

Mid-Atlantic Coastal Wetland Assessment Overview & Future Efforts

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Partnership for the Delaware Estuary

Martha Maxwell-Doyle

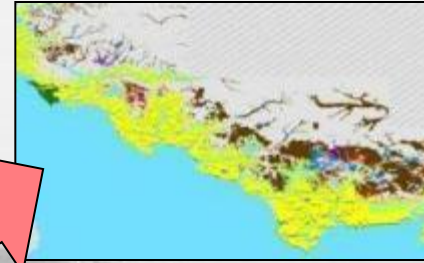
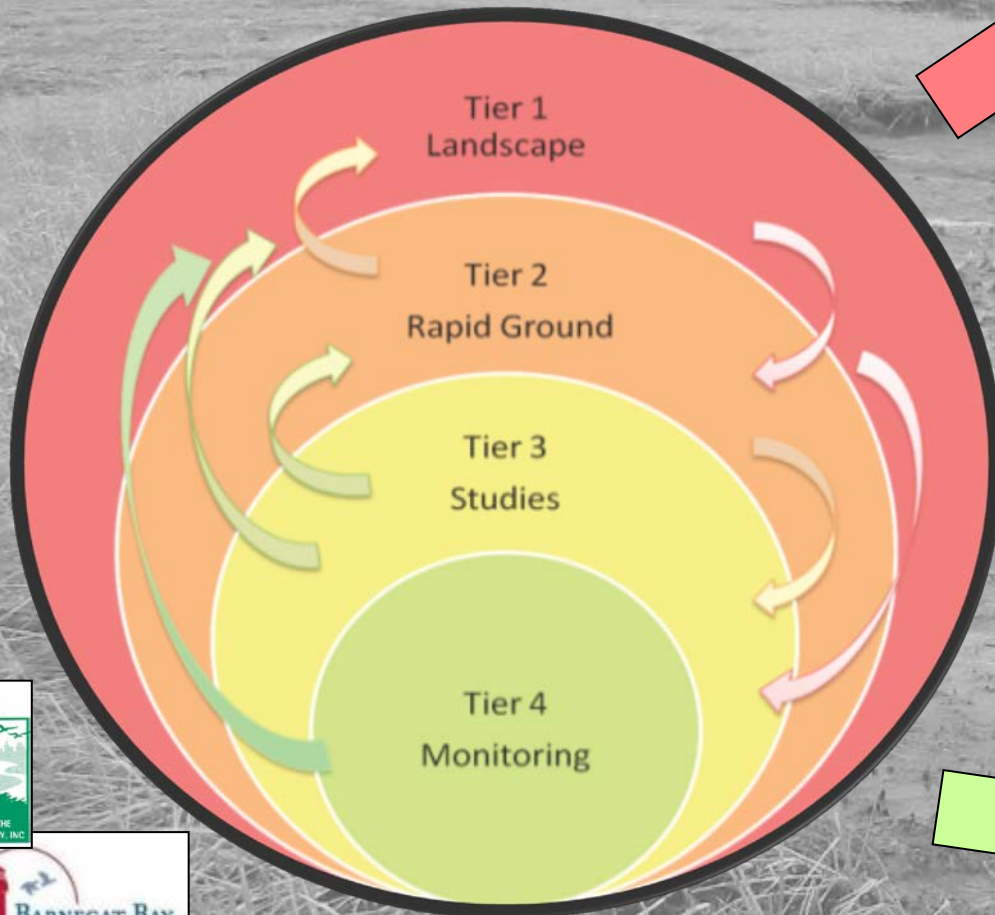
Barnegat Bay Partnership



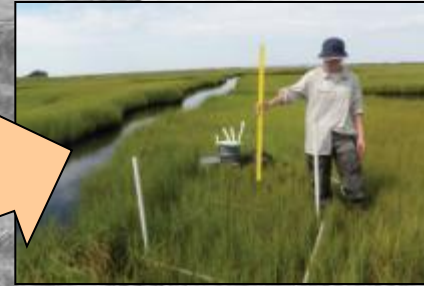
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The Mid-Atlantic Coastal Wetland Assessment

Integrated monitoring of tidal wetlands for water quality, habitat management, and climate/restoration planning



Remote Sensing



Ground-Truthing



Intensive Studies



Station Monitoring

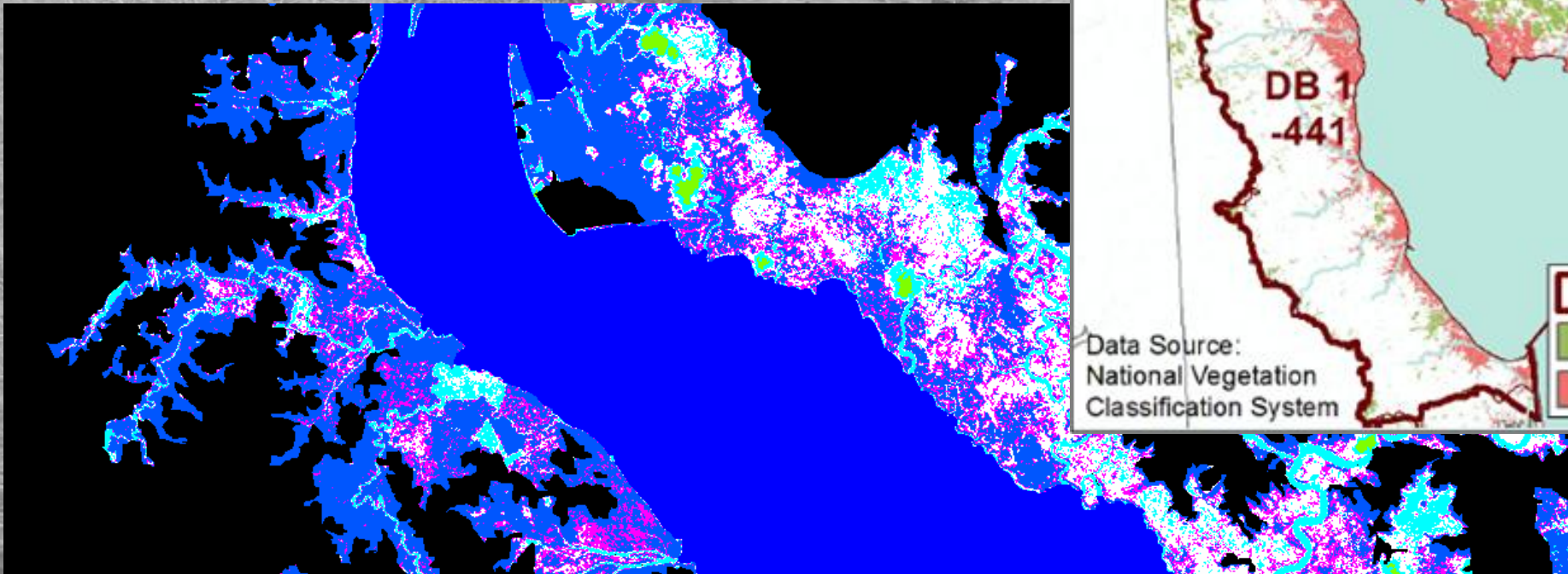
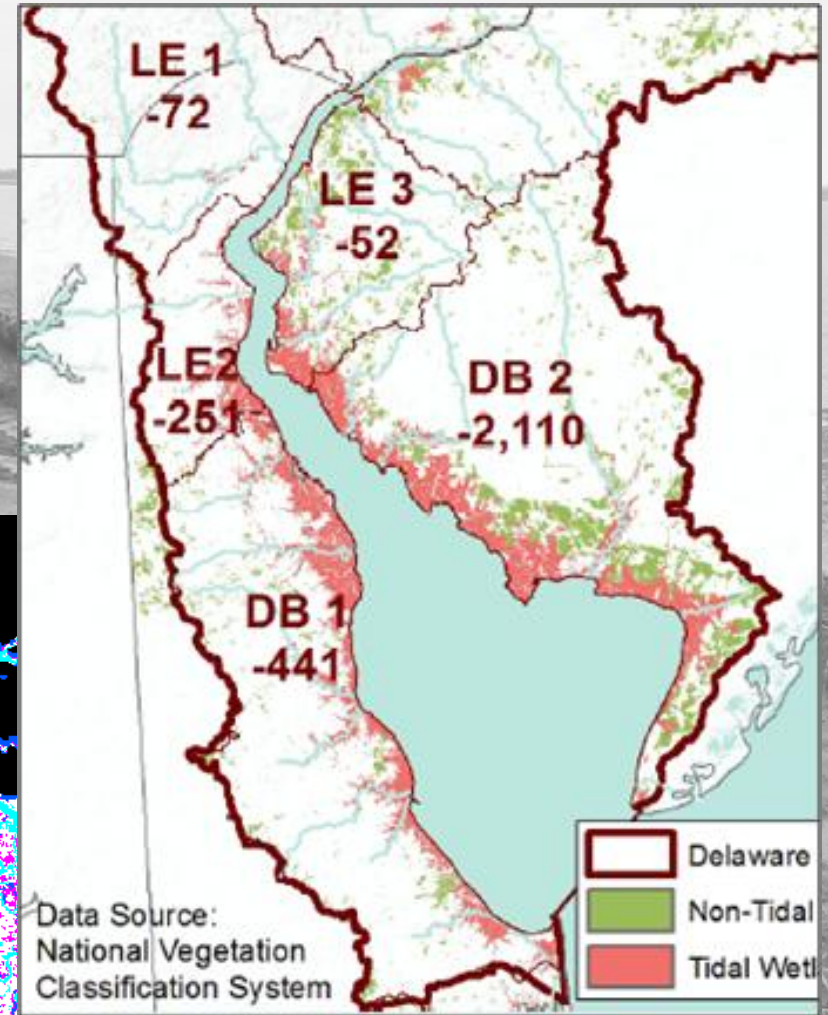


