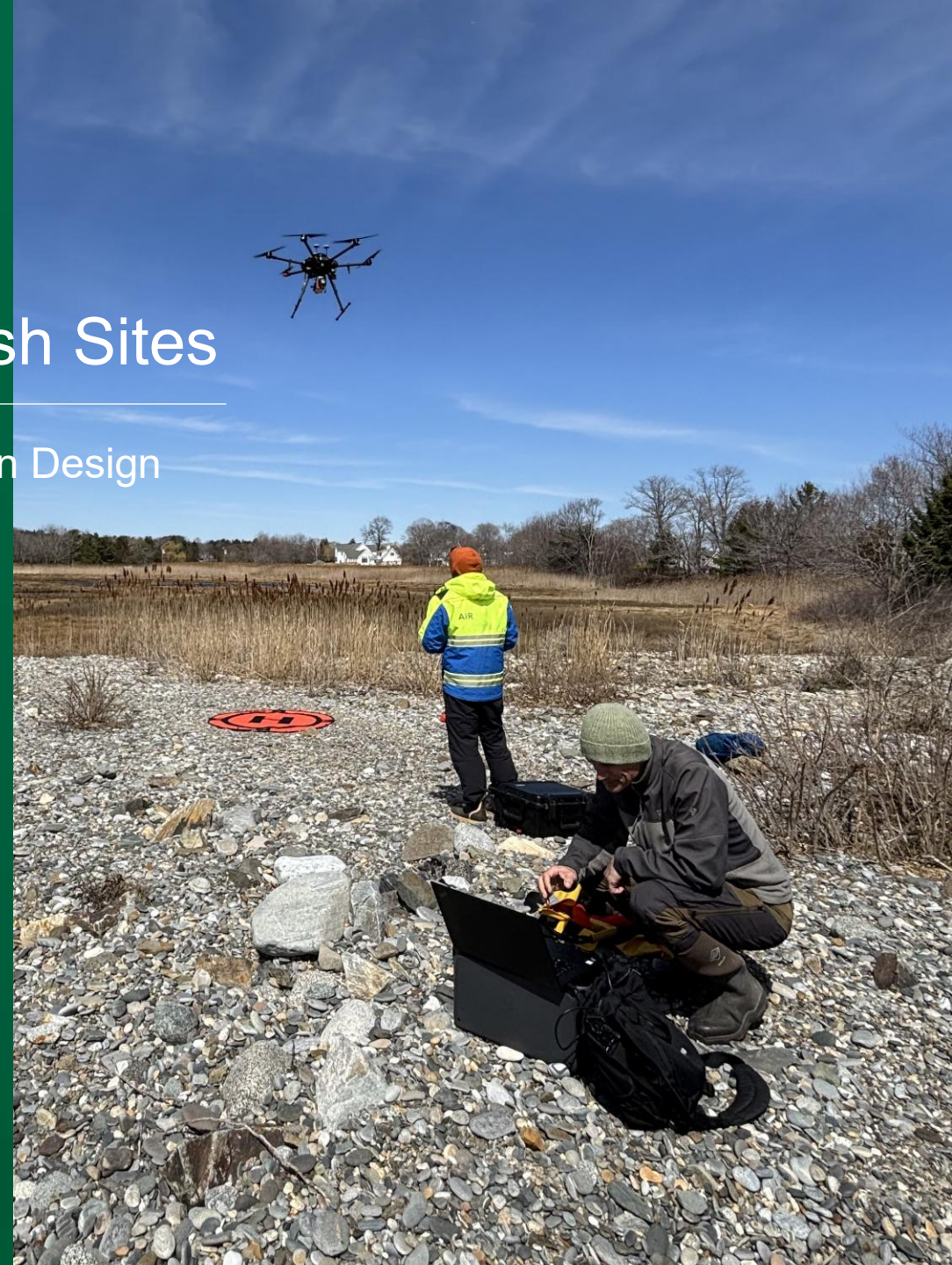


High Resolution LiDAR of Eight Salt Marsh Sites

Working with Partners to Support Restoration and Adaptation Design



New Hampshire
**FISH AND GAME
DEPARTMENT**

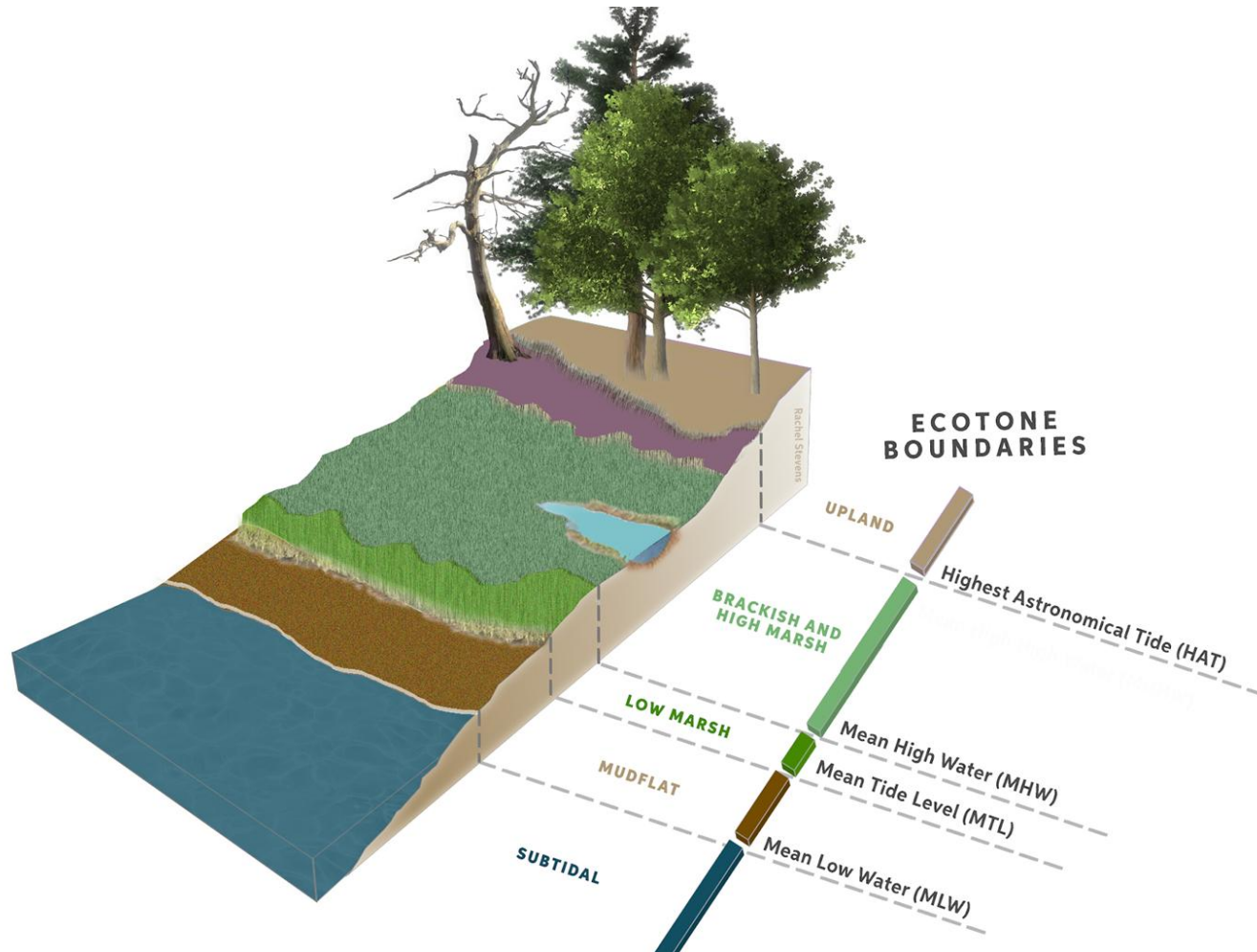


A Good Knowledge of Elevation is Critical to Designing Salt Marsh Restoration & Adaptation Projects

| | | |
|-------------|-------------------------------------|--|
| Restoration | RESTORATION | Repairing the hydrology of embankments, ditches and the marsh plateau using techniques such as runneling, ditch remediation, or restoration of tidal flow. |
| Adaptation | LIVING SHORELINES | Designing interventions to mitigate eroding shorelines using techniques such as creating rock sills, adding sediment, or planting vegetation. |
| Adaptation | FACILITATING MARSH MIGRATION | Facilitating marsh migration inland by using techniques such as lowering the elevation of the abutting upland edge or increasing tidal flow into the terrestrial border. |

