

Salt Marsh Migration in Long Island Sound

Understanding Marsh Migration into Upland Habitats

Jamie O'Connell, MEdSc 2015
Yale School of Forestry and Environmental Studies
Advisor: Dr. Shimon Anisfeld

Overview

- Salt marshes and sea level rise
- Migration as an adaptation to sea level rise?
- Research Questions
- Methods and Site Selection
- Results
- Conclusions

Introduction

Will sea level rise cause marsh drowning?



Survival Option: Migration

Aboveground Profile

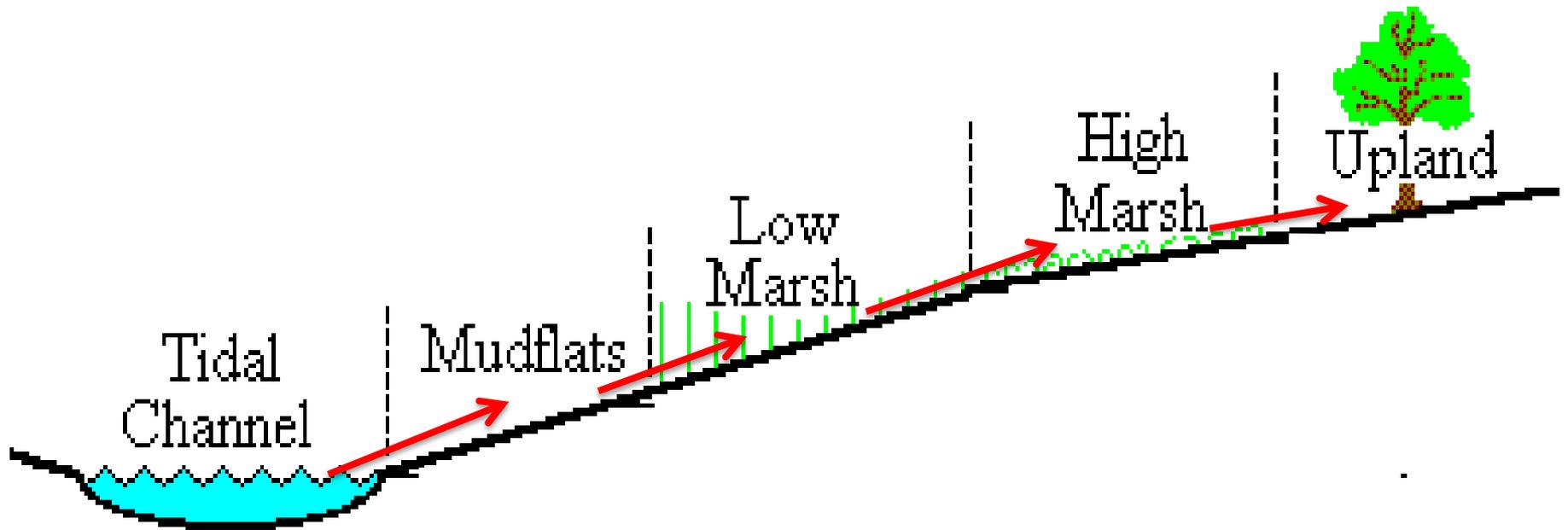


Image modified from:

<http://www.eserc.stonybrook.edu/cen514/fall2003/images/vegzonsm.gif>

Research Qs

(1) Are marshes migrating into upland habitat?

(2) If so, how quickly?

