

Vulnerability of the VDWR's Coastal Assets to Sea Level Rise



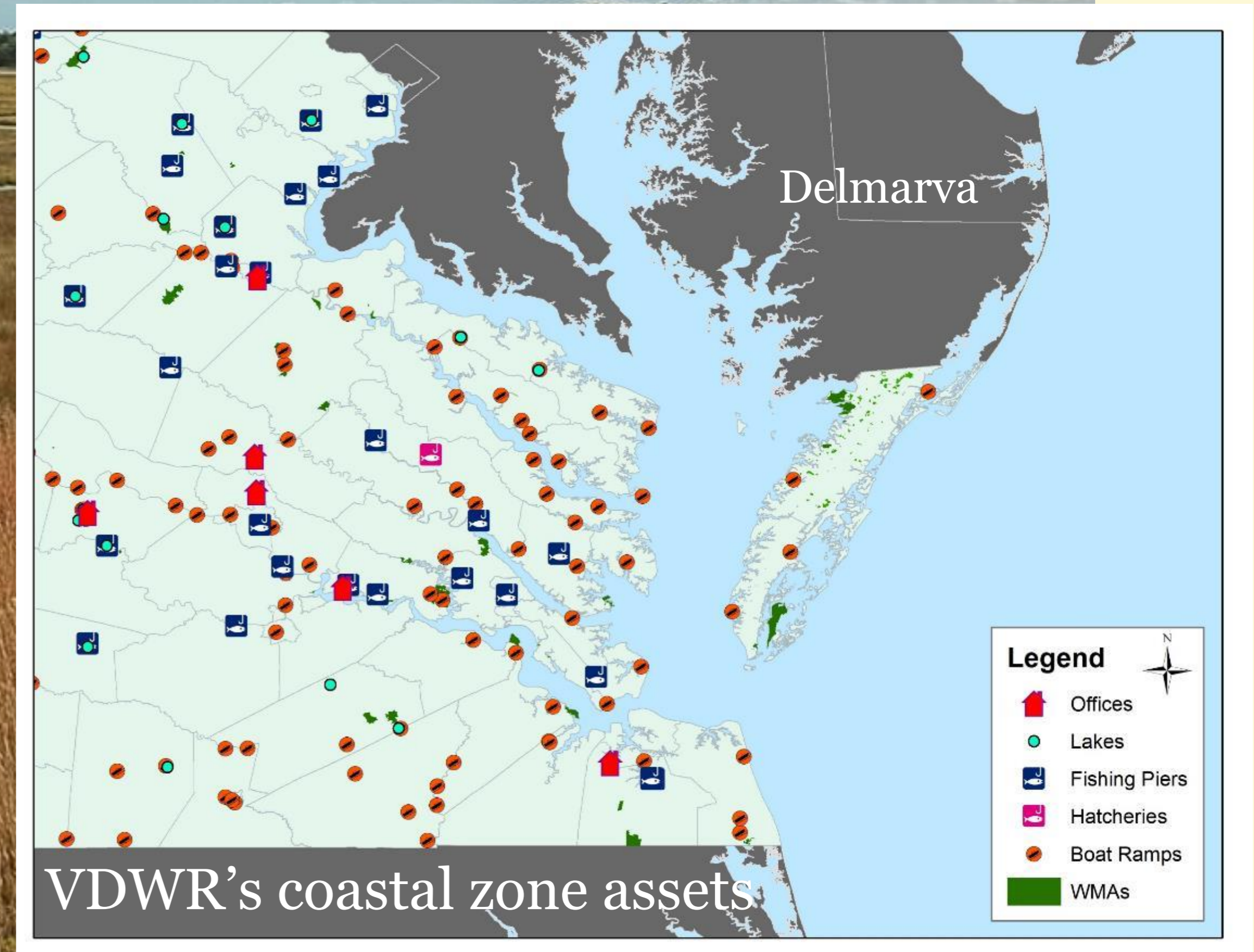
CONSERVE. CONNECT. PROTECT.

The Liabilities of Asset Ownership

Statewide, VDWR manages:

- ~225,000 acres in WMA
- Hundreds of boat ramps + fishing piers
- Dozens of lakes/reservoirs
- Nine fish hatcheries
- 10 offices + many other structures

Assets + Climate Change = Potential for
overwhelming maintenance & liability



A vulnerability assessment enables the DWR to...

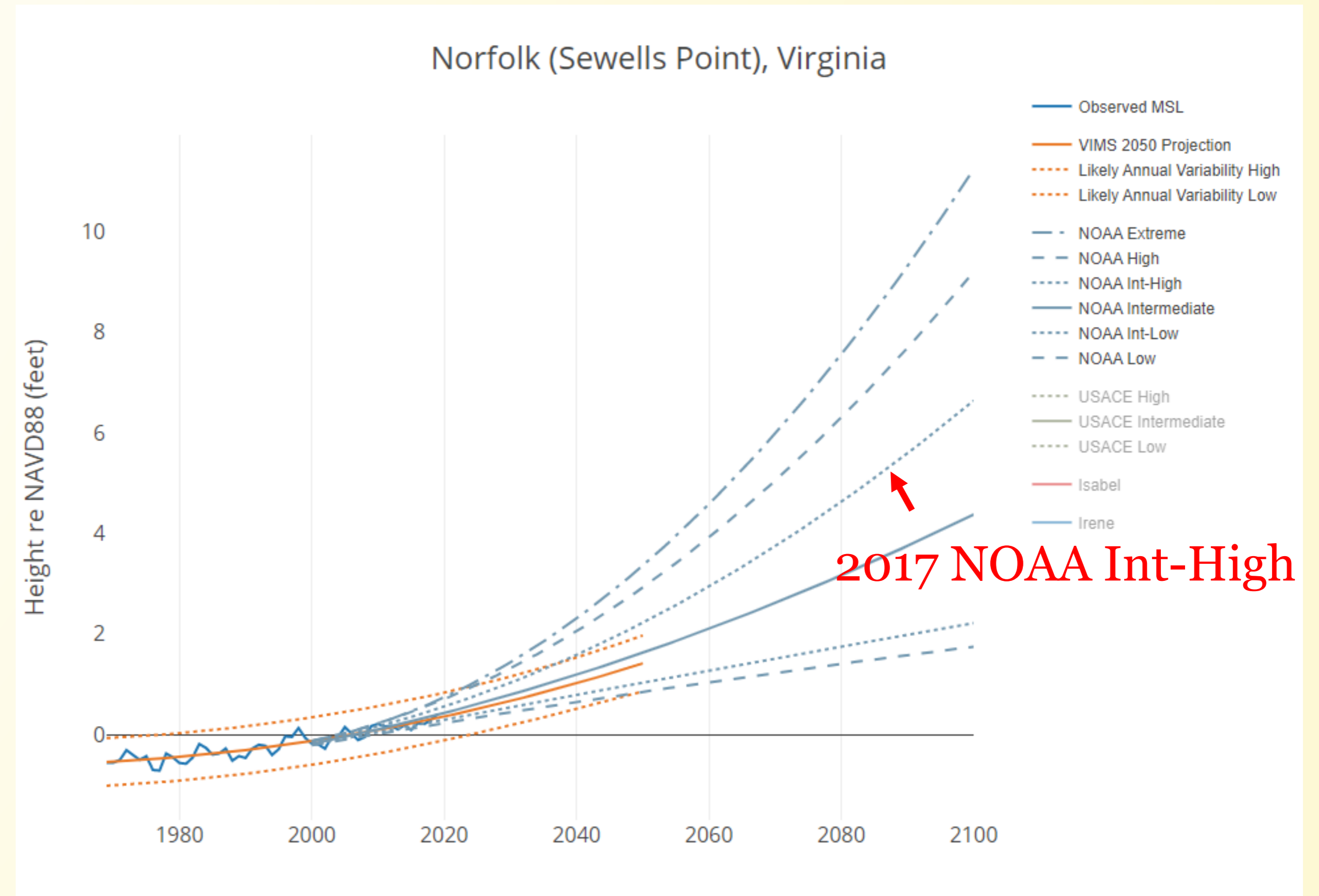
- identify what is at stake and when
- inform constituents well in advance of projected loss in assets
- ensure wise and strategic future investments of conservation dollars