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MACWA Tier 1 – Census at Landscape Level

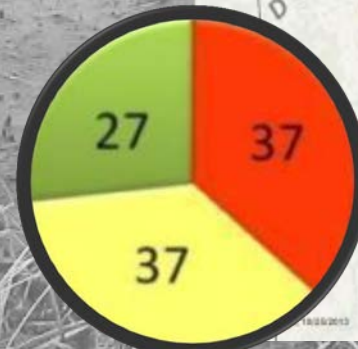
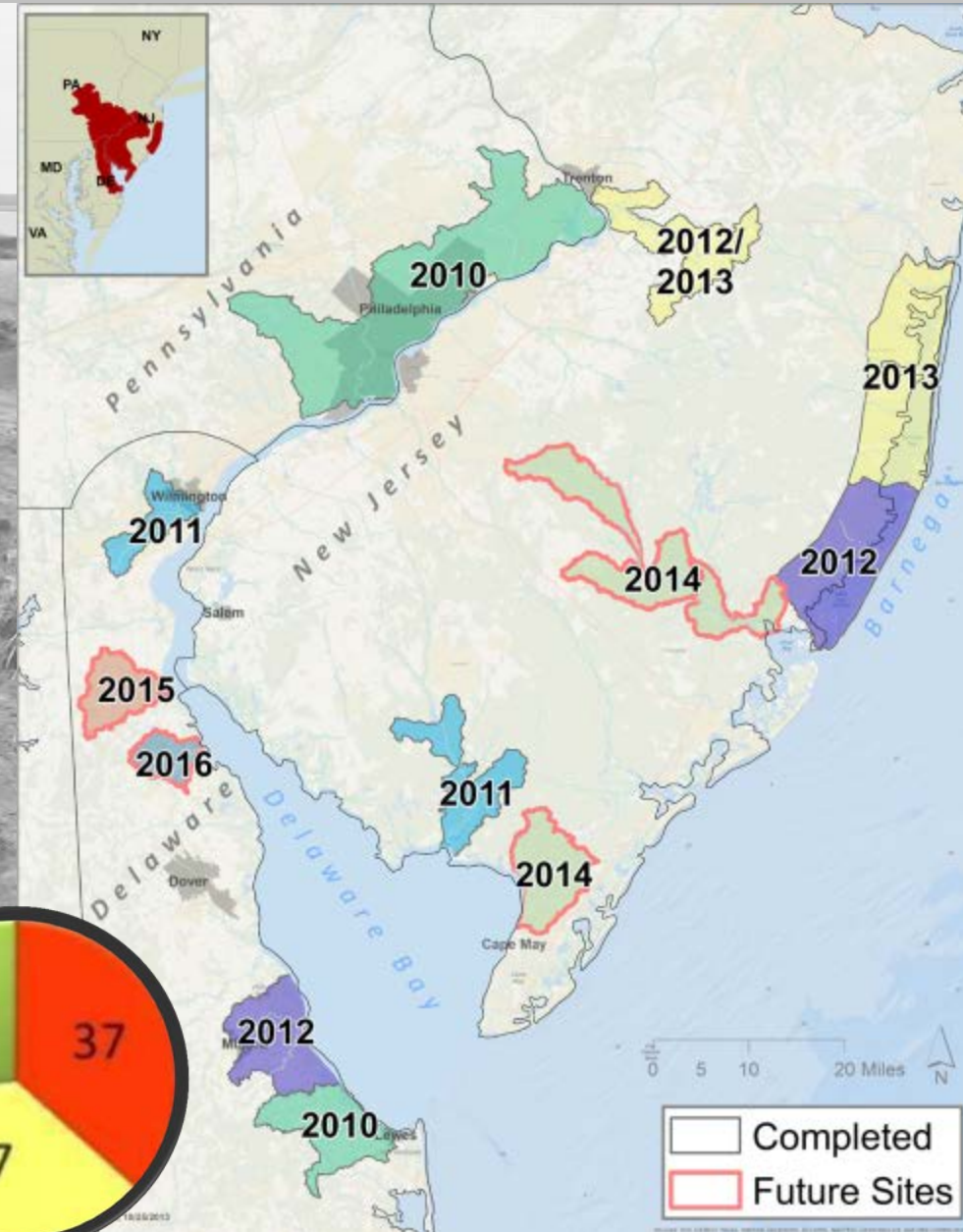
Update:

- PDE 2012 State of Estuary Analyses
- Updated NWI for PA Coming – Thank You!
- Various Post-Sandy Studies of Wetland Losses and Protective Benefits



MACWA Tier 2 – Rapid Assessments

- PDE/BBP has assessed the condition of 313 points since 2010 (*with DNREC*)
- Comparative data analyses and management recommendations furnished in 2014
- Current Focus: Integrated analysis all years to date



