Protection Prioritization for Climate Change Adaptation on the Virginia Eastern Shore

Coastal Partners Workshop

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November 17, 2016

The Nature Conservancy

Protecting nature. Preserving life.

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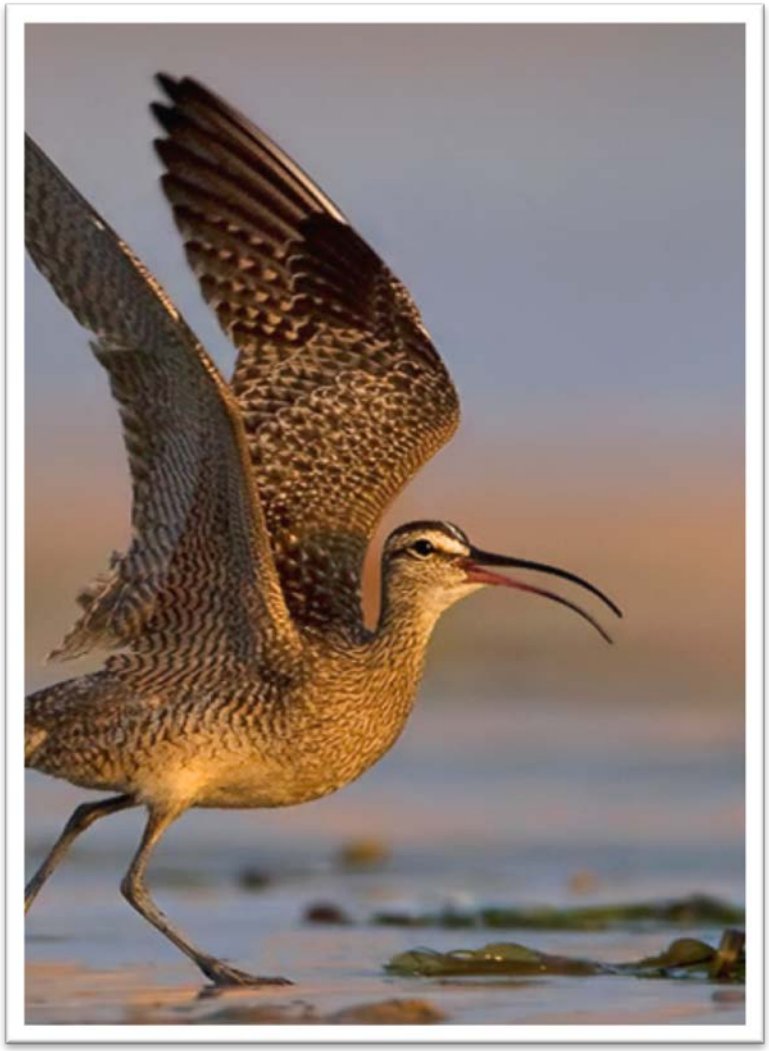
Today's Topics

- ❑ Big picture Coastal Resilience at TNC
- ❑ Marsh Retreat Zone Analysis
- ❑ Next steps



Climate Resilience and Risk Reduction:

A GLOBAL PRIORITY

HELP COMMUNITIES INCORPORATE NATURAL INFRASTRUCTURE INTO COMMUNITY PLANNING TO REDUCE RISK, CAPTURE BENEFITS AND INCREASE ECOSYSTEM HEALTH.

