

The Nature
Conservancy



Sea Level Affecting Marshes Model (SLAMM) SAV Component

Ecological Effects of Sea Level Rise Project

SAV Workgroup Meeting

March 14, 2022



warren
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consulting, inc.

EESLR Overview



National Centers for Coastal Ocean Science

Ecological Effects of Sea Level Rise



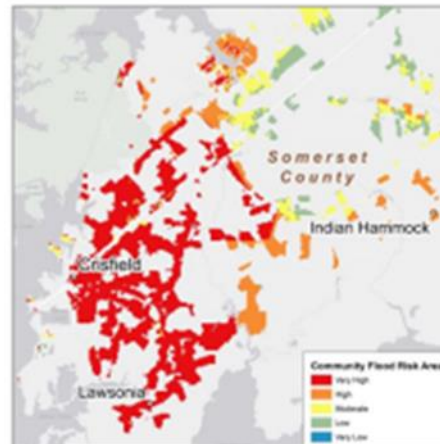
- **Multidisciplinary research program**
 - inform coastal managers of local coastal vulnerability & solutions to mitigate flood risk
- **Collaborative science model**
 - integrates stakeholder input to ensure relevancy, applicability & value to coastal managers

EESLR Project Goals

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



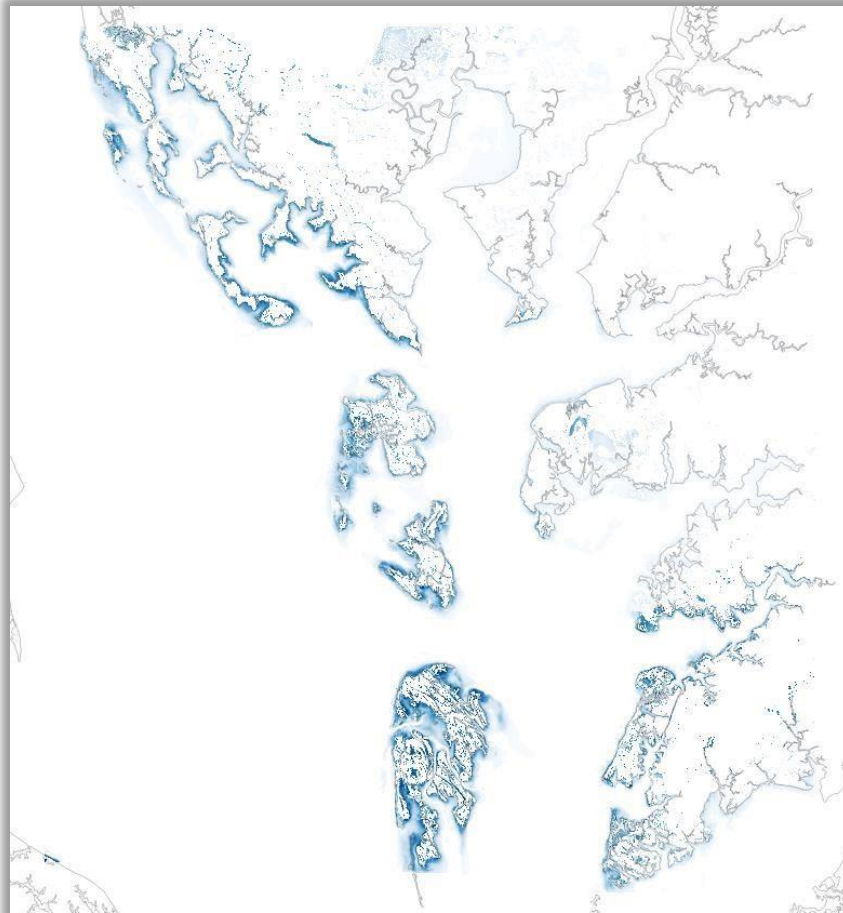
Photo Credit – Sherrievon Sternberg DNR Photo Contest 2014



