



Tidal marsh restoration planning and monitoring for at-risk Saltmarsh Sparrow

Alison Kocek and Jonah Saitz

USFWS Southern New England Coastal Program

Coastal Program



The Coastal Program



The U.S. Fish and Wildlife Service Coastal Program A Conservation Leader

The Coastal Program works with communities to voluntarily restore and protect habitats that benefit fish, wildlife, and people. We also develop resources that help land managers and practitioners deliver habitat conservation. By working together, we can sustain the people, economies, and wildlife that rely on coastal ecosystems.

Since 1985 the Coastal Program has worked with over **8,200 PARTNERS** to:

PROTECT
2,100,000+
acres of habitat



RESTORE
550,000+
acres of habitat



RESTORE
2,600+
miles of stream



DELIST/DOWNLIST
15 federally-listed threatened and
endangered species



OUR MISSION

to achieve voluntary habitat conservation by providing technical and financial assistance, in collaboration with partners, for the benefit of federal trust species.

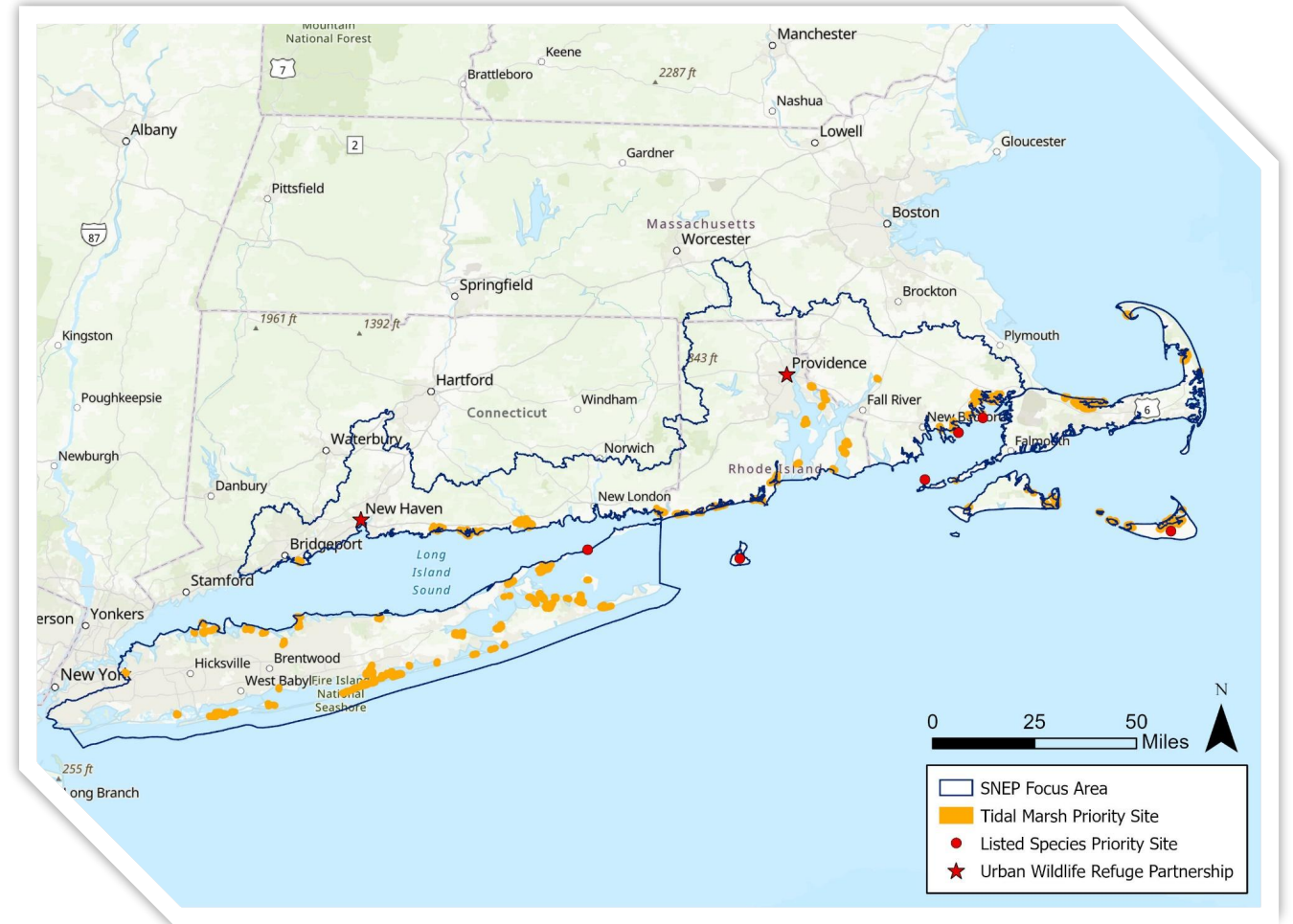
Southern New England Coastal Program (SNEP)

4 Staff Members

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Covering

- Ornithology / Wildlife Biology
- Tidal Wetland & Riverine Restoration Guidance
- Community Engagement
- Hydrology



2023 Technical Assistance



24,000+
RTK Survey Points

18
HOBO Logger
Deployment

9
Training /
Outreach
Events

42
Point Counts

38
Avian Trapping
Events

21
Partner's
Engaged

339
Birds Banded

MAP: [Freevectormaps.com](https://www.freevectormaps.com)