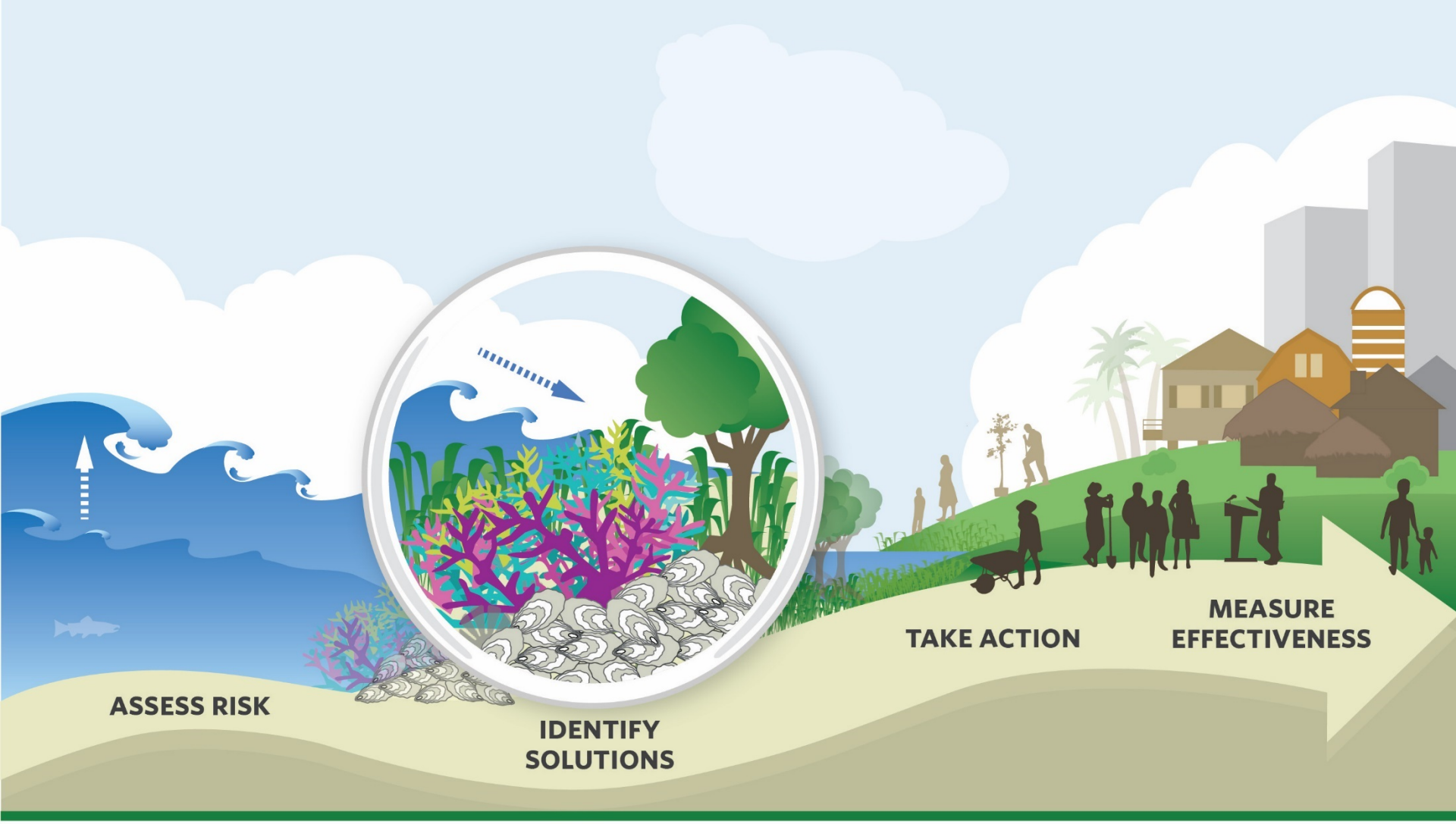
Desired Conservation Outcomes

CLIMATE RESILIENCE & RISK REDUCTION

Communities are made safer and more resilient to climate hazards.

Ecosystem health and functionality are restored to benefit both humans and nature.

The benefits of natural solutions are well documented and embraced while damages from disasters and climate change are reduced.



COASTAL RESILIENCE

APPROACH

Coastal Resilience addresses four critical areas of climate adaptation planning:

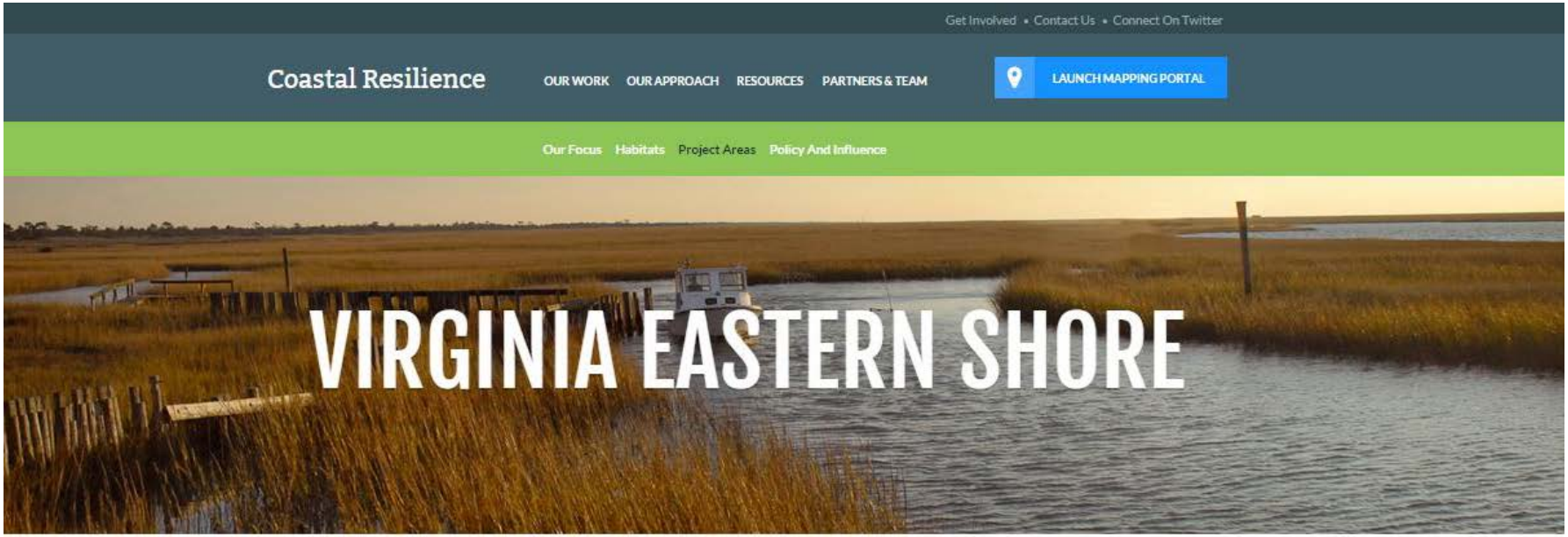
(1) Assess Risk and vulnerability to coastal hazards including current and future storms and sea level rise scenarios, **(2) Identify Solutions** for reducing risk across social-ecological systems, **(3) Take Action** to help communities develop and implement nature-based solutions where appropriate and **(4) Measure Effectiveness** to ensure that our efforts to reduce risk through restoration and adaptation are successful.

The Nature Conservancy

www.coastalresilience.org

Enhancing Coastal Resilience on Virginia's Eastern Shore

COASTALRESILIENCE.ORG/VIRGINIA



Protecting Future Shorelines

SITUATION

- Mainland marshes transgress or migrate landward w/ SLR
- Marshes need unimpeded, low elevational gradient for successful migration
- Marsh migration is impeded by shoreline hardening
- The extent to which marshes are allowed to migrate depends on the landowner, existing & future uses
- Three-quarters of existing marsh is protected; what level or protection exists for future marsh?

