Maryland's Ecological Effects of Sea Level Rise Project

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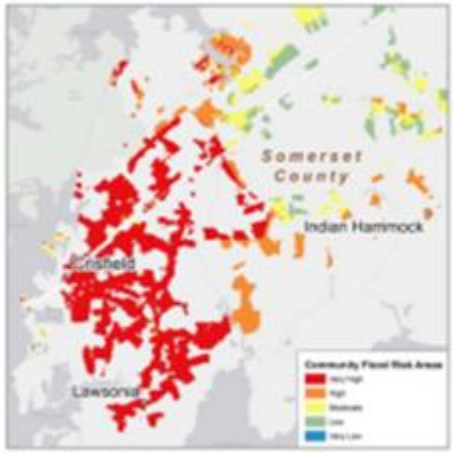
EESLR Overview

- Multidisciplinary research program
  - inform coastal managers of local coastal vulnerability & solutions to mitigate flood risk
- Collaborative science model
  - integrates stakeholder input to ensure relevancy, applicability & value to coastal managers

Project Goals

- Quantify the benefits of natural & nature-based features (NNBF)
- Inform conservation & management under future sea level rise scenarios

Photo Credit – Sherrieson Sternberg DNR Photo Contest 2014



Significant parts of Somerset County are at "very high" risk for coastal flooding.

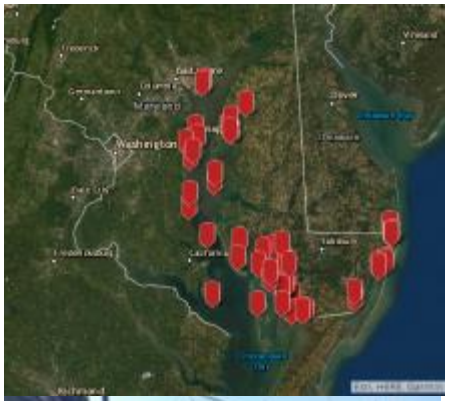
Objectives

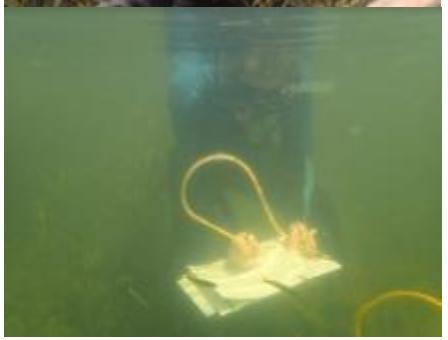
1. Enhance understanding of flood protection capacity & performance of NNBF under extreme & chronic events
2. Increase understanding of statewide flood protection capacity of NNBF under current conditions & future SLR scenarios
3. Quantify NNBF benefits for current and future SLR scenarios & integrate into Maryland's natural resource management
4. Work with regional, state & local stakeholders to:
   - Develop conservation & management recommendations to preserve or elevate the protective benefits of NNBF
   - Enhance resiliency of Maryland's vulnerable coastal communities

Objective 1

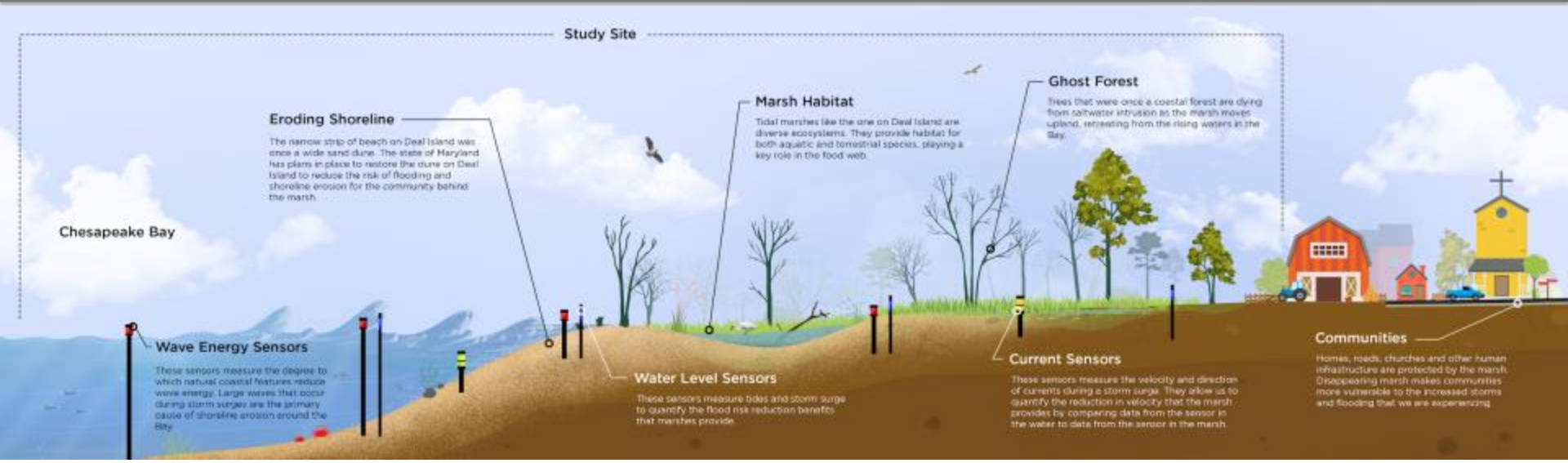
Enhance understanding of flood protection capacity & performance of NNBF under extreme & chronic events