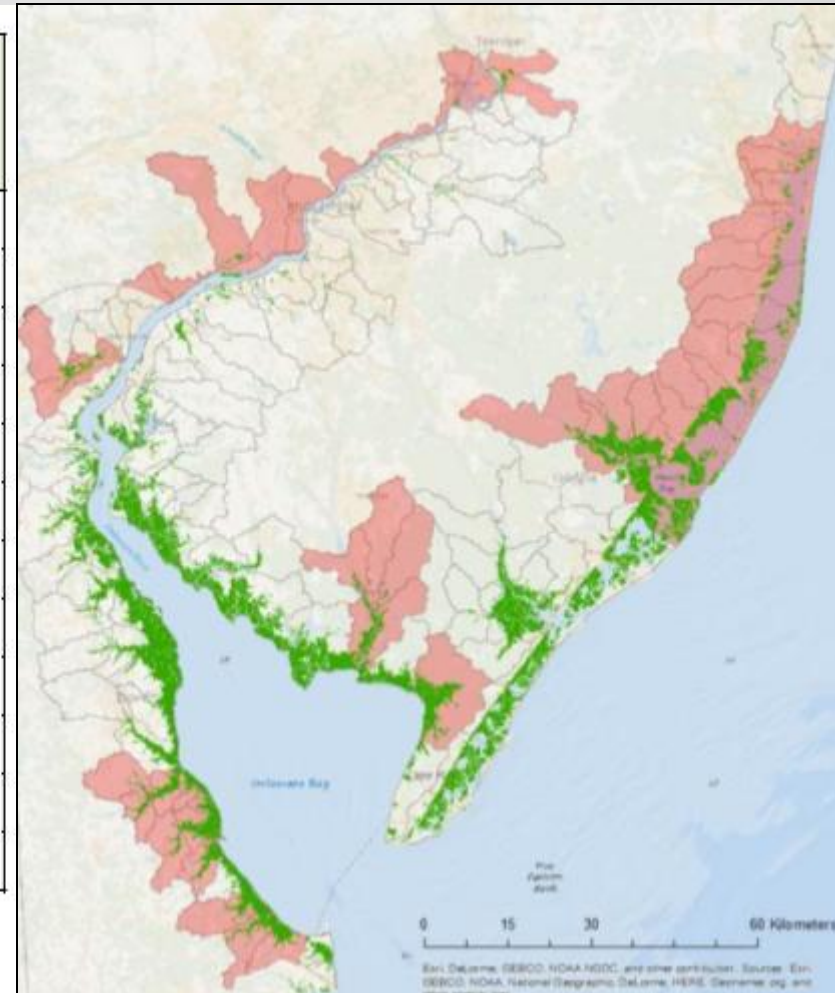
MACWA Tier 2 – Rapid Assessments

- 131 HUC12s with tidal habitats in DE, NJ, PA (38, 81, 12, resp.)
- 49 HUC12s have been assessed via RAM, or 37.4%

RAM Site	# HUC12s	Tidal Wetland Area within HUCs (ha ⁺)	% of HUC that is Tidal Wetlands	# Points	% Tidal Wetland Area Assessed**
PA tidal	10	517.2	2.0%	30	0.041%
Crosswicks	1	305.3	3.5%	30	0.069%
Christina	3	1222.6	6.2%	30	0.017%
St. Jones	2	3120.5	13.4%	30	0.007%
Murderkill	4	3964.8	14.3%	30	0.005%
Mispyllion	3	5130.4	25.9%	34	0.005%
Broadkill	3	6224.3	22.4%	37	0.004%
Maurice	5	4385.6	10.0%	30	0.005%
Dennis	1	3821.6	17.3%	30	0.005%
North BB	7	2512.3	4.2%	30	0.008%
South BB	5	6289.1	14.2%	30	0.003%
Mullica	5	12874.8	24.4%	15	0.001%

Hectare = 1.0 x 10⁴ meters²

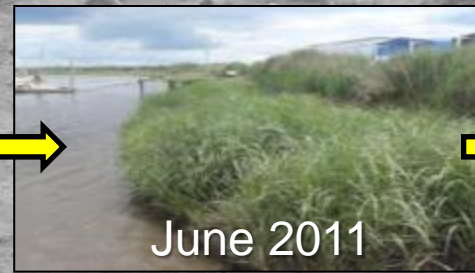
**Area assessed is full 250 buffer (~0.0069 ha) multiplied by the number of RAM points assessed



MACWA Tier 3 – Intensive Studies



- **Ecosystem Service Studies:**
N removal, levee-building in salt marshes
- **Living Shoreline Tactics:**
New hybrids in 2014 and 2015 to boost coastal wetland resilience



- **New 2014 Marsh Futures:**
Elevation capital and BMP mapping

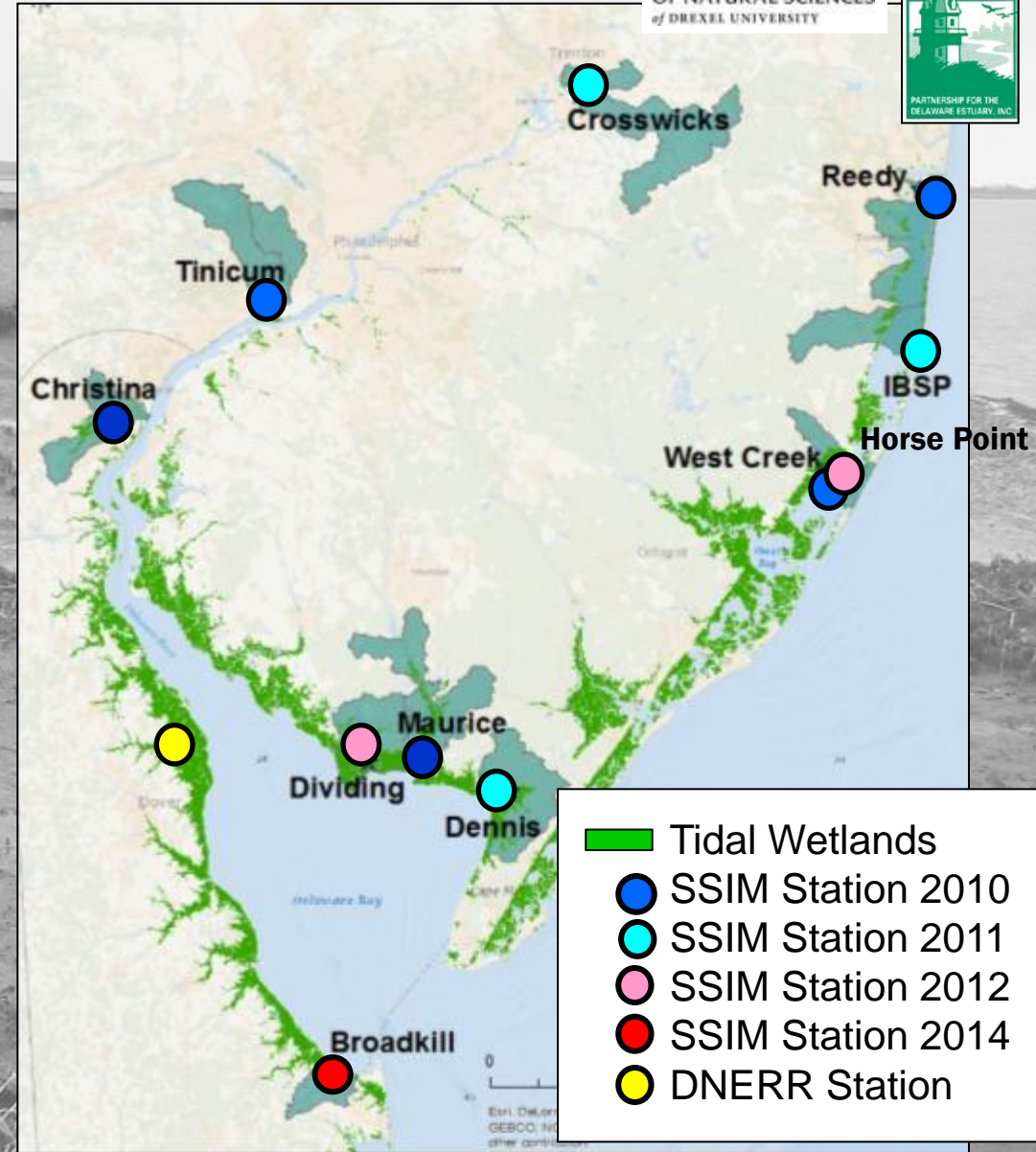


MACWA Tier 4 – Station Monitoring



Update:

- 11 Stations installed
- Broadkill, DE Station put in 2014
- Monitoring progress:
 - 3 stations in 2011
 - 7 stations in 2012
 - 9 stations in 2013
 - 10 stations in 2014
- Have funding for
 - 4 of 10 stations in 2015
 - 2 of 10 stations in 2016
 - 0 of 10 stations in 2017



Coastal Wetlands: a NEP Priority

Measurable Goals for the Delaware Estuary

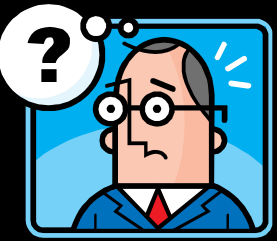


Goal Statement: Healthy Habitats supporting healthy waters and communities.