RESEARCH SITES AND METHODS

2 urban transects

- 1 *Forest*
- 1 *Scrub*

3 rural transects

- 2 *Forest*
- 1 *lawn*

Carolina Creek - East Haven, CT

Hammonasset Beach State Park - Madison, CT

© 2015 Google
Image Landsat

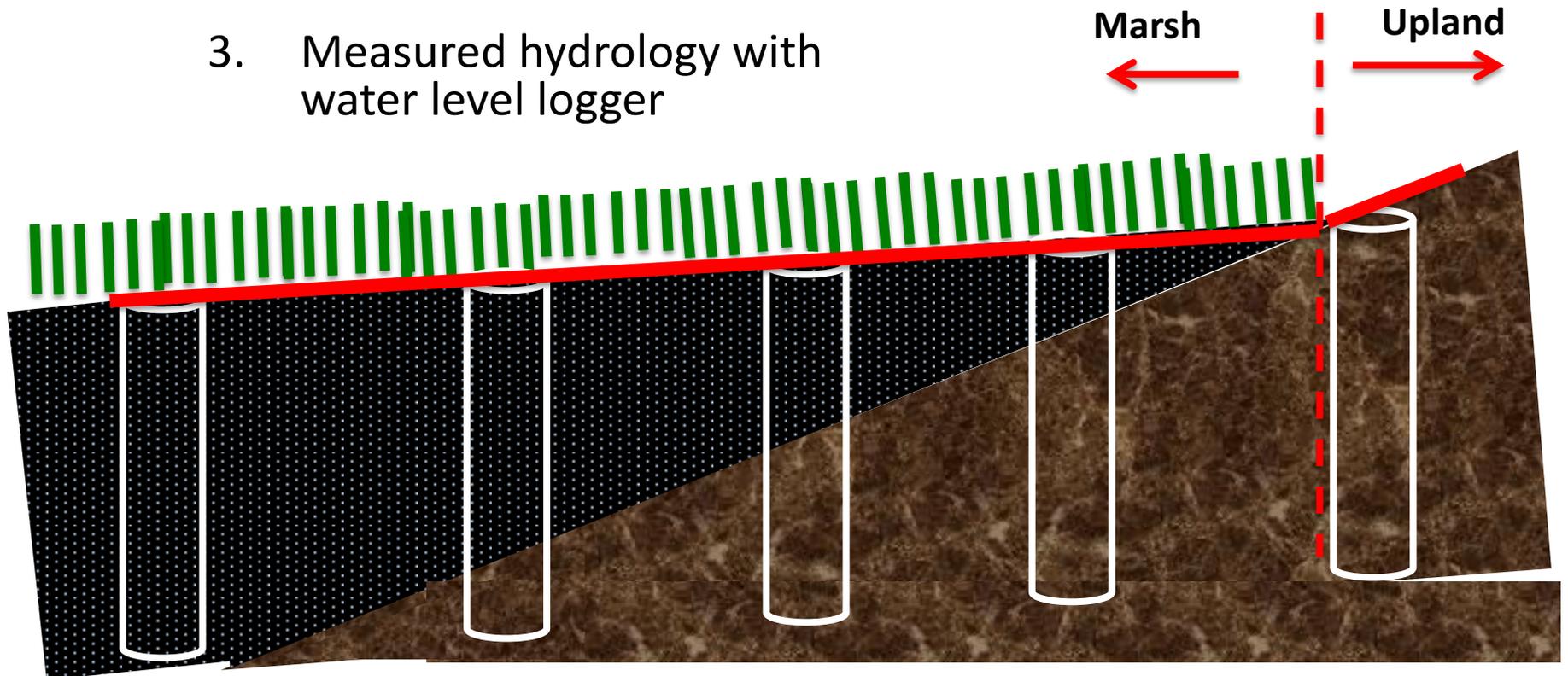
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google e