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



SAV Model Development

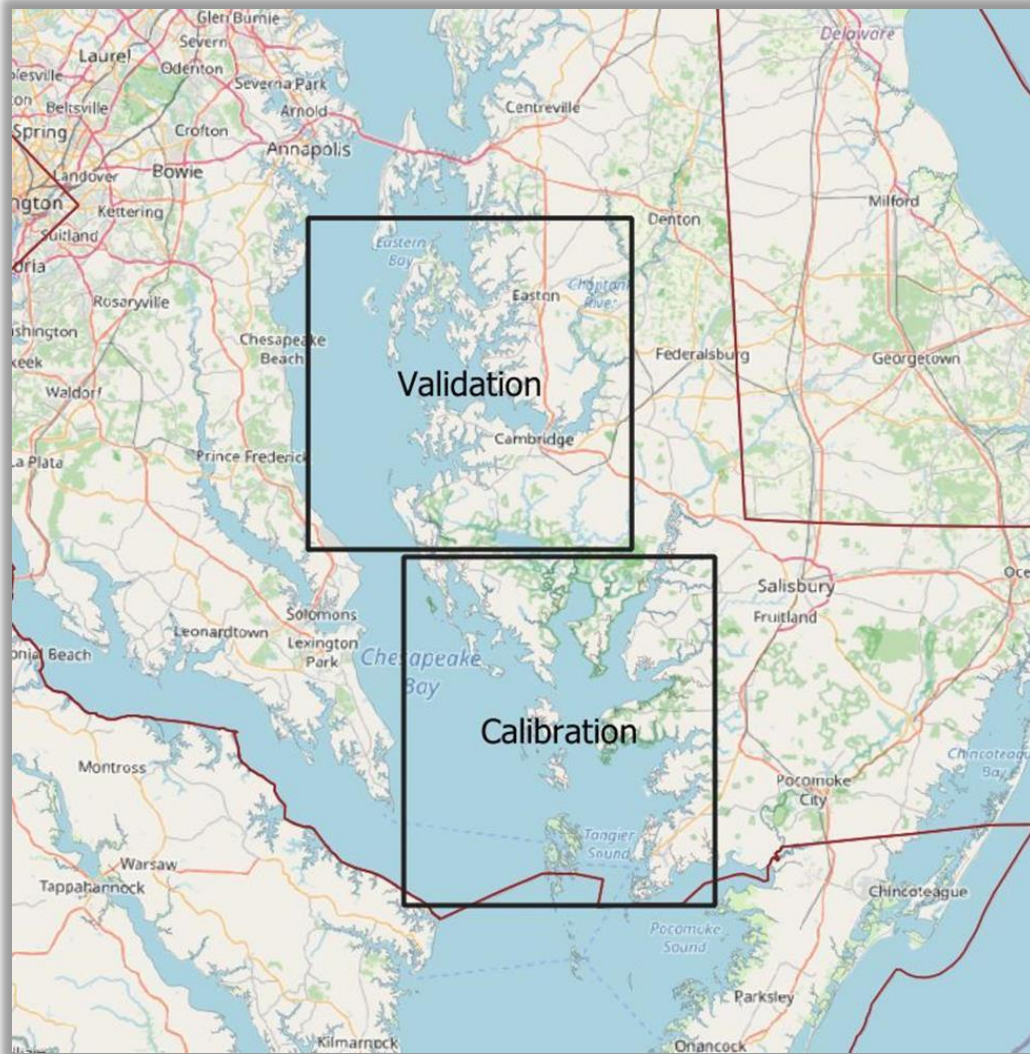


This project was a test of, and refinement of the SAV component of the Sea Level Affecting Marshes (SLAMM) model

The SLAMM SAV model uses a generalized linear model (GLM) as a general modeling approach