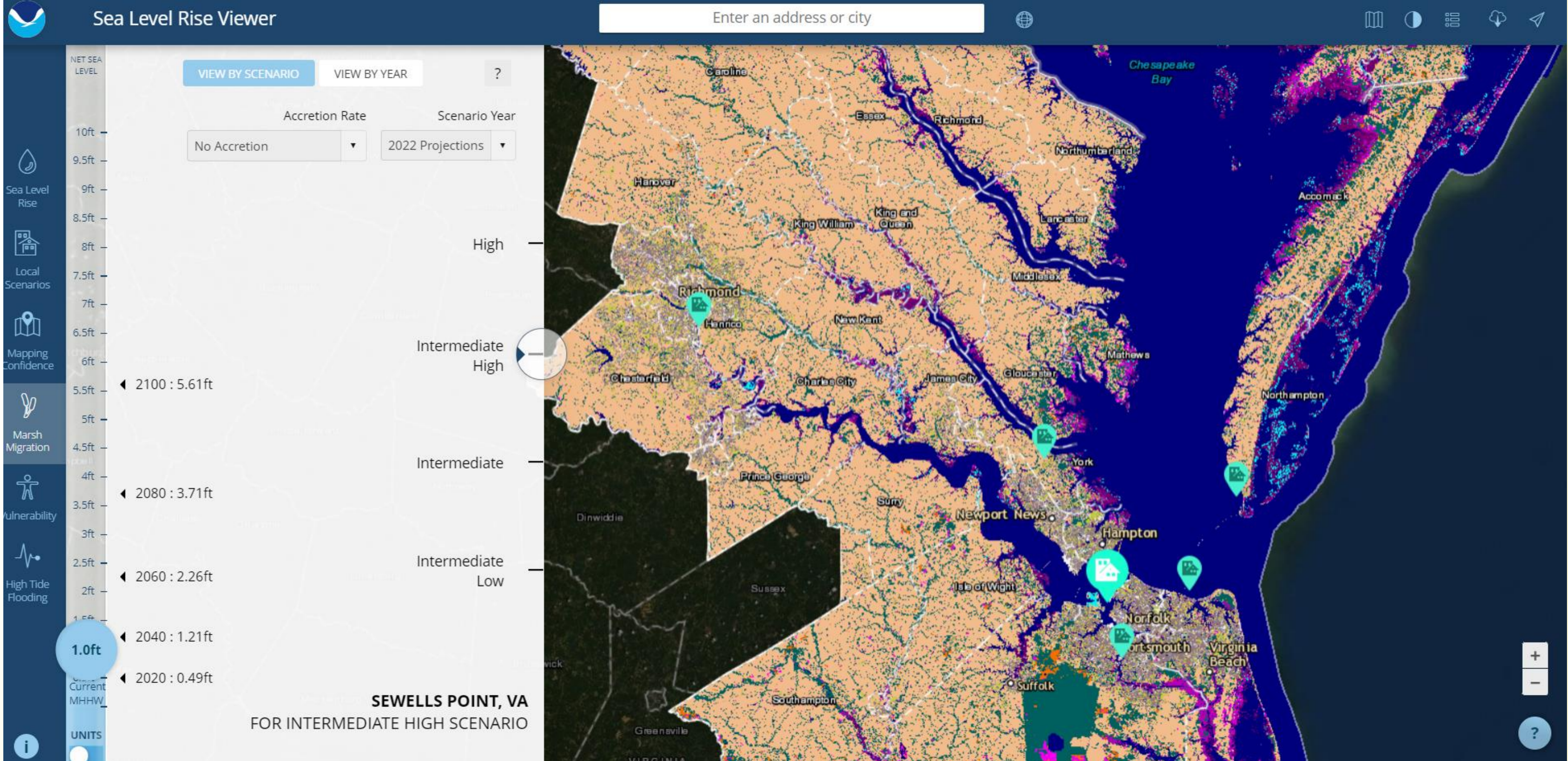


Christian Hall, 09/13/2022, Gloucester Point Boat Ramp Inundation



Our approach (model selection)





2022 NOAA Int-High marsh migration tool – submitted to the Fourth National Climate Assessment by the SLR and Coastal Flood Hazards Scenarios and Tools Interagency Task Force



