Wetland Adaptation Areas & Marsh Protection Index

Rachel Bacher
Dylan Taillie
Chesapeake and Coastal Service

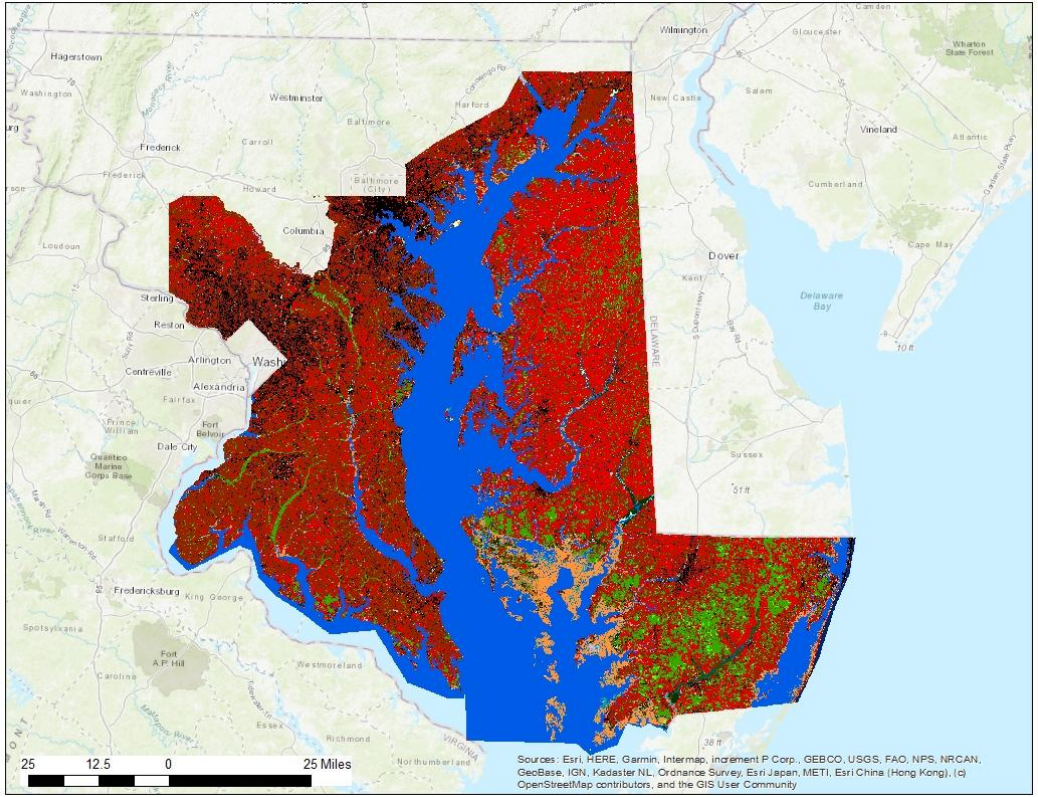
MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Maryland’s Wetlands