The model predicts a percent likelihood of SAV presence

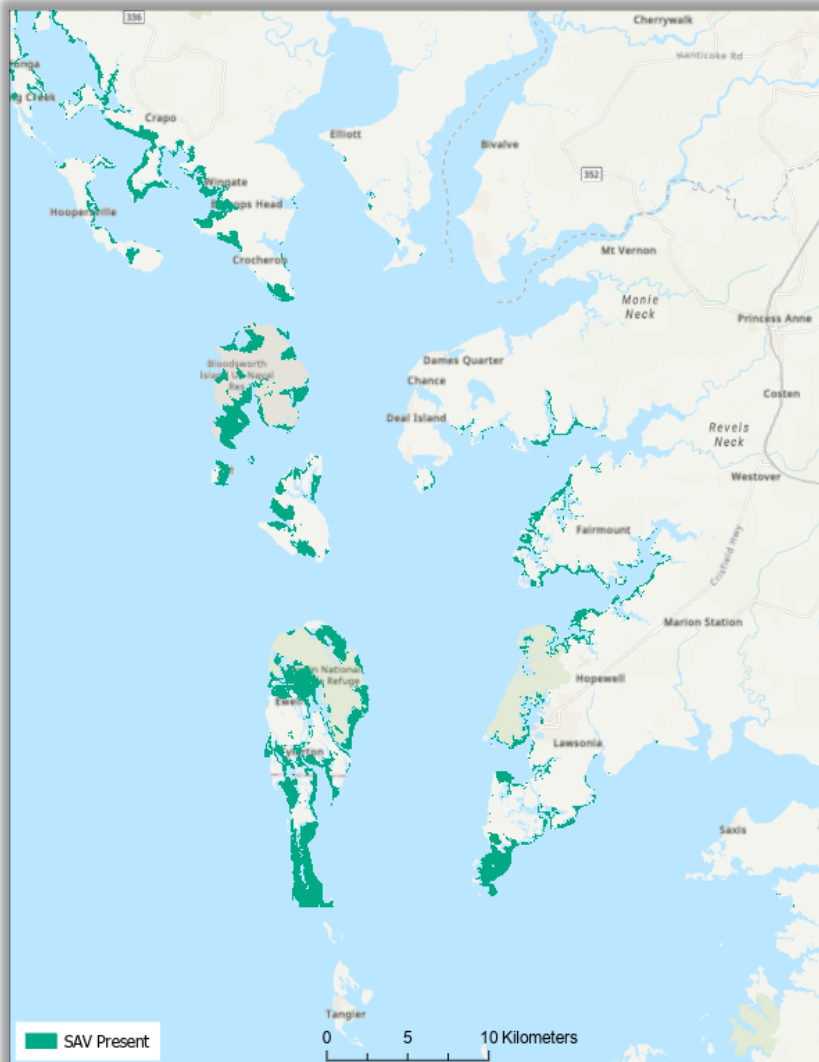
Model Locations



Calibration Area –
Tangier Sound

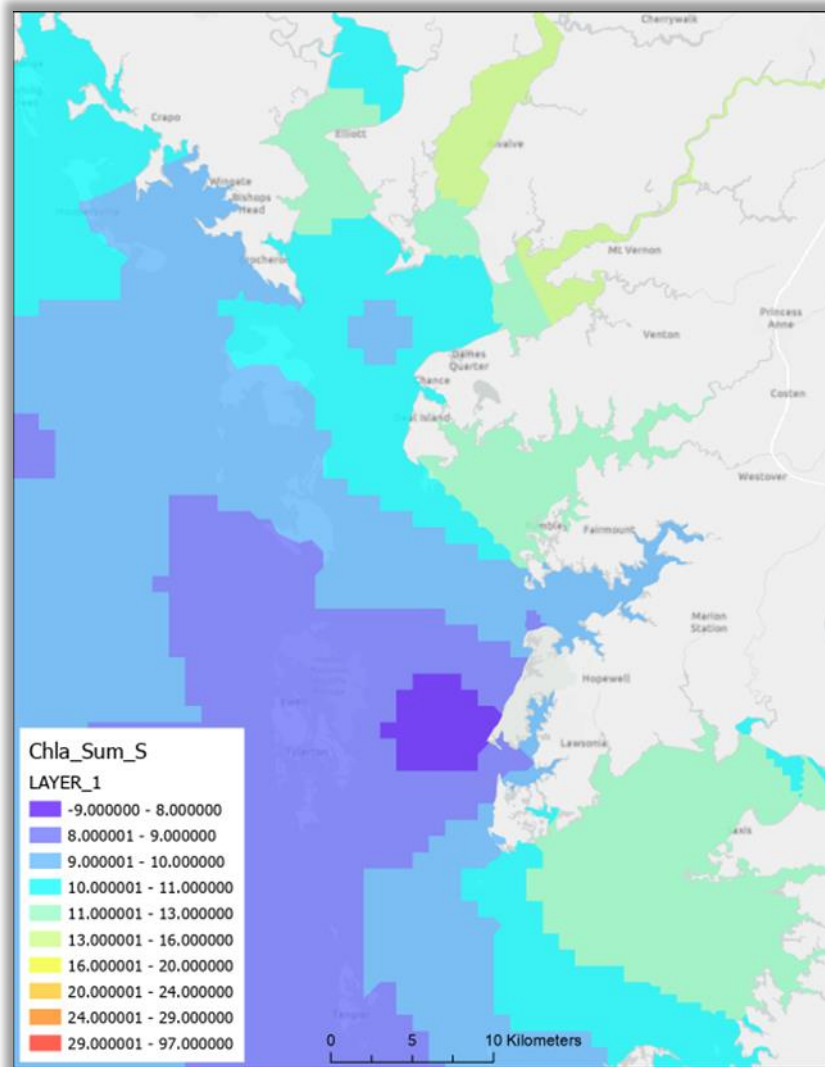
Validation Area –
Choptank River

Spatial Input Data - SAV distribution



- VIMS SAV Survey Data
- SAV present in at least 7 out of 10 previous years (2010-2019) or present in the most recent year (2019).

Spatial Input Data – Habitat Conditions



Three primary inputs:

- Physical properties
- Water velocity
- Water quality

Model Projections – Sea-Level Rise Scenarios



| <u>Year</u> | <u>SLR since 2010</u> | <u>Projection scenario</u> |
|-------------|---------------------------|---|
| <u>2010</u> | <u>0 m</u> | <u>Current conditions</u> |
| <u>2040</u> | <u>0.42 m</u> | <u>1% probability, stabilized emissions</u> |
| <u>2050</u> | <u>0.42 m</u> | <u>Upper limit of likely range, growing emissions</u> |
| <u>2070</u> | <u>1.05 m</u> | <u>1% probability, growing emissions</u> |
| <u>2100</u> | <u>1.98 m</u> | <u>1% probability, growing emissions</u> |

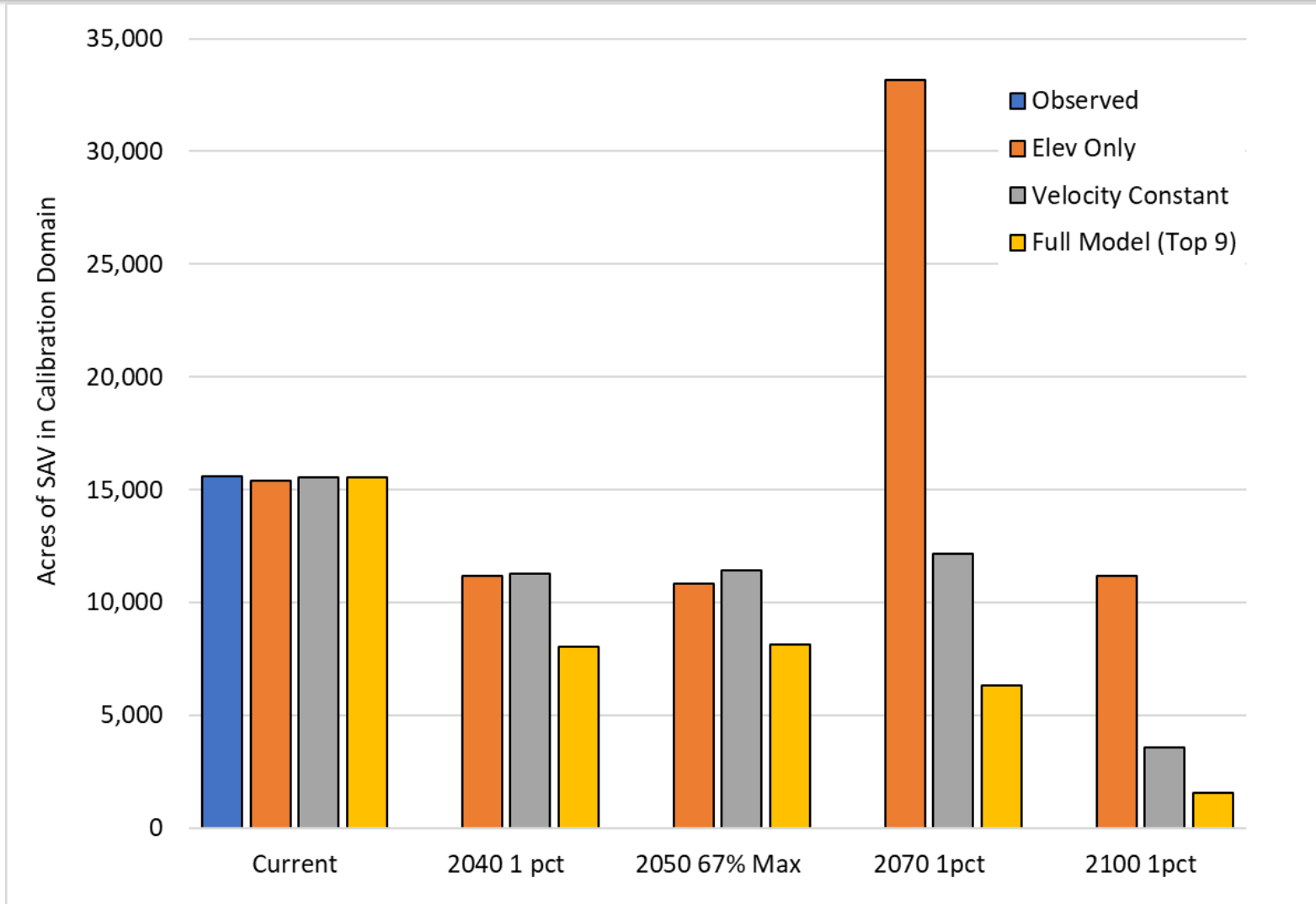
Model Projections



Model projections were run in three different ways:

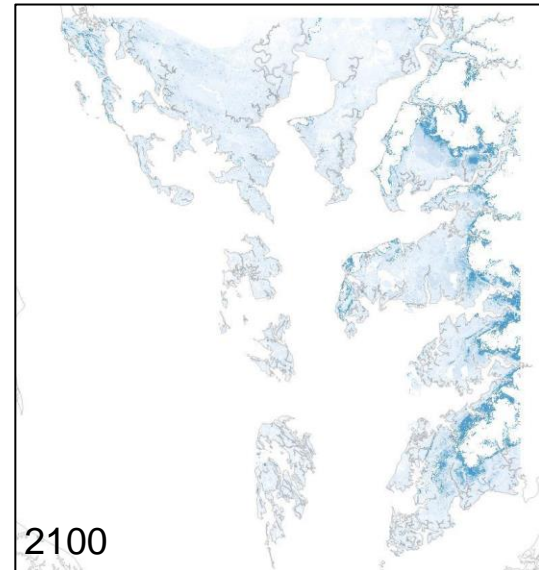
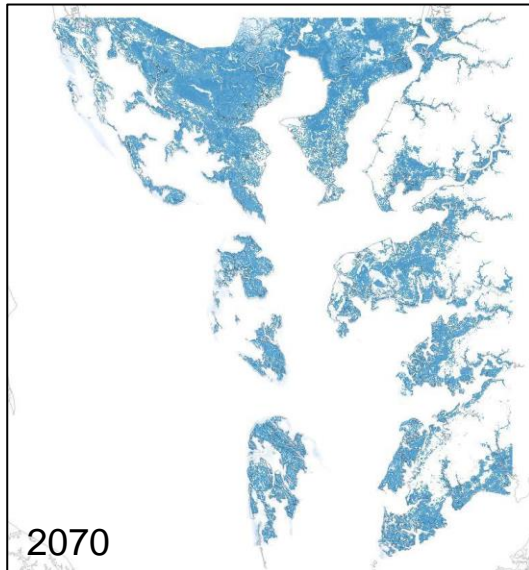
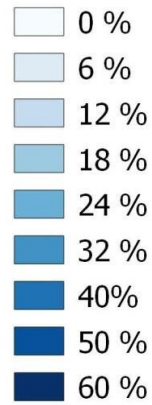
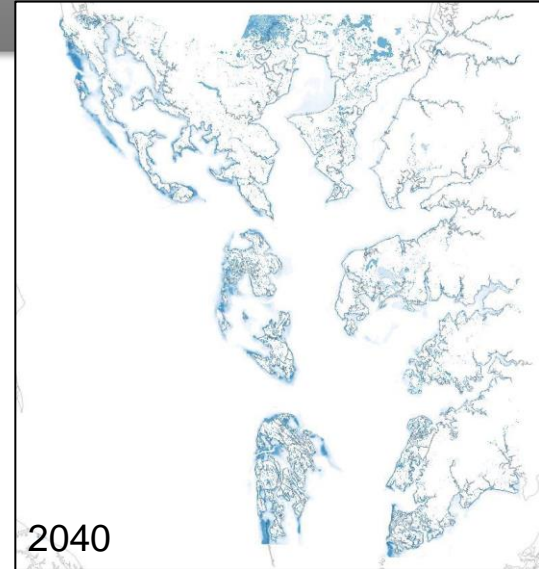
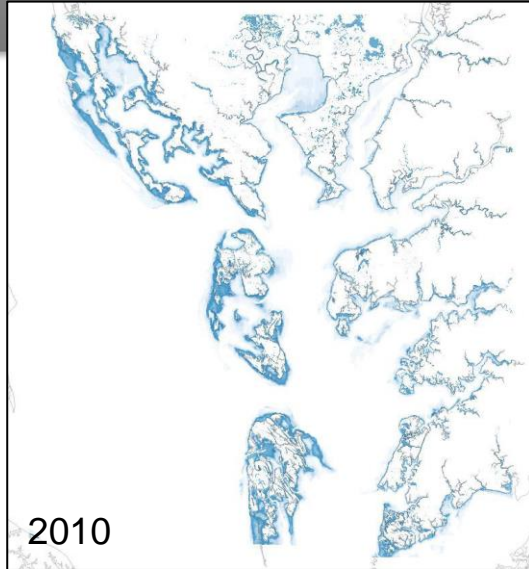
1. A model incorporating "elevation only" was run to see where potential SAV habitat could open up on the basis of bed elevation/water depth
2. A model keeping "velocity constant" was run to see where potential SAV elevation habitat were not predicted to be colonized on the basis of water-quality data
3. A full model projection was run incorporating elevation, water quality, and future predicted changes in water velocity