Elevation is Critical to Designing Salt Marsh Restoration & Adaptation Projects

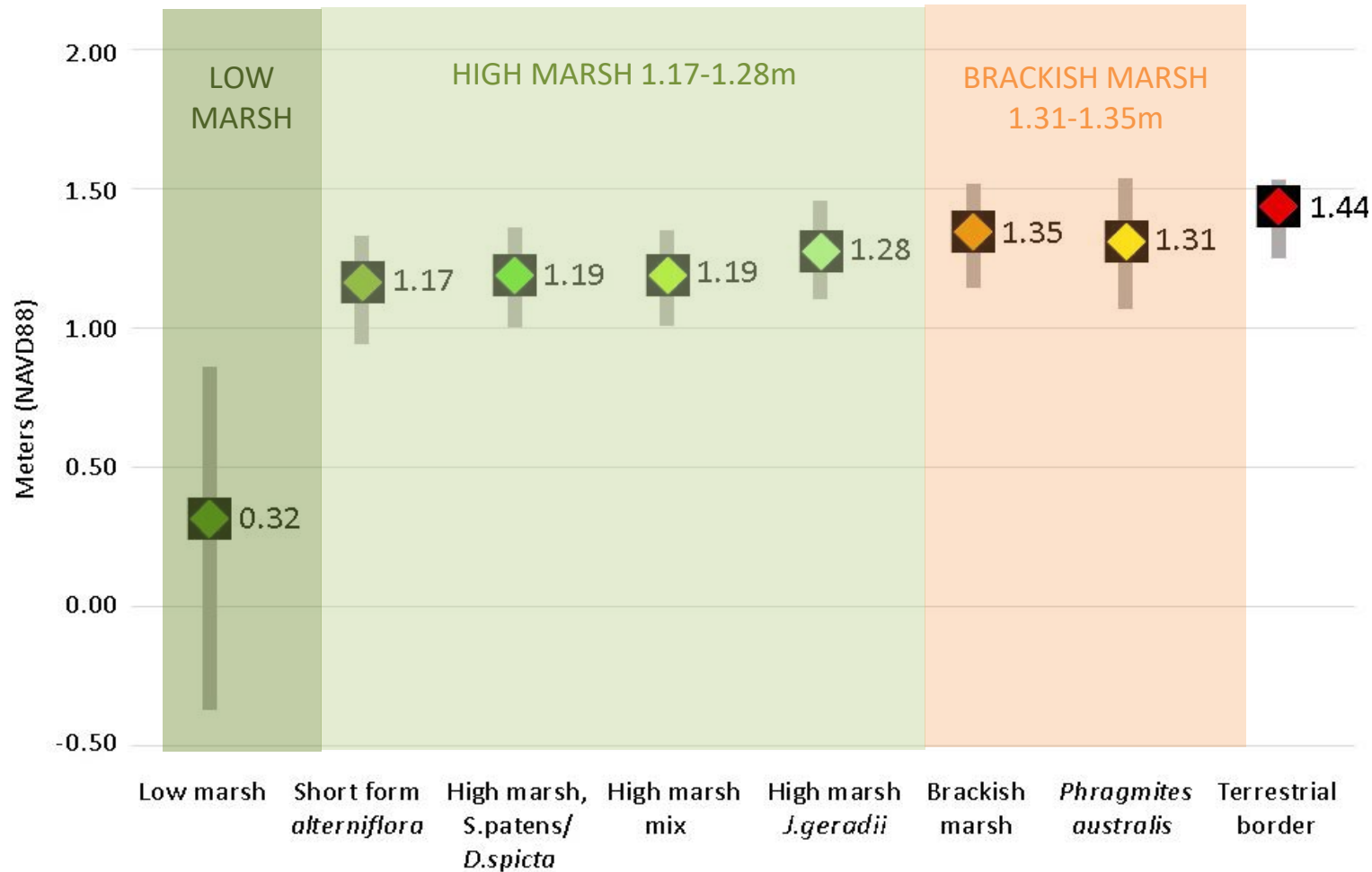
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Ecotone boundaries, that is where two habitats interface, are determined by marsh surface height and so exposure to tidal flooding in a salt marsh.

The Entire High Marsh Elevation Range is an Average of Just 4.3 inches

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An earlier study in Great Bay showed that marsh plants grow within a very narrow height range.