Imagery Date: 4/9/2013 41°09'39.21" N 72°43'20.05" W elev -68 ft eye alt 99.08 m

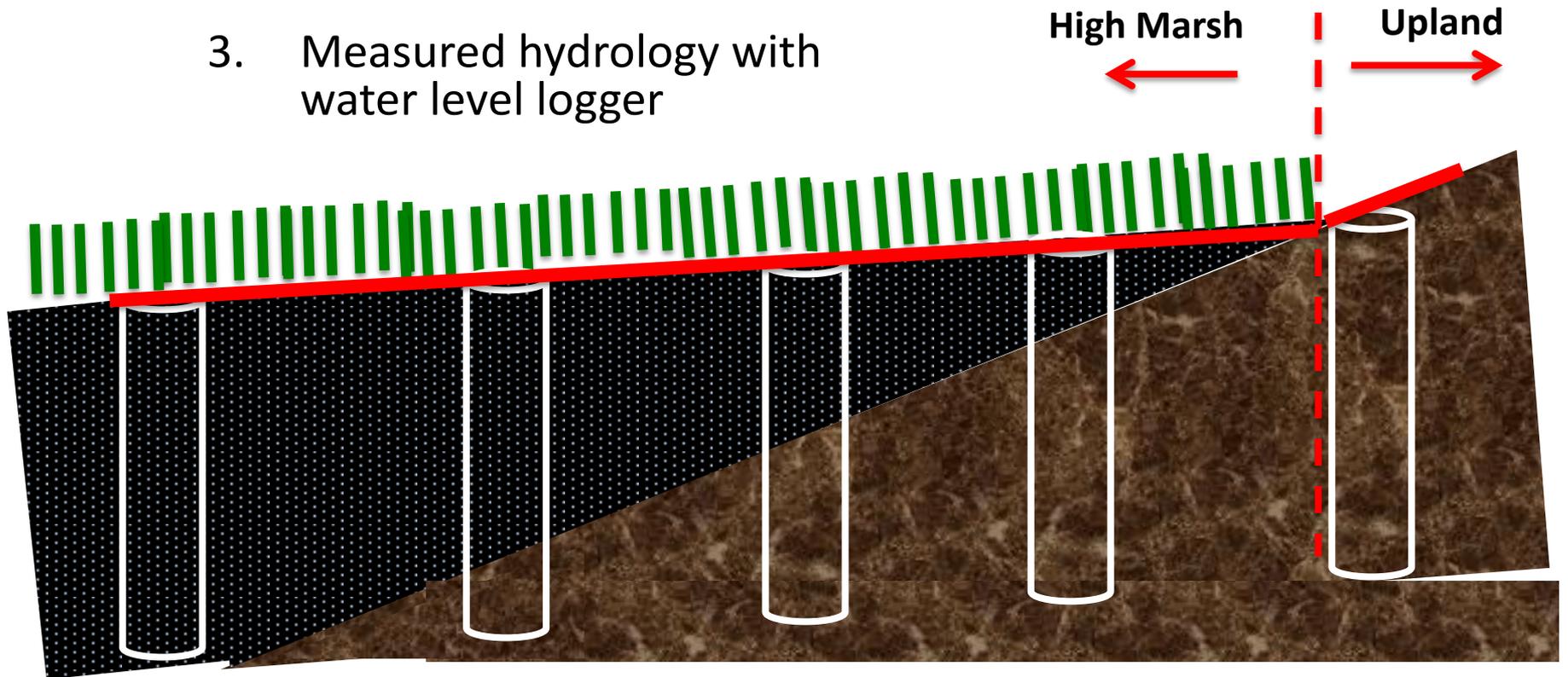
Methods

1. Collected 4-5 soil cores /transect
2. Surveyed transect elevation
3. Measured hydrology with water level logger



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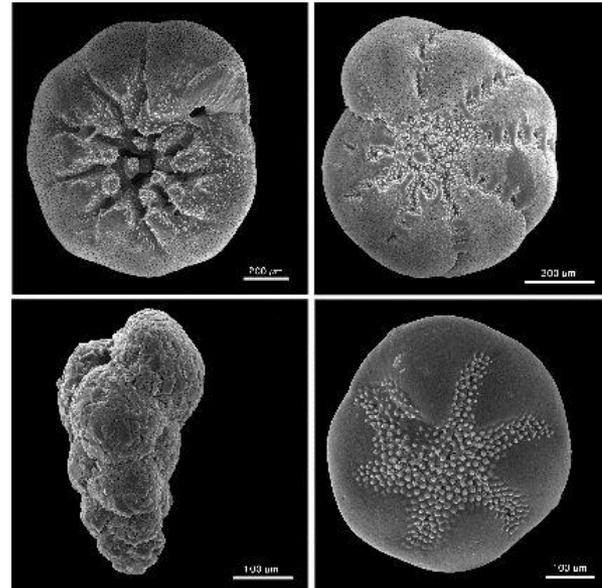


How to differentiate between marsh and upland soil?