Impetus for updating WAAs

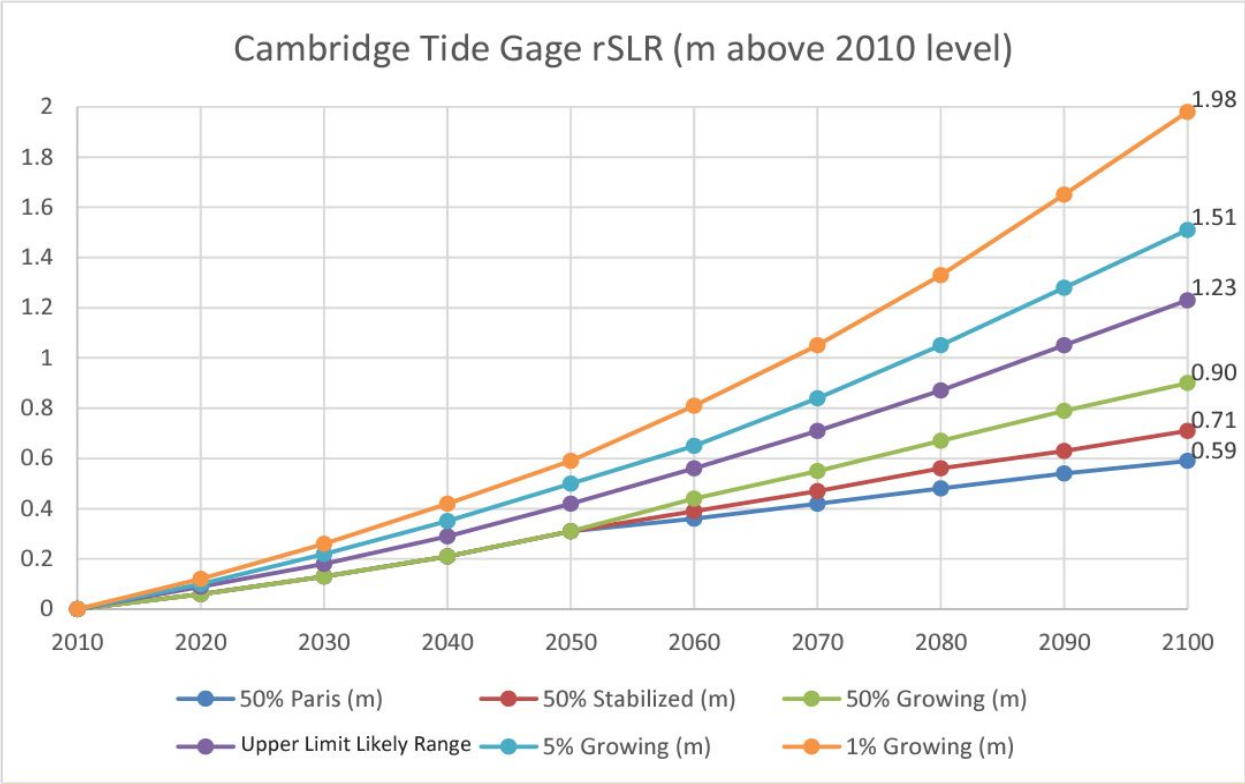
- New SLAMM data at 10m resolution
  - higher resolution for land-use and elevation, results at 10 year time steps yields better predictions of future wetlands at more frequent intervals
- Programmatic need to distinguish between uplands that convert to wetlands and wetlands that remain wetlands
- Multiple timesteps means we can display the “corridor” for wetland migration

Sea Level Affecting Marshes Model (SLAMM)