From the CCMP (page 14):

- *Provide for the restoration of living resources of the Delaware Estuary and protect their habitats and ecological relationships for future generations.*

Healthy Habitats =	Measure – short term	Measure – long term	Responsible Agencies:	Assumptions/ Needs:
Functioning wetlands	<ul style="list-style-type: none"> • Get a robust tidal wetland monitoring program with a regional body for coordination and consistency of tracking wetland health in place by 2020 • Develop estuary-wide baseline for tidal wetland health by 2020 and goals to sustain tidal wetland health by 2022. • Identify and implement tactics to maintain high value tidal wetlands and limit acreage loss to 5% of 2006 acreage by 2025 	<ul style="list-style-type: none"> • Take aggressive action to limit net acreage loss of tidal wetlands to 15% of 2006 acres by 2040 • Tidal wetland health TBD in 2022 based on short term actions • No net loss of non-tidal wetlands 	PDE, EPA, States, USFWS, NOAA, USACE	- Continuation of MACWA to track wetland acreage and health



Key Questions

Are wetlands keeping pace with sea level rise?

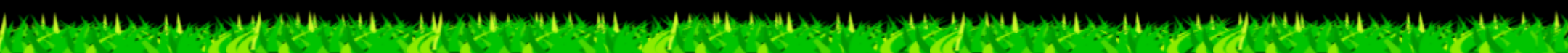
How are wetlands responding to stressors, such as pollution?

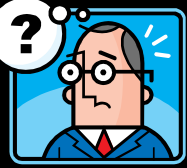
How is wetland health affecting ecosystem services?

Where will wetlands likely survive in the future?

What can be done to increase wetland sustainability and ecosystem functions?

What tactics can be used, and where, how, and when?





Are wetlands keeping pace?

No, not in many, if not most, areas

from Tier 1 studies, State of Estuary reports

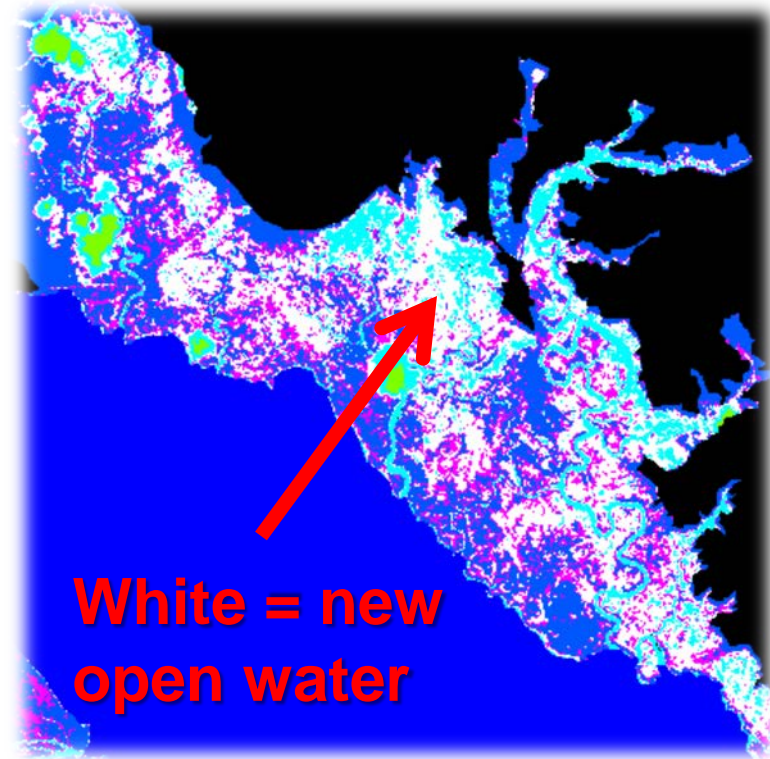
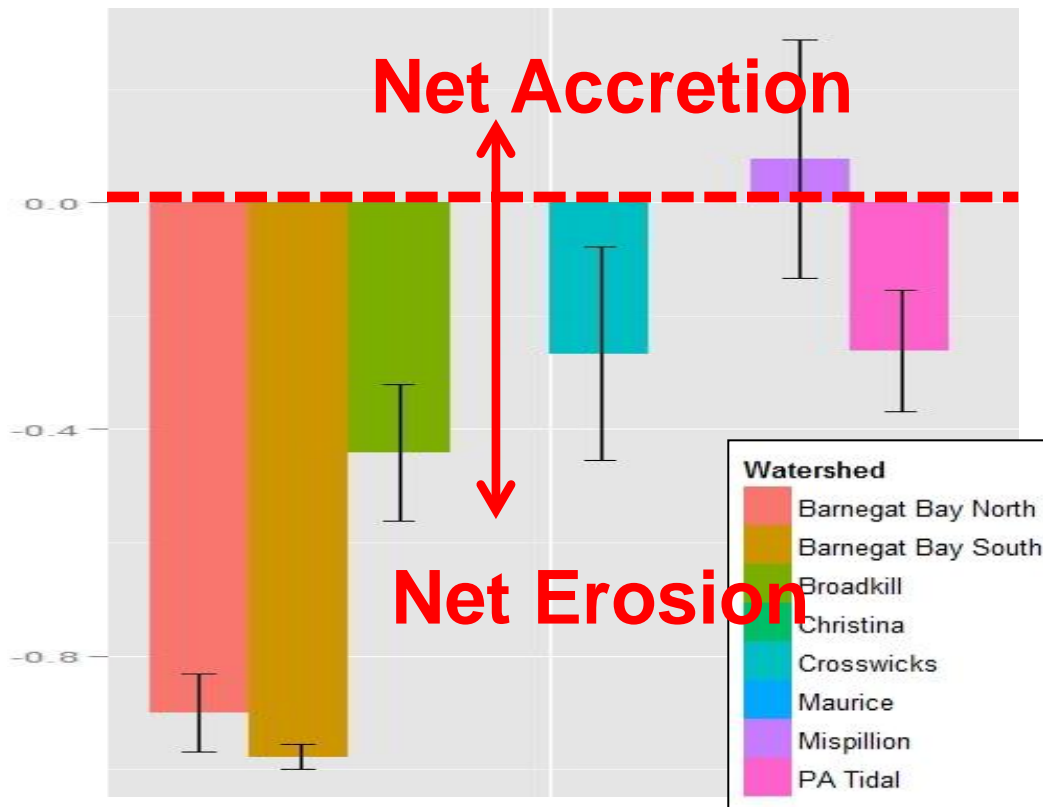
**~1 acre per day in
Delaware Estuary**



Two Decline Patterns

Edge Erosion (Horizontal)