Methods



- Differentiate by:
 - Color?
 - Carbon (LOI)?
 - Foraminifera



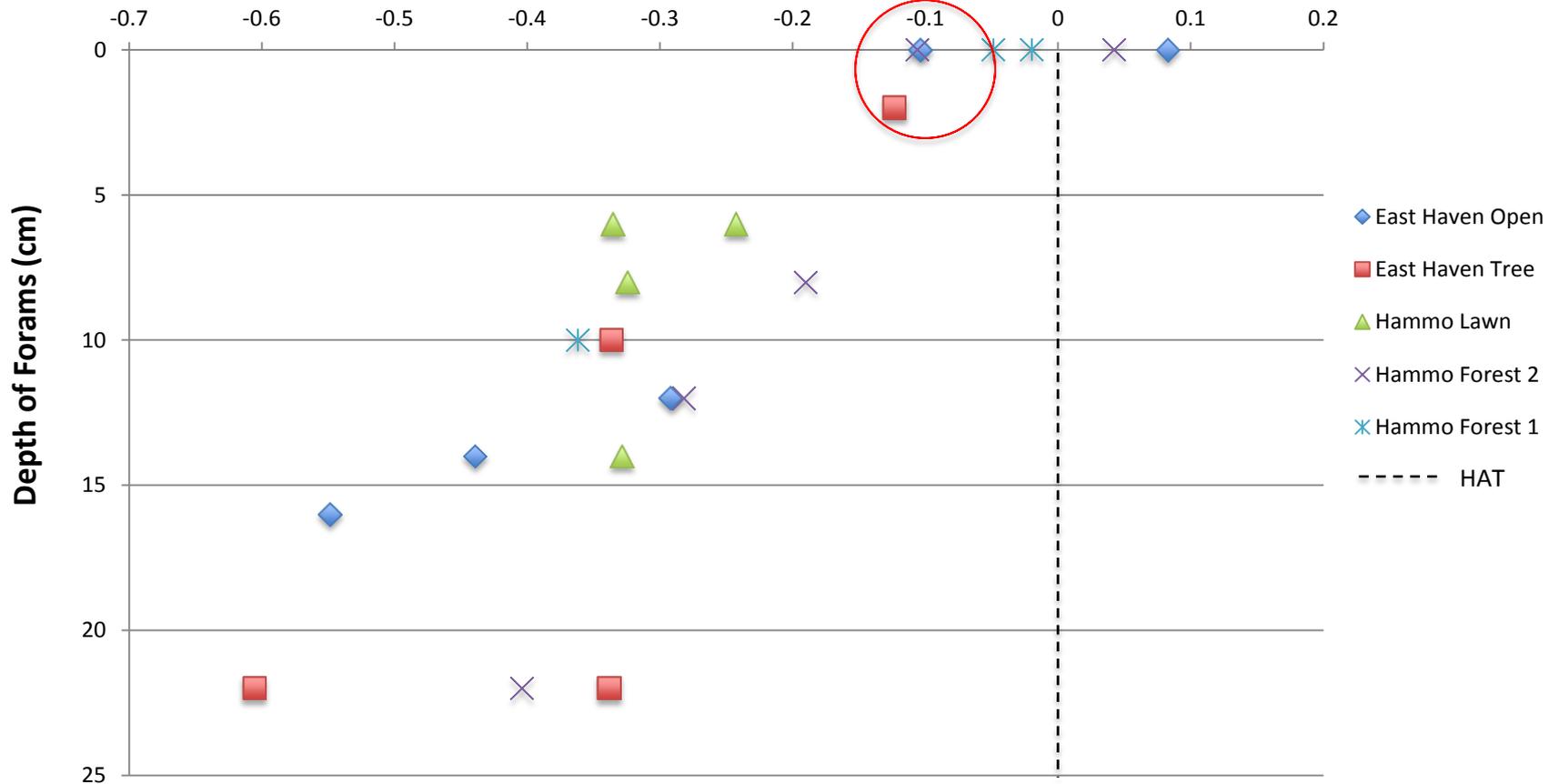
RESULTS

**QUESTION 1: IS THERE EVIDENCE OF
MIGRATION?**

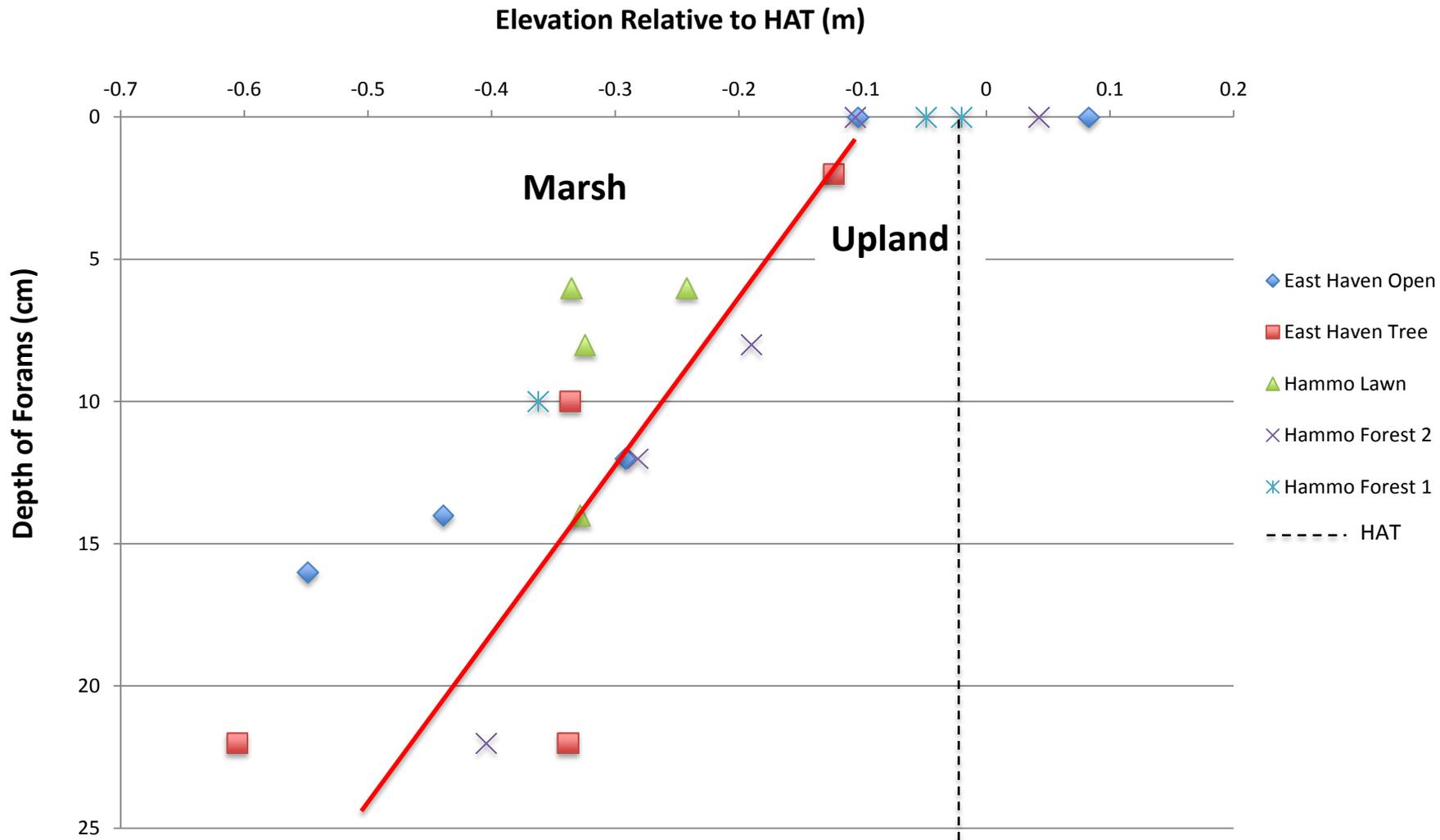
Depth of Forams Relative to HAT

Marsh ←————→ Upland

Elevation Relative to HAT (m)