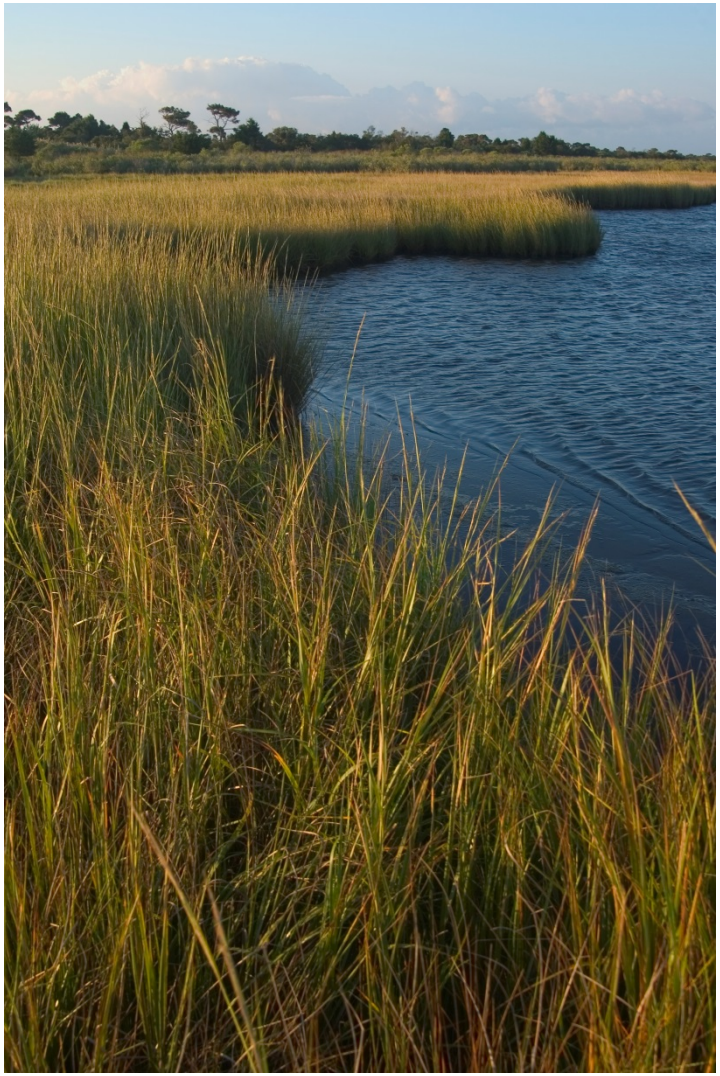
Protecting Future Shorelines

Desired Outcome:

- Maximize the potential for marshes to migrate inland and persist in the face of sea-level rise given existing land uses, condition and barriers.

Strategy:

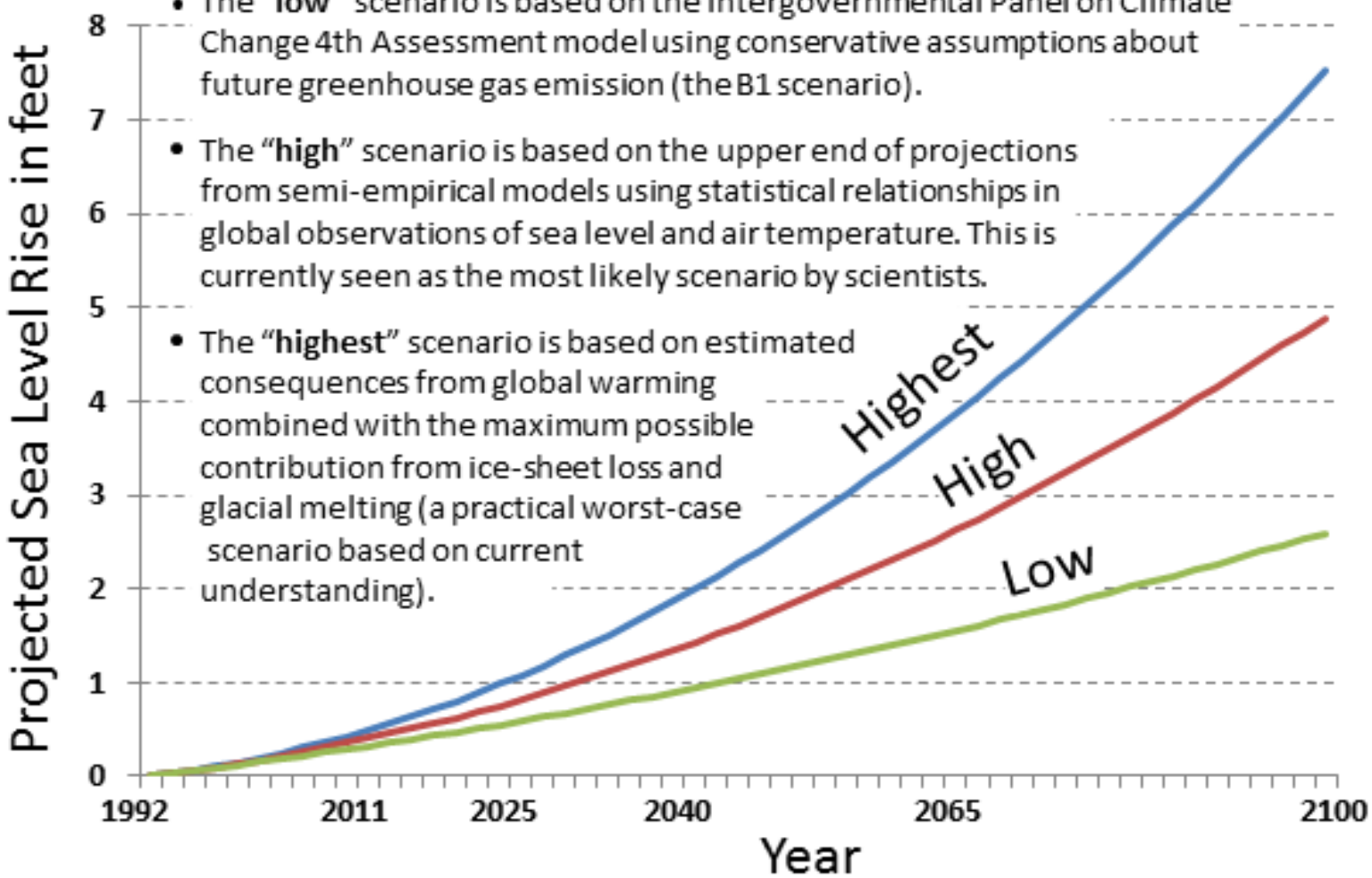
- Identify future marsh migration or retreat zones along the mainland edge of the Eastern Shore to direct future investments in restoration, protection and policy strategies that enhance coastal resilience.