PHOTO: USFWS/Jonah Saitz

Overview

01. Saltmarsh Sparrow

02. Monitoring techniques for Saltmarsh Sparrows

03. Salt Marsh restoration monitoring techniques





PHOTO: Shawn Billerman

The Salt Marsh Sparrow



Saltmarsh Sparrow: Distribution & Habitat

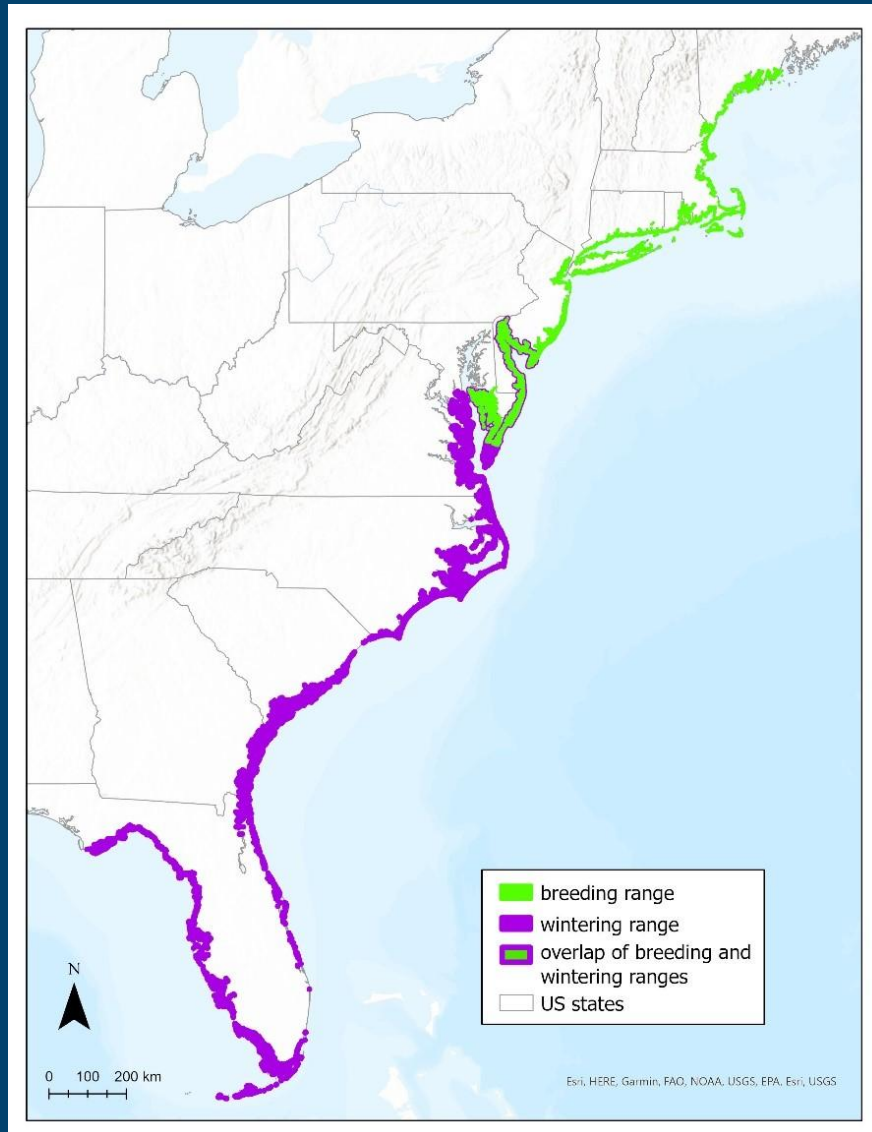


PHOTO: Paul J. Fusco



Saltmarsh Sparrow: Nesting Ecology



Saltmarsh Sparrow: Primary Threats

Direct threats to nests/nestlings



Predation



Nest flooding
(Need a minimum 23-day window without flooding for a nest to succeed)



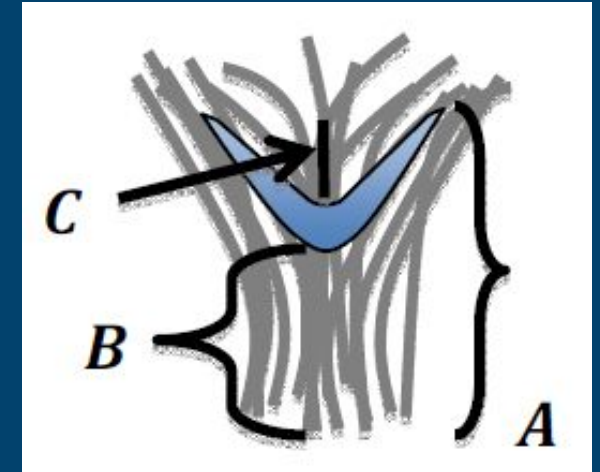
Saltmarsh Sparrow: Strategies to Avoid Nest Loss

Nest placement

- High elevation marsh (*Spartina patens*)
- Nest height in vegetation
- Domed nest architecture

Physical characteristics

- Short incubation time
- Rapid chick growth
- Early nest departure



Saltmarsh Sparrow: Primary Threats

Primary drivers of Saltmarsh Sparrow decline

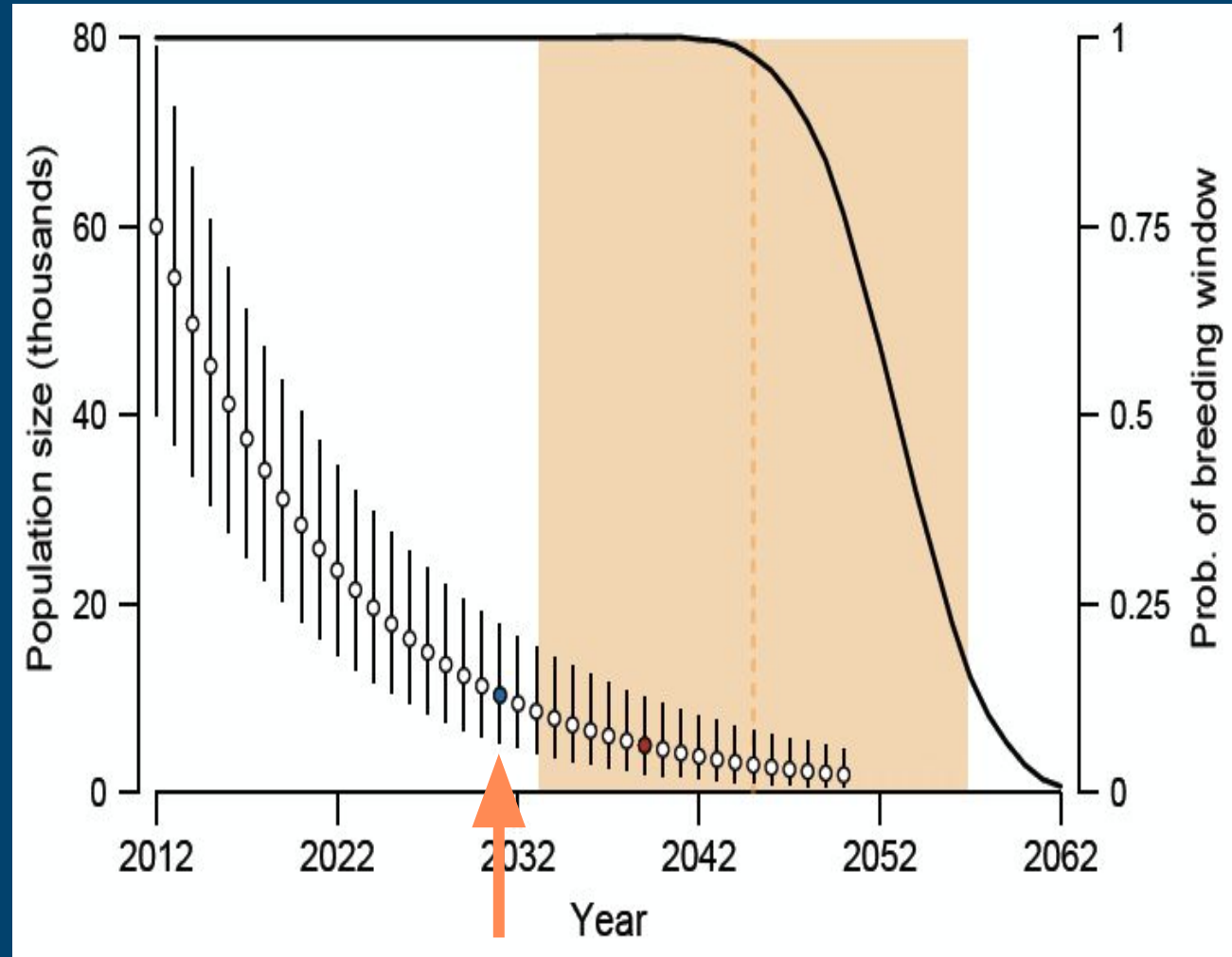
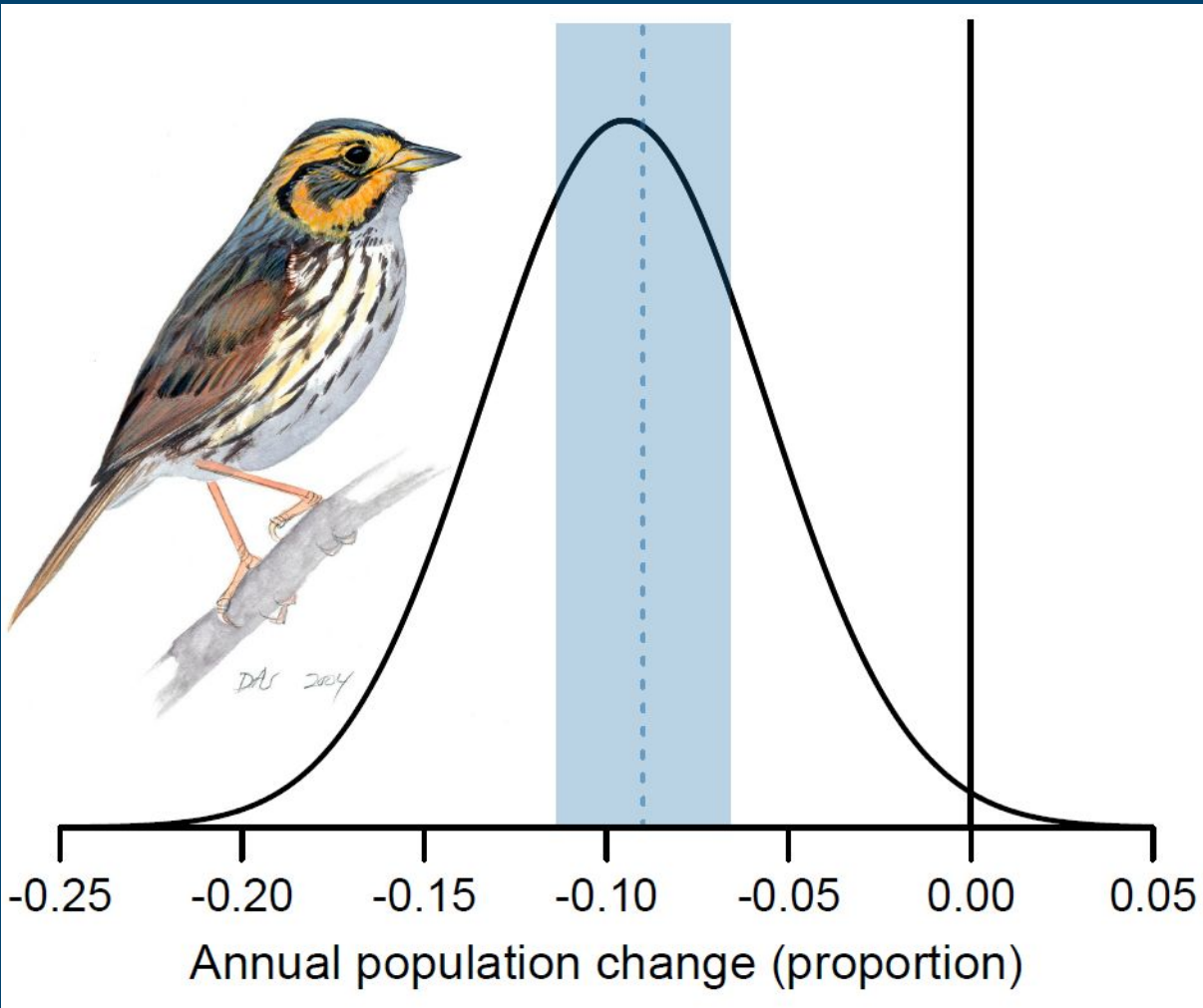
- Direct nest failure
- Decline in amount of nesting habitat

