Coastal Resilience

Moderator: Scott Graves

Presenters: David Kozak, Mark Paine, Jim Tait, Rebecca French

Citizen Science

Tuesday 1 August, 2017 @ 8:30am - 9:30am

Panel Discussion: Coastal Resilience

Moderator: Scott Graves

Presenters: *Mark Paine, Jim Tait*

– panel questions/discussion points to include …

The importance of ongoing environmental monitoring; expanding collaborations on citizen science, academia and local state agency stakeholders; and future planning for coastal resilience – SLAMM modeling and more. Examples of West Haven City, WH High School, SCSU ENV classes, SCSU MAR classes, East Haven City.

Citizen Science

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Panel Discussion: Coastal Resilience

Presenter: *Mark Paine*

Mr. Paine is the Department of Public Works liaison to the Harbor Management Commission, the Inland Wetlands Watercourse Agency and the West Haven Watershed Association. He has also managed the Menunkatuck Audubon Society's osprey platform project. He recently received the Outstanding Municipal Official of the Year award for New Haven County from the Southwest Connecticut Conservation District. Mr. Paine, an alumnus of SCSU, has worked with SCSU faculty including James Tait and Scott Graves on coastal resilience monitoring projects involving SCSU students. He has also worked with local West Haven High School teachers (Kevin Dickson) and students to further study the Cove River estuary.

Presenter: *Mark Paine*

Citizen Science

Tuesday 1 August, 2017 @ 8:30am - 9:30am

Southern Connecticut State University

Presenter: *Mark Paine*

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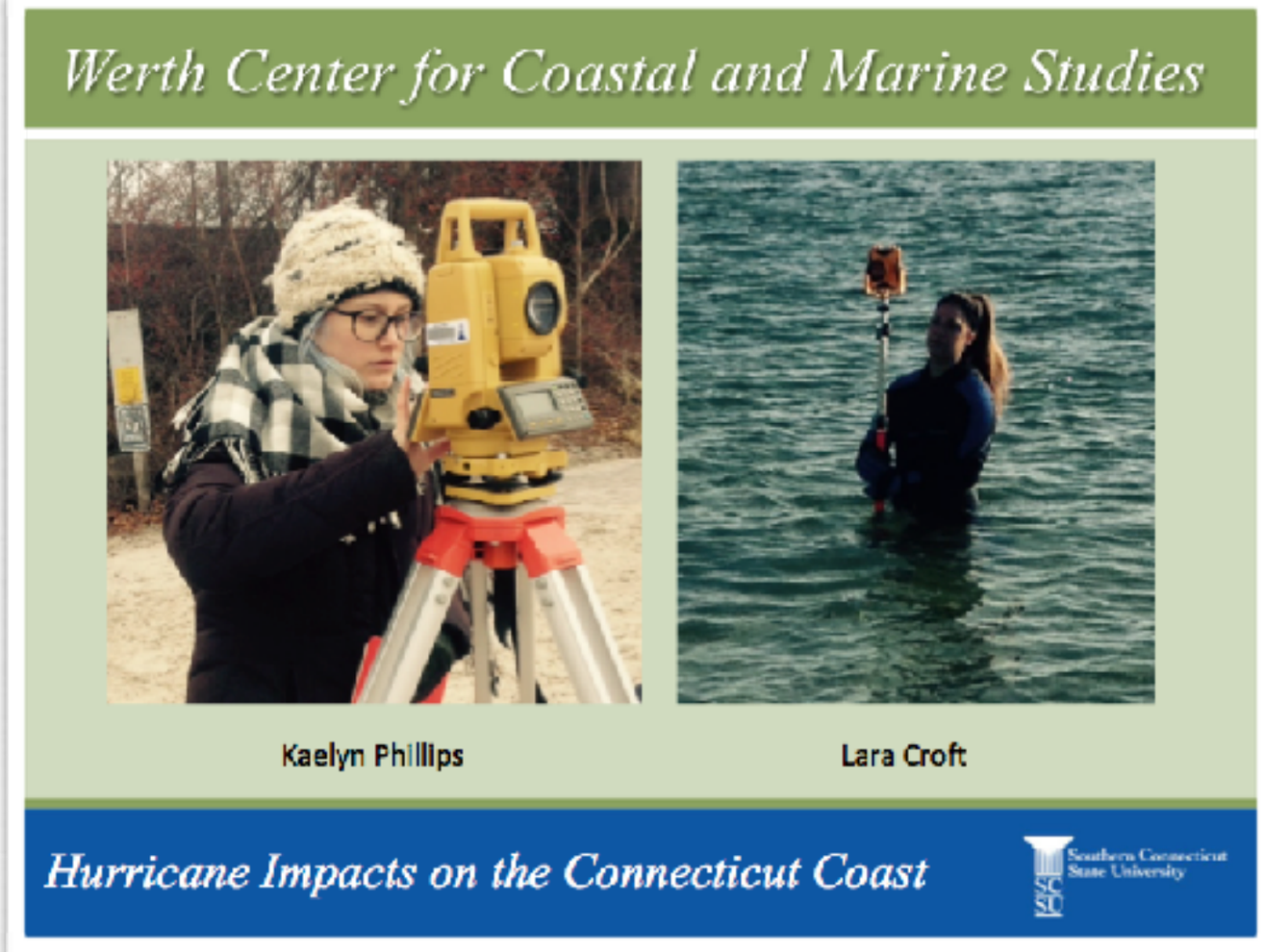
Panel Discussion: Coastal Resilience