Model Results - Tangier

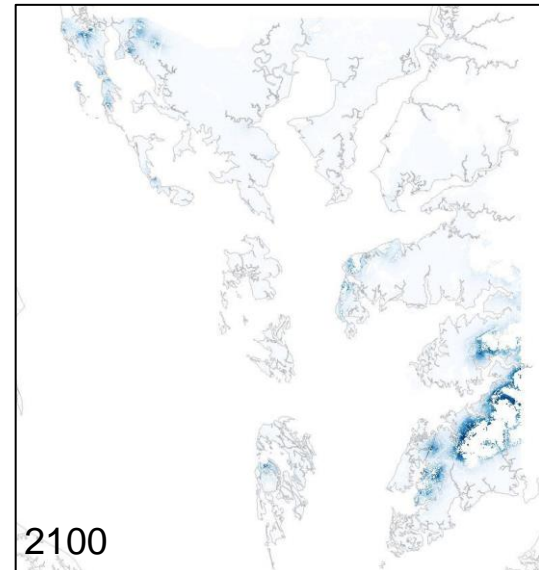
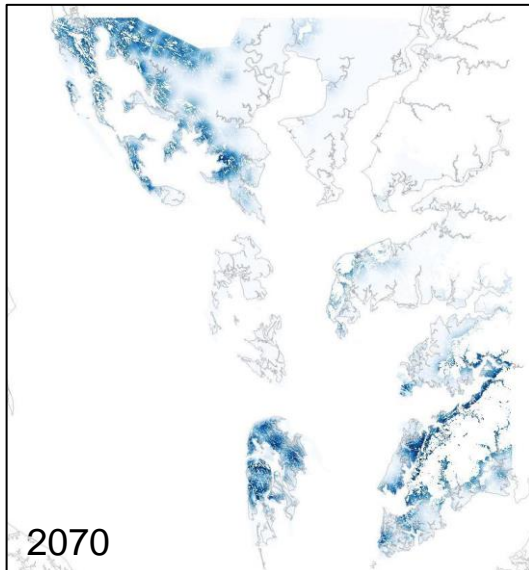
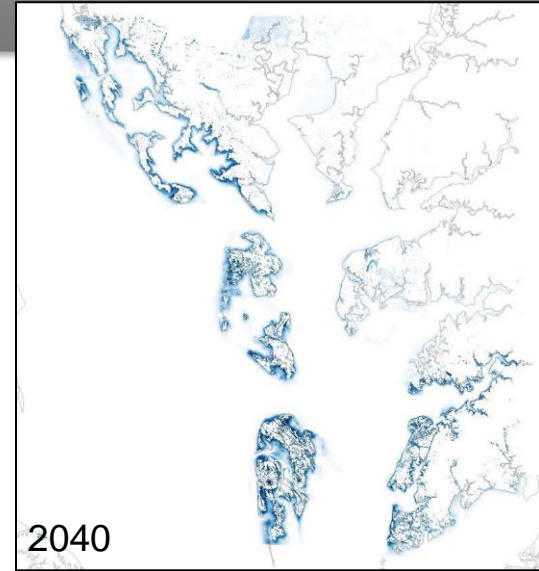
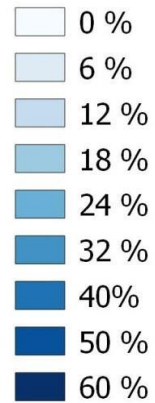
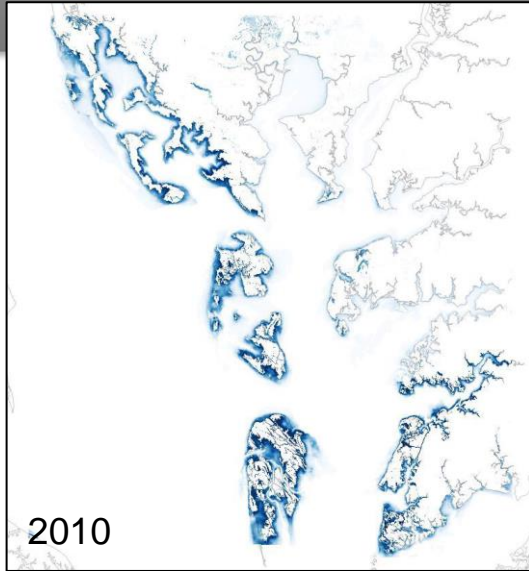


Model Results – Tangier

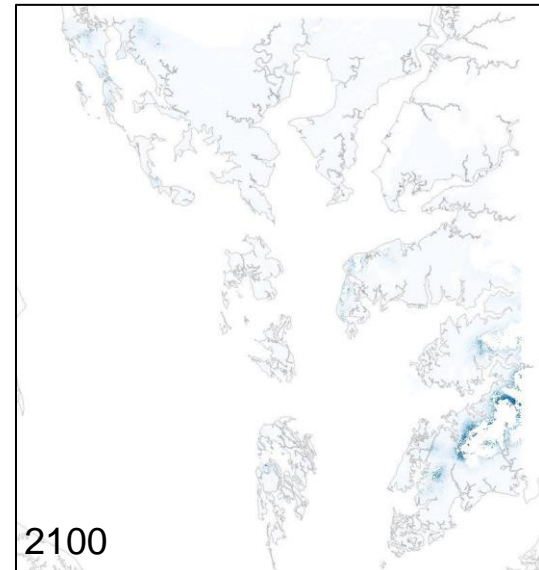
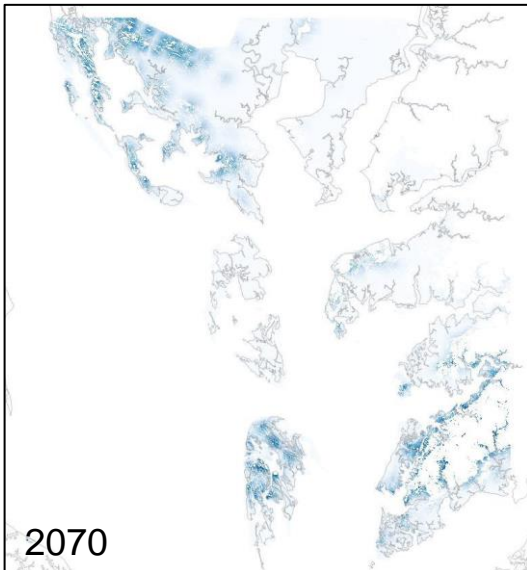
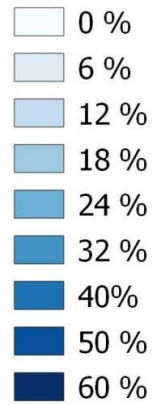
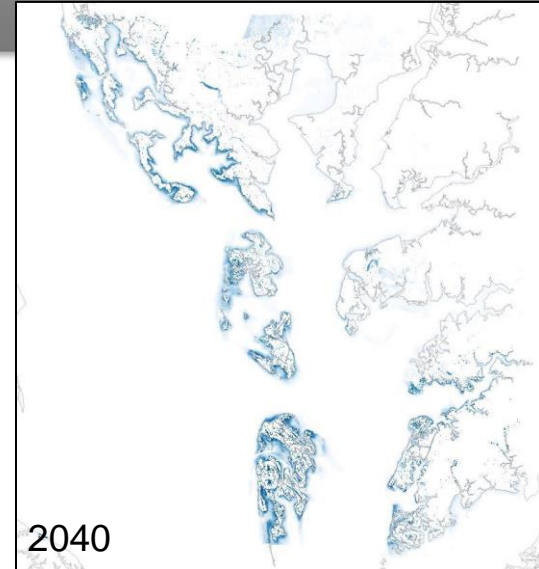
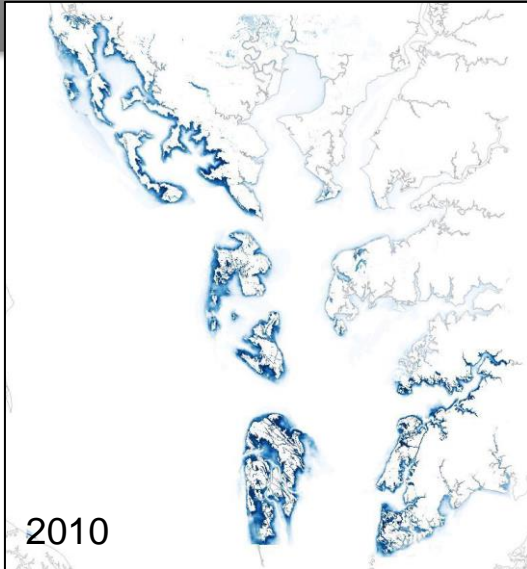
SLR only