Factors leading to decline

- Sea level rise outpacing marsh accretion rates
- Increased storm frequency, duration and severity
- Hardening around marshes
- Marshes abutting urban centers



Saltmarsh Sparrow: Population Status



Critical Minimum: 10,000 birds



(Correll et al. 2016)

(Field et al. 2017)

Conservation Through Salt Marsh Restoration



PHOTO: Jesse Costa

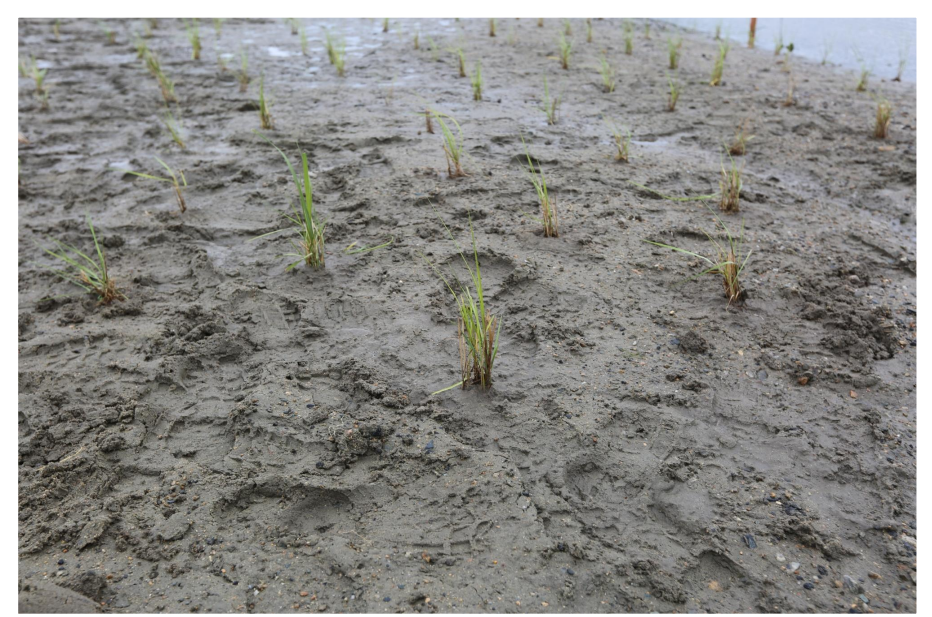


PHOTO: Lisa



Saltmarsh Sparrow: Restoration Monitoring

Recommendations for Monitoring Saltmarsh Sparrows on Salt Marsh Restoration Projects

Version 1.0



Saltmarsh Sparrow: Monitoring Techniques

Method	Metric	Inference
Point counts	Occupancy, abundance, species richness, Index of ecological condition	Occupancy confirmation Abundance & change over time No breeding confirmation No breeding success
Passive observation of breeding behavior	Food, fecal sac, nest material carry; observation of recently fledged young	Breeding behavior Breeding confirmation Breeding success No change in breeding success over time
Fixed effort mist-netting	# females and juveniles captured	Breeding confirmation Positive correlation w/ breeding success, Change in breeding success over time
Nest searching	# nests, clutch or brood size, nest site vegetation	Breeding confirmation Change in breeding over time Change in breeding success over time*

Effort



Saltmarsh Sparrow: Monitoring Techniques

Effort
↓
+



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Effort



Saltmarsh Sparrow: Monitoring Techniques



Effort



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Saltmarsh Sparrow: Monitoring Techniques

Rapid Survey Recommendation (Sanchez 2022)

Effort

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Salt Marsh Pre-Restoration Monitoring Techniques

PHOTO: USFWS/Jonah Saitz

Water Levels

Elevation

Vegetation



Water Levels

- A critical component in any marsh restoration
- Deployment of 18 HOBO loggers across 4 sites in 2023