Presenter: *Jim Tait*

Dr. Tait received a Ph.D. is Earth Sciences, with a specialty in coastal oceanography, from the University of California at Santa Cruz. His current research focuses on the coastal impacts of large storms such as Irene and Sandy. He is co-founder and co-coordinator of the Werth Center for Coastal and Marine Studies at SCSU. He has worked with coastal communities to develop resilience in the face of rising sea level and storm intensification. One of his most cherished accomplishments is being included in the surfing movie Beyond Monster Mavericks.



Presenter: *Jim Tait*

21st Annual GLOBE Meeting

Citizen Science

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Working with fellow faculty and students on detailed beach and inland transects - surveying with Total Station.

Southern Connecticut State University

Presenter: *Jim Tait*

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CT Shore Profile Locations

Southern Connecticut State University

Citizen Science

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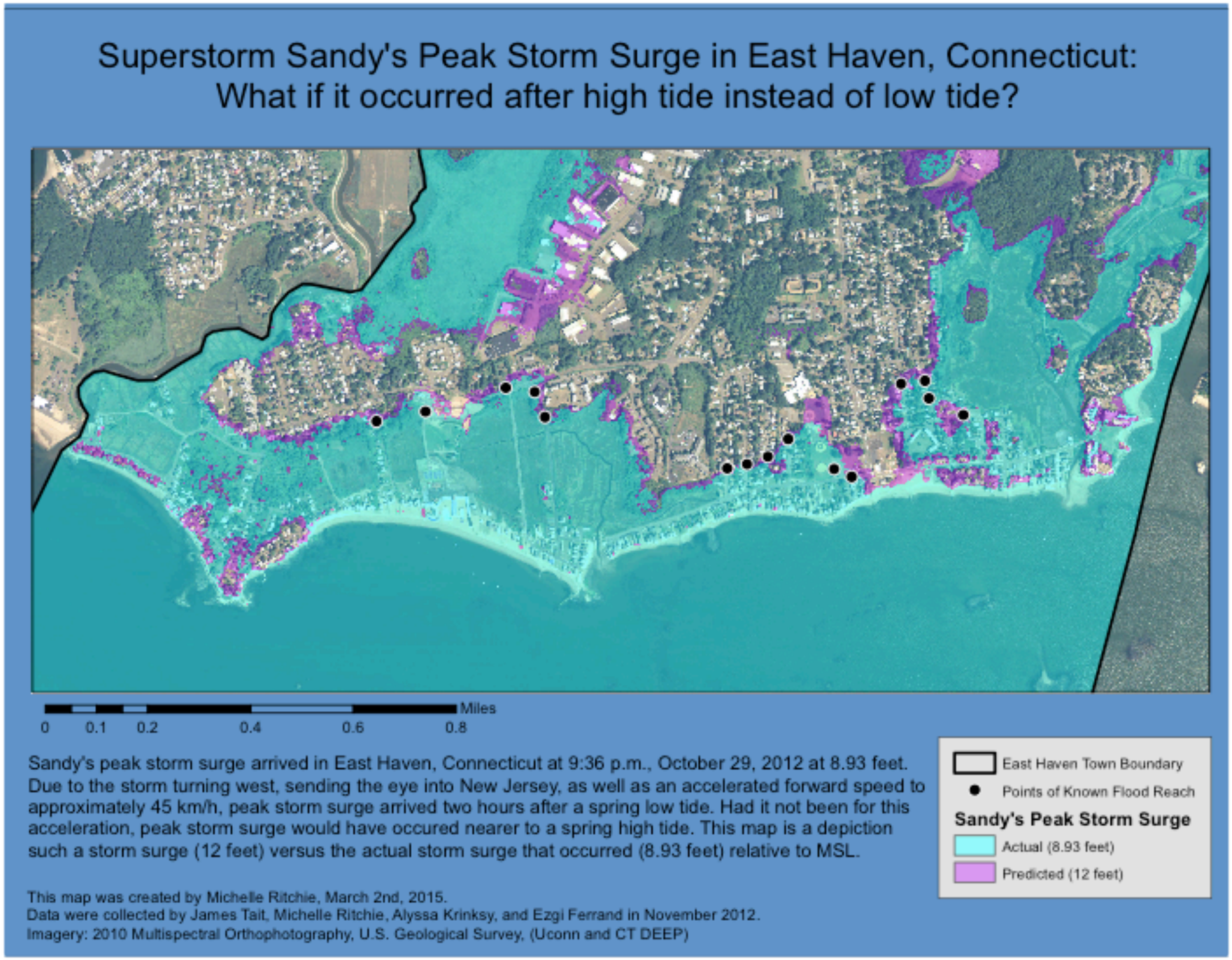