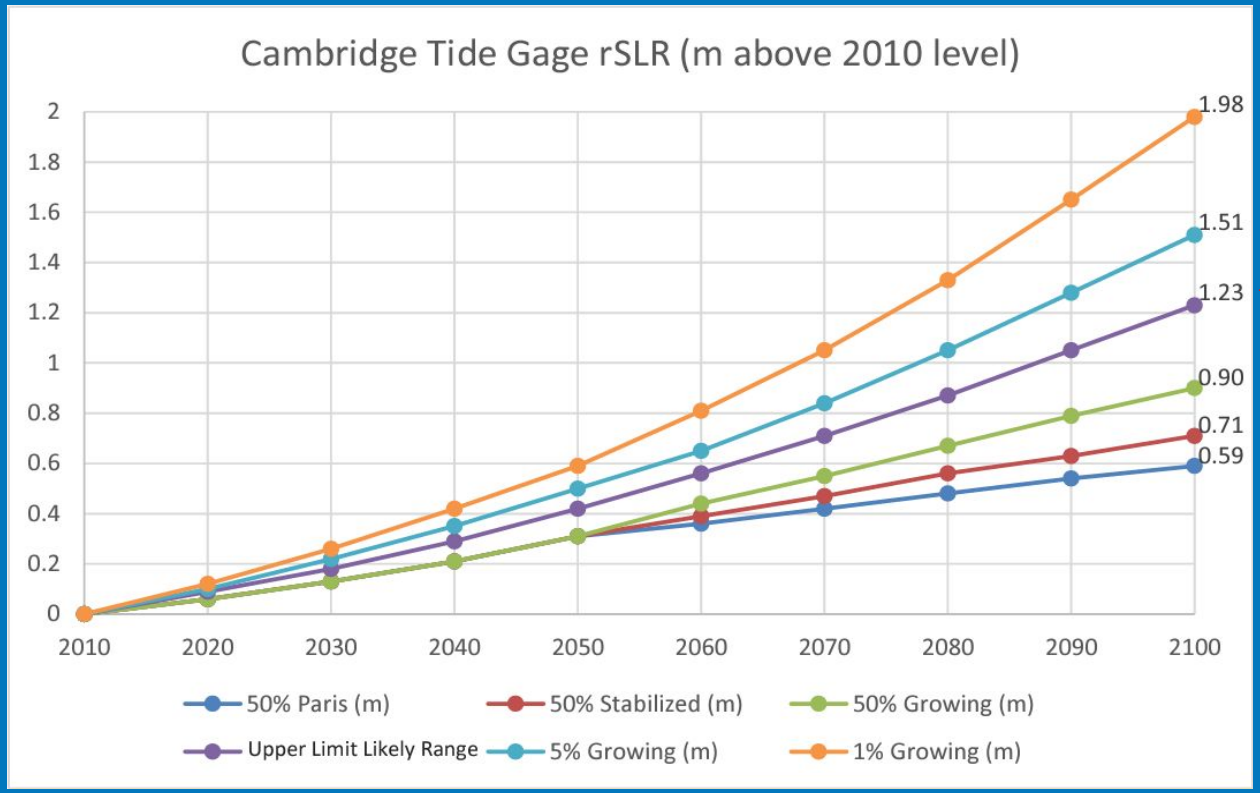


GIS Code	Color	Name
1		Developed Dry Land
2		Forested Dry Land
3		Forested Wetland
4		Tidal Cypress Swamp
5		Inland Fresh Marsh
6		Tidal Fresh Marsh
7		Transitional Salt Marsh
8		Regularly-flooded Marsh
9		NonForested Dry
10		Estuarine Beach
11		Tidal Flat
12		Ocean Beach
13		Ocean Flat
14		Rocky Intertidal
15		Inland Open Water
16		Riverine Tidal
17		Estuarine Open Water
18		Tidal Creek
19		Open Ocean
20		Irregularly-flooded Marsh
22		Inland Shore
23		Tidal Forested Wetland
24		Blank
25		Flooded Developed Dry Land
26		Flooded Cypress Swamp