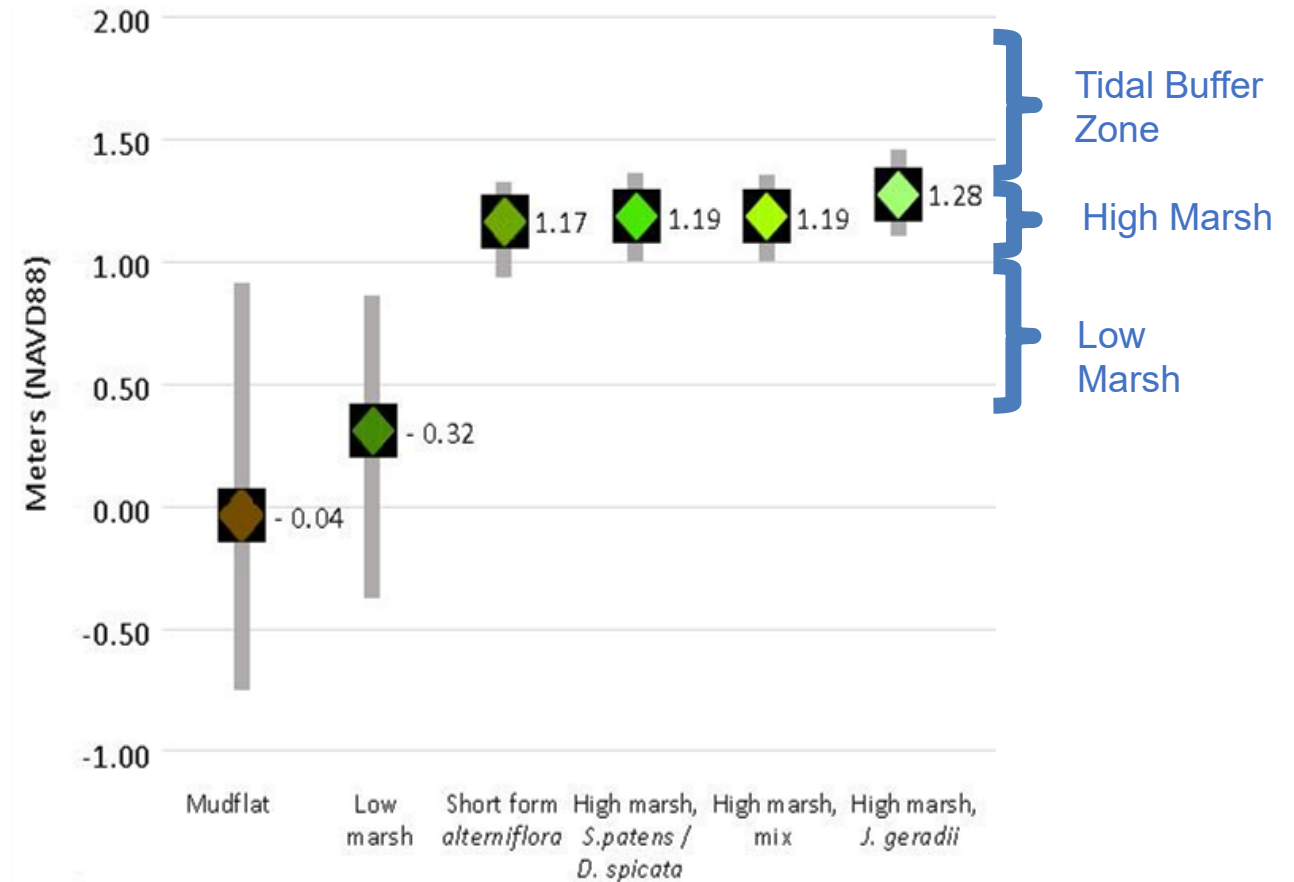
The entire high marsh plant species assemblage occur in an elevation range just 0.11m or 4.3 inches.

Accurate Elevation Data can be Used to Design Living Shorelines, Marsh Migration and Salt Marsh Restoration Projects

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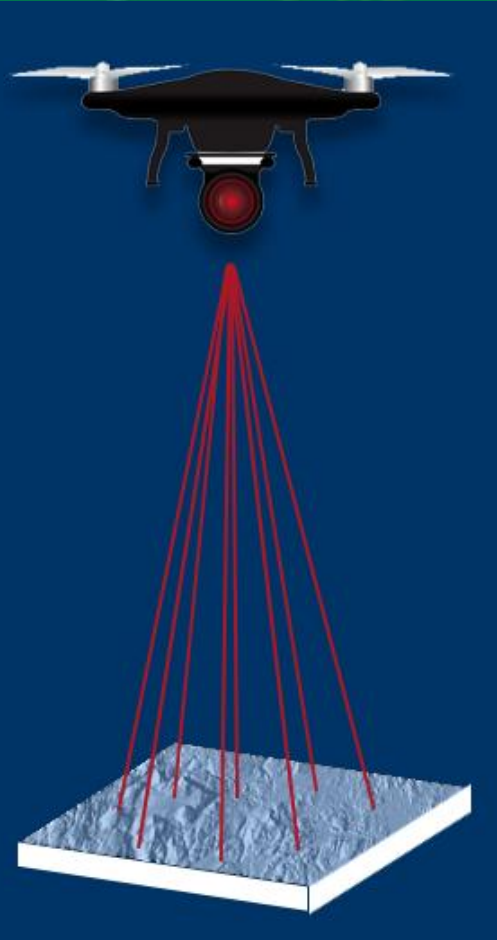


Reconstruction of fringing marsh shoreline for erosion control and marsh migration requires knowledge of plant species and the current and potential elevation ranges. The living shoreline project at Wagon Hill Farm is a great example. Its ecotone elevations, shown in blue on the right, closely match the height ranges measured in the Great Bay study.