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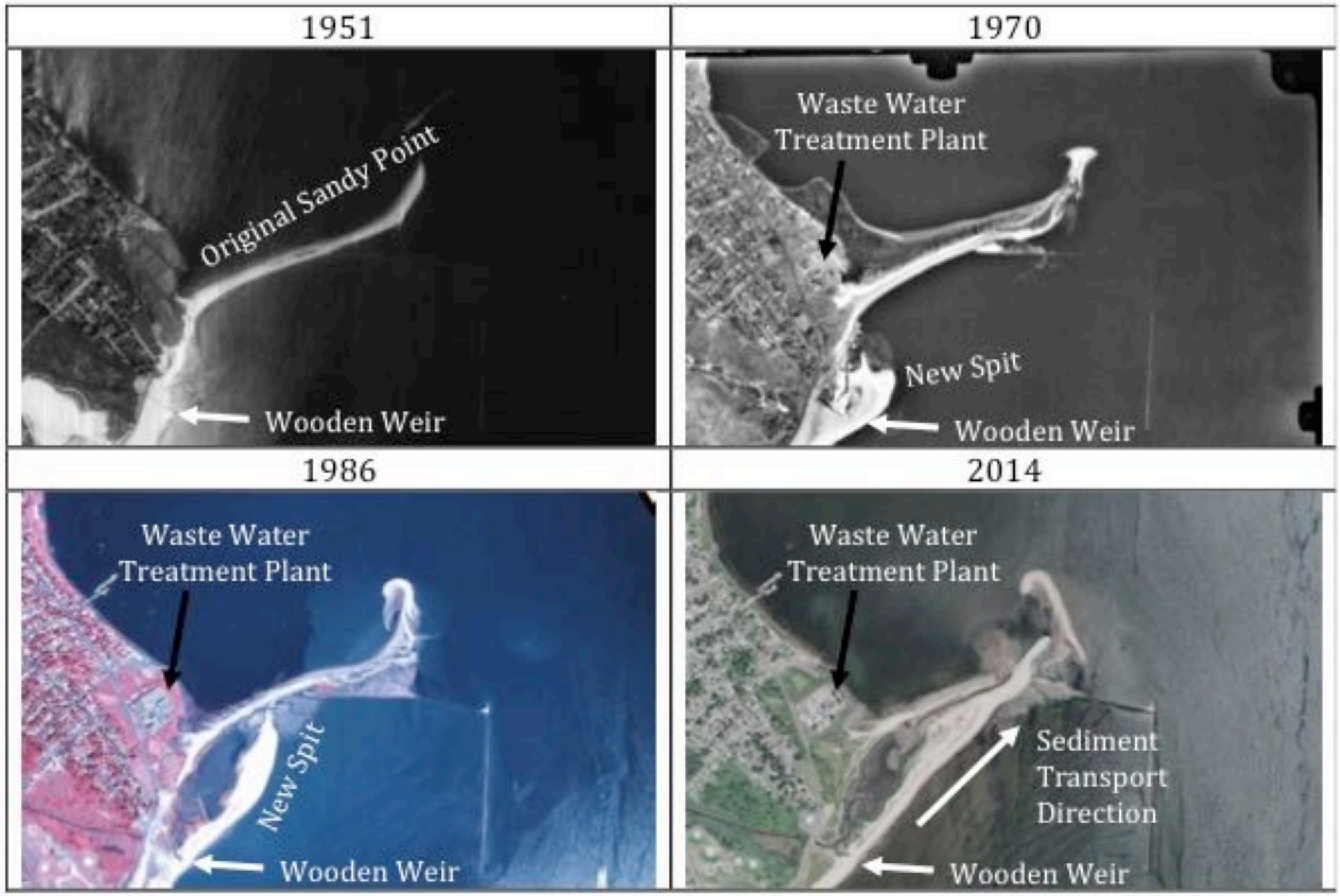
West Haven Along-shore sediment transport.



Southern Connecticut State University

Presenter: *Jim Tait*

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Panel Discussion: Coastal Resilience
Moderator: Scott Graves

The importance of ongoing environmental monitoring; the value of Citizen Science and GLOBE; How local GLOBE students can connect their data collection to the needs of a local stakeholder/municipality. Examples of Cove River, West Haven City, WH High School, SCSU ENV classes.

COVE RIVER MARSHES "TREATED" IN 2011

Forty Nine acres are tidal wetlands in the Cove River system and are dominated by phragmites

INVASIVE SPECIES

- Non-native species – those species that are alien to the ecosystem that they have been introduced into, and whose introduction causes or is likely to cause harm to the environment or human health.

- Invasive species - some non-native species exhibit an aggressive growth habit and can out-compete and displace native species, and they are a serious problem in Connecticut and elsewhere.

- CT DEP – works to protect native species and the habitats in which they occur.
  - control & removal
  - assist landowners

~2010 Invasive marsh grasses dominate

~2016 Native marsh grasses returning

ACTIONS / REMEDIATION

- Herbicide treatment:
  - Imazapyr & Glyphosate spraying
- Mulch Mowing:
  - “Marshmaster”
- Spot application of herbicide and weed pulling
- Native marsh grass planing & tending
- Continuous monitoring