1. Site Selection
2. Field-based NNBF and Nearshore Habitat Monitoring
3. Field-based Hydrodynamic Monitoring





Field Setup



Wave Sensor

Water Level Sensor

Currents Profile (ADCP)

Objective 2

Increase understanding of statewide flood protection capacity of NNBF under current conditions & future SLR scenarios

1. Evaluate statewide buffering capacity of NNBF
2. Evaluate SLR Impacts to NNBF
3. Evaluate Buffering Capacity of NNBF under Future SLR conditions

Coastal Flooding Modeling Framework

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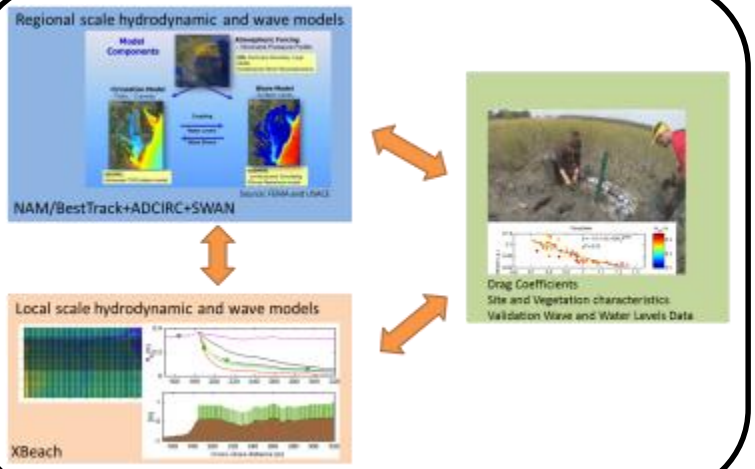
Scenarios

- Sea-level rise
- Extreme events
- Marsh migration and conservation
- Management actions

Costal Flood Hazards Models



State-wide coastal protection information

Scenario-based simulations that compare the benefits of various management actions

GEORGE MASON UNIVERSITY

Anticipated Outcomes & Products

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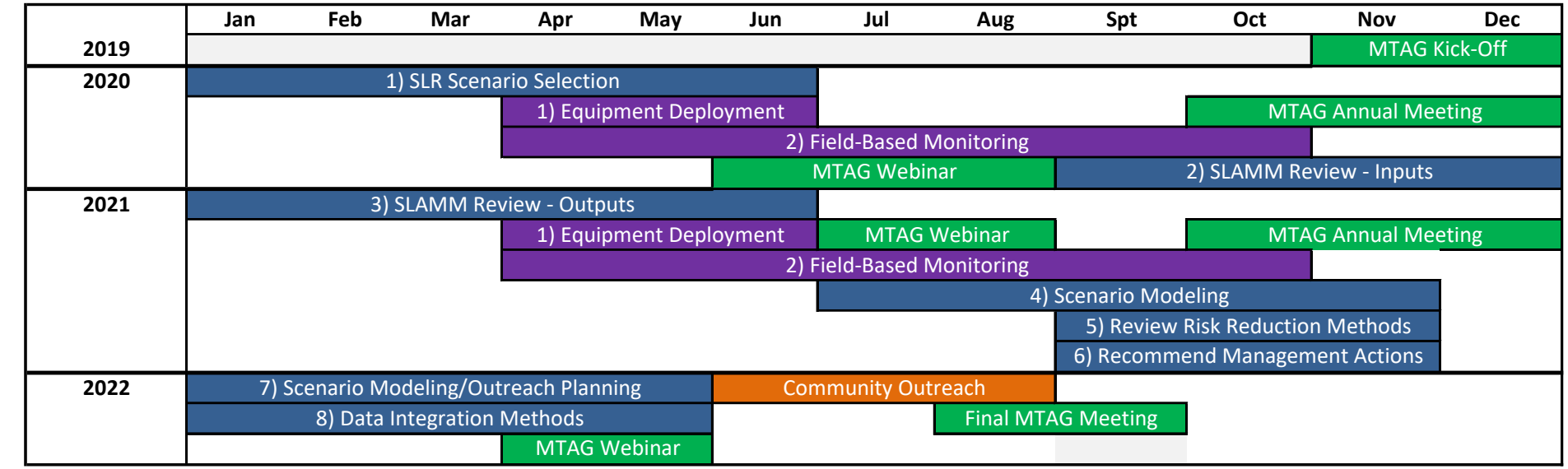
- Site-level biological & hydrodynamic characterizations
- Spatial datasets
- Updated statewide conservation & restoration targeting tools
- Management recommendations for priority areas as sea levels rise
- Communication materials

