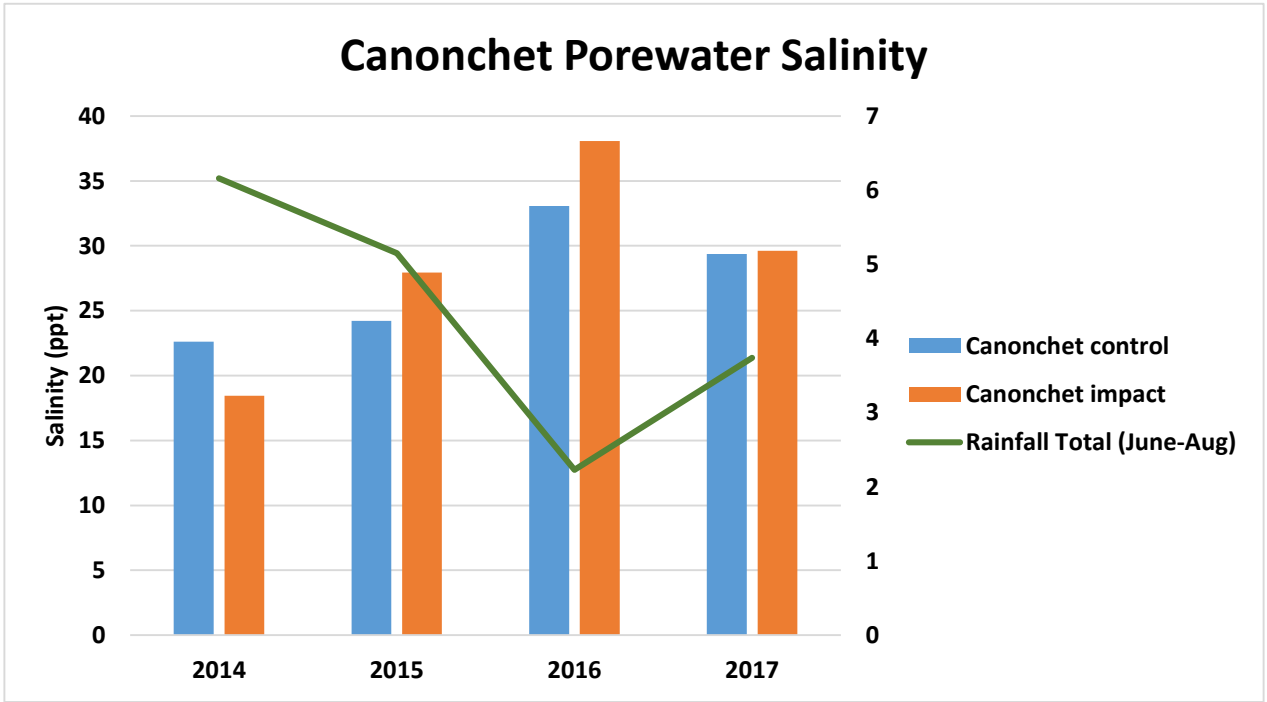
Open Water: % cover



S alterniflora: % cover




Middlebridge Porewater Salinity
Salinity (ppt)
45
40
35
30
25
20
15
10
5
0
7
6
5
4
3
2
1
0
2014
2015
2016
2017
Middlebridge control
Middlebridge impact
Rainfall Total (June-Aug)