EDUCATION / COLLABORATION

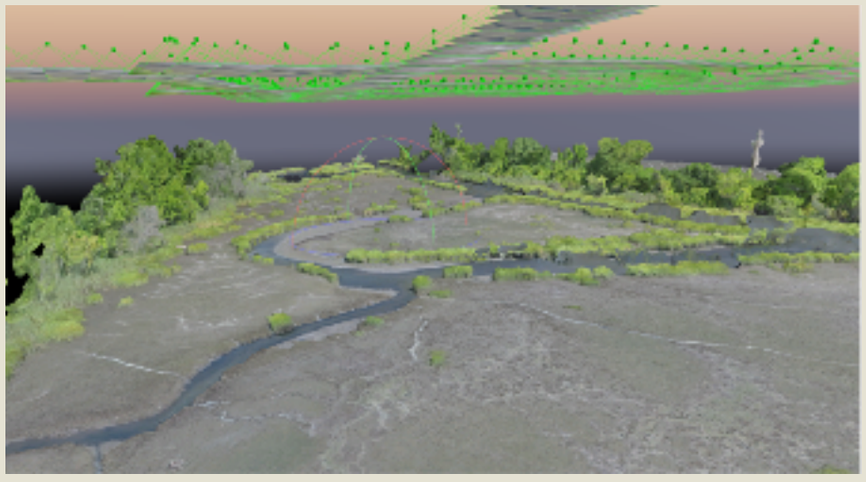
- SCSU Undergraduates
  - ENV350 class field studies
- SCSU Graduates
  - SCE575 class field studies
- WHHS Biology / Environmental Science
  - class field studies

Students help gather climate data

Coastal Resilience

Osprey's View of Coastal Resilience in Urban Environments
µUAS: New Tools for Monitoring Coastal Resilience

Structure from Motion (SfM): software applications for Ecological Mapping with µUAS/drones



processed with