Objective #1

Determine which coastal assets are expected to be “*impacted*” by SLR by 2080

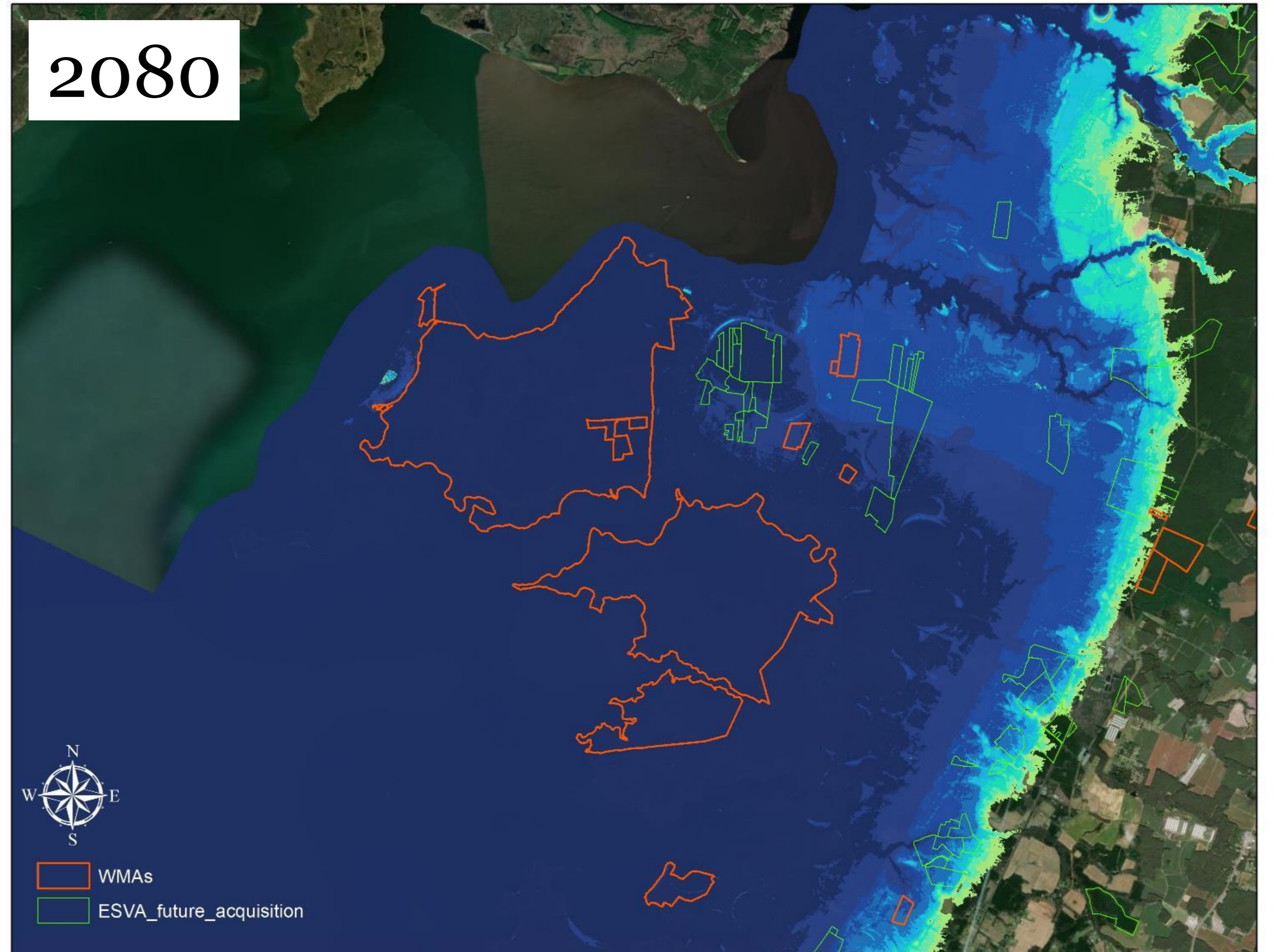
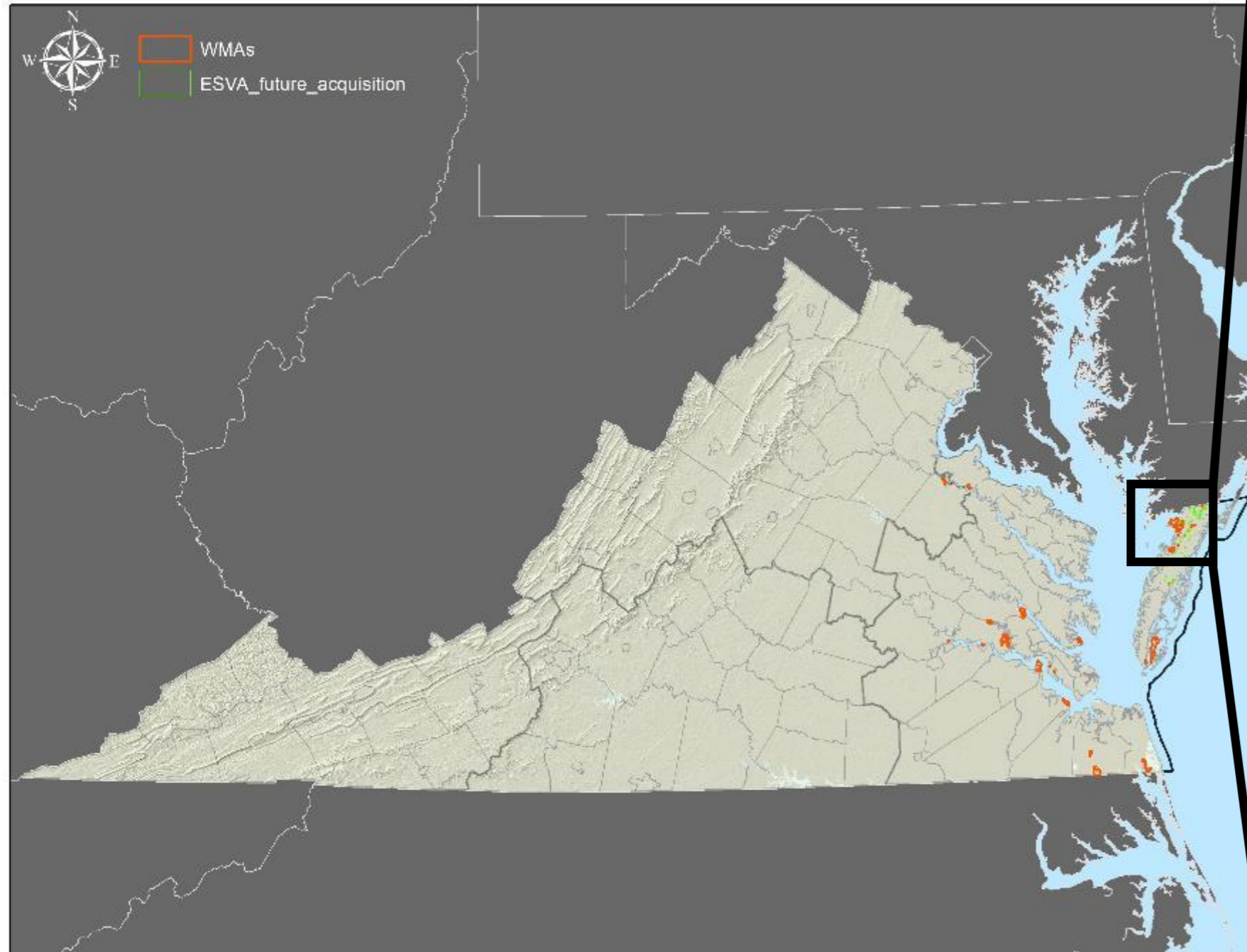
Impacted WMA = if a 500-year or more probable storm surge event layer crosses **the property boundary**.

Other impacted assets (boat ramps, piers, office, lake) = if a 500-year or more probable storm surge event layer crosses an asset’s “**critical point(s)**.”