Sea Level Affecting Marshes Model (SLAMM) rerun using 6 sea level rise scenarios

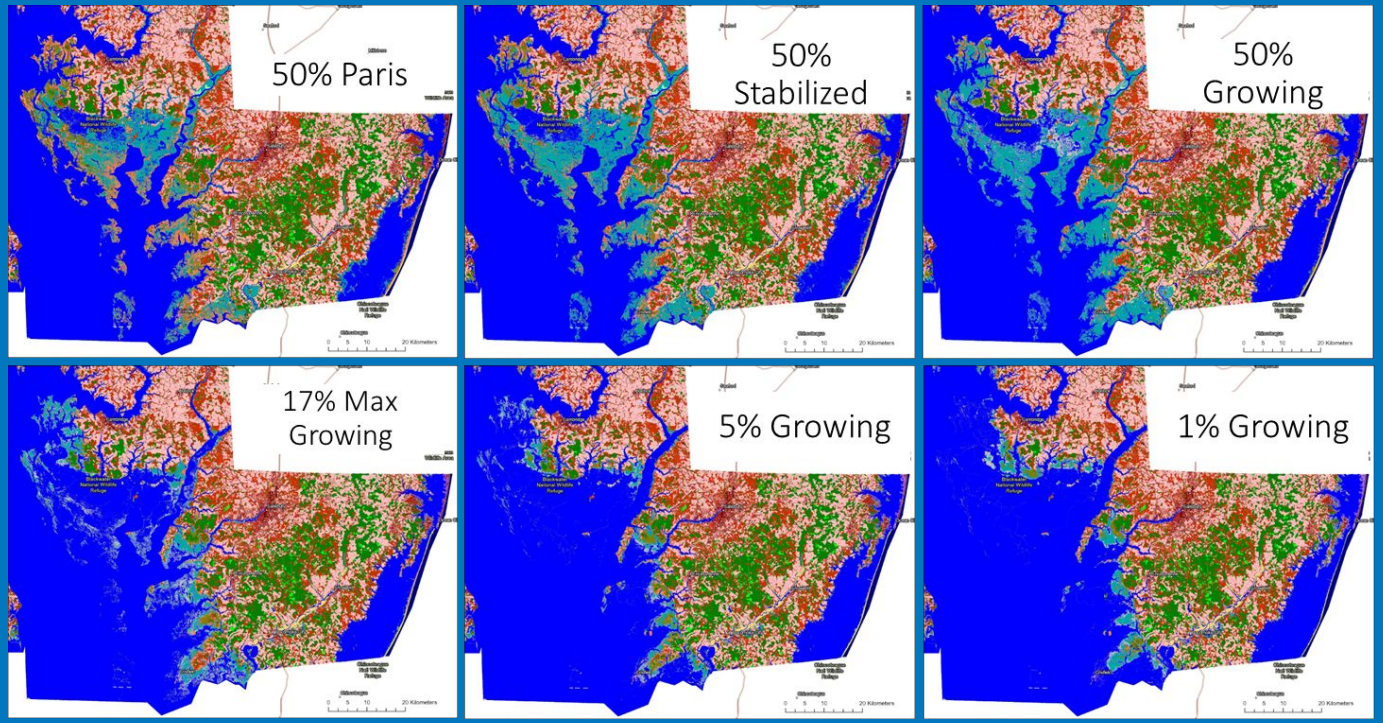


Sea Level Affecting Marshes Model rerun using 6 sea level rise scenarios



Sea Level Affecting Marshes Model rerun using 6 sea level rise scenarios

Decadal timestep 2100



SLAMM Inputs

- Wetlands: from National Wetland Inventory
- Elevation: LiDAR-based DEMs (except for Aberdeen)
- Tidal range: developed from NOAA tide gauge data
- Dikes and impoundments: NWI, National Levee Database, site-specific examples
- Erosion: available shoreline change data from VIMS and MGS
  - Spatial averages excluding protected shorelines
- Accretion: elevation change based on SET data
- **SLR is the only stressor**

Resulting Layers (11 vs. 1)