Pix4D Mapper Pro

Pix4D map/model rendering with µUAS flight path and camera locations above terrain

µUAS Piloting
*Peter Broadbridge**

Ground Station App for Mission Planning

Dr. Scott M. Graves, Associate Professor
Department of the Environment, Geography and Marine Sciences
Southern Connecticut State University

Presenter: *Scott Graves*

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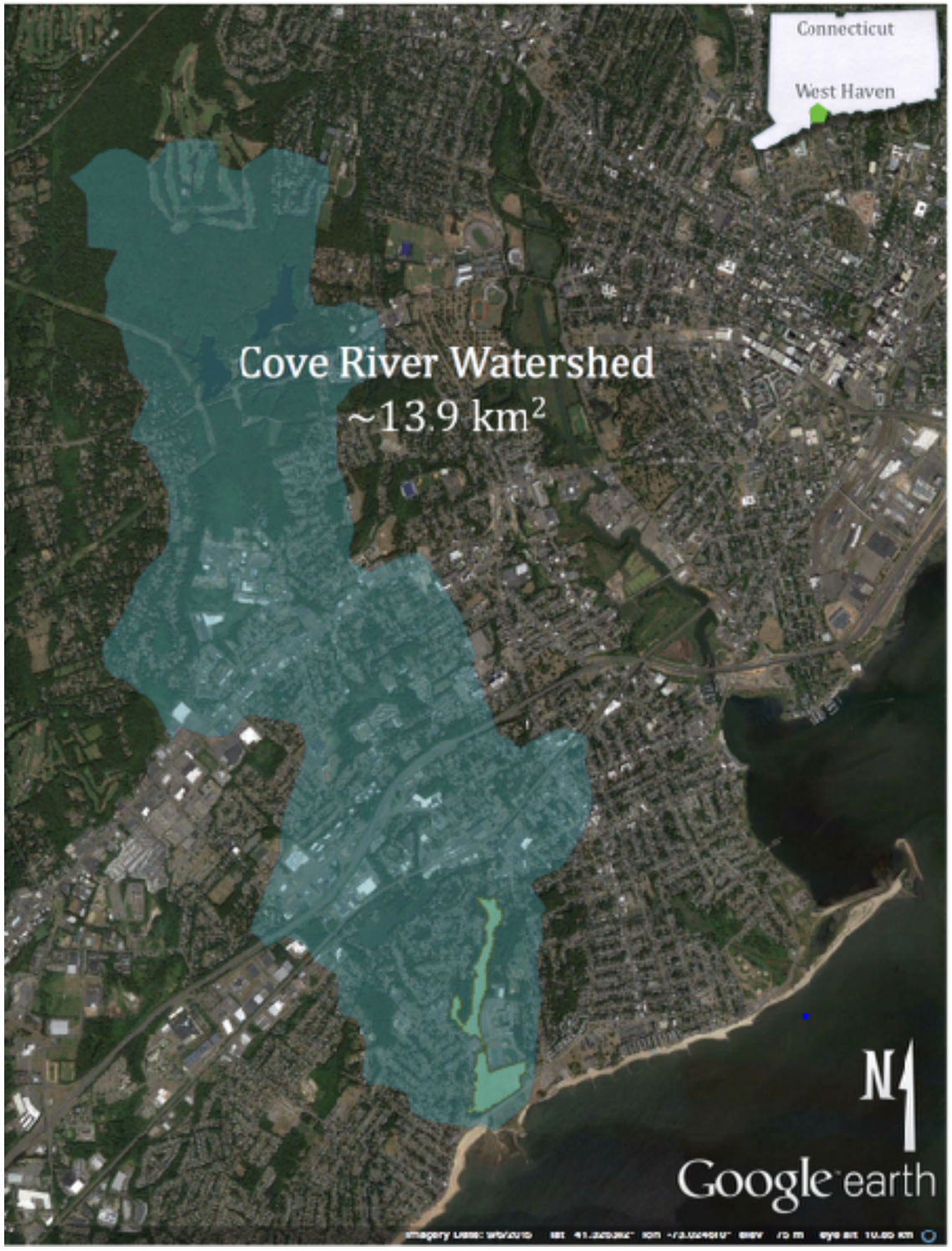
Watershed and location map of Cove River Historical Site and field study site