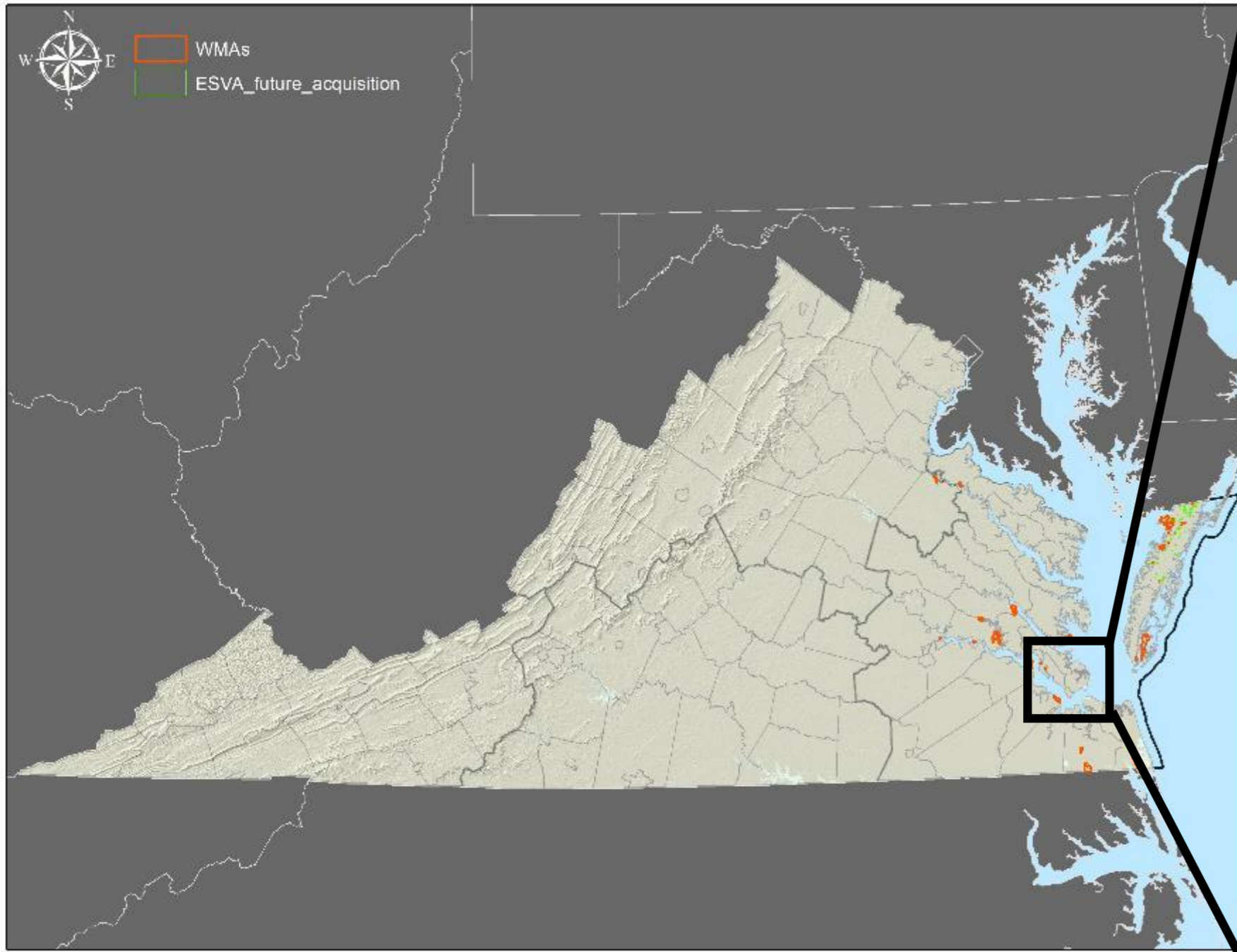
Critical point: a key geospatial feature of an asset upon which inundation of said point compromises asset functionally or usability
e.g. top of boat ramp slope (inflection point).



SLR Projection Saxis WMA, Accomack County (6,212 acres)



SLR Projection Fox Hill, Hampton



What is at Stake?

DWR assets already impacted by SLR or expected to be by 2080

50 boat ramps (22%)

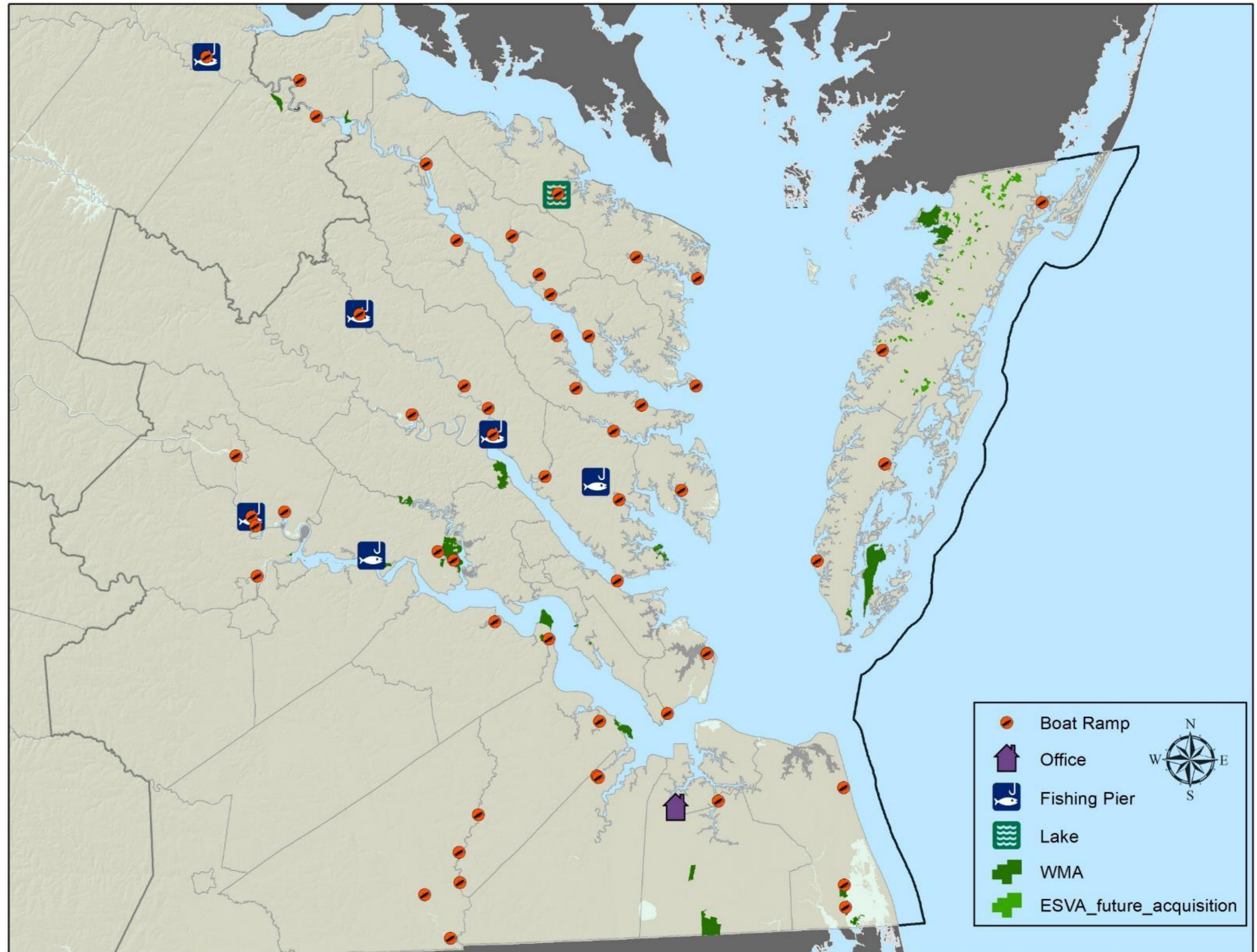
18 WMAs* (38%)