Sea Level Affecting Marshes Model SLAMM by 2100

Sea Level Affecting Marshes Model SLAMM by 2070

Sea Level Affecting Marshes Model SLAMM by 2050

Wetland Adaptation Areas 2100

Wetland Adaptation Areas 2070

Wetland Adaptation Areas 2050

Wetland Adaptation Areas Index 2100

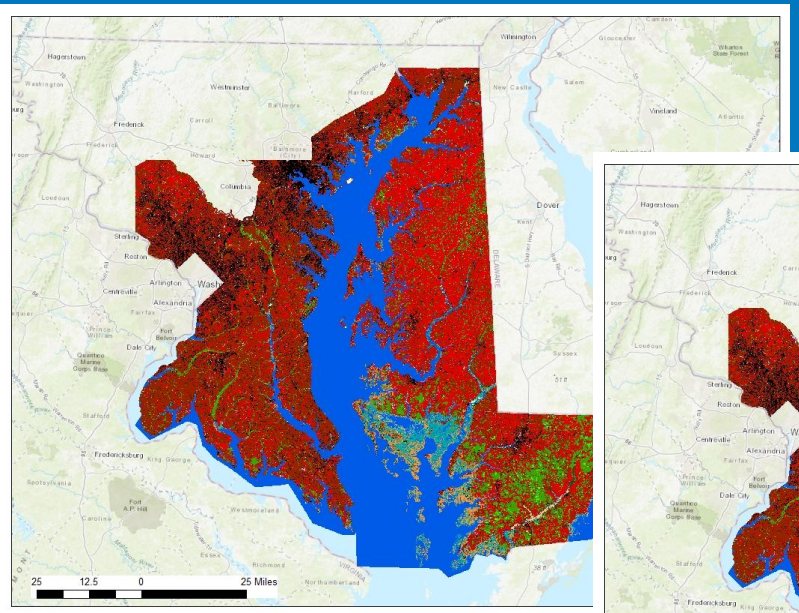
Uplands to Wetlands in 2100

Drowned Lands in 2100

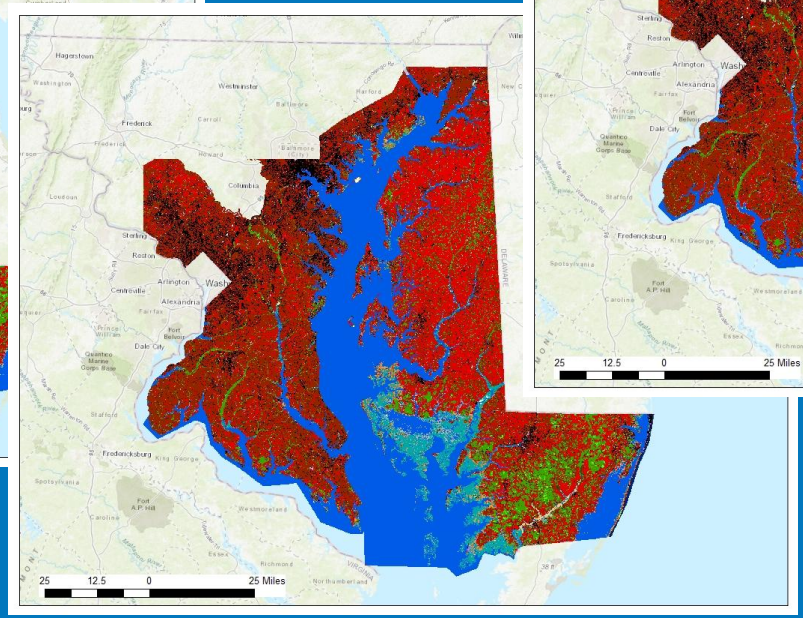
Drowned Lands in 2070

Drowned Lands in 2050

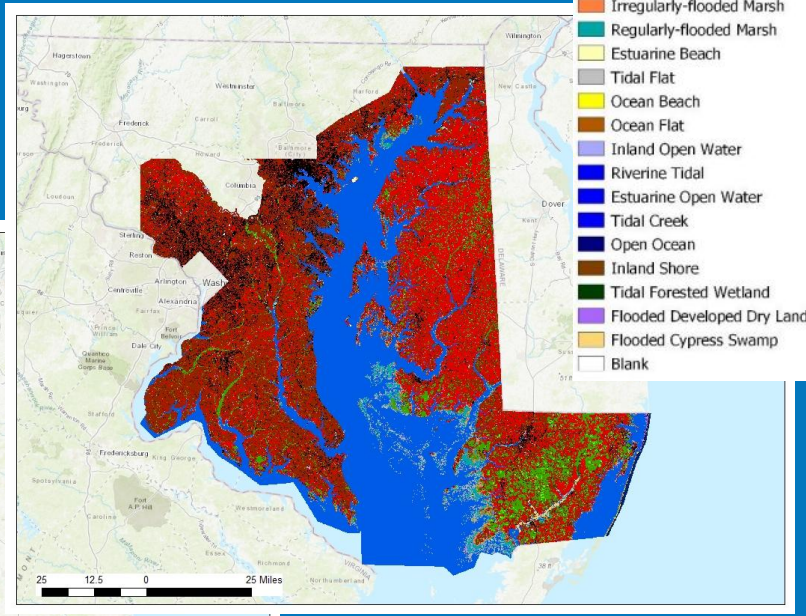
SLAMM Results for chosen scenario 2050, 2070, & 2100



2050



2070



2100

Wetland Adaptation Areas

NEW!

Dataset visualizes the areas projected to be wetlands in 2050, 2070, and 2100 (both upland conversion and persistent wetlands)

- 2050 represents a rise of 1.37ft
- 2070 represents a rise of 2.32ft
- 2100 represents a rise of 4.03ft

Upland to Wetlands

NEW!

instances of wetland conversion under 4.03 feet of sea level rise (SLR), under a scenario of rising greenhouse gas emissions with a probability of at least 17%, using reported base sea levels in the year 2010

Wetland Adaptation Areas Index

Is it a wetland in 2100?