Depth of Forams Relative to HAT



RESULTS

**QUESTION 2: HOW QUICKLY IS THIS
MIGRATION HAPPENING?**

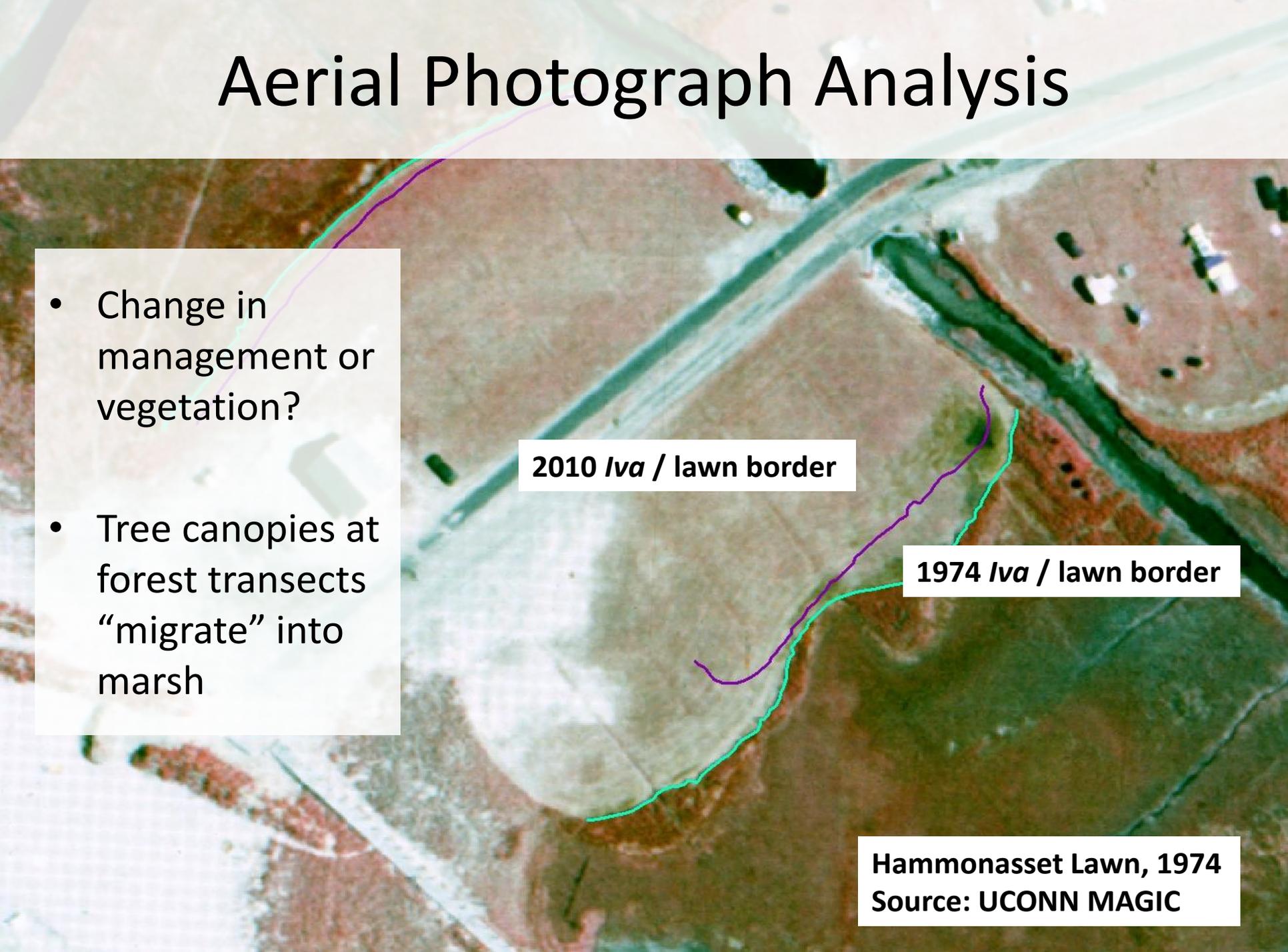
Aerial Photograph Analysis

- Change in management or vegetation?
- Tree canopies at forest transects “migrate” into marsh

2010 *Iva* / lawn border

1974 *Iva* / lawn border

Hammonasset Lawn, 1974
Source: UCONN MAGIC



CONCLUSIONS AND NEXT STEPS

Conclusions and Next Steps

- Marshes are migrating!
- Use radioisotopes to date cores (Pb-210 or Cs-137)
- Does upland type or urbanism affect migration rate?