http://www.snappergraphics.co.nz/project.php?pid=24

Ground-based photography - ground-truthing

fall 2012

spring 2013

Ground-based photography - ground-truthing

Panorama Views of Lower-Mid Cover River Estuary/Marsh, April 30th 2016

Presenter: *Scott Graves*

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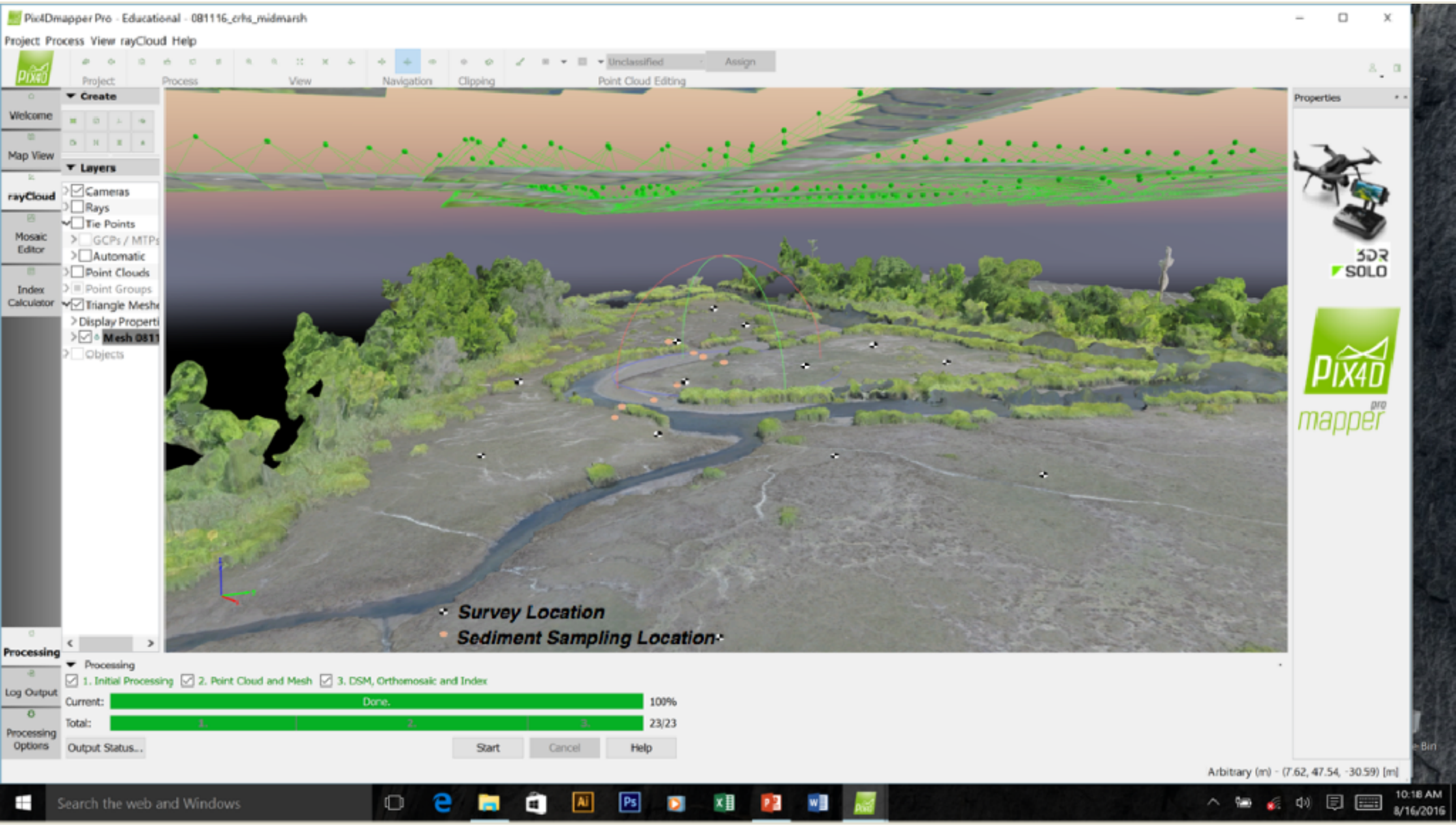