12 WMA structures (?)

7 fishing piers (11%)

1 Office (9%)

1 Lake (3%)



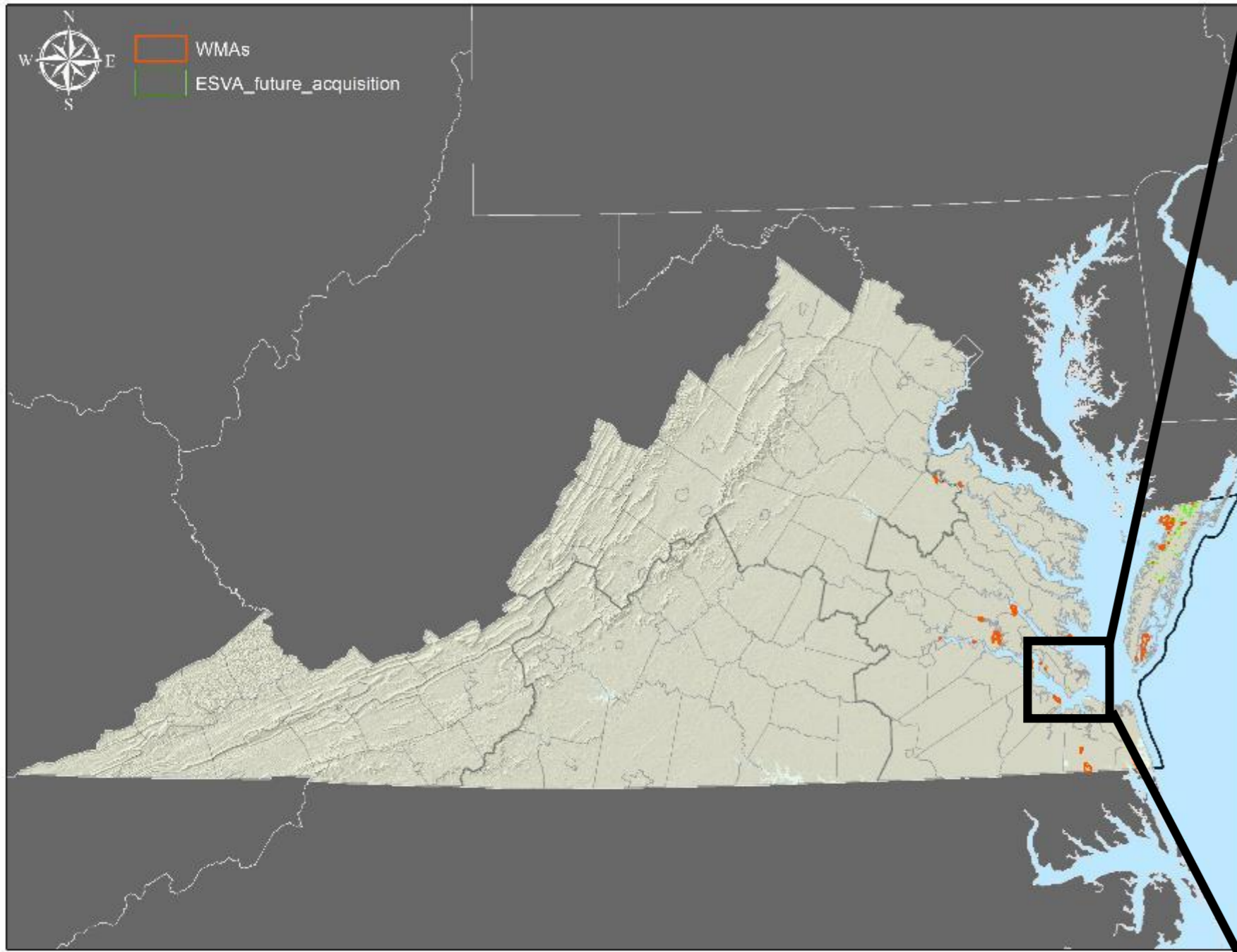
Objective #2

Among the impacted assets, determine which are expected to be inundated daily (by the MHW mark) or permanently (by the MLW mark) in the next 58 years, and when.

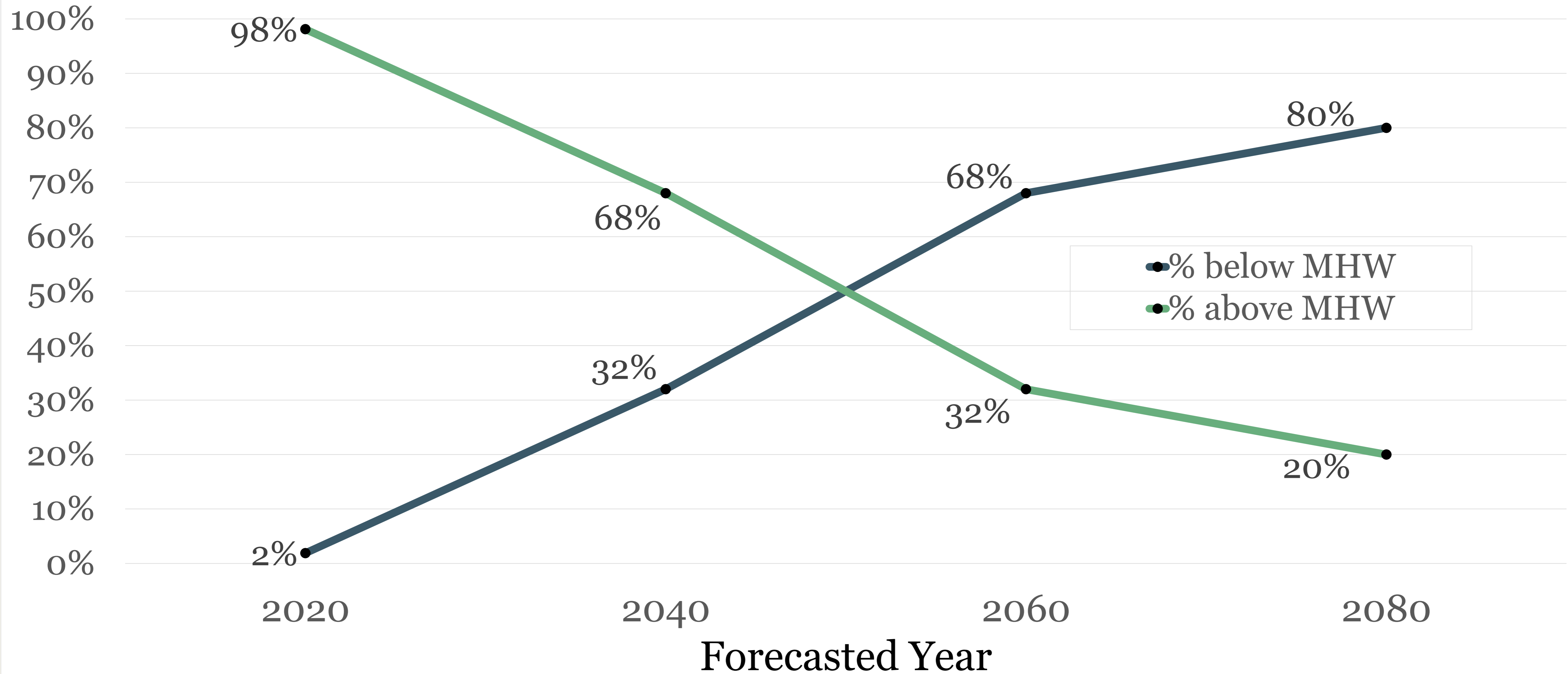
- Only assets with critical points (focus on boat ramps)
- Daily inundation (MHW) of the critical point was considered the threshold of comprised usability.