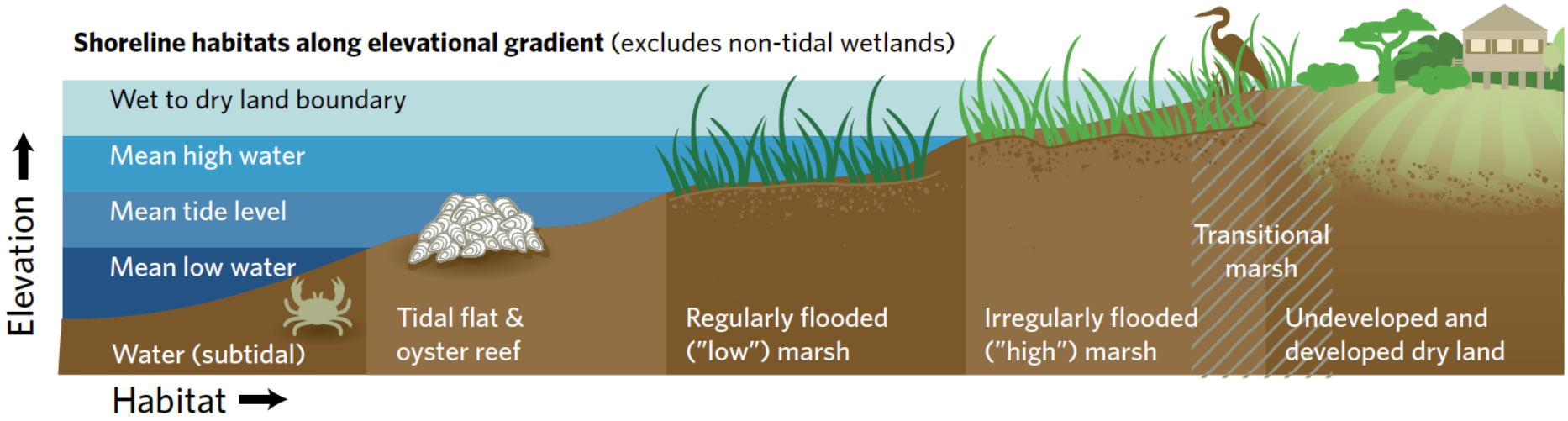
Selecting SLR Projections

These sea-level rise projections are based on the 2012 National Climate Assessment and have been customized for Virginia by the Virginia Institute of Marine Science.

