

Living Shoreline Monitoring with ShoreWatch

Virginia Institute of Marine Science
Center for Coastal Resources Management

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With Support by JRA and NOAA

Background

NOAA project to map Living Shorelines in the Middle Peninsula of Virginia



Working with the Living Shoreline Collaborative (LSC) to identify simple rapid monitoring protocols

Purpose and Users

Collect standardized monitoring data for living shorelines

- Understand performance and effectiveness of projects in different settings and for varied designs

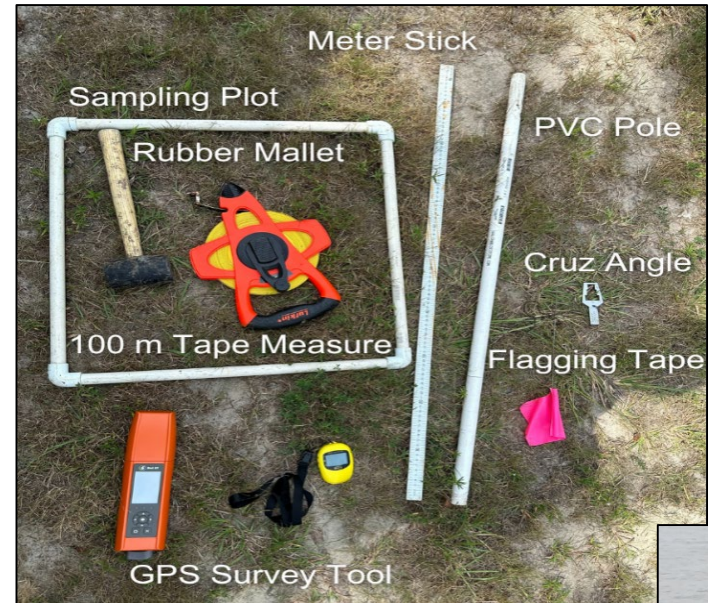
Designed for organizations and groups involved in living shoreline management and/or application



Equipment

Accessible and affordable

Necessary Field Equipment	
Bamboo Poles ¹ , PVC Poles, or Tomato Stakes ²	Rubber Mallet or Hammer
100 m Tape Measures (waterproof is ideal)	Pencil & Waterproof Paper (if ArcGIS is down)
Meter Stick	Cruz Angle
Phone or Tablet	Sampling Plots ³
GPS Survey Tool (e.g., Bad ELF from VIMS)	Marking or Flagging Tape
Apps to Install on Phone or Tablet	
ArcGIS Field Maps App ¹	ArcGIS Survey123 App ¹
Inclinometer App (e.g., Bubble Level)	Plant ID App (e.g., Seek)



GPS Survey Tool and Phone/Tablet connected via Bluetooth for enhanced accuracy

Equipment and Apps



ArcGIS Field Maps

Geolocate and collect baseline data for Living Shoreline elements

- Seamless integration
- Username and Password
 - Data integrity



ArcGIS Survey123

Forms to collect and link data to created element features to track changes over time

Example Site

Living Shoreline with Oyster Shell Bag Sill in Norfolk, VA

- East Ocean View Community Center
- 9520 20th Bay St. Norfolk, VA (Little Creek)

I will introduce the major steps of the protocol

- Initial Set-Up Site Visit
- Routine Monitoring (Data Collection)