10

+

2100 wetland size

15

+

Green infrastructure

10

+

Hydric soils

15

+

BioNet

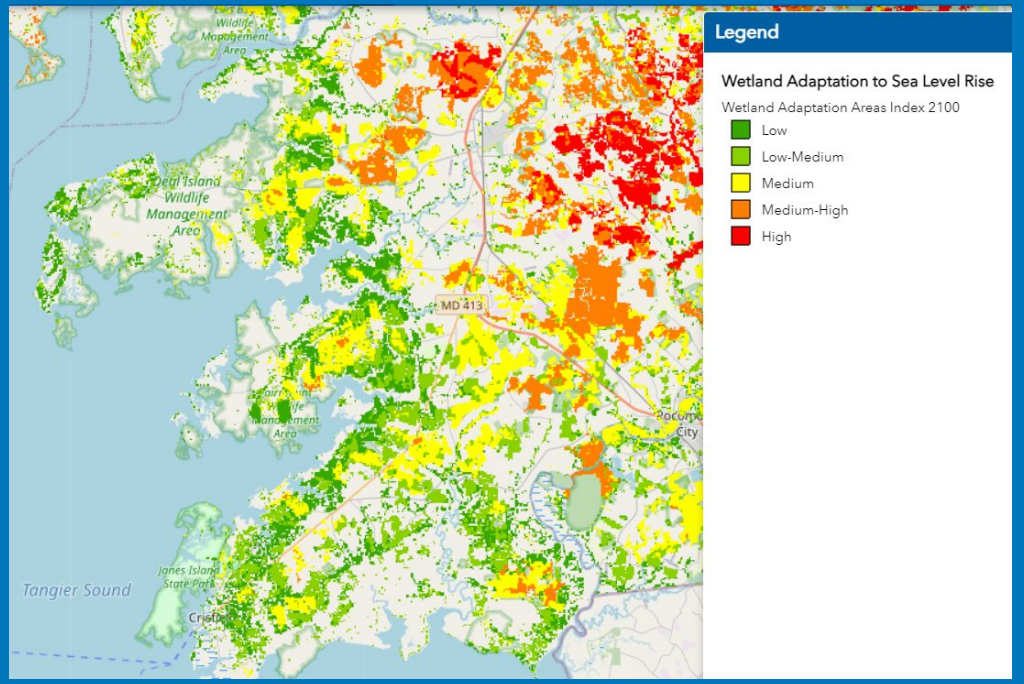
10

=60

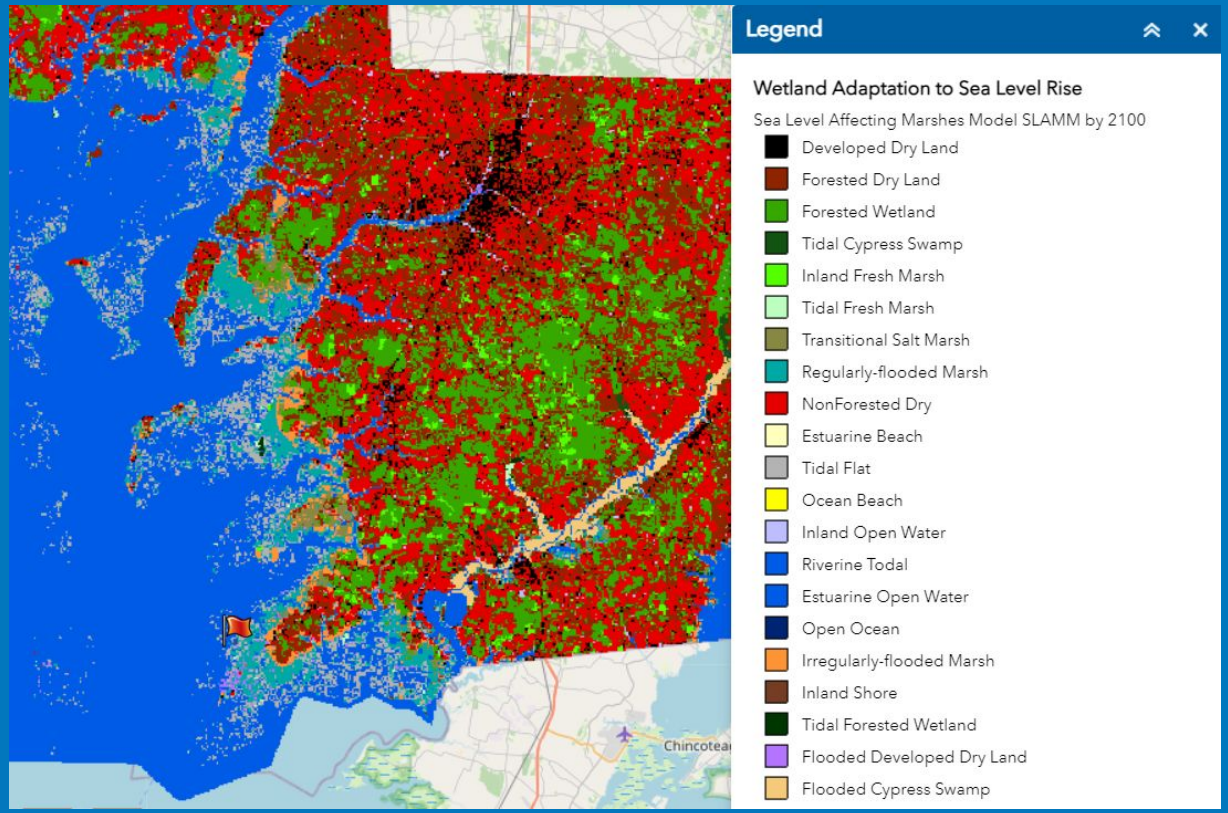
Some symbols courtesy of UMCES IAN ian.umces.edu

WAA Index 2100

- The index ranks future wetlands by their potential for providing high quality habitat
- Footprint of entire layer has the same ‘likelihood’ of wetlands present by 2100