Structure from Motion (SfM): software applications for Ecological Mapping with µUAS/drones

SfM vs. Traditional Surveying and other DEMs

S. Graves and M. Miller - SCSU Department of the Environment, Geography and Marine Sciences

It is important to understand that SfM image mosaics and 3D models are not the result of blending an stitching the original images.

SfM processing identifies and evaluates key elements (individual pixels) among and across adjacent images to generate a "point cloud" of many millions of pixels. From this point cloud, a new image mosaic map and digital surface model are generated.

SCSU East Campus field

Google Earth Image of Cove River Historical Site wetland and forest habitats.

CRHS Estuarine salt marsh and mudflat

CRHS newly regrown closed canopy forest. 50-60 yrs of forest regrowth have converted what was an open meadow with just a few fringing trees, to a fully closed canopy forest.

CRHS Fresh water marsh

Scale

0 5 10 15 20 25

Google earth

Tour Guide 1991

41°15'45.20" N 72°57'39.28" W elev 4 ft eye alt 1483 ft

Osprey

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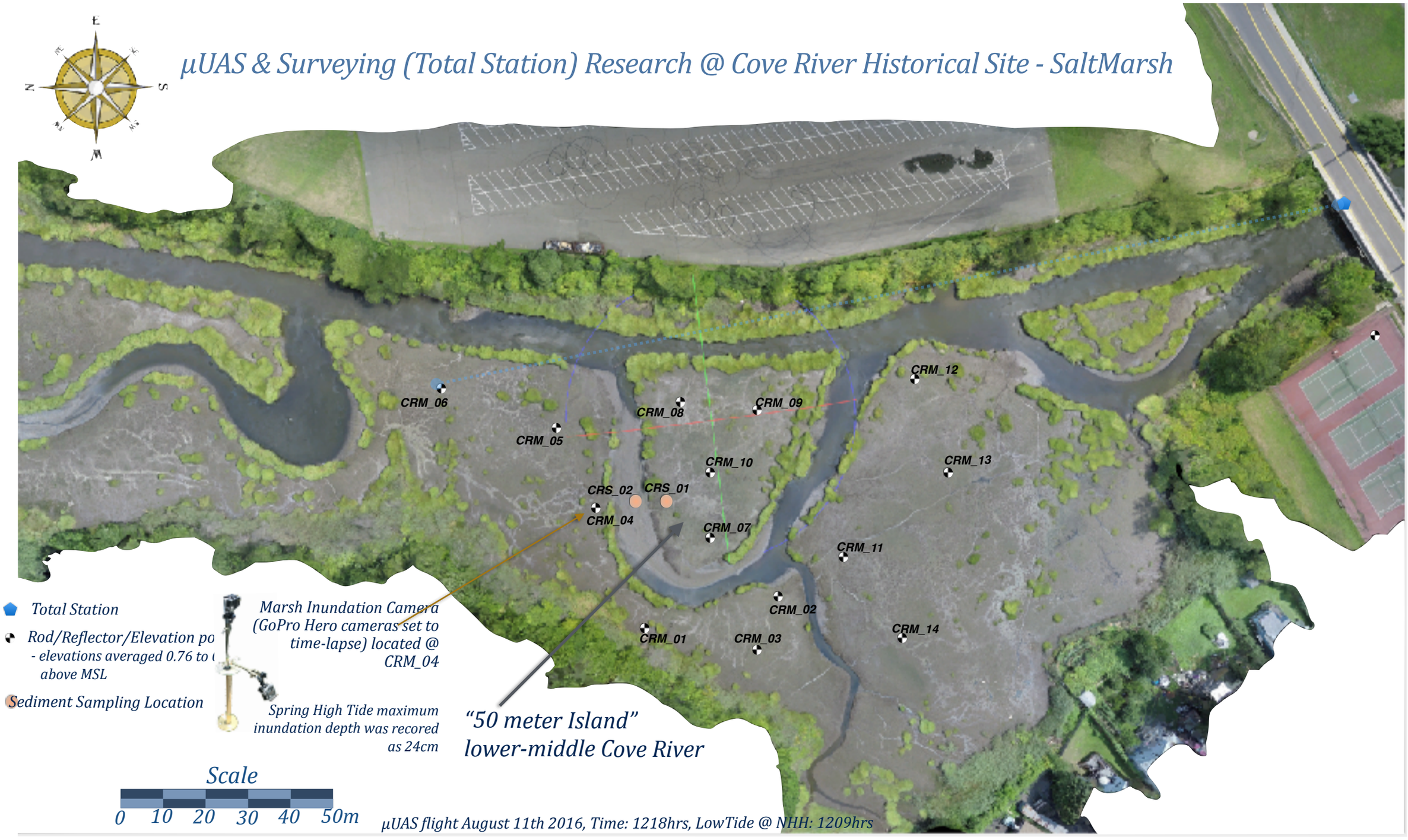