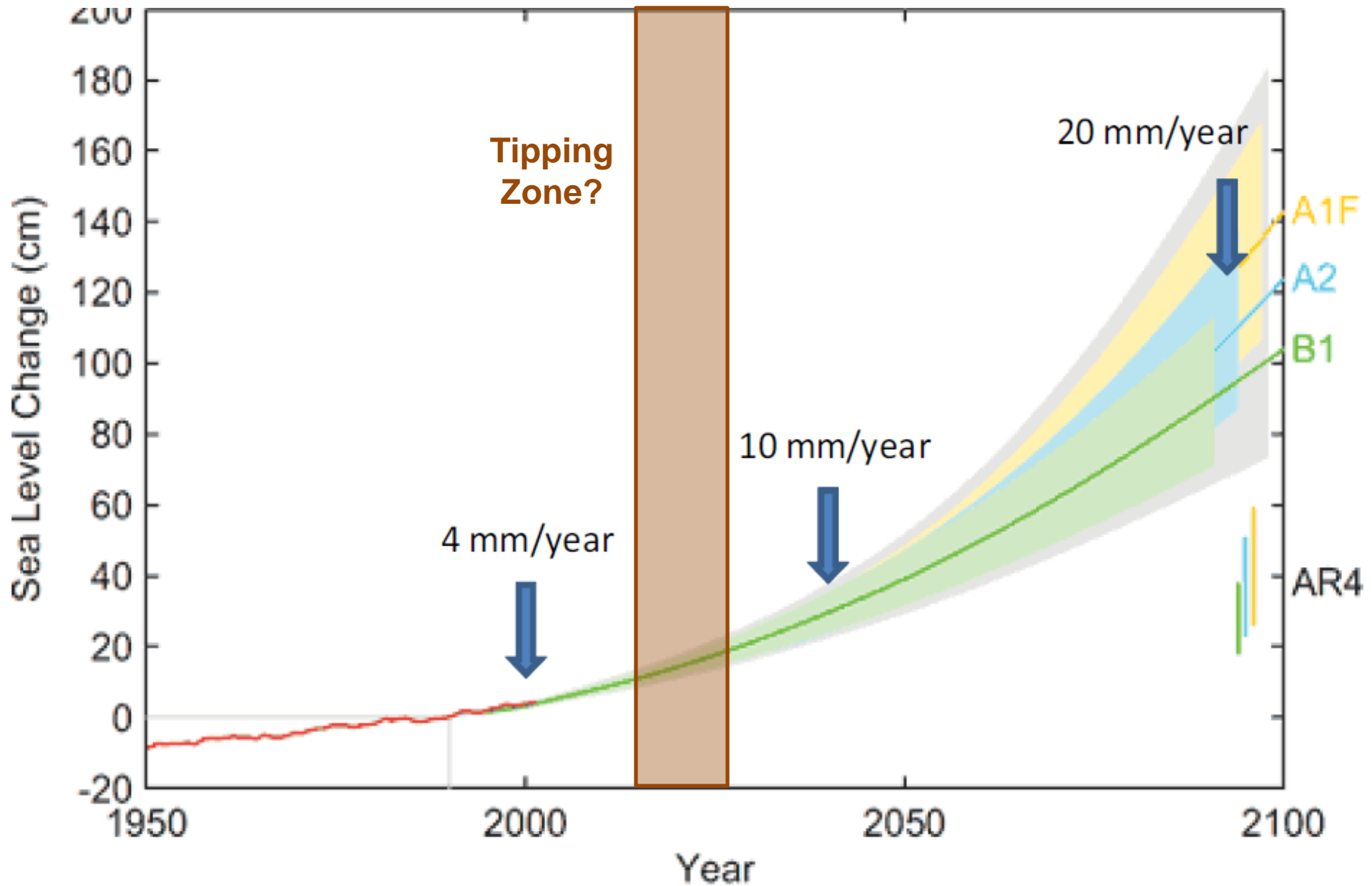
Interior Drowning (Vertical)



Source: Riter and Kearney 2009

~1 m edge loss per year

Most Salt Marshes Cannot Survive When Sea Levels Rise >1 cm Per Year



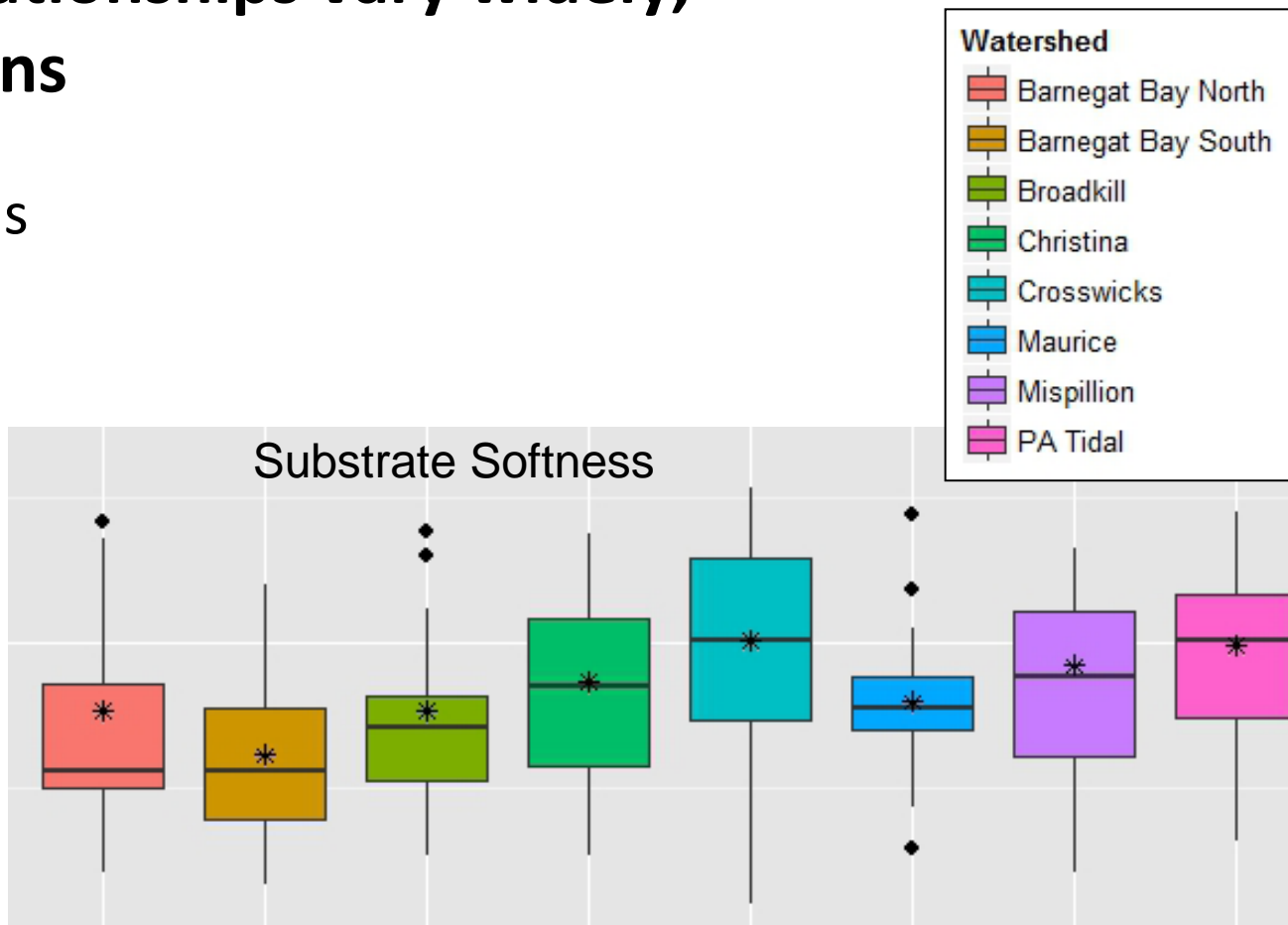


How are wetlands responding to stressors, such as pollution?

Stressor-response relationships vary widely, with lots of interactions

- Hydrology alterations
- Mosquito ditching
- Nutrient loadings
- Fill, Point sources
- Marine debris