Acknowledgements

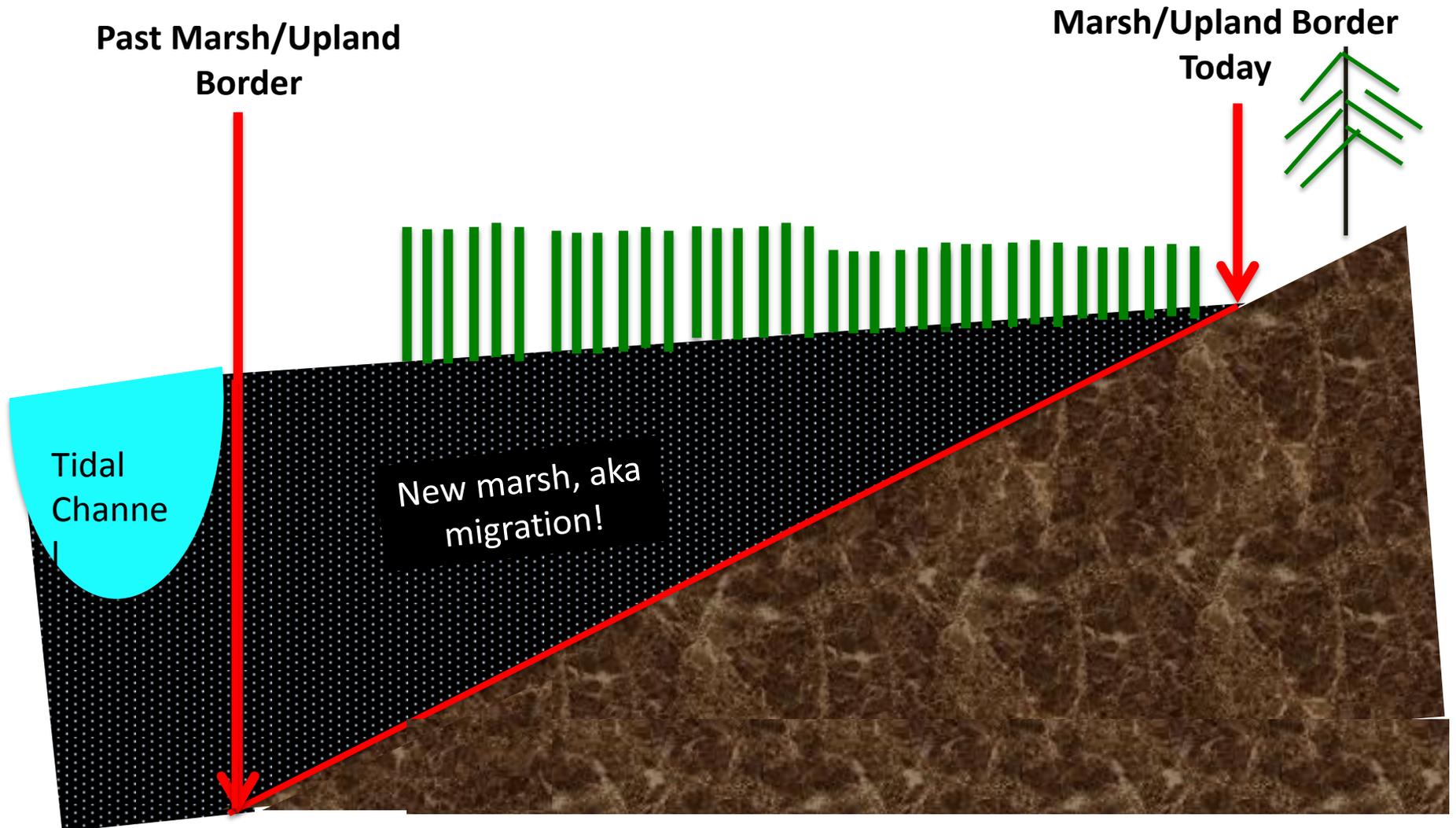
- Hixon Center for Urban Ecology
- SeaGrant
- FES Dean's Office
- Dr. Shimon Anisfeld
- Kate Cooper, Kevin Sherrill, Troy Hill, Annie O'Connell



QUESTIONS?