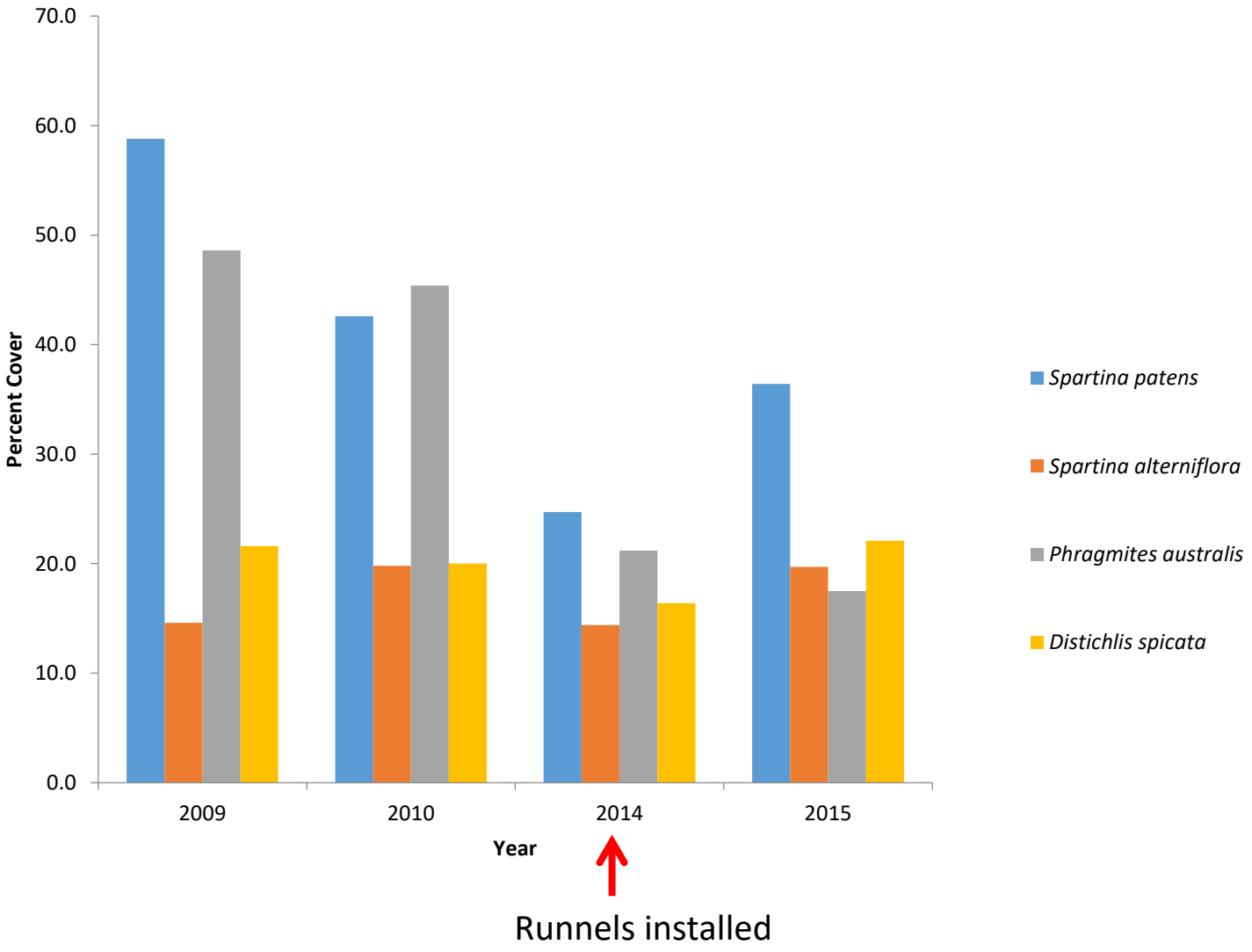

Canonchet Porewater Salinity
Salinity (ppt)
40
35
30
25
20
15
10
5
0
7
6
5
4
3
2
1
0
2014
2015
2016
2017
Canonchet control
Canonchet impact
Rainfall Total (June-Aug)

Round Marsh, Jamestown

- Drainage enhancement to reduce impounded standing water, *Phragmites* coverage and mosquito breeding habitat