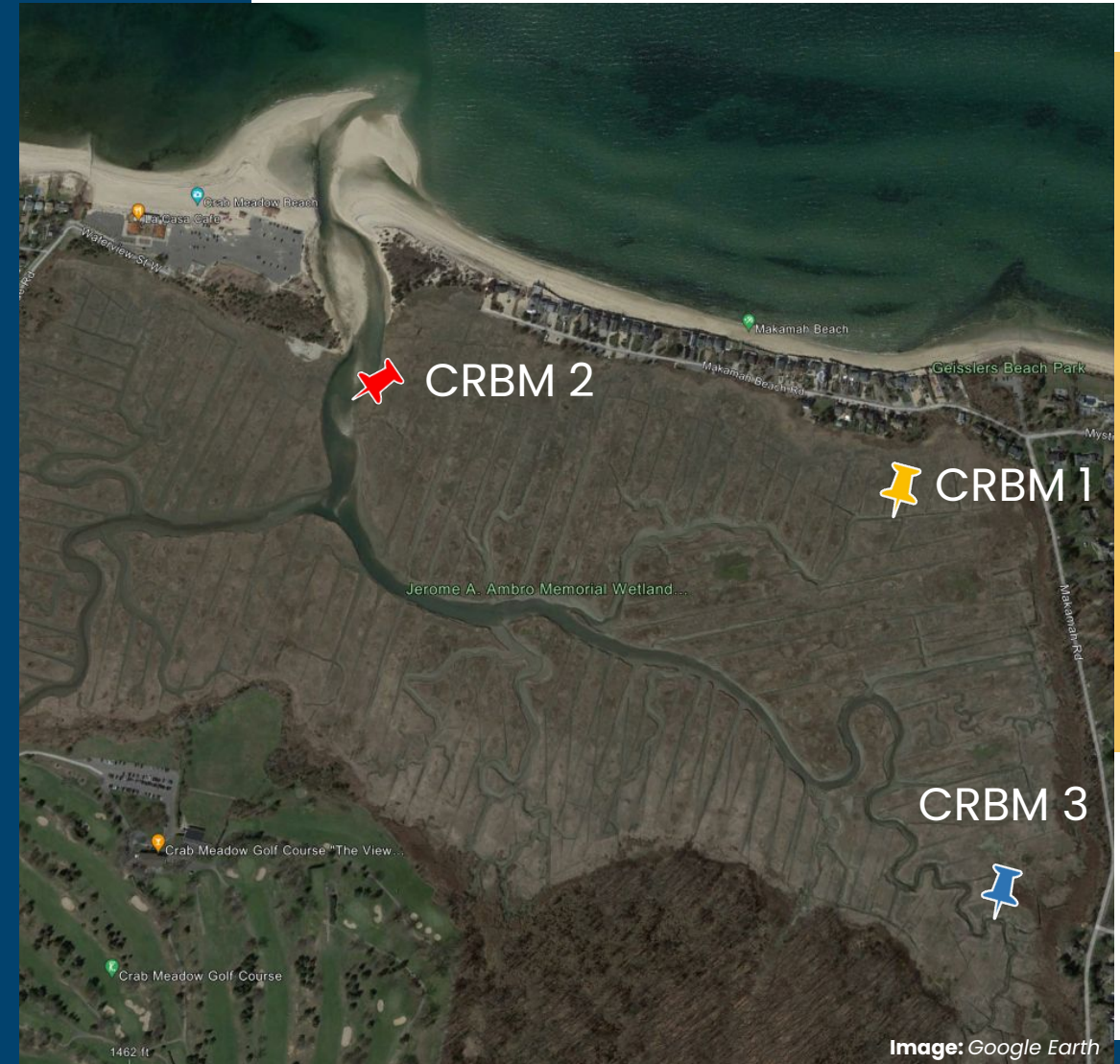


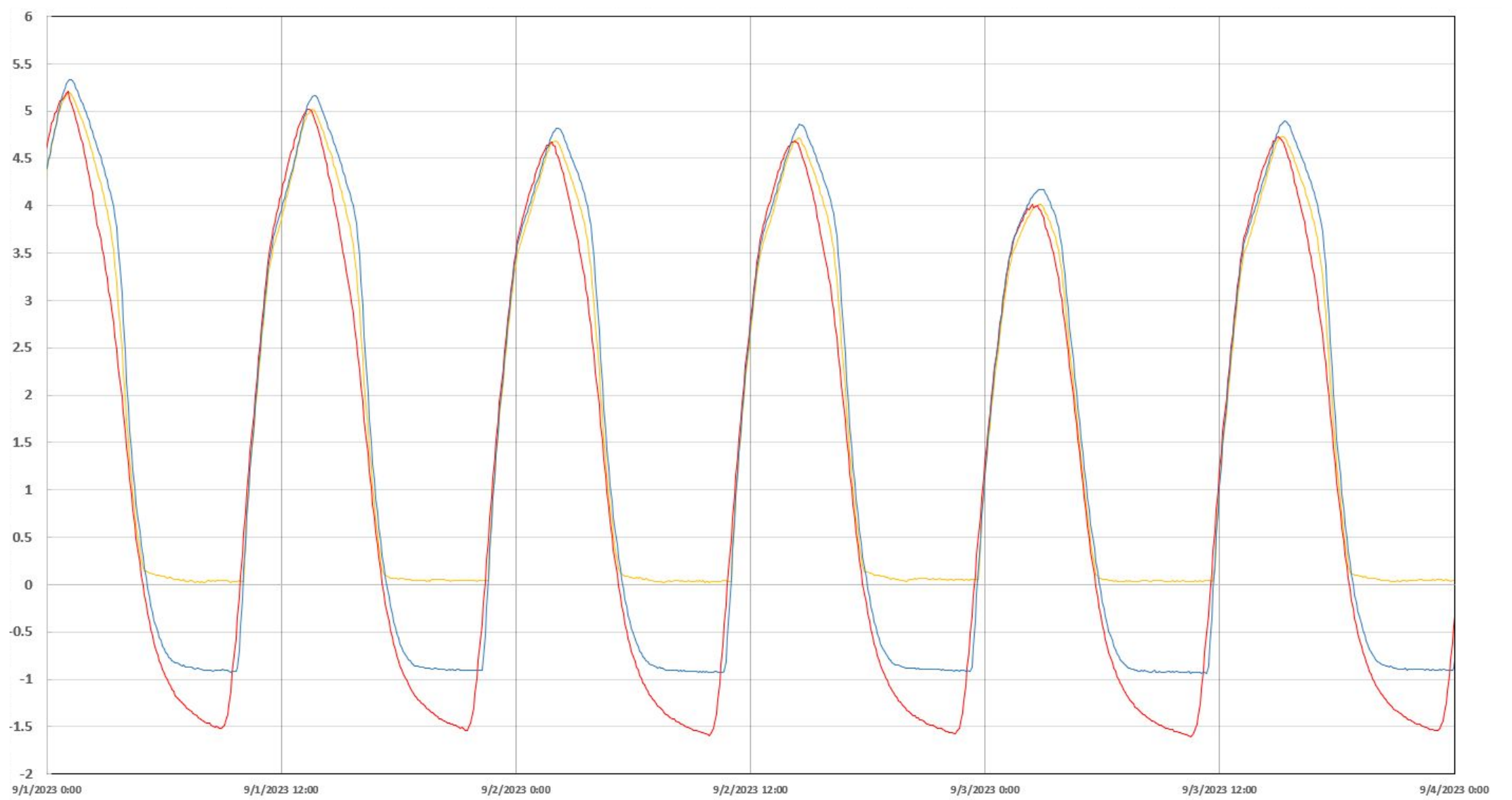
PHOTO: USFWS/Jonah Saitz



Methodology

- **Timeline: 30+ day install, preferably May–August**
- **Install water loggers in key channels**
- **Data process (using HOBOWare*)**
- **Collect reference measurements from the field to calibrate data**