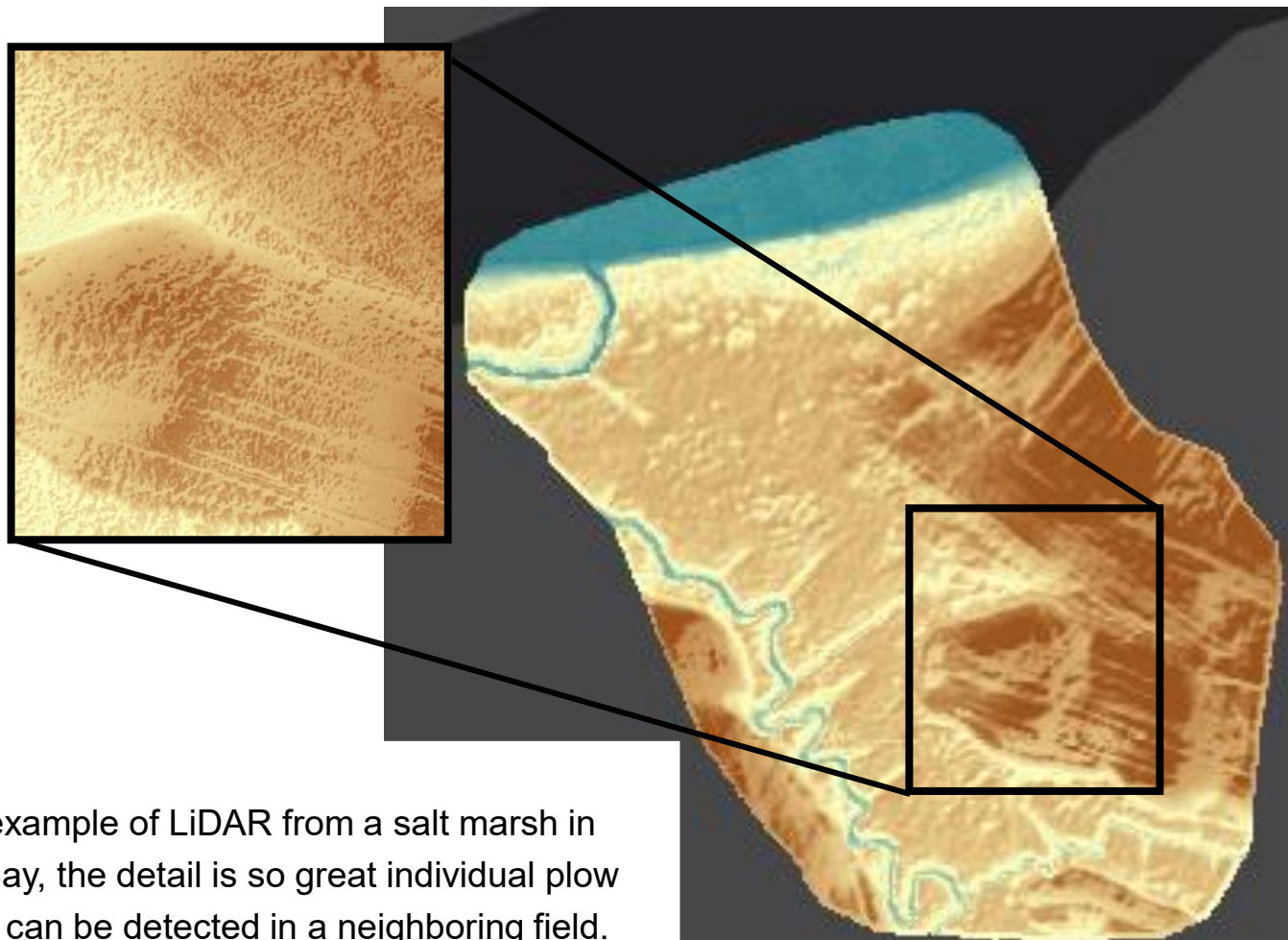


What is LiDAR?