µUAS & Surveying (Total Station) Research @ Cove River Historical Site - SaltMarsh



µUAS flight August 11th 2016, Time: 1218hrs, LowTide @ NHH: 1209hrs

Presenter: *Scott Graves*

Cove River Historical Site Mid Marsh Complex

CRHS Marsh Complex Components

A. MidMarsh Area = 17,537m^2

B. Marsh Channel Area = 3,617m^2

C. UpperMidMarsh Mudflats Area = 3,412m^2

D. 50m Island Mudflats Area = 1,449m^2

E. LowerMidMarsh Mudflats Area = 5,663m^2

F. TearDrop Island Mudflats Area = 261m^2

Total Exposed Mudflats Area = 14,402m^2

C+D+E+F

MarshVegetation Area = 3,135m^2

A-B-C-D-E-F

Marsh Channel/Marsh Ratio = 20.6%

B/A

MarshVegetation/Mudflats Ratio = 21.7%

(A-B-C-D-E-F)/(A-B)

Presenter: *Scott Graves*

21st Annual GLOBE Meeting

October 31st 2015 @ CRHS, mid tide stage

Acknowledgements: many thanks to the following persons for their invaluable help and assistance in conducting field surveys and in the μUAS aerial mapping endeavors:

· μUAS field team – graduate students Peter Broadbridge, Scott Thibault, Darryl Nicholson; ·Marsh top surveying team – undergraduates Shannon Bronson, Matthew Connors, and Dr. J. Tait

– all from Southern Connecticut State University Department of the Environment, Geography and Marine Sciences