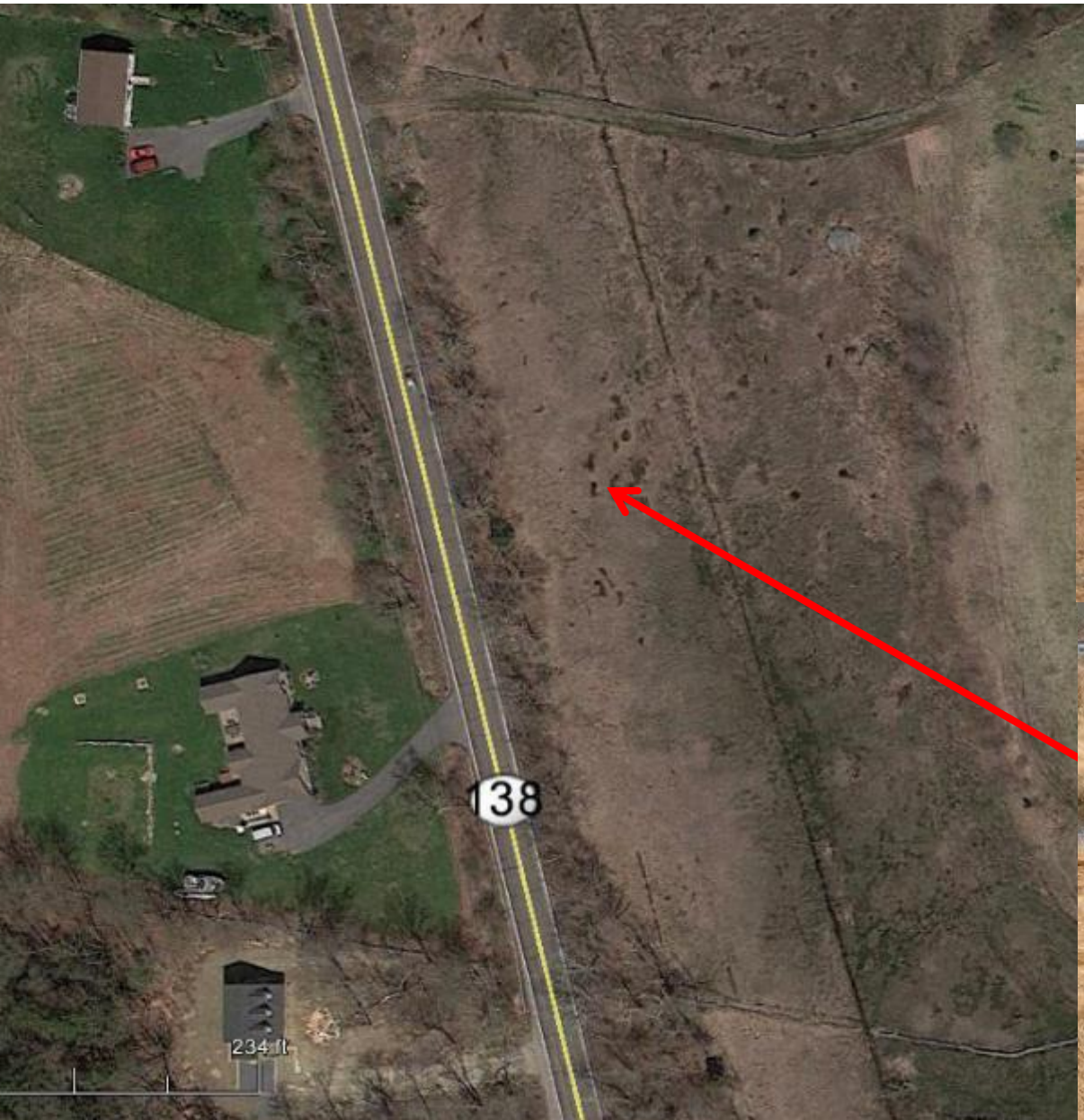
2012

Round Marsh Vegetation percent cover



Broad Cove: Dighton, MA

- high marsh still in tact, expanding depressions in upper marsh

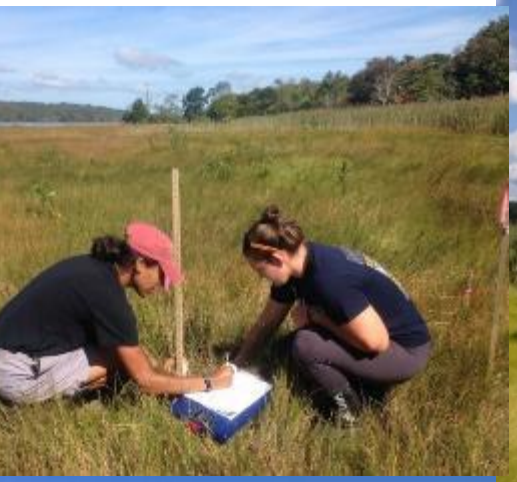


Impounded water on marsh surface

Lessons Learned:

- If marsh elevation is too low, marsh unlikely to revegetate and scouring could result due to the volume of water flooding and draining during a tidal cycle
- Runnels in upper marsh and in marsh migration corridor greatest recolonization
- Maintain sills at the mouth of runnels to prevent excessive drainage
- Conduct project in phases to allow marsh to revegetate and stabilize unconsolidated sediments
- Peat is gold! Keep it on the marsh surface

Thank You



Eager & brilliant interns!

CRMC Coastal Resources Management Council

DEM Rhode Island

U.S. Fish & Wildlife Service

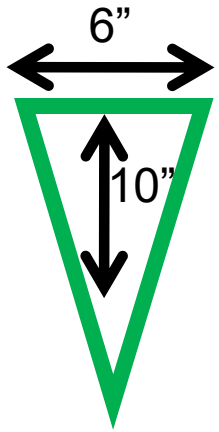
National Oceanic and Atmospheric Administration NOAA US Department of Commerce

NRCS Natural Resources Conservation Service

Example of marsh sill

Figure 10: Sapowet runnel range of profiles

small runnels



large runnels