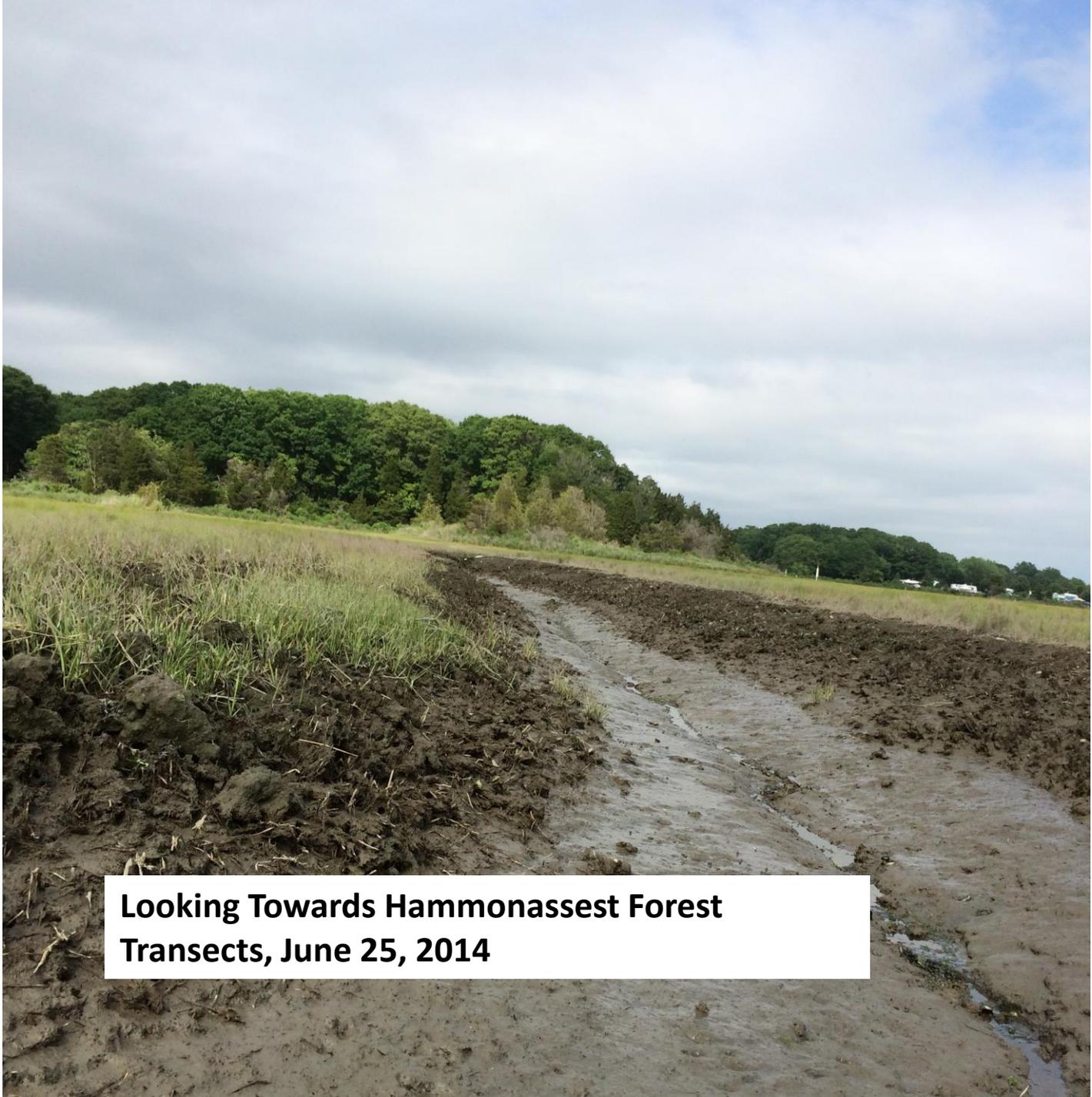
Survival Option #2: Migration

Belowground Profile





Hammonasset Lawn Transect, June 11, 2014



**Looking Towards Hammonassest Forest
Transects, June 25, 2014**

Methods



4. Differentiate by:

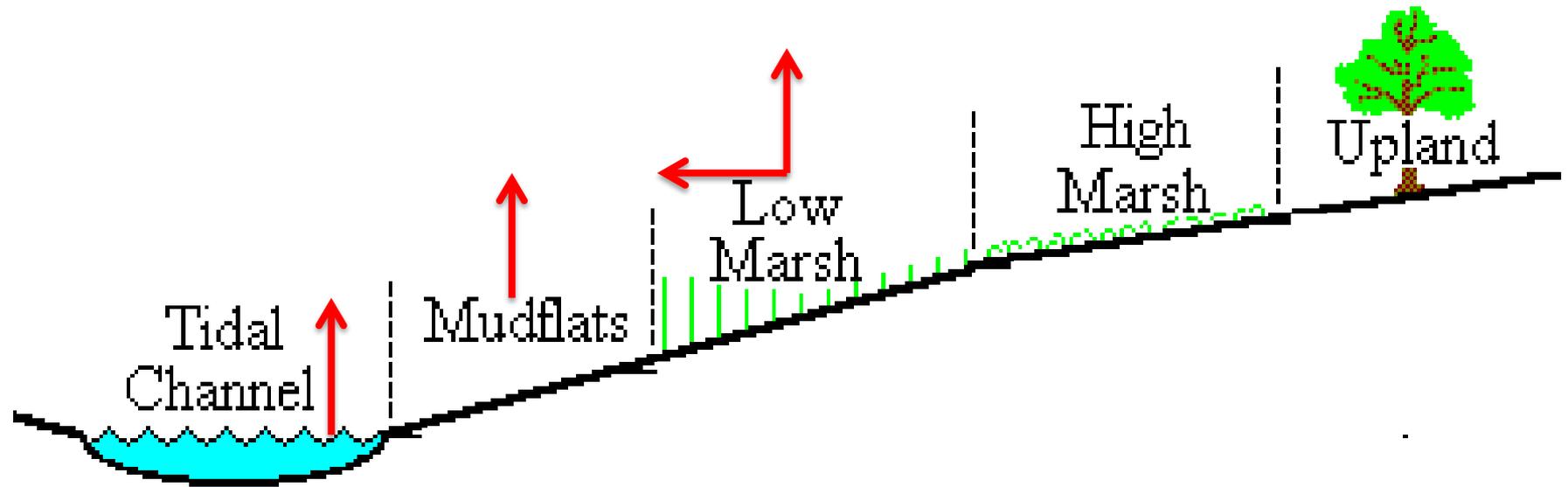
- Color?
- Carbon (LOI)?
- Foraminifera?