— CRBM 1
NE Corner

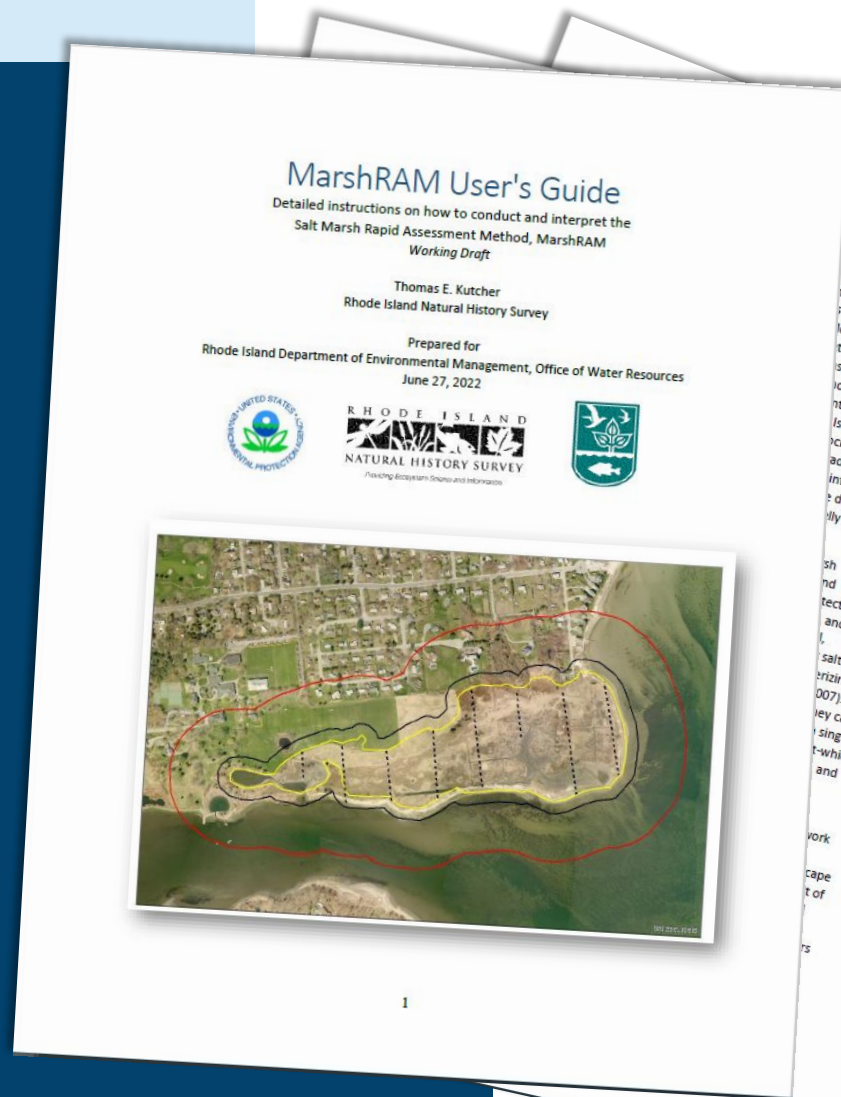
— CRBM 2
Mouth

— CRBM 3
SE Corner



MarshRAM

A Methodology for Salt Marsh Rapid Assessment



(Kutcher et al. 2022)



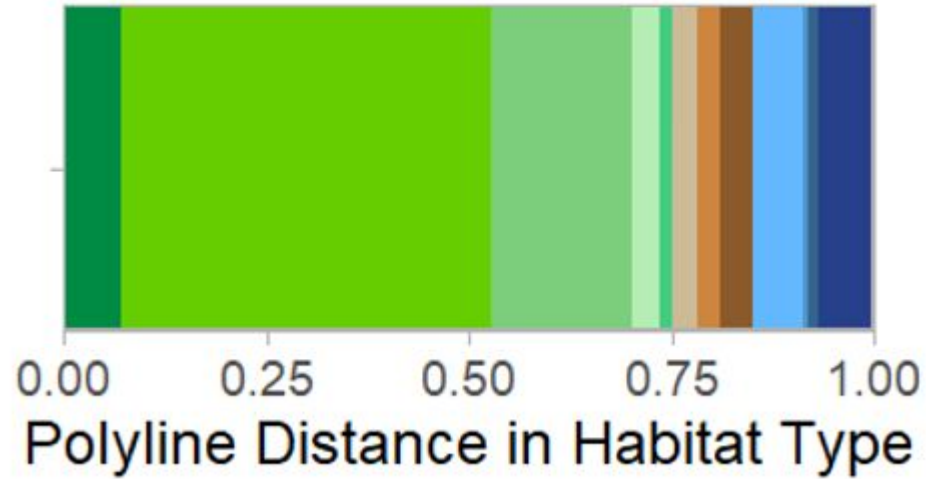
Maxar, Microsoft, Esri Community Maps Contributors, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc. METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS



Marsh RAM Vegetation Transects



Site Wide Marsh RAM
(Transects 1-12)



Cover Type

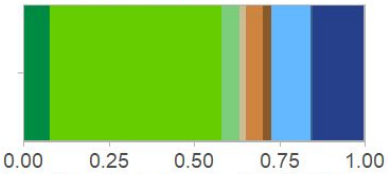
- Natural Creek
- Natural Pool
- Natural Panne
- Ditch
- Dieback Denuded Peat
- Dieoff Bare Depression
- Phragmites
- Salt Shrub
- Meadow High Marsh
- Mixed High Marsh
- Transitioning High Marsh (Short *S. alterniflora*)
- Low Marsh (Tall *S. alterniflora*)



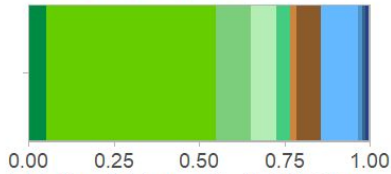
Marsh RAM Vegetation Transects



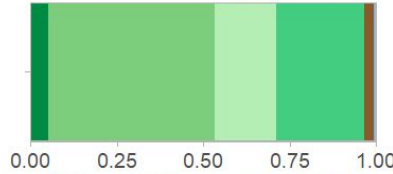
Marsh RAM Transect #1



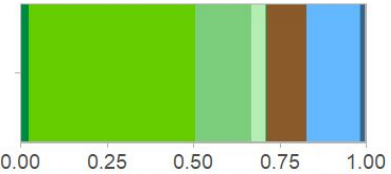
Marsh RAM Transect #2



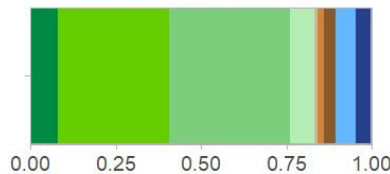
Marsh RAM Transect #3



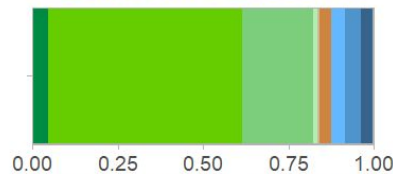
Marsh RAM Transect #4



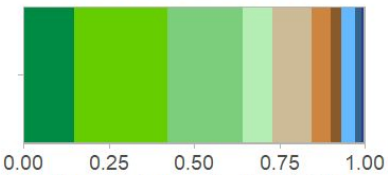
Marsh RAM Transect #5



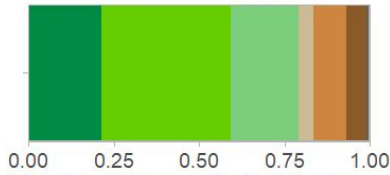
Marsh RAM Transect #6



Marsh RAM Transect #7



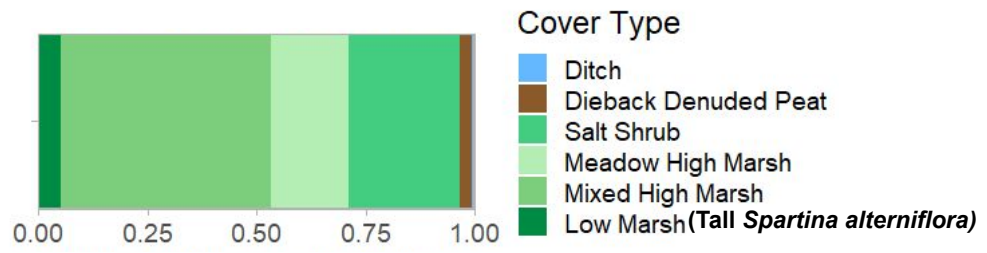
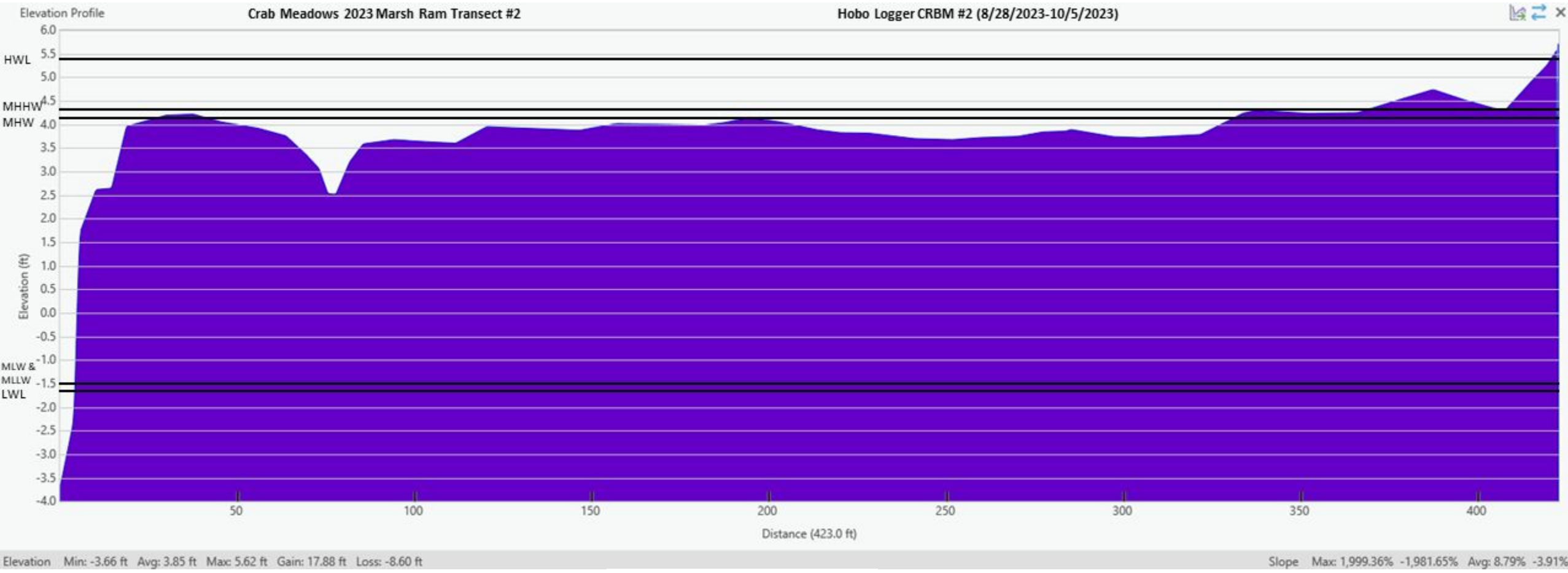
Marsh RAM Transect #8