SLR Projection Fox Hill, Hampton



Percentage of SLR-impacted boat ramps above and below MHW



Objective #3

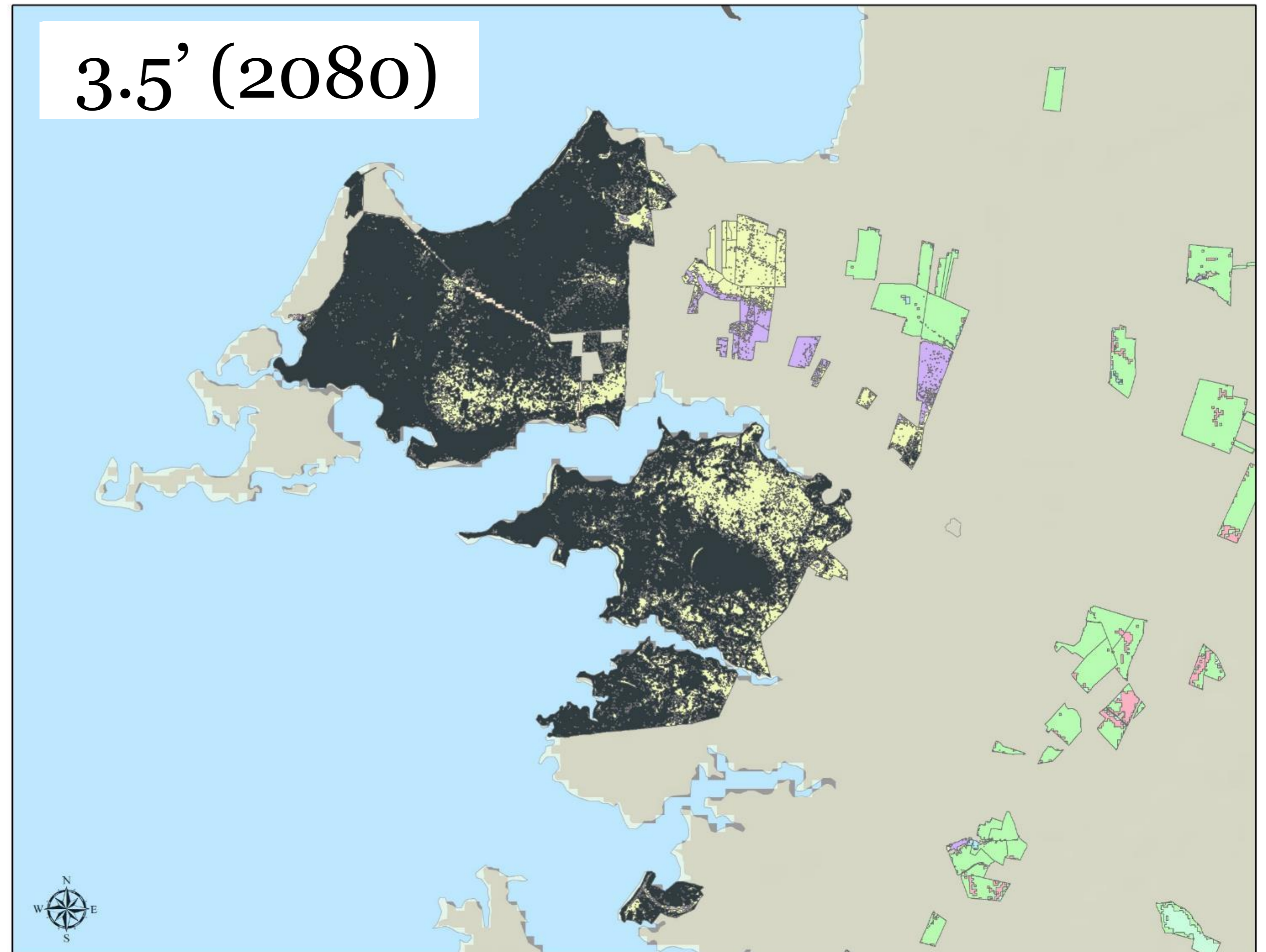
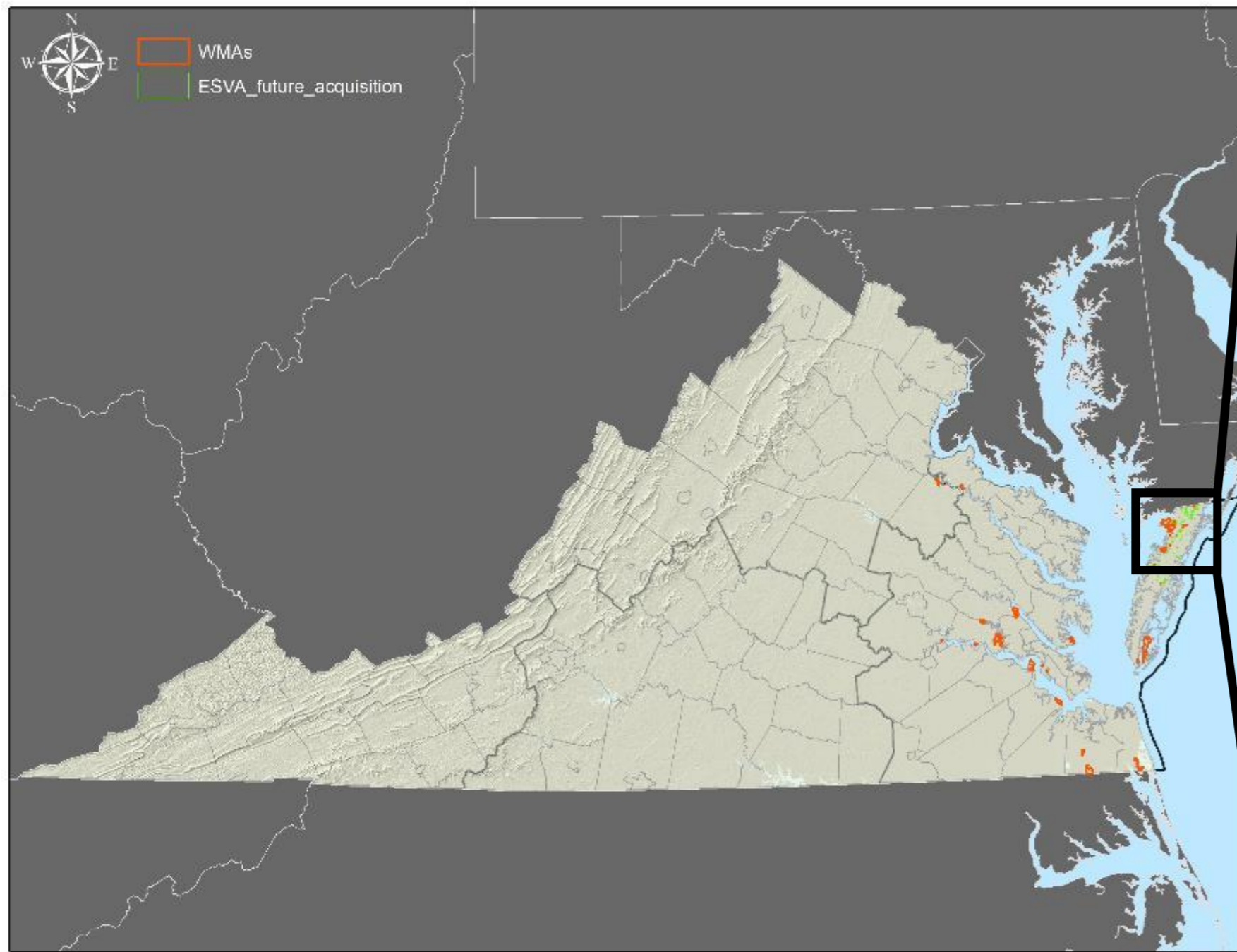
For WMAs, determine how much property will be inundated and habitat modified by saltwater intrusion