SLAMM- Land Cover Classifications

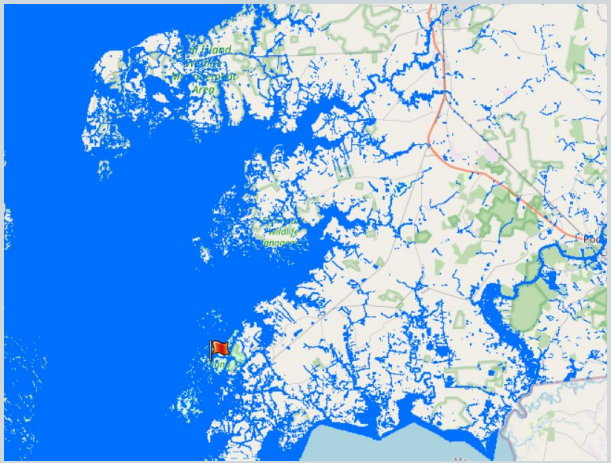


- SLAMM data was also used to create “Drowned Lands” layer = open water

Drowned Lands

2050

1.37ft



2070

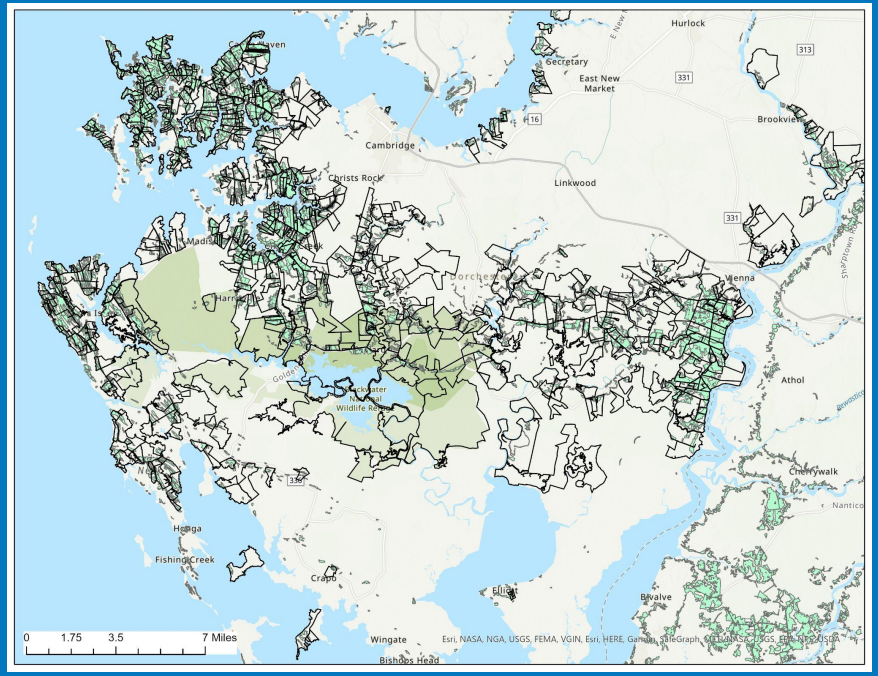
2.32ft

2100

4.03ft

How will the new data be used?

- Targeting of parcels for conservation
- Reviewing proposals on Grants Gateway
- Wetland Adaptation Strategy & Marsh Protection Index

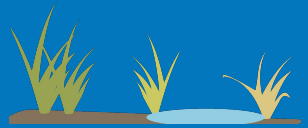


a new Marsh Protection Index

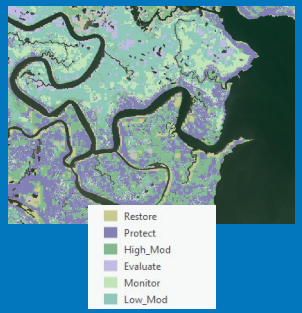
- Measuring a marshes ability to protect vulnerable communities from coastal hazards
- We hope to use results of this index creation to prioritize areas for preservation and restoration on the landscape

the Marsh Protection Index

Marsh health

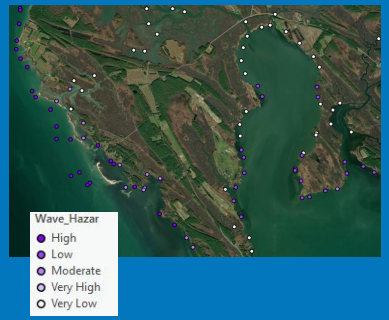


USGS Prism (UVVR)