Methods

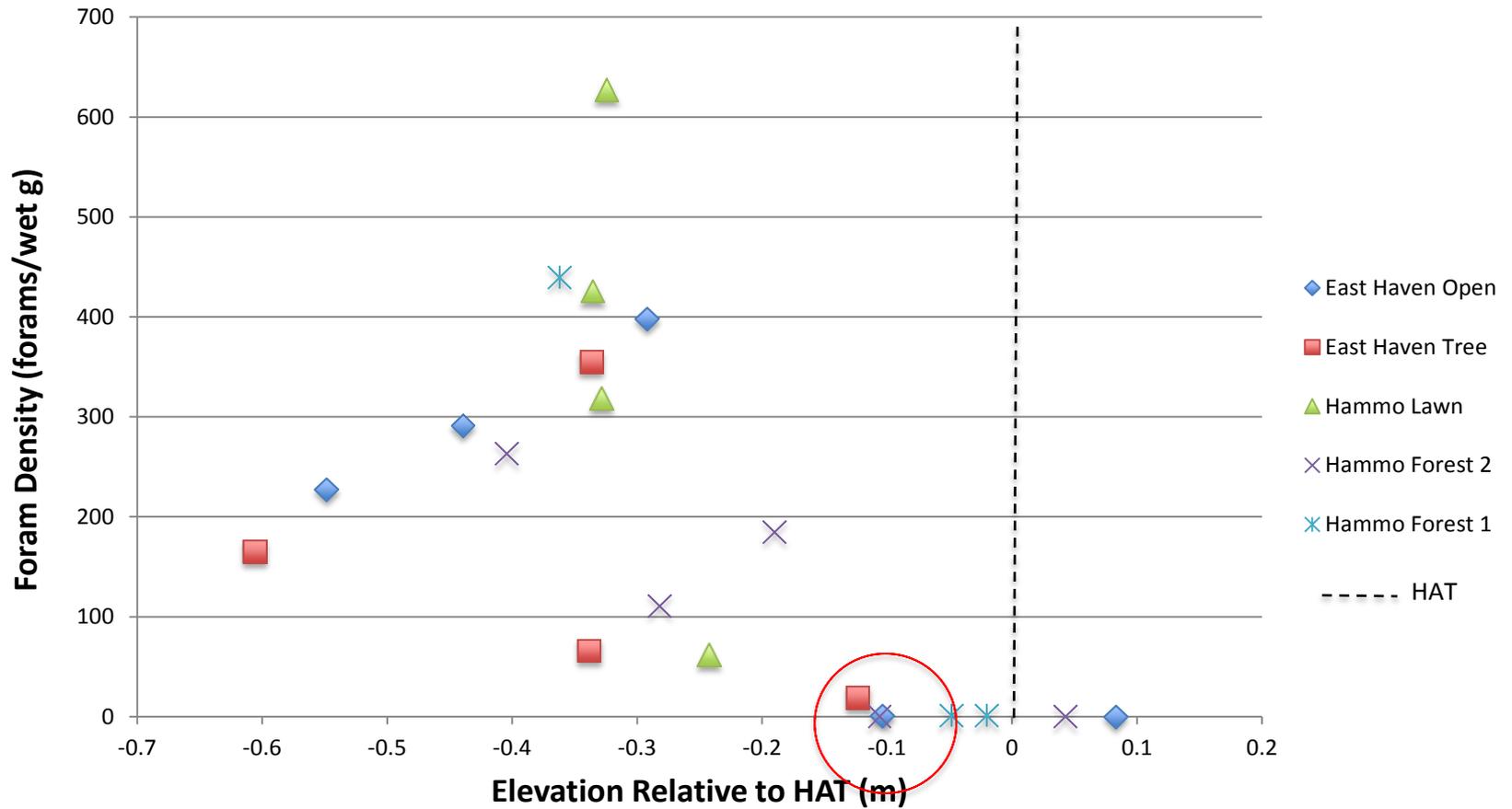
5. Determine rate of migration:

- Date soil cores with radioisotopes
- Aerial photographs – quantify shifts in vegetation

Survival Option #1: Salt Marsh Accretion



Surface Foram Density Relative to HAT



Surface Foram Density Relative to HAT