2022 NOAA Marsh Migration model

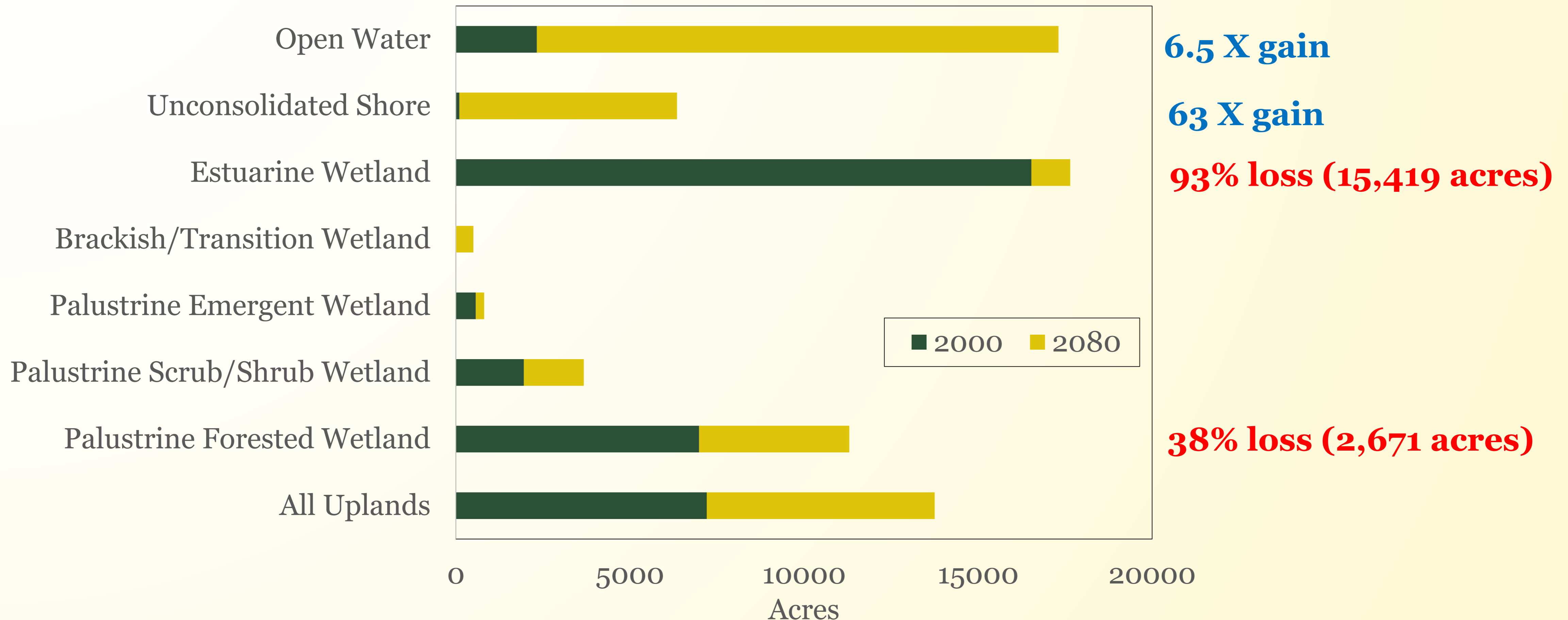
- Habitat composition characterized at year 2000 baseline, then at 2080 for each impacted WMA.
- All gains reported in unconsolidated shoreline and open water was assumed to be land inundated (lost) to at least daily MHW.



Habitat Conversion Saxis WMA, Accomack County (6,212 acres)



Acreeage Loss / Habitat Conversion (18 WMAs)



Mockhorn – 6,723 acres



Northampton County

Accomack County

Princess Anne – 1,274 acres



Virginia Beach

Isle of Wight

Hog Island – 1,017 acres



Surry County

Saxis – 5,853 acres



Ragged Island – 1,160 acres



The Take Home

59.5% (21,238 acres) of SLR-impacted WMAs are projected to be submerged by 2080; **10%** of all statewide WMA acreage

Major loss of estuarine and forested wetlands



Objective #4

Develop selection criteria for prioritizing boat ramps should triaging future resources be necessary

- Infrastructure Prioritization Framework, Marcelo et al. (2016) found that “prioritization [at state governments] is often based on a politics, loose qualitative assessments, or professional judgment, but without clear principles underpinning selection.”
- Some ramps are more valuable than others.
 - E.g. parking capacity or proximity to other public ramps.



What's next? Selecting and Weighting Criteria

12 Criteria Selected

Recreational value

- Number of ramps?
- Parking capacity?
- Accompanied by a pier?
- Shoreline fishing?

Importance to community

- Proximity to other public ramps?
- Social vulnerability of community?