Chesapeake Bay Environmental Center, MD (Credit Janine Harris)

Where are we now?



Workgroups

Field Work

MTAG Meetings

Outreach

Proposed Workgroups

- Sea Level Rise (March/April 2020)

Review state SLR projections and scenarios and make recommendations for SLR projections/scenarios to include within the EESLR project. (Ex: Timeframes, probabilities, emission pathways, tide gauges)

Year	Emissions Pathway	Central Estimate 50% probability SLR meets or exceeds:	Likely Range 67% probability SLR is between:	1 in 20 Chance 5% probability SLR meets or exceeds:	1 in 100 Chance 1% probability SLR meets or exceeds:
2030		0.6 ft	0.4 – 0.9 ft	1.1 ft	1.3 ft
2050		1.2 ft	0.8 – 1.6 ft	2.0 ft	2.3 ft
2080	Growing	2.3 ft	1.6 – 3.1 ft	3.7 ft	4.7 ft
	Stabilized	1.9 ft	1.3 – 2.6 ft	3.2 ft	4.1 ft
	Paris Agreement	1.7 ft	1.1 – 2.4 ft	3.0 ft	3.2 ft
2100	Growing	3.0 ft	2.0 – 4.2 ft	5.2 ft	6.9 ft
	Stabilized	2.4 ft	1.6 – 3.4 ft	4.2 ft	5.6 ft
	Paris Agreement	2.0 ft	1.2 – 3.0 ft	3.7 ft	5.4 ft
2150	Growing	4.8 ft	3.4 – 6.6 ft	8.5 ft	12.4 ft
	Stabilized	3.5 ft	2.1 – 5.3 ft	7.1 ft	10.6 ft
	Paris Agreement	2.9 ft	1.8 – 4.2 ft	5.9 ft	9.4 ft

Sea level Rise Projections for Maryland 2018, Baltimore tide-gauge. Projection probabilities for different time horizons and emissions pathways.

Proposed Workgroups

- Living Shoreline (Spring/Summer 2020)
  Discuss options for living shoreline monitoring. Discuss living shoreline types and MTAG priorities. Make recommendations for living shorelines to monitor that would inform management or practitioner decision-making.
- Marsh Model (Fall 2020 – Spring 2021)
  Review SLAMM inputs and outputs for marsh model
- SAV Model (Fall 2020 – Spring 2021)
  Review SLAMM inputs and outputs for SAV model
- Risk Reduction (2021)
  Inform methods for quantifying risk reduction.

Proposed Workgroups

- **Management Actions (2021)**
  Identify and review proposed management actions for scenario modeling (ex. living shorelines, thin-layer sediment placement, marsh restoration, green vs. gray solutions).
- **Data Integration (2022)**
  Discuss data integration options for state targeting models. Identify other data integration opportunities. How best can model outputs be integrated into existing decision-making tools? How should data be used? How should data not be used?
- **Scenario Modeling/Community Outreach (2022)**
  Identify scenarios of interest (storm events and management strategies) based on focus areas, SLR scenarios, and management actions list. Identify stakeholders and make outreach recommendations. Participate in outreach meetings as is relevant.

Discussion

1. SLR Workgroup Participation (March-April)

2. Where can this project inform other decision-making tools/processes?

3. How would ARWG like to be engaged moving forward?

Questions?

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