from Tier 2 rapid assessments






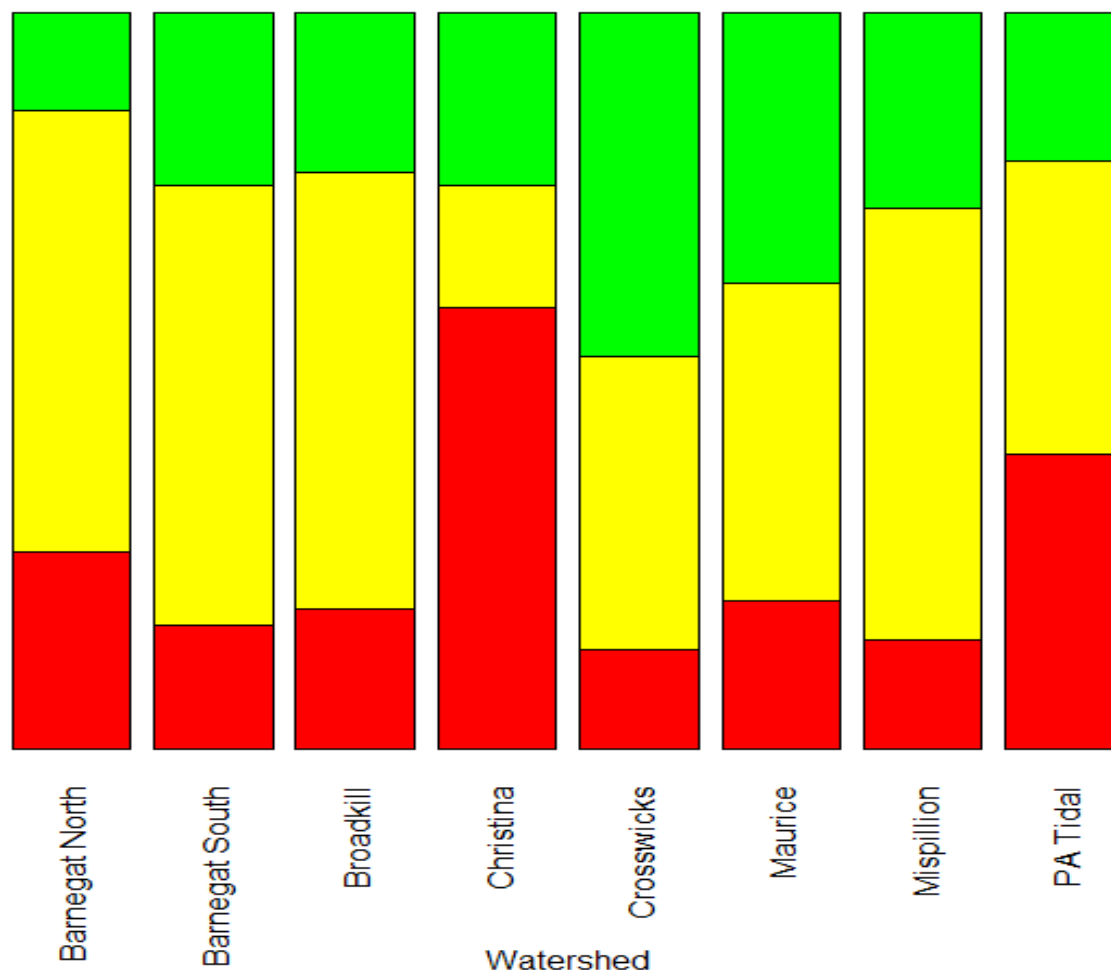


How is wetland health affecting ecosystem services?

Most are moderately or severely stressed, lowers benefits

from Tier 2 rapid assessments

-  Severe
-  Moderate
-  Minimal



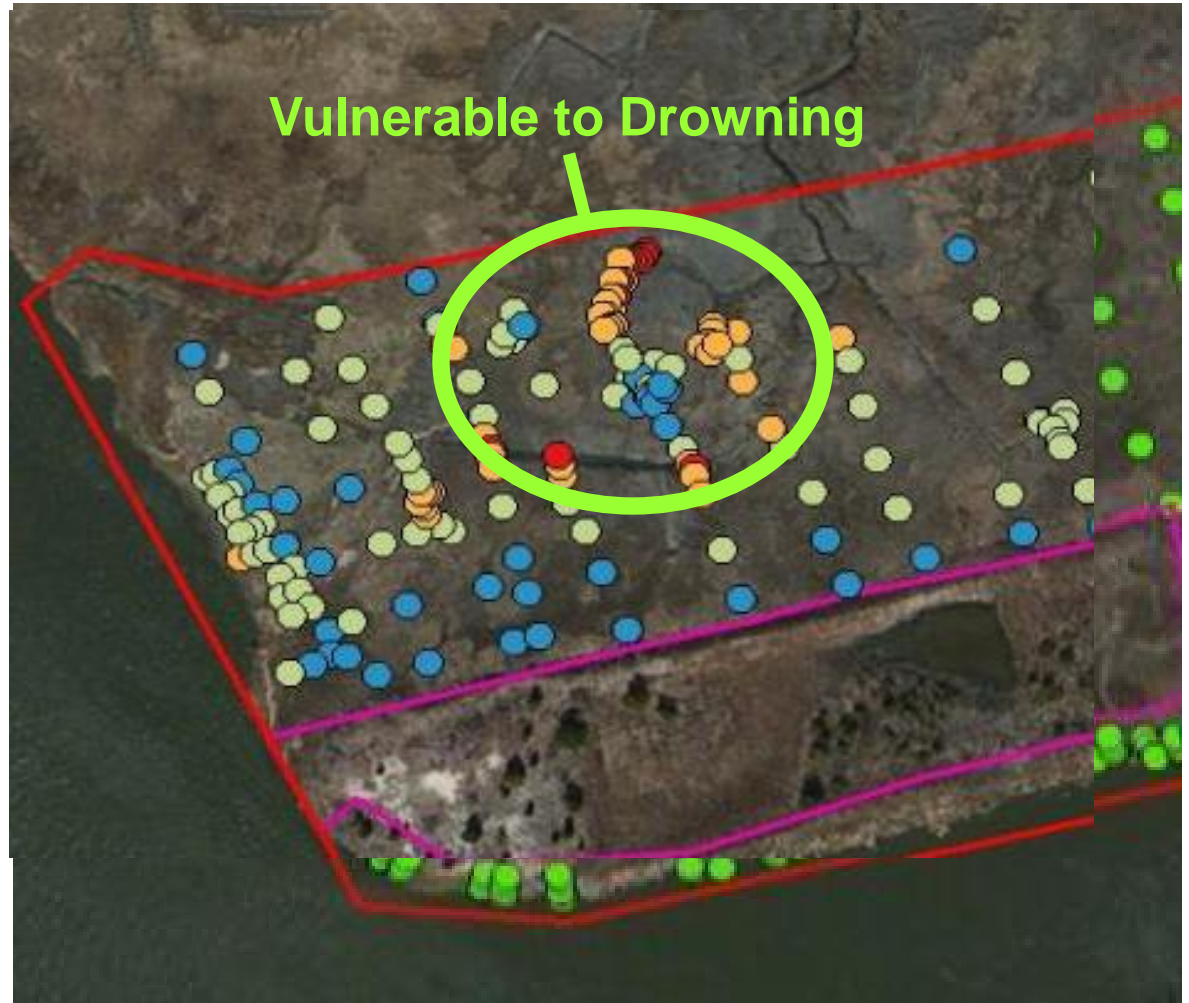


Where will wetlands likely survive in the future?

Depends on Local Conditions

Use MACWA Tier 2 and 4 data to identify anomalies

Tier 3 special studies



Drowning (Vertical Loss)