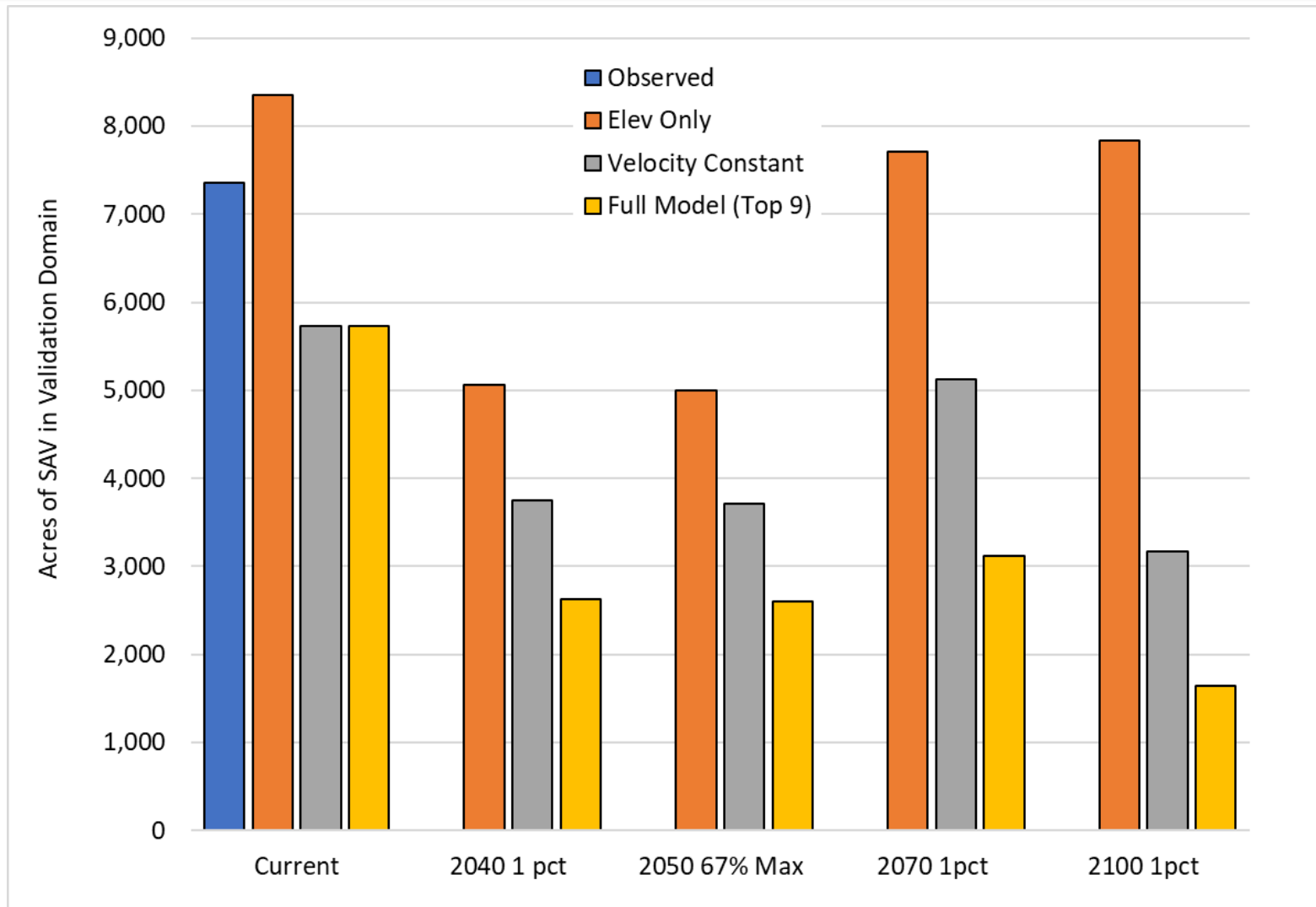
Model Results – Tangier velocity constant