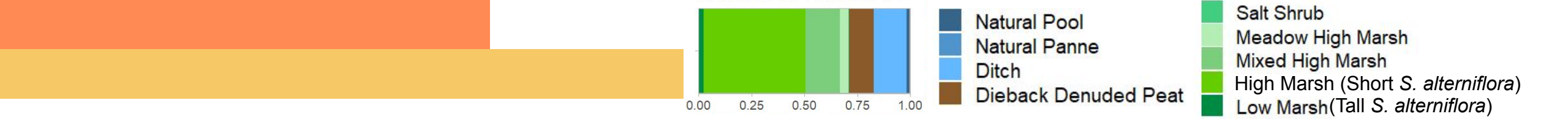


Cover Type

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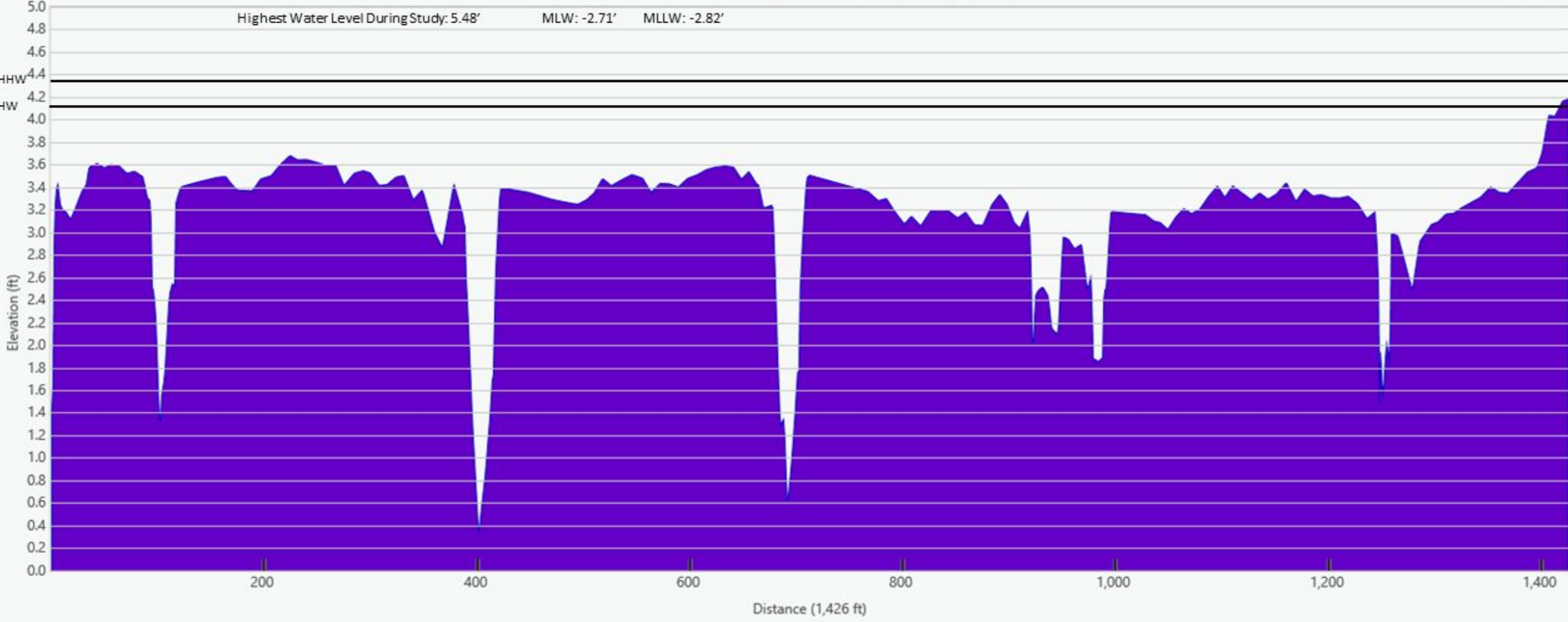






Elevation Profile **Crab Meadows 2023 Marsh Ram Transect #3** **Hobo Logger CRBM #2 (8/28/2023-10/5/2023)**