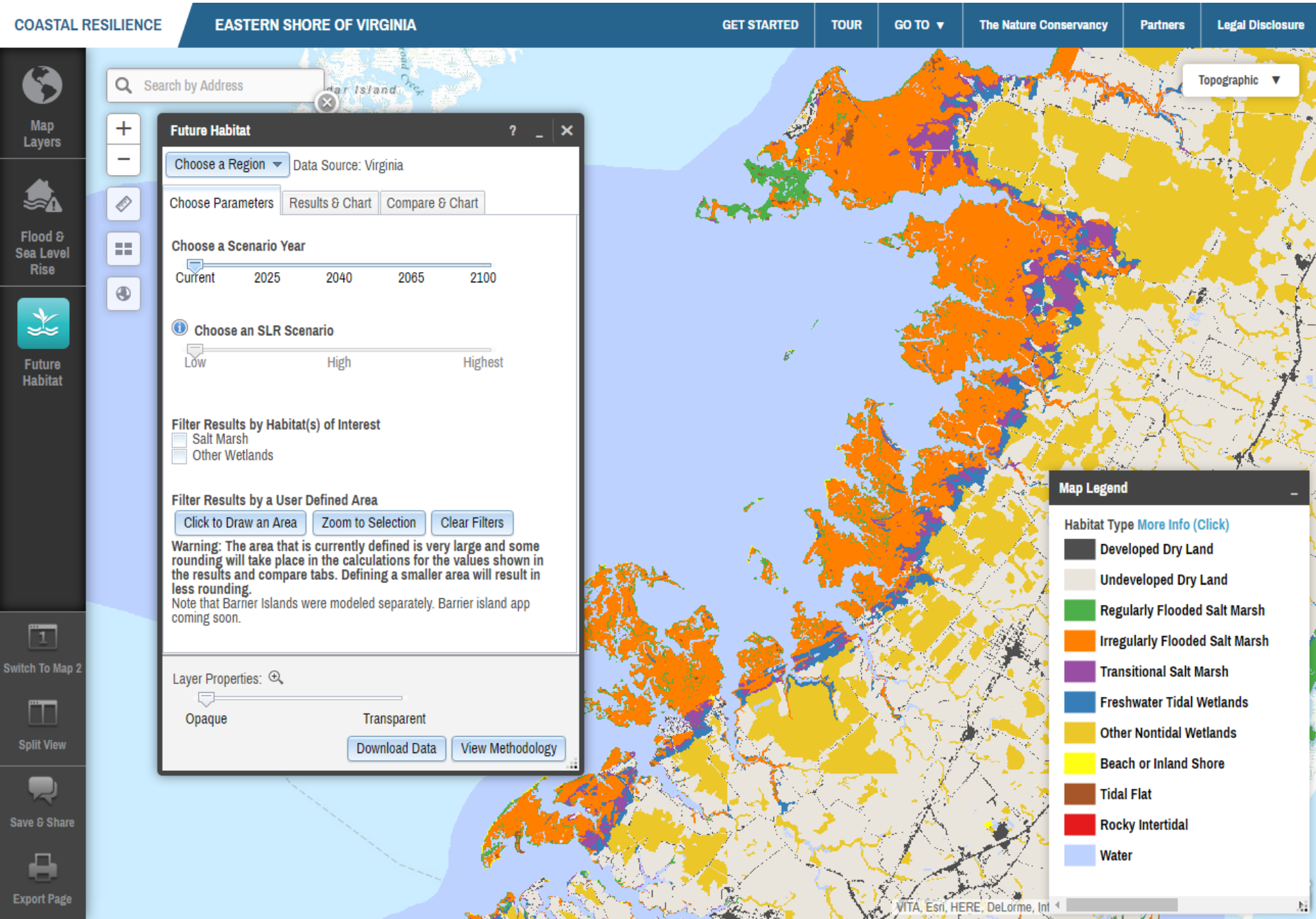
- The "**low**" scenario is based on the Intergovernmental Panel on Climate Change 4th Assessment model using conservative assumptions about future greenhouse gas emission (the B1 scenario).
- The "**high**" scenario is based on the upper end of projections from semi-empirical models using statistical relationships in global observations of sea level and air temperature. This is currently seen as the most likely scenario by scientists.
- The "**highest**" scenario is based on estimated consequences from global warming combined with the maximum possible contribution from ice-sheet loss and glacial melting (a practical worst-case scenario based on current understanding).



SLAMM: Sea Level Affecting Marshes Model



Future Habitat app | maps.coastalresilience.org/virginia



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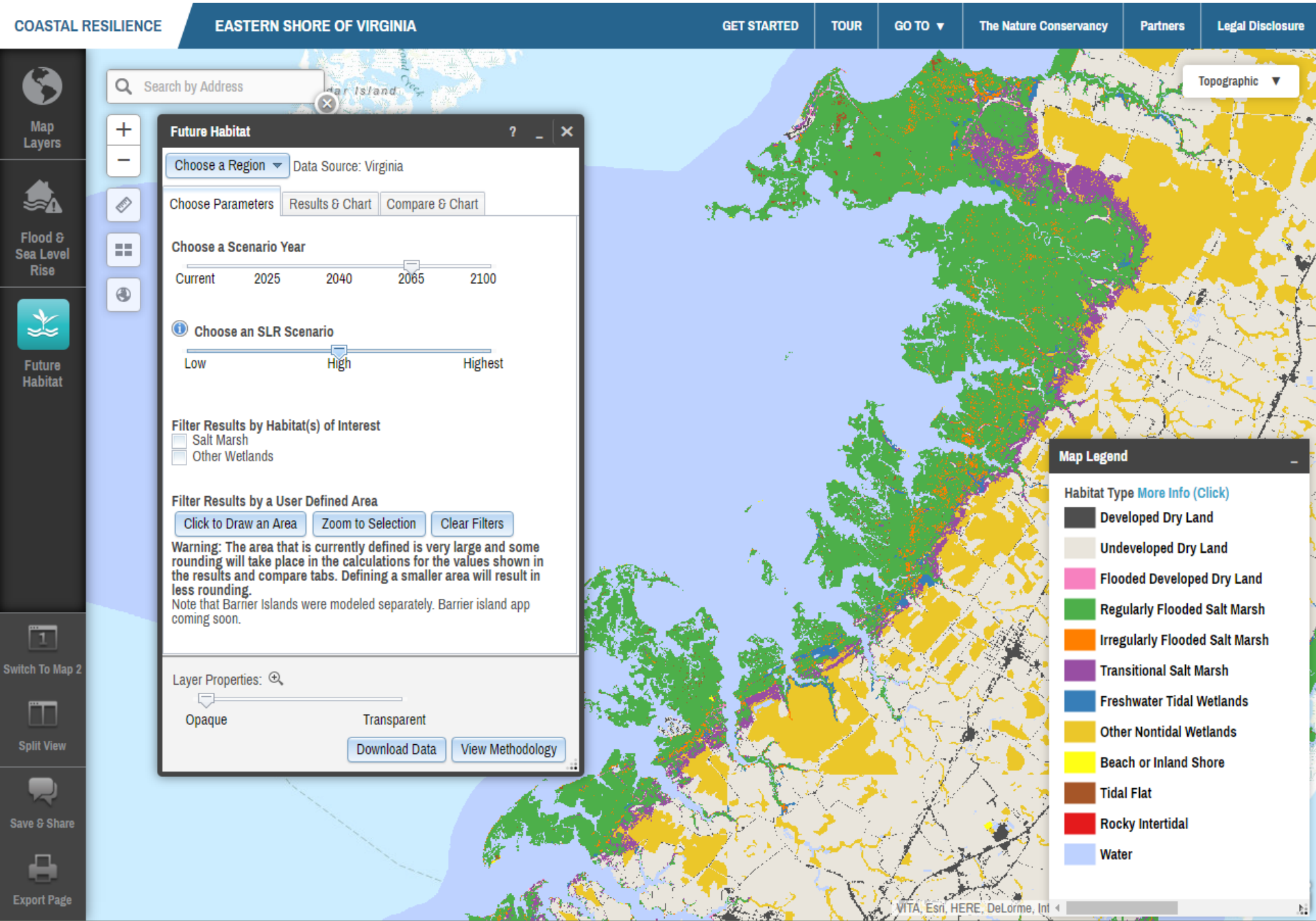
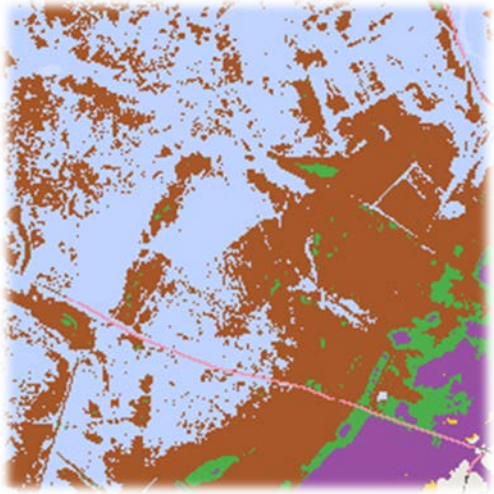