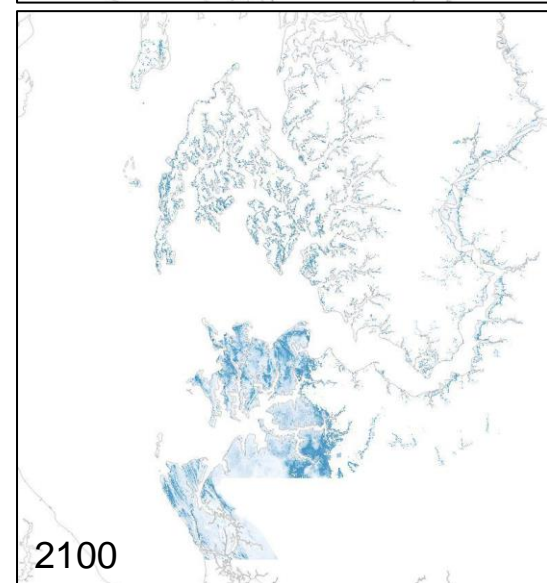
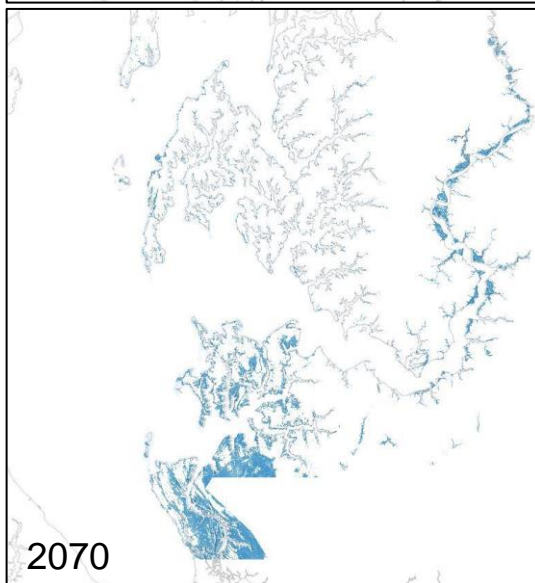
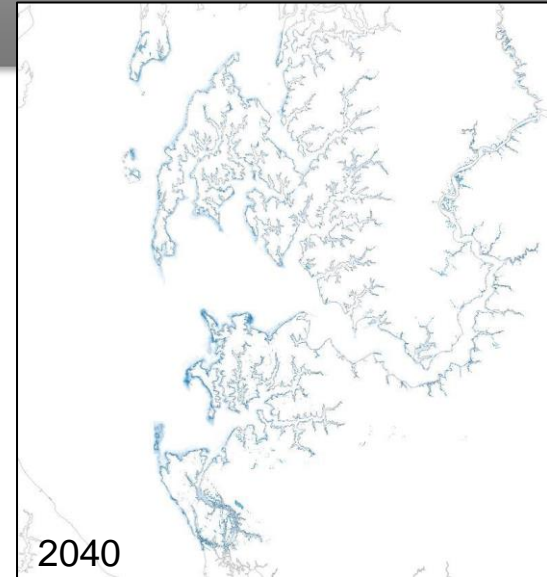
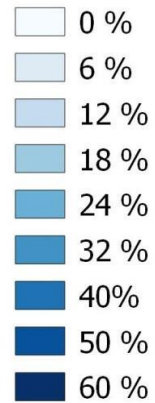
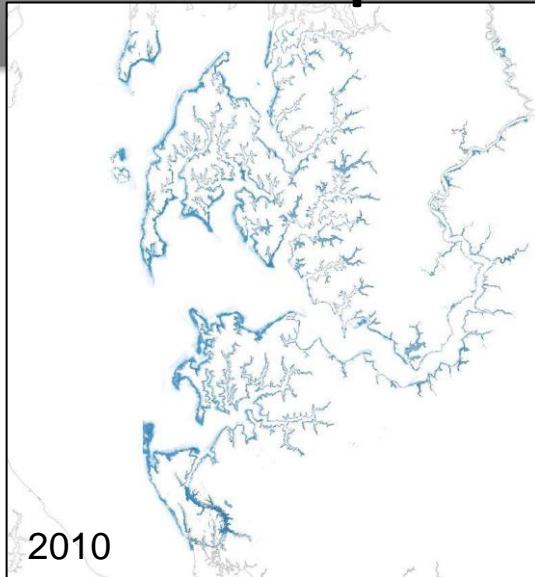
Model Results – Tangier full model



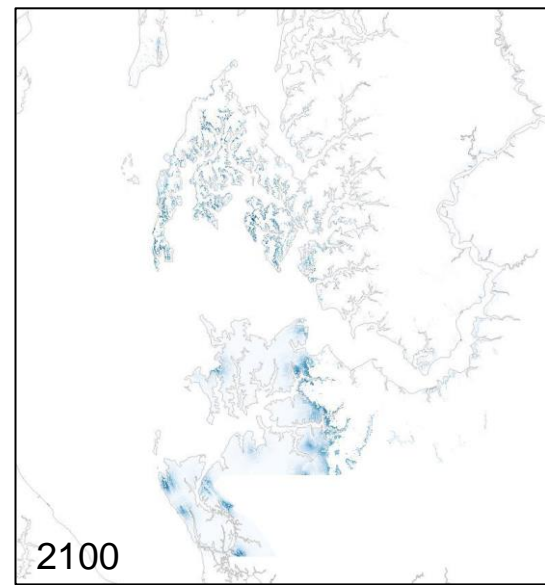
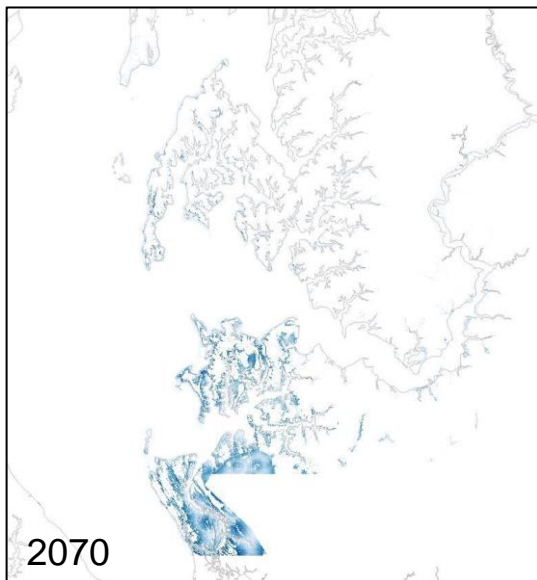
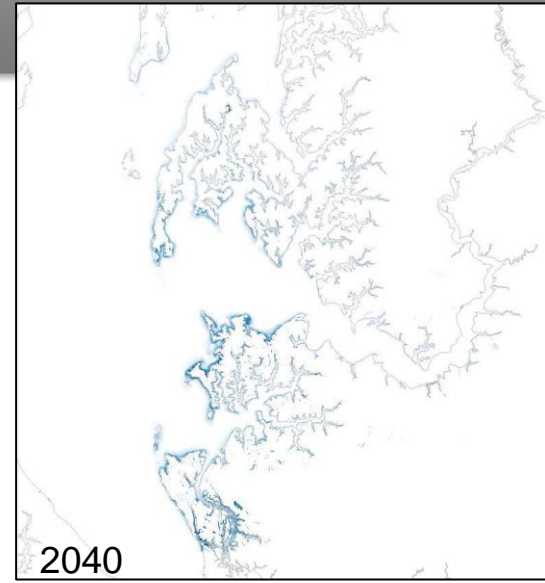
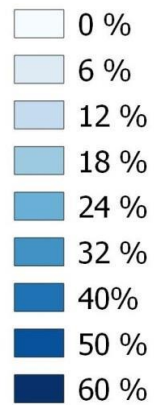
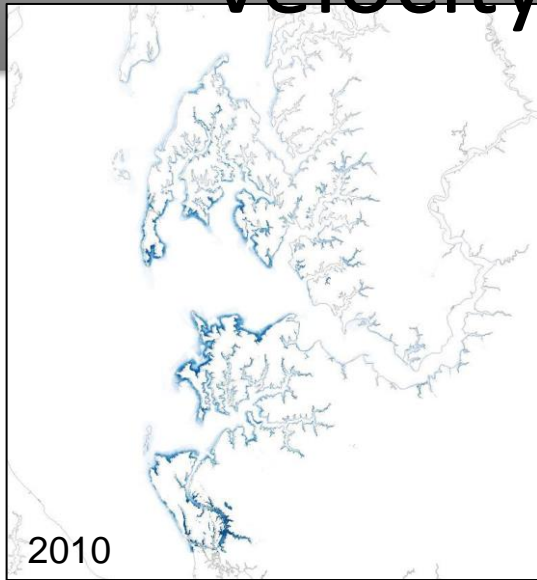
Model Projections - Choptank