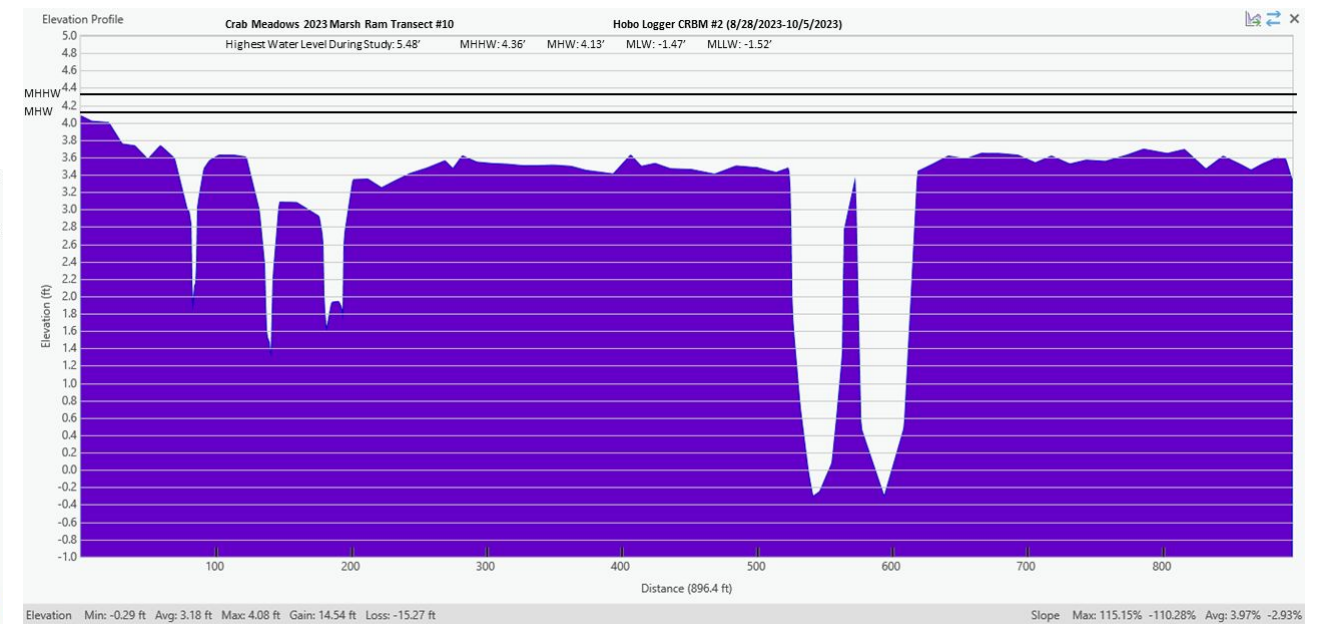
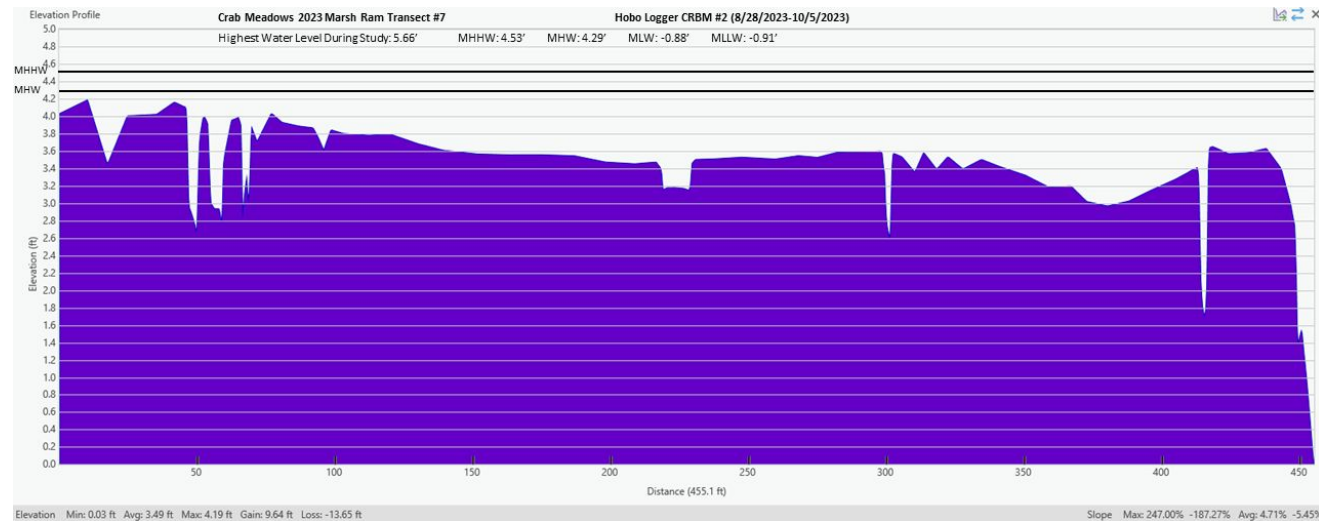
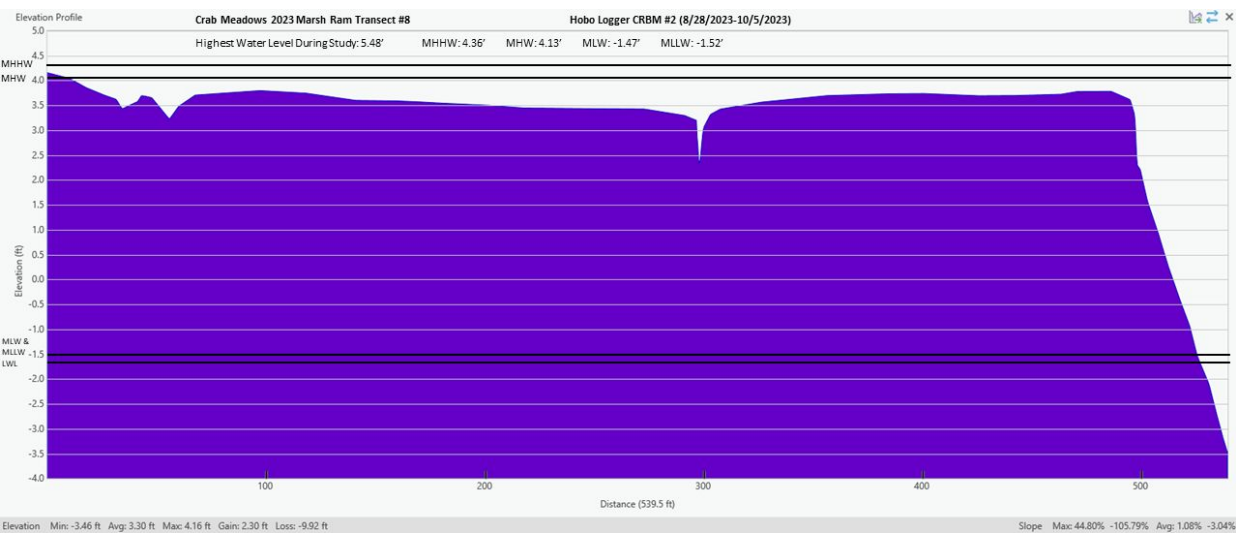
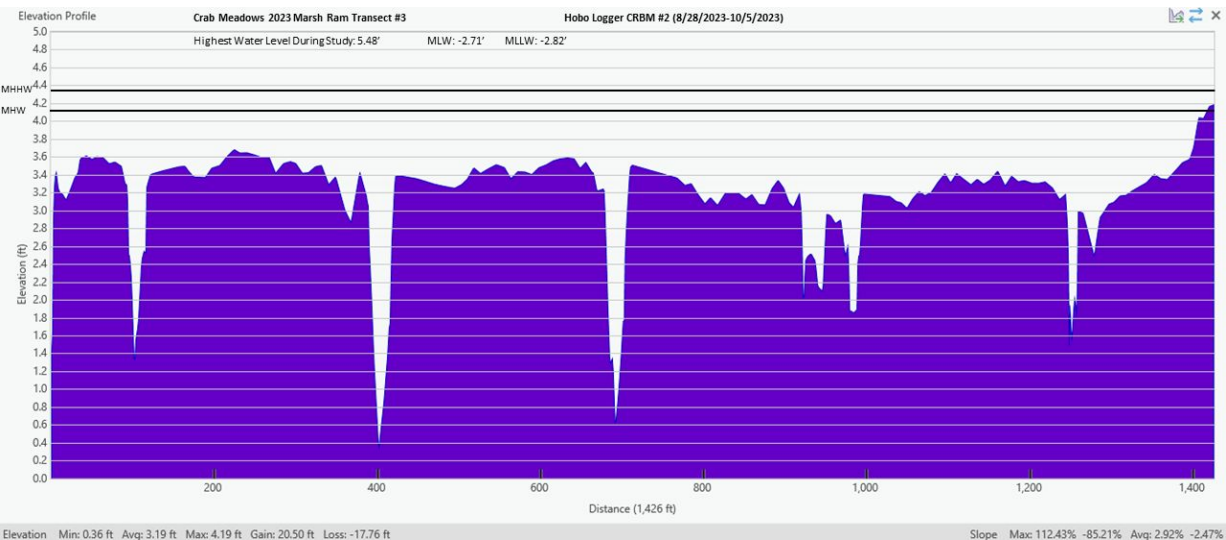
Highest Water Level During Study: 5.48' MLW: -2.71' MLLW: -2.82'