Marsh Retreat Zone Analysis

Current uplands and freshwater wetlands…

…that will convert to water, tidal flat or salt marsh in a future scenario…



…are called "Marsh Retreat Zone"

Selecting SLR Projections

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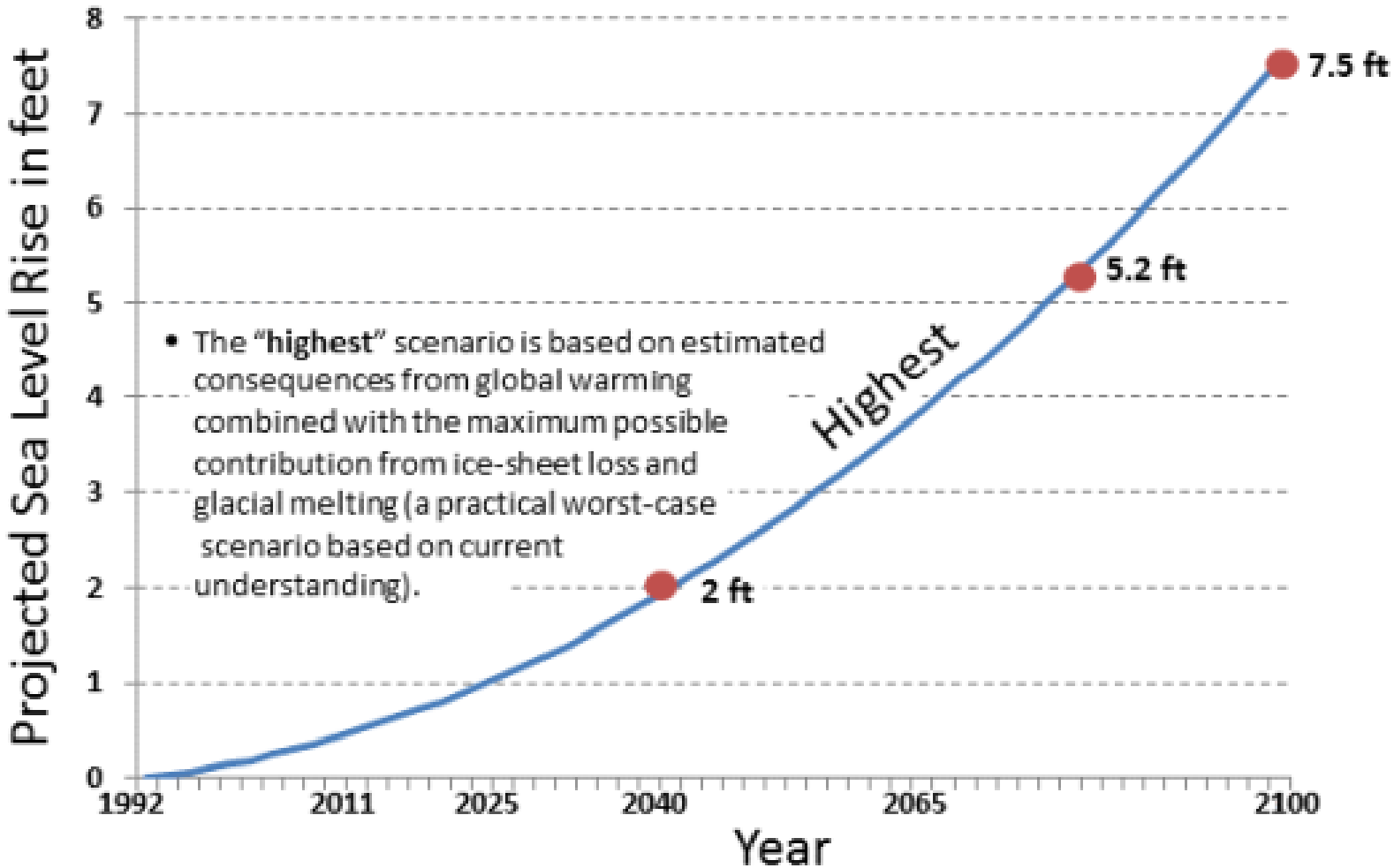