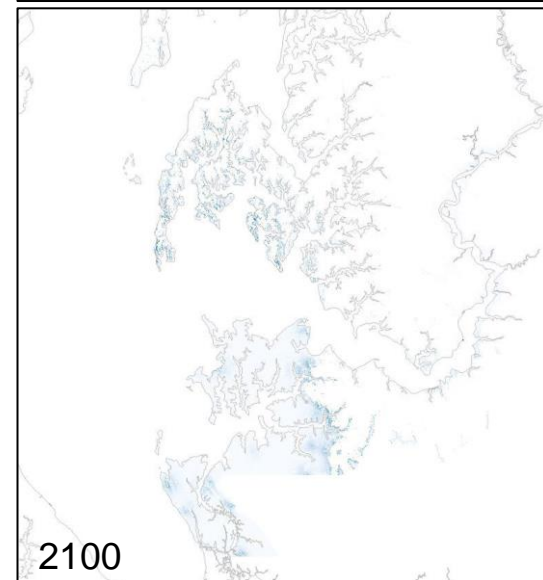
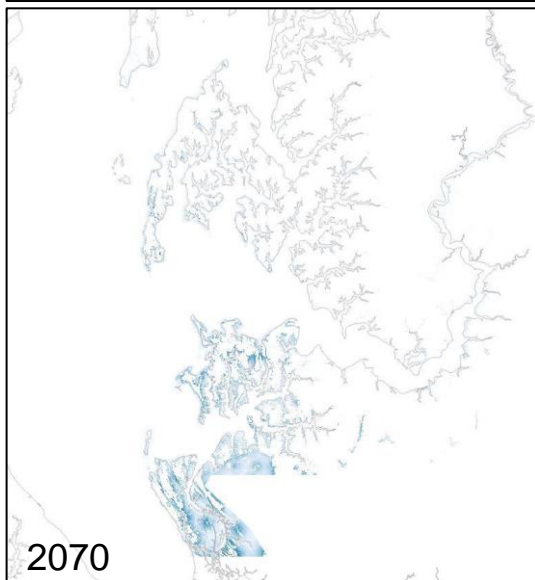
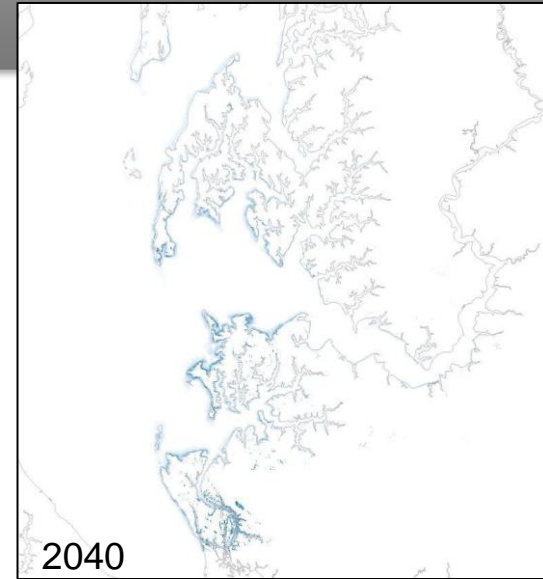
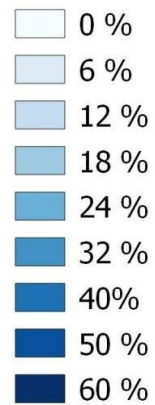
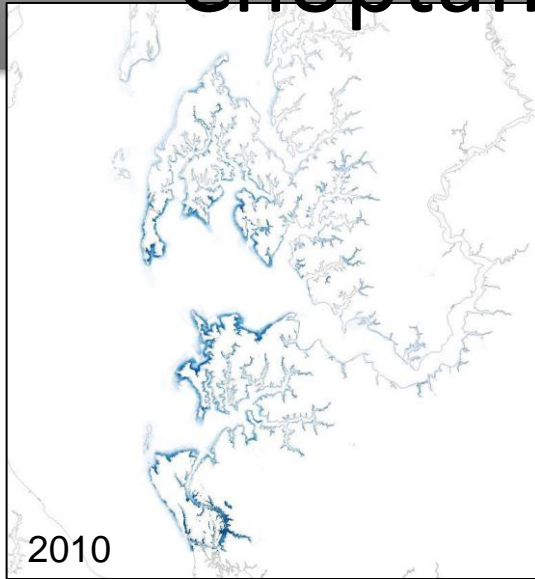
Model Results – Choptank SLR only



Model Results – Choptank velocity constant



Model Results – Choptank full model



Discussion & Next Steps



- Initial Thoughts? Feedback? Surprises?
- Application of results to SAV management actions
- Connections to SAV restoration goals
- Recommendations for integration with other projects or management applications
- Potential Next Steps
 - Improvements for this model (future water quality)
 - Expand to other segments

Acknowledgements



EESLR SAV Workgroup

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