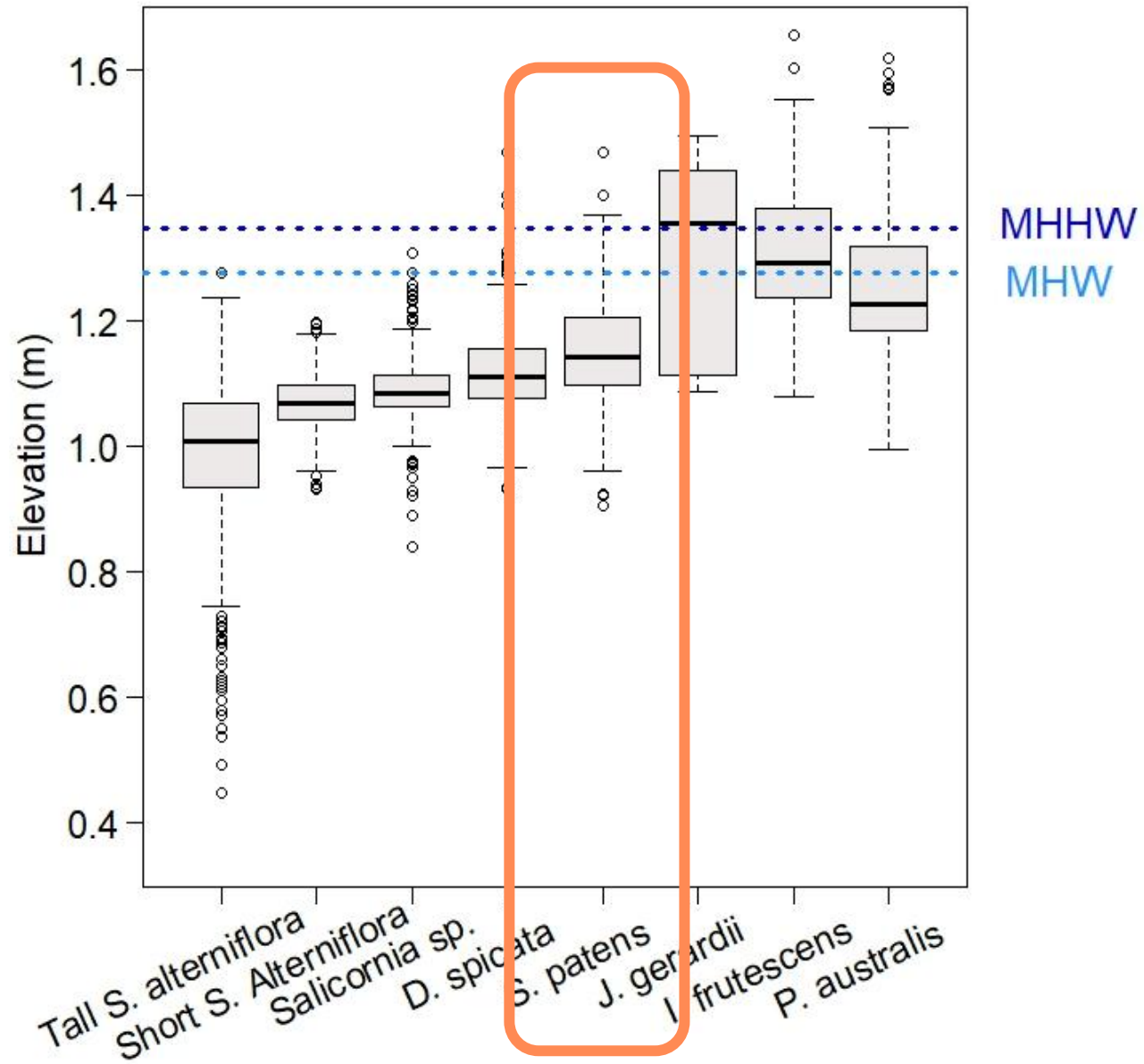
Elevation Min: 0.36 ft Avg: 3.19 ft Max: 4.19 ft Gain: 20.50 ft Loss: -17.76 ft

Slope Max: 112.43% -85.21% Avg: 2.92% -2.47%





Combine Data



Total n =
1,611



Combine Data

**Successful nesting
unlikely**

Minimum 23-day window required for successful nesting

Mean Saltmarsh Sparrow nest height off ground (9 cm)

Highest *S. patens*

Mean *S. patens*

Elevation (m)

1.52

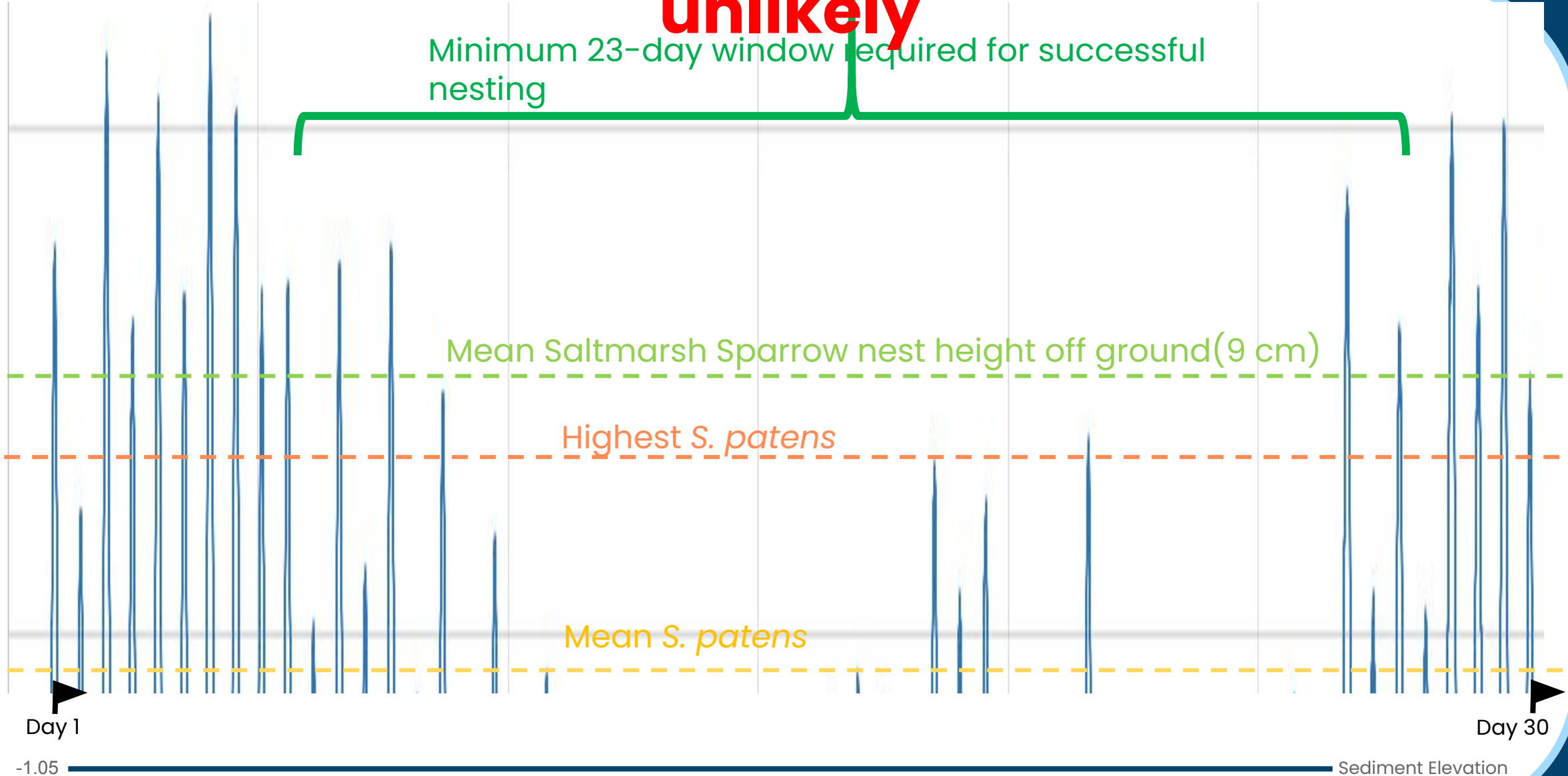
1.22

Day 1

Day 30

-1.05

Sediment Elevation



Summary

- **Considering Saltmarsh Sparrows when restoring marshes will support the species**
- **Newly developed rapid monitoring techniques can determine post-restoration outcomes for Saltmarsh Sparrow**
- **Creating high marsh can benefit Saltmarsh Sparrows**
- **Combining data sources can help:**
 - **Set TLP height targets**
 - **Focus target areas of need**
- **SNEP can partner to support monitoring efforts for upcoming salt marsh restoration projects**



Any Question's

Learn More about us:

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