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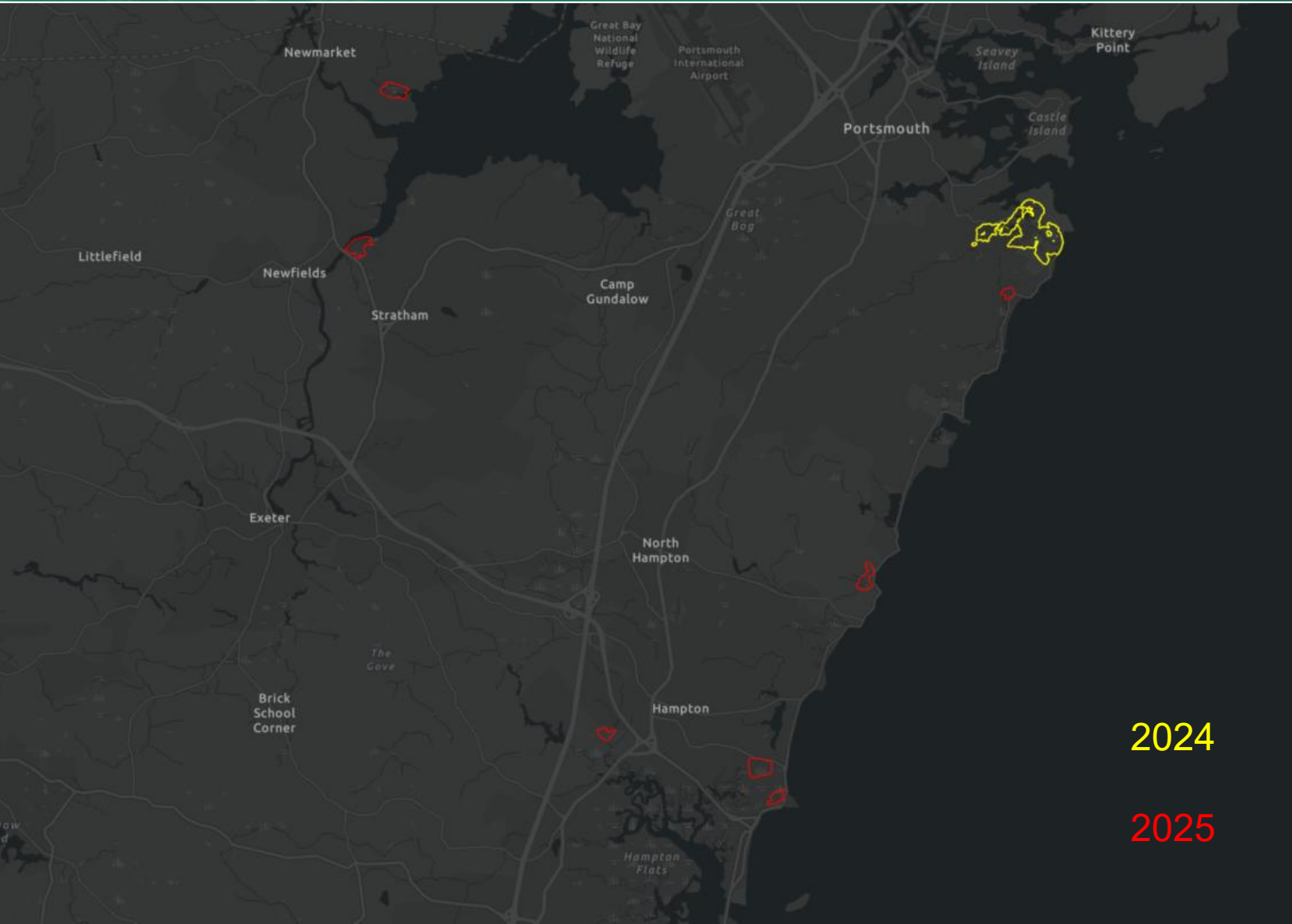
Light Detection and Ranging, or LiDAR, technology uses laser payloads on aircraft or drones to measure elevation by timing how long an emitted pulse of light takes to reflect back to the sensor.



In this example of LiDAR from a salt marsh in Great Bay, the detail is so great individual plow furrows can be detected in a neighboring field.

Eight Sites

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Sites were selected by coordinating with partners including NH Coastal Program, PREP, and TNC to see where restoration projects were being planned.