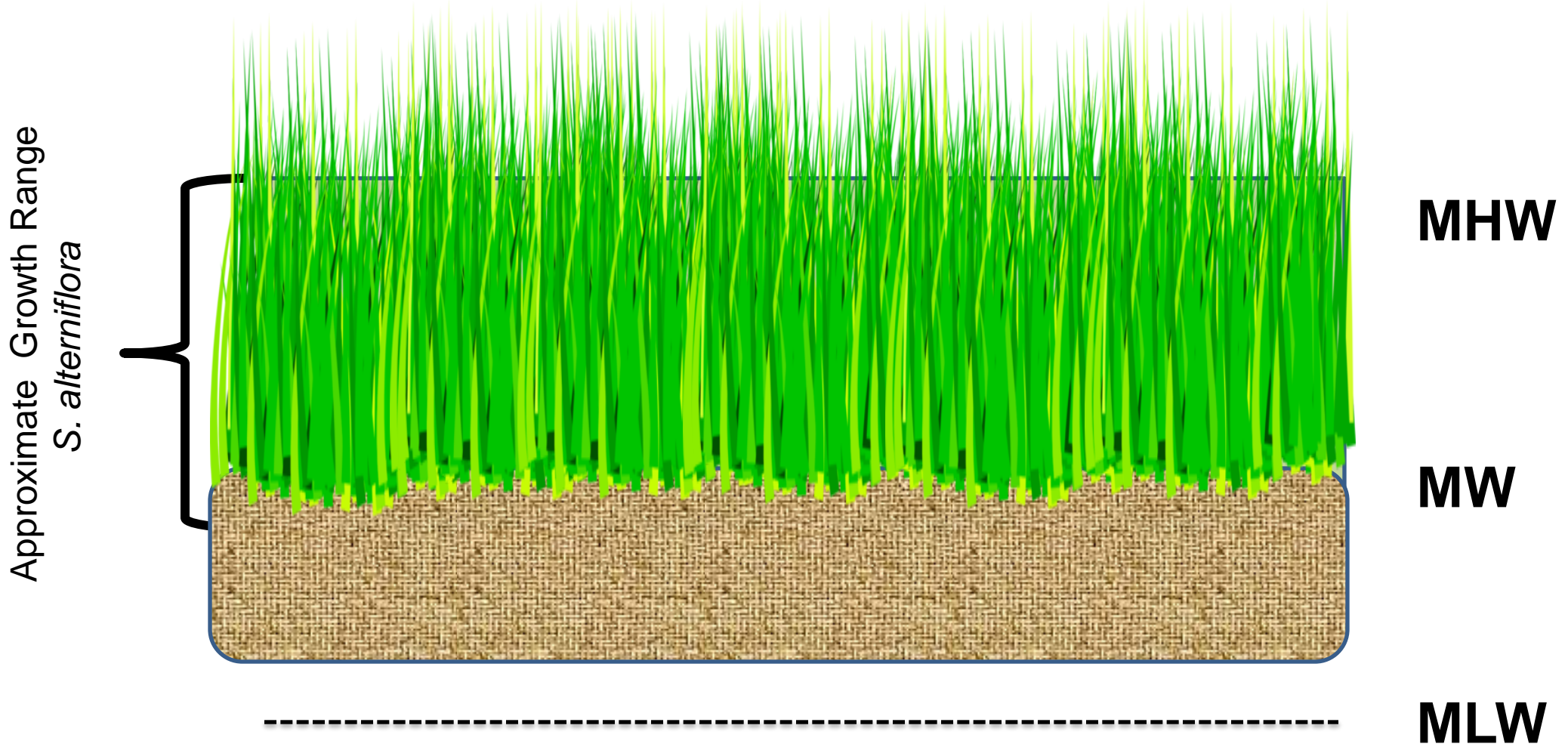
- Plants Have Optimal Growth Ranges



Slide adapted from James Morris

Drowning (Vertical Loss)

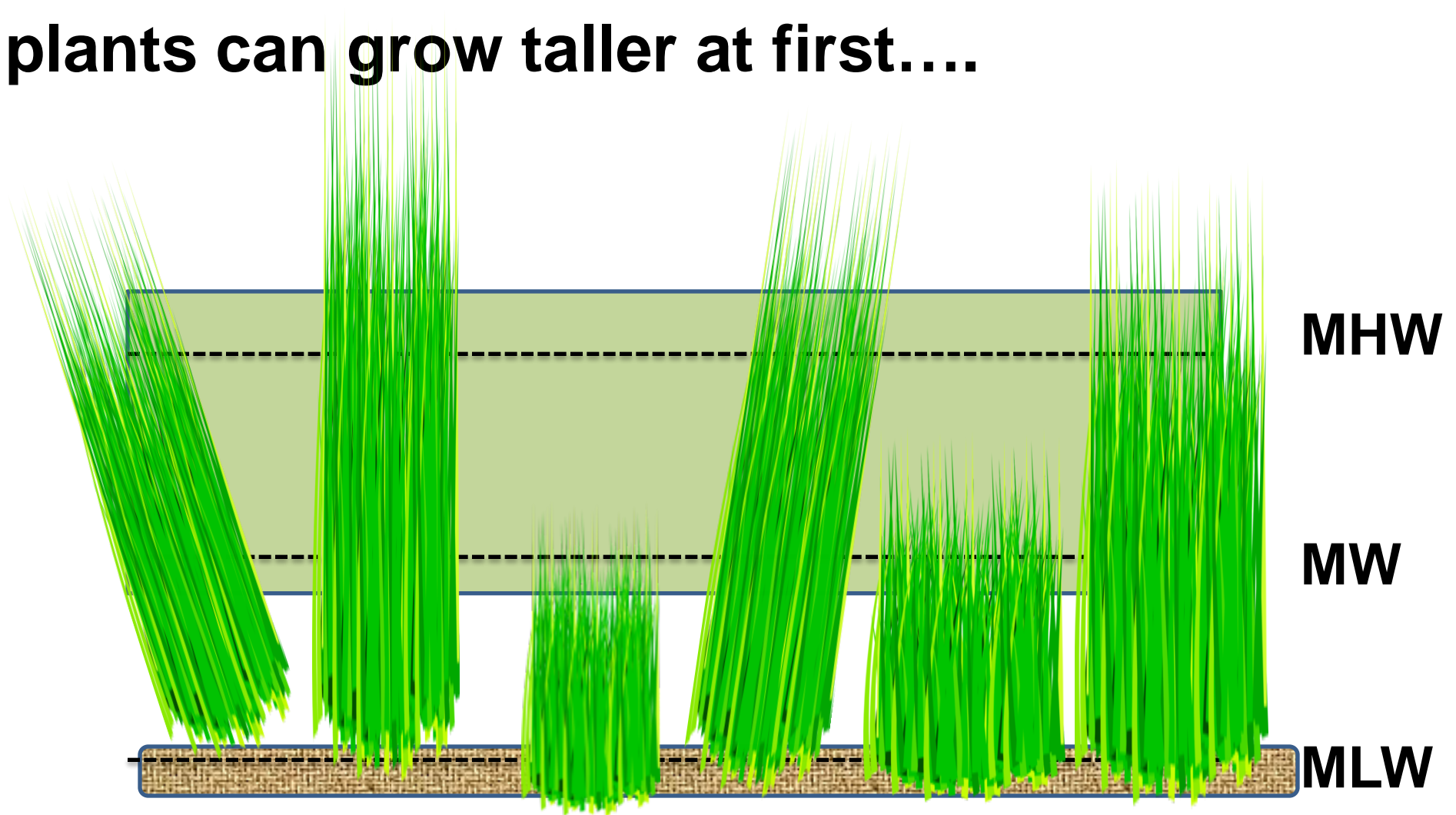
When rate of SLR > rate of (net) accretion



Slide adapted from James Morris

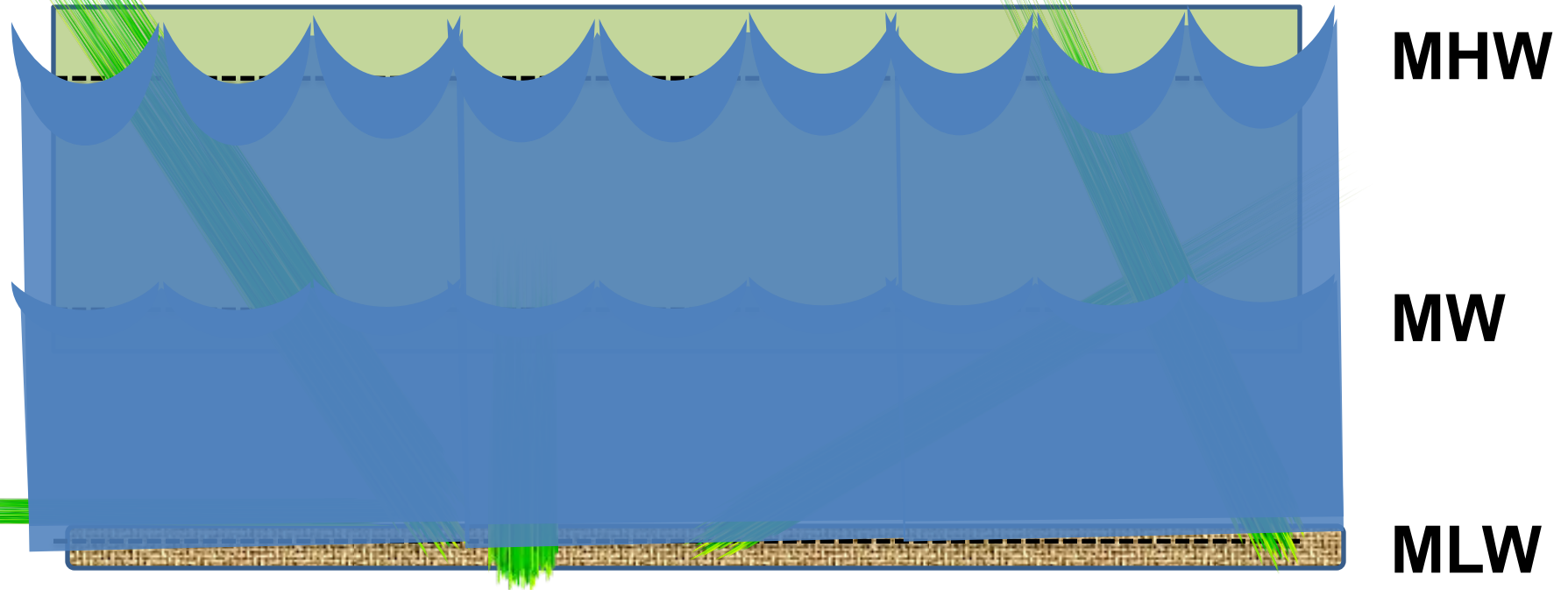
Drowning (Vertical Loss)

... plants can grow taller at first....