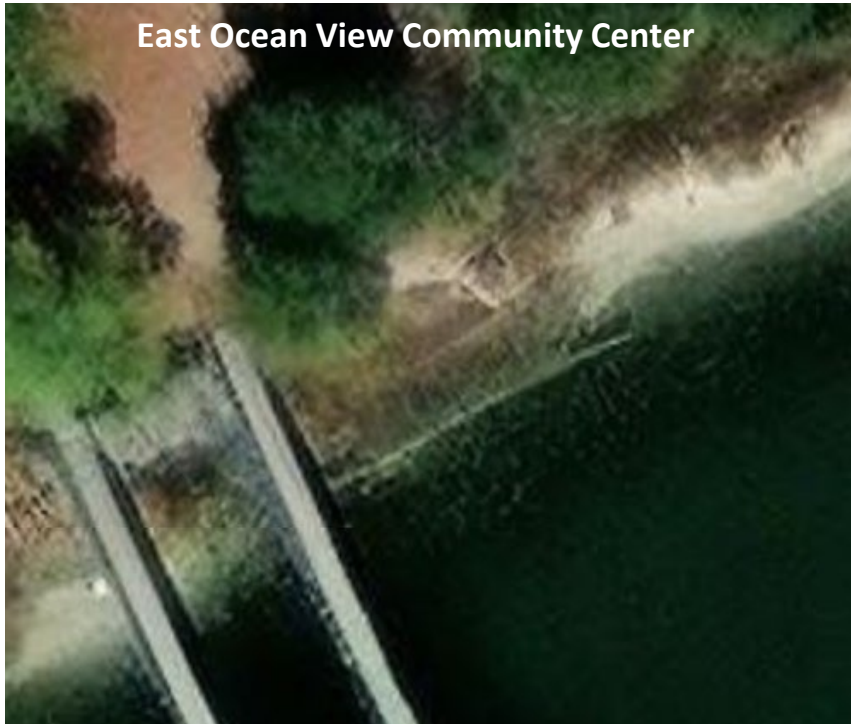


Initial Set-Up Site Visit

One-time setup to prepare site for data collection during routine monitoring

Includes

- Delineations of site and living shoreline features
 - E.g., structure, planted area, marsh zones
- Marking locations for future data collection
 - E.g., Transects and plot sampling approach



Initial Set-Up Site Visit



Monitoring Site

- Capture as-built project areas
- Name, location, and details of site



Living Shoreline Treatment(s)

- Type of treatments include
 - Rock Sill
 - Oyster Structure
 - Coir Logs
 - Breakwaters
- Details of Living Shoreline project