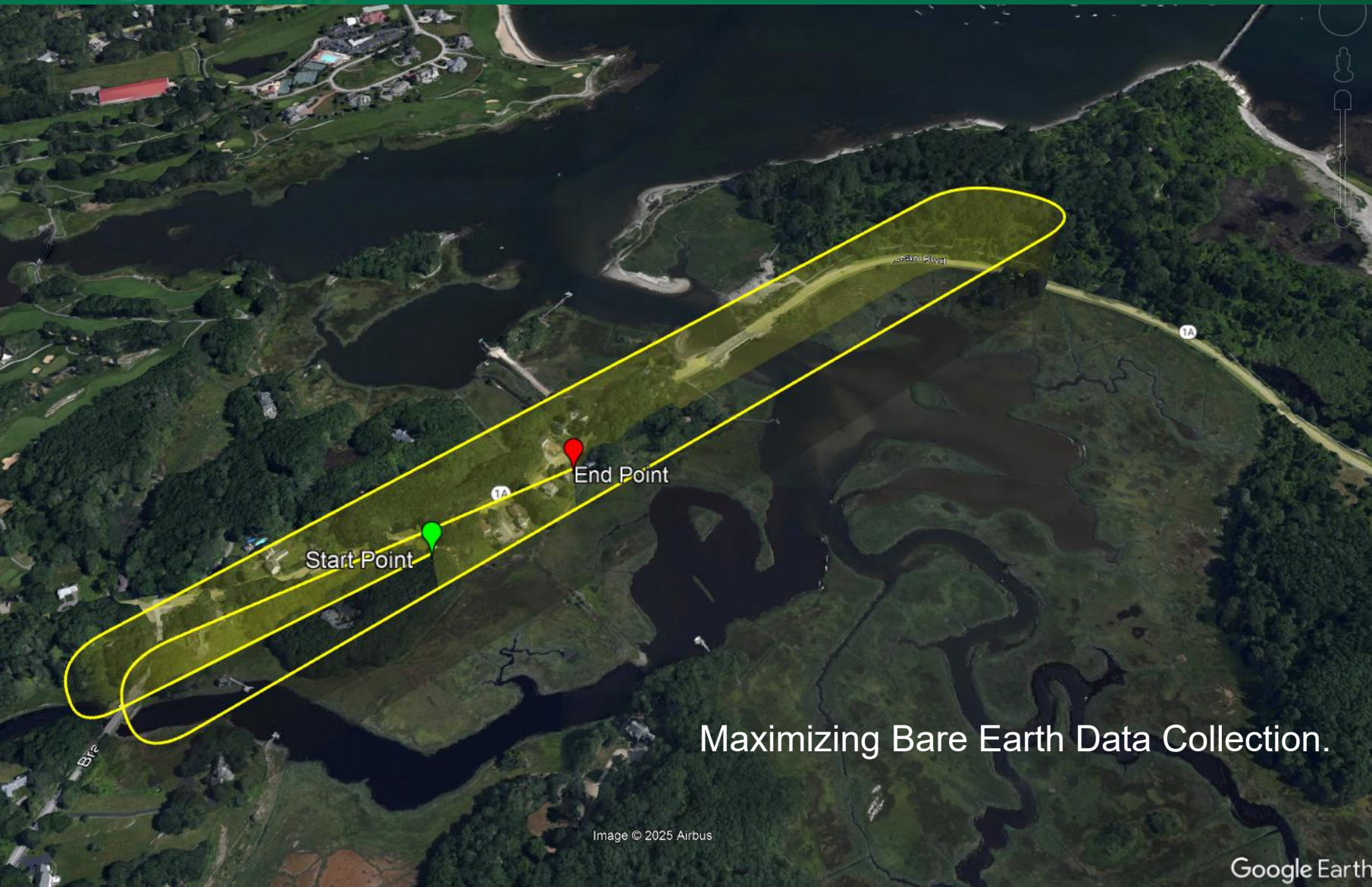
One pilot site was flown in 2024, and the other seven in 2025.

2024

2025

Detailed Flight Paths Planned

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To maximize accuracy, data collection took place within a two-hour window of local low tide to get as much detail of tidal creeks and other geomorphology while they were not concealed by water.

All sites were flown in early spring soon after snow melt and before the vegetation started to grow to maximize LiDAR returns from as close to the bare ground as possible.

Maximizing Bare Earth Data Collection.