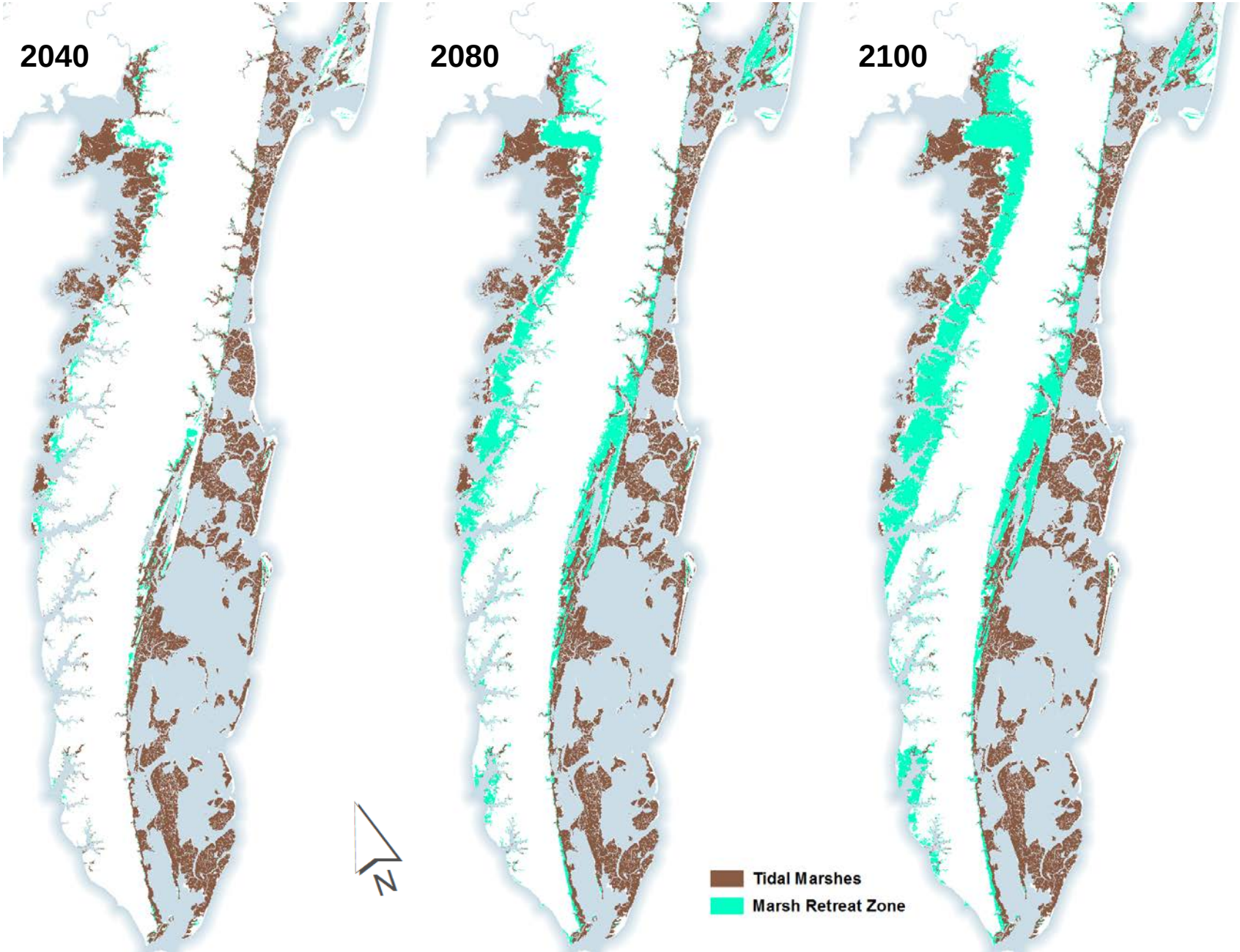
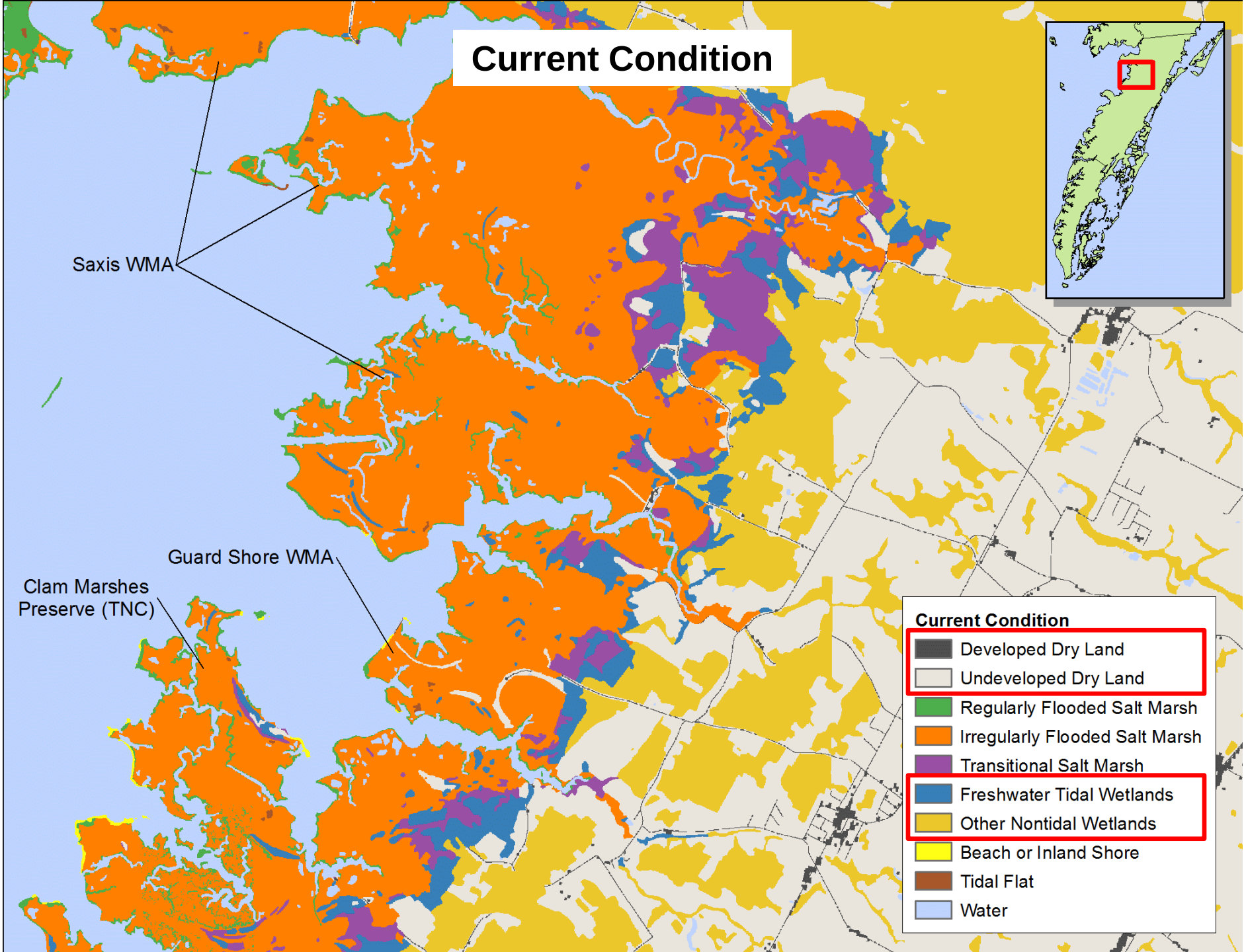
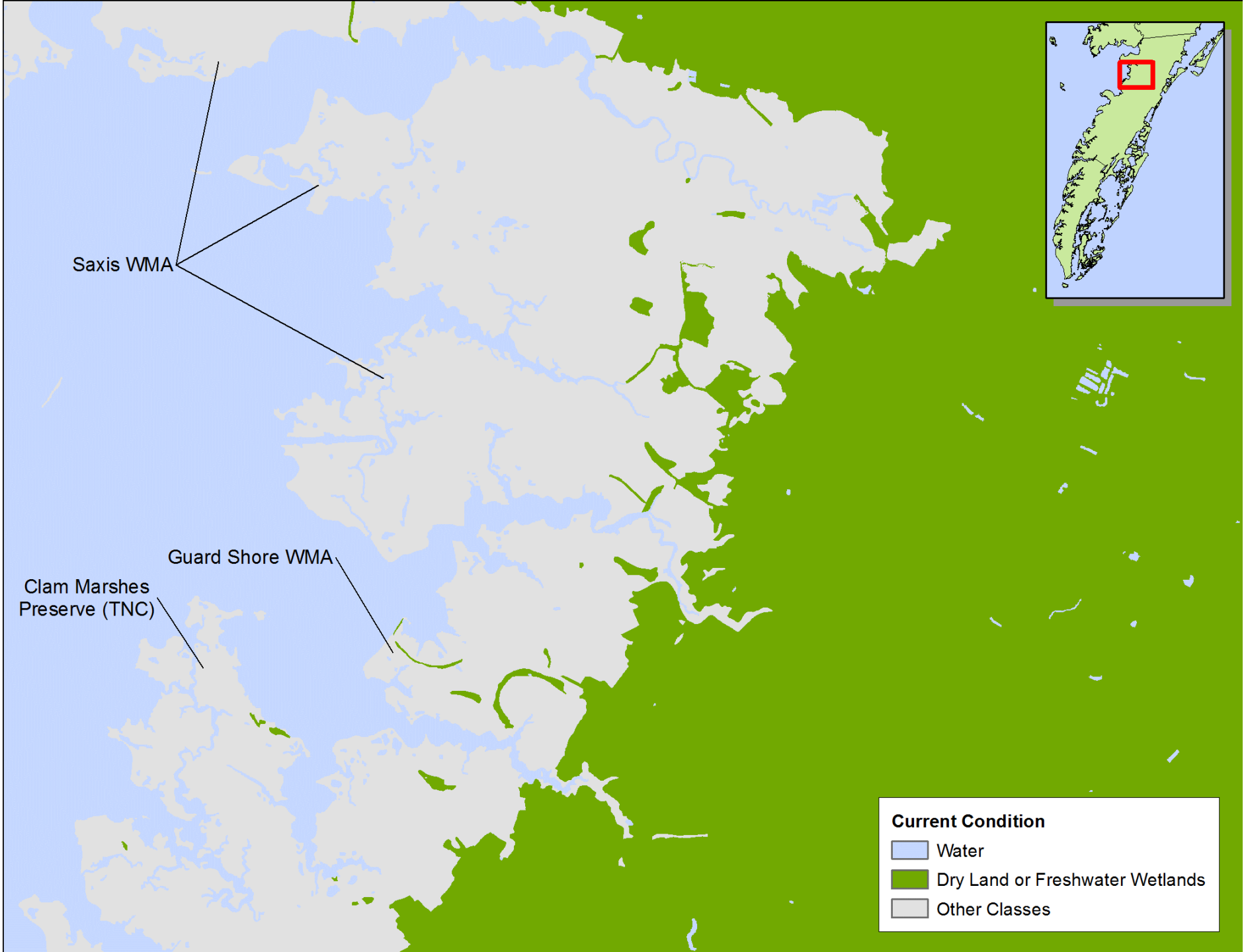