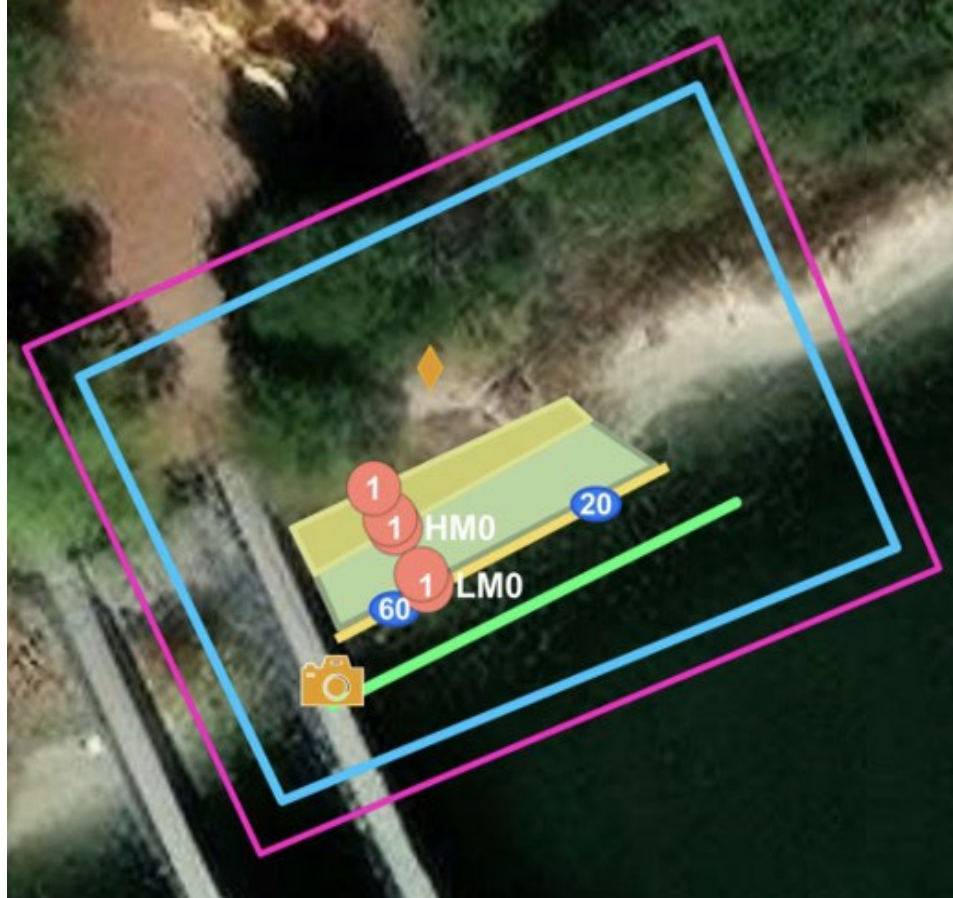


☐	Monitoring Site Area 5,912.6 m²
SITE INFORMATION *	
Monitoring Site Name *	
East Ocean View Community Center	
Must be unique (cannot be duplicated)	
Street Address	
9520 20 th Bay Street	
Maximum 100 characters	
Locality	
No Value	
Land Use	
No Value	
Owner Type	
No Value	
SITE CONTACT AND ACCESS INFORMATION	
PROJECT GOALS	

Used to link features and data for Living Shoreline projects

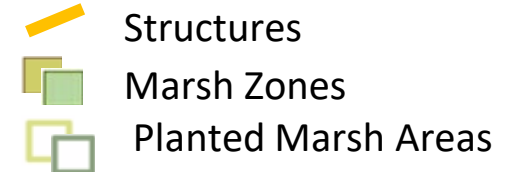
Initial Set-Up Site Visit

Use GPS location to create Living Shoreline features on the map



Monitoring Features

- Delineate living shoreline features



Transects & Quads

- Track plant community and structure evolution in small sample areas re-visited each monitoring event



Standardized categories to allow for comparisons between other projects with similar features

Routine Monitoring

Monitoring Events

Different reasons for monitoring based on timeline

- As-Built (post construction)
- Long Term (annual, semi-annual)
- Post Storm

Monitoring measures include:

- **Structure measures** - e.g., # live oysters, structure high water mark
- **Marsh measures** - e.g., marsh width, % cover, plant composition
- **Riparian measures** - e.g., tree count
- **Bank measures** - e.g., slope, cover

Observations & Characterizations

Some metrics do not require intensive analysis

- Basic performance like fish & wildlife, upland bank characterization



Maintenance measure examples:

- Storm impacts
- Structure integrity
- Marsh edge/bank erosion
- Grazing exclusion device

Routine Monitoring



Data collected in forms stored in each feature



Field Maps 10:11 AM Mon Jun 24

Marsh Measures

Date/Time:
Monday, June 24, 2024
10:11 AM

Marsh Zone:
Low Marsh

Vegetative Cover in Low Marsh
Specify Total Percent Cover:

☐ 0%
☐ 1-5%
☐ 5.1-25%
☐ 25.1-50%
☐ 50.1-75%
☐ >75%

Dominant Plant Species In Low Marsh
Specify the DOMINANT Plant Species:
In the Low Marsh

☐ Saltmarsh cordgrass (*Spartina alterniflora*)
☐ Saltmeadow hay (*Spartina patens*)
☐ Black needlerush (*Juncus roemerianus*)
☐ Big cordgrass (*Spartina cynosuroides*)
☐ Saltmarsh bulrush (*Bolboschoenus robustus*)
☐ Salt grass (*Distichlis spicata*)
☐ Sea lavender (*Limonium carolinianum*)
☐ Saltmarsh aster (*Symphyotrichum tenuifolium*)
☐ Common reed (*Phragmites australis*)
☐ Other

Date and time are automatically recorded.

A rough visual estimate of Total percent vegetation cover indicates marsh establishment, stability, health, and ecosystem function.

The dominant plant species (i.e., >50% of total cover) indicates marsh stability and function, and water levels in the marsh.

Future Monitoring Data Collection & Sharing

Living Shoreline community monitoring website

- Monitoring manual, appendices, plant guides, etc.
- Dashboard - to view and export collected data

Dashboard Capabilities

- Display summary performance metrics & highlight changes over time
 - E.g., average oyster density, plant cover, plant diversity, average marsh width
- Report generation (includes map of site and performance measures)
- Each organization can export their collected data



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