Detailed Orthomosaics Collected at Most Sites

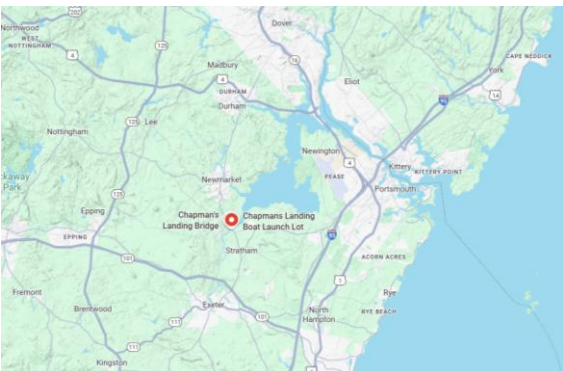
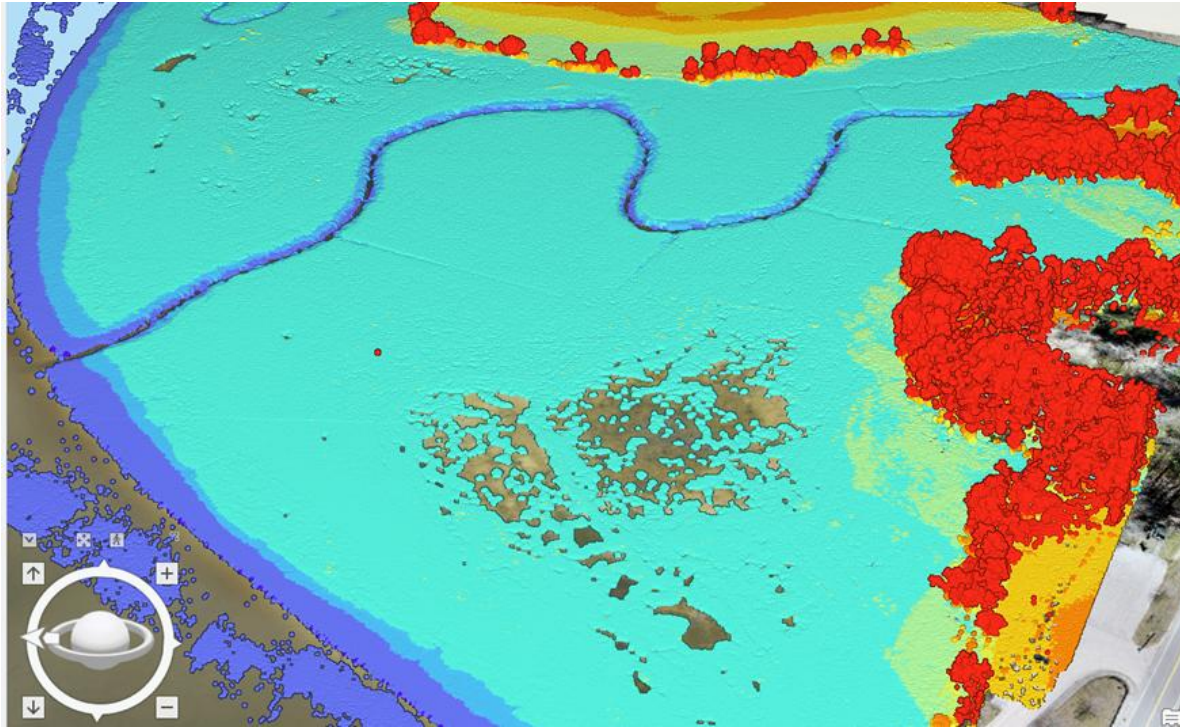
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Detailed aerial imagery was also collected during the same flight, and so at the same tide cycle stage as LiDAR data collection.

Chapman's Landing, Stratham NH

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This is an example of the results from the marsh next to Chapman's Landing boat launch in Stratham. Cooler colors indicate lower areas and warmer higher with bare areas indicating standing water such as salt marsh pannes and pools.

Data Available to Download Publicly

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DATA ACCESS VIEWER

Discover, customize, and download authoritative land cover, imagery, and lidar data.

Powered by **DIGITAL COAST**

Choose a Data Type to Explore

Imagery

Land Cover

Elevation/Lidar



Data can be downloaded at NOAA's Digital Coast coast.noaa.gov/digitalcoast. Here compressed LiDAR files are available for bulk download in .laz format.

Just click on the "Elevation/Lidar" button

New Hampshire, USA

Draw

[← Return to Results](#)

2024 Great Bay NERR UAS Lidar DEM: New Hampshire Salt Marshes

Great Bay National Estuarine Research Reserve
22.58 MB

Add to Cart

0 in cart

Also available as a [Bulk Download](#).

Attributes

Data Source: Raster Digital Elevation Model
Cell size (m): 0.50
Vertical Accuracy (cm): 0.98 - Tested to meet vertical root mean square error (RMSEz) in open terrain
Horizontal Accuracy (cm): null - undefined
Vertical Datum: NAVD88
Tide controlled: No

Related Links

[Metadata](#)

Then search for “New Hampshire” to find the 2024 and 2025 Great Bay NERR UAS Lidar DEMs, meaning digital elevation model.



2024 Great Bay NERR UAS Lidar: New Hampshire Salt Marshes

Close

About

Coastal Topographic Lidar

Providers

Great Bay National Estuarine Research Reserve

Other Resources

Metadata, 3D Viewer (Potree NOAA)



Download

Download the data [at this link](#)



Download the “Designing Salt Marshes” report [here](#) or at greatbay.org/science/habitat-science