Responsibility of maintenance

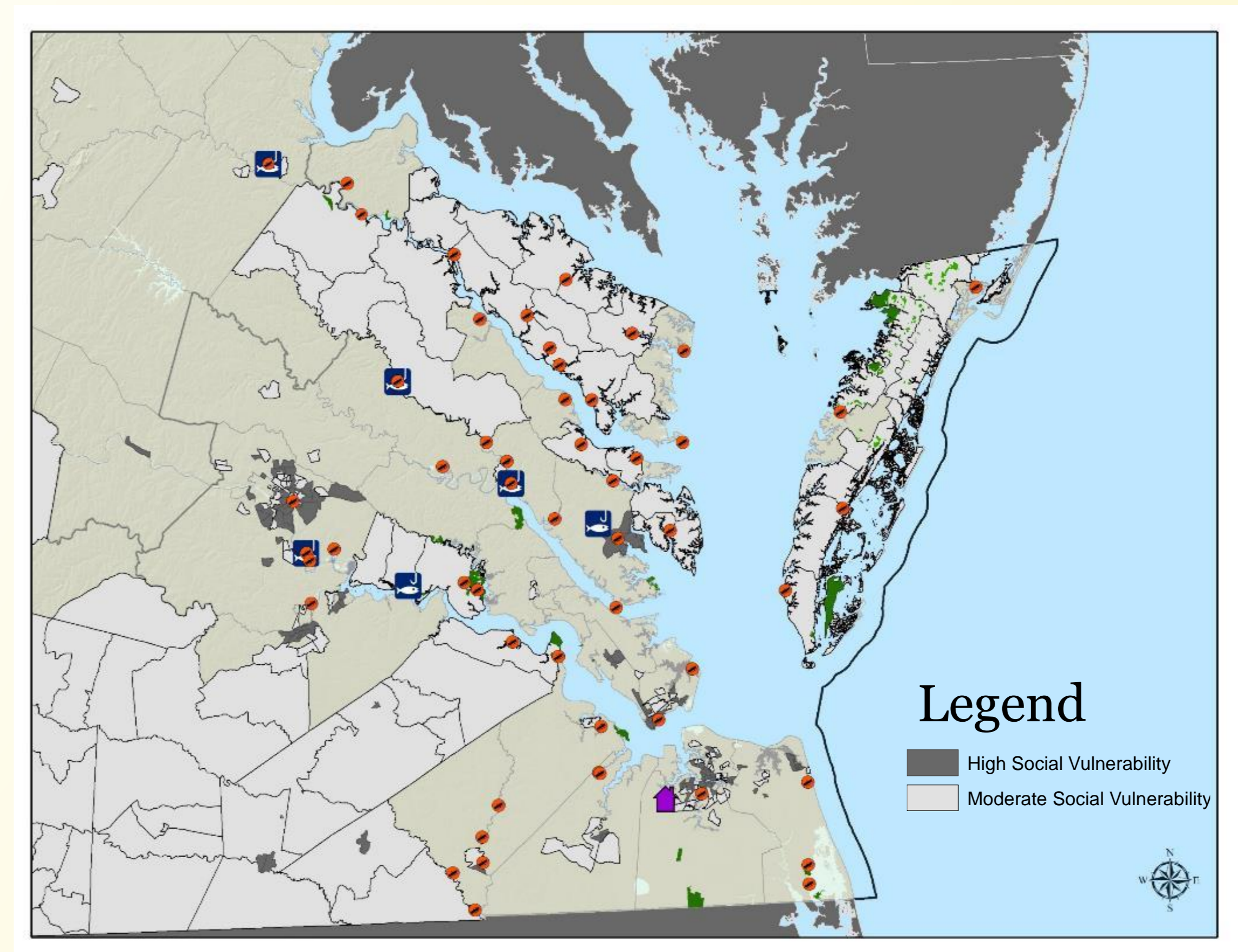
- VDWR owned?
- VDWR maintained?

Accessibility/liability

- Frequency of dredging?
- Road accessibility?

Adaptability

- Opportunity to modify/obtain upland property to avoid relocation?
- Remaining expected lifespan of infrastructure?



Next steps?

Improve accuracy and precision of data: Purchase, rent, or borrow a real-time kinematic positioning (RTK) base station and mobile rover units. Set-up base station on the nearest benchmark and mobile units on the critical point(s) for data collection.

Finish collecting data for selection criteria. Deliberate just and equitable weighting of criteria with constituent engagement.

Integrate GIS tool into DWR's strategic land acq. screening tool.

Start locating viable new water access sites, perhaps even sites that are not currently waterfront.



Acknowledgements

Becky Gwynn, DWR's Co-deputy Director

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John Kirk, DWR's Capitol Programs Manager

Partnering agencies, organizations, and universities



Thank you!

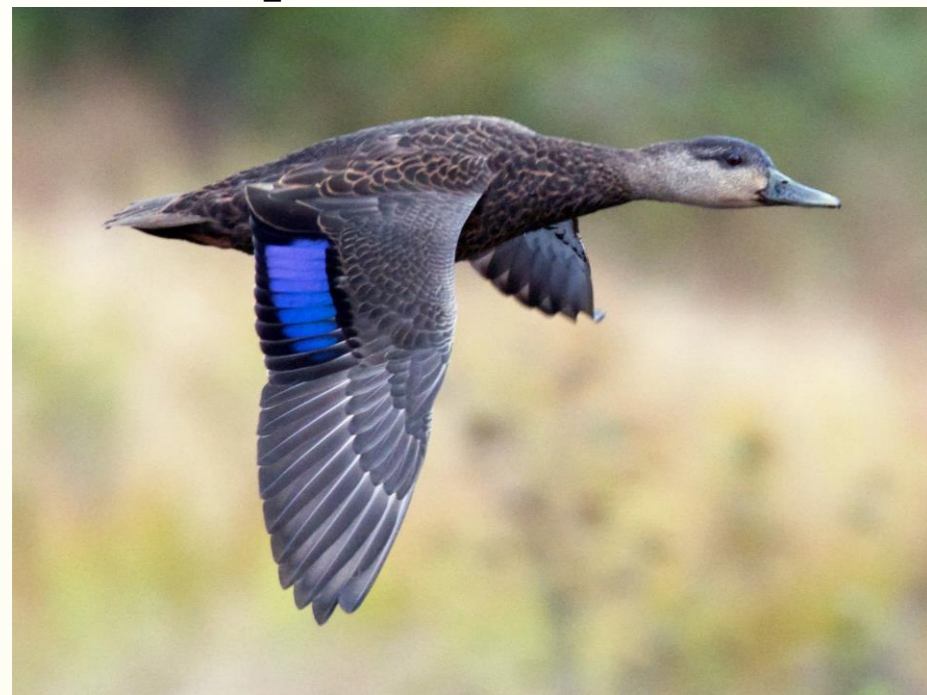
Species of Greatest Conservation Need (SGCN)



Northern Diamondback
Terrapin



Saltmarsh Sparrow



American Black Duck



Black Rail