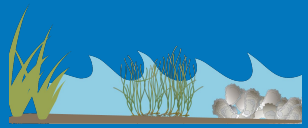


Proximity or exposure to hazards

DNR Hazard Index

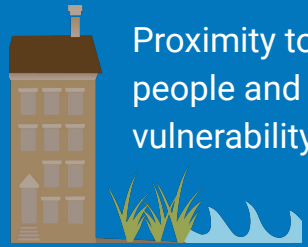


Proximity to other habitats

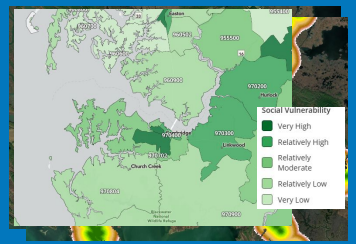


SAV, Benthic Habitat (Oysters), Dunes, Forests

Proximity to people and vulnerability

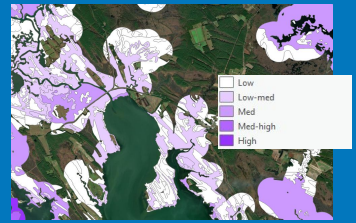


Social vulnerability
Population Density

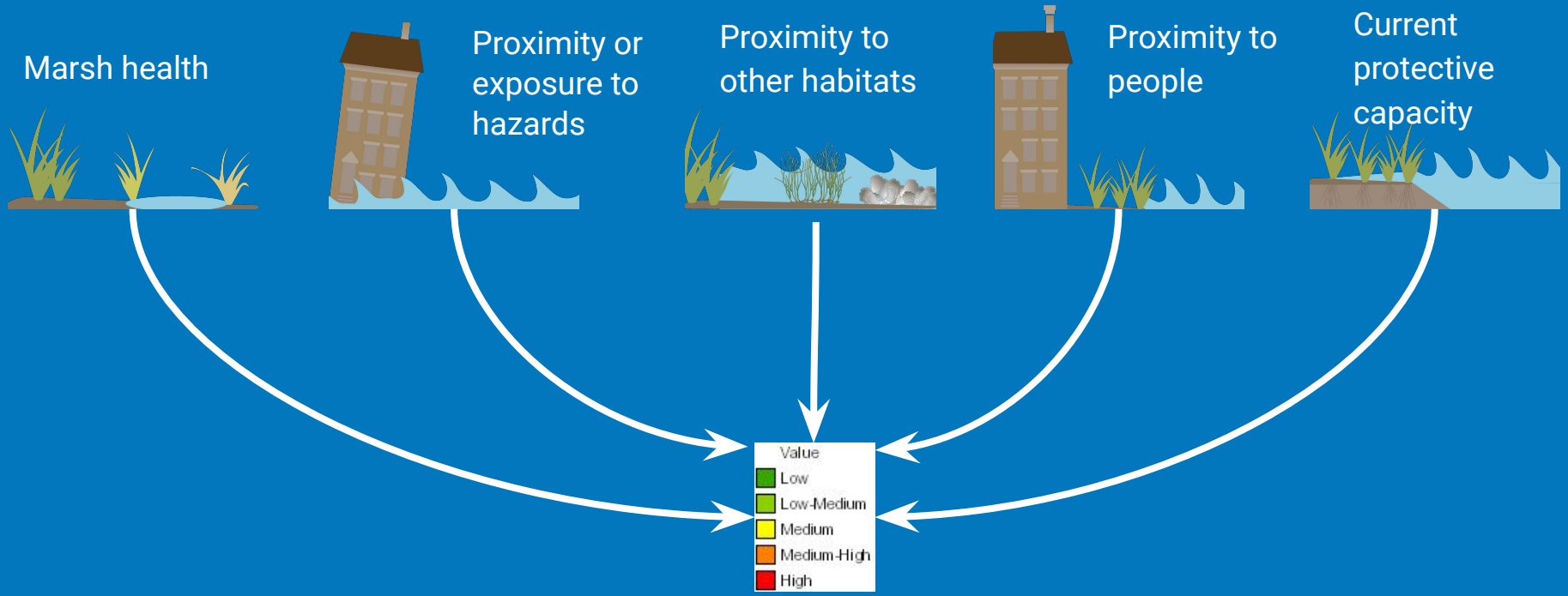


Current protective capacity

George Mason EESLR Modeling + Marsh Size



the Marsh Protection Index



DNR will receive **$43 Million** through EPA CPRG

Afforestation & Improved Forestry Management

- Restore 500 acres of Atlantic white-cedar, bald-cypress, shortleaf pine, and other trees on public and private lands
- Improved forestry management on at least 1,000 acres
- Regional forestry management plans

Blue Carbon

- Restore 200 acres of marsh
- Restore 400 acres of living shorelines that protect marshes
- Restore the tidal connectivity of 400 acres of marshes
- Using conservation easements and Coastal Resilience Management Plans, work with private landowners to plan for wetland transition or actively restore wetlands on their property (100 plans, 50 acres of restoration)

Community Engagement

- Project liaisons
- Meeting compensation