Drowning (Vertical Loss)

But eventually succumb

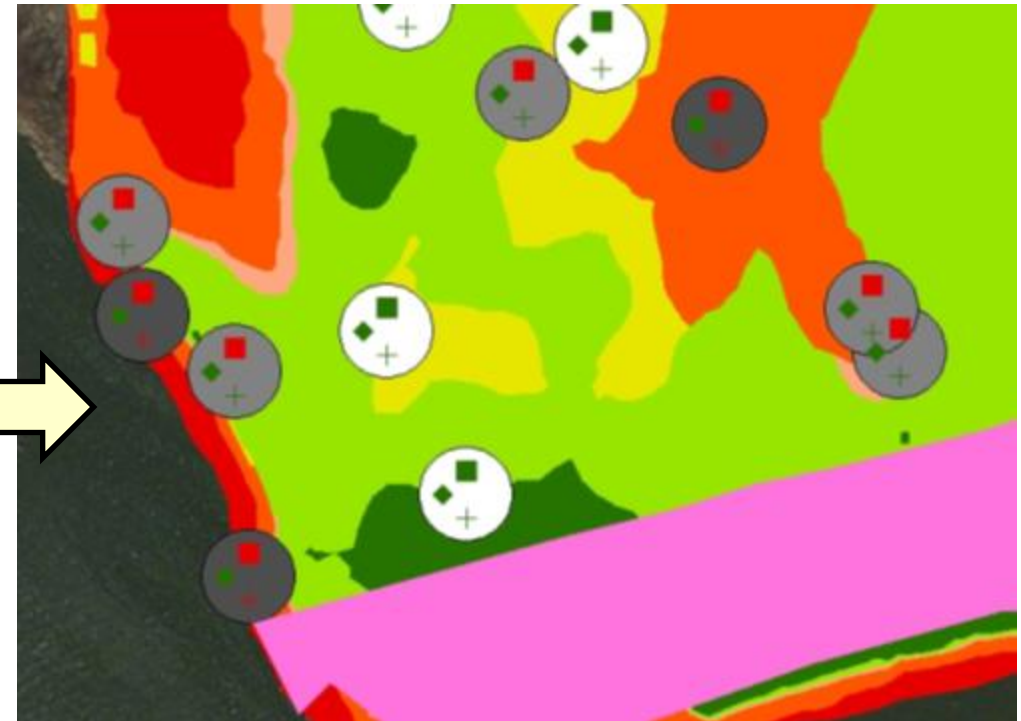


Vulnerability Maps

Combine data on plant growth ranges and elevation

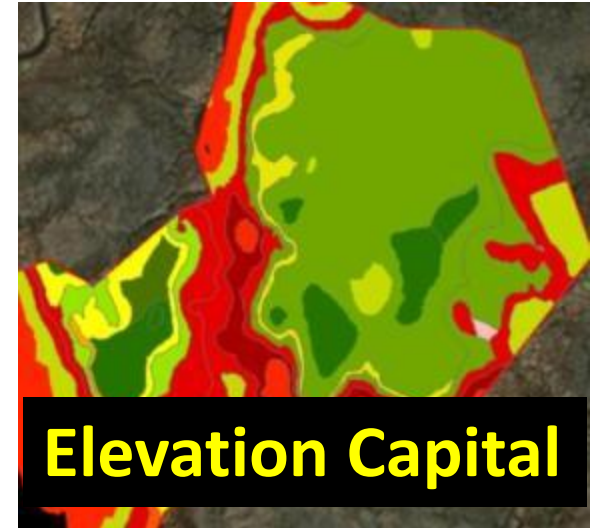
Elevation Capital Mapping

Weighted measures adjusted elevations (unitless)



Vulnerability Mapping

Drowning Risk



Erosion Risk

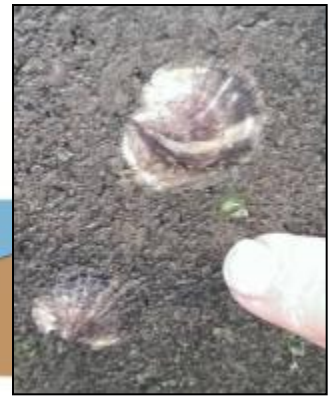
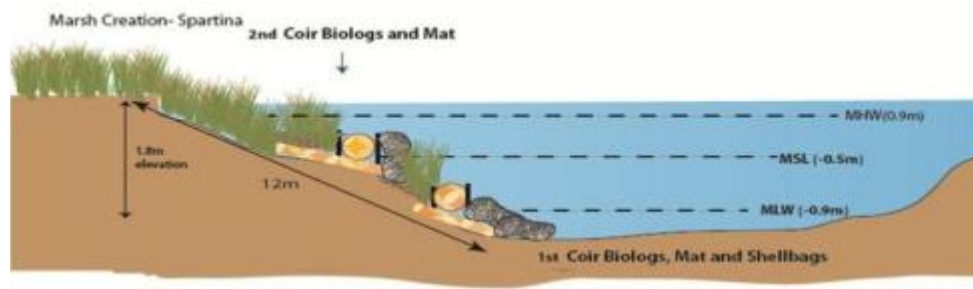




What tactics can be used to stem losses?

Many options now exist:

from Tier 3 special studies



Performance monitoring can be linked to MACWA

Science-Based Monitoring of Tidal Wetland Enhancement Projects

MACWA

- Stressor Context
- Reference Benchmarks

Project Design

- Match Tactic to Site-Specific Needs
- Tailor Project Design to Local Conditions

Project Monitoring

- Tailor to Goals and Local Conditions
- Consistent Framework & Protocols
- Link to Reference Array



Next: 5-year integrated analysis

Which activities and metrics yield the most useful products?

Can we downsize to reduce costs?

Are there key issue areas that need to be strengthened?



Next Steps

- Integrated 5-year analysis, report
- Update & streamline RAM & SSIM
- Validate EPA multilevel strategy
- Rank stressor priorities by watershed
- Recommendations for coastal managers
- Chart restoration priorities (e.g. marsh futures)
- **Link to performance monitoring of post-Sandy resilience projects**



- Coastal wetlands are a strategic priority, as reflected in our NEP Goals

<i>Healthy Habitats =</i>	<i>Measure – short term</i>	<i>Measure – long term</i>
Functioning wetlands	<ul style="list-style-type: none">• Get a robust tidal wetland monitoring program with a regional body for coordination and consistency of tracking wetland health in place by 2020	<ul style="list-style-type: none">• Take aggressive action to limit net acreage loss of tidal wetlands to 15% of 2006 acres by 2040

- MACWA helps address goals of NEP partners (e.g., state wetland plans)
- MACWA helps to pave the way for a comprehensive water quality monitoring strategy that EPA is encouraging the states to have in place
- MACWA helps guide strategic restoration and coastal resilience projects

Summary

- Coastal wetlands are a hallmark feature of the Delaware Estuary and coastal mid-Atlantic
- They provide diverse benefits that sustain lives and livelihoods
- They are vulnerable to combined watershed and climate stressors
- Monitoring of wetland status and trends will assist in managing and sustaining them
- Regional coordination strengthens scientific outcomes, improves management and leverages more diverse funding



for more Info: <http://www.delawareestuary.org/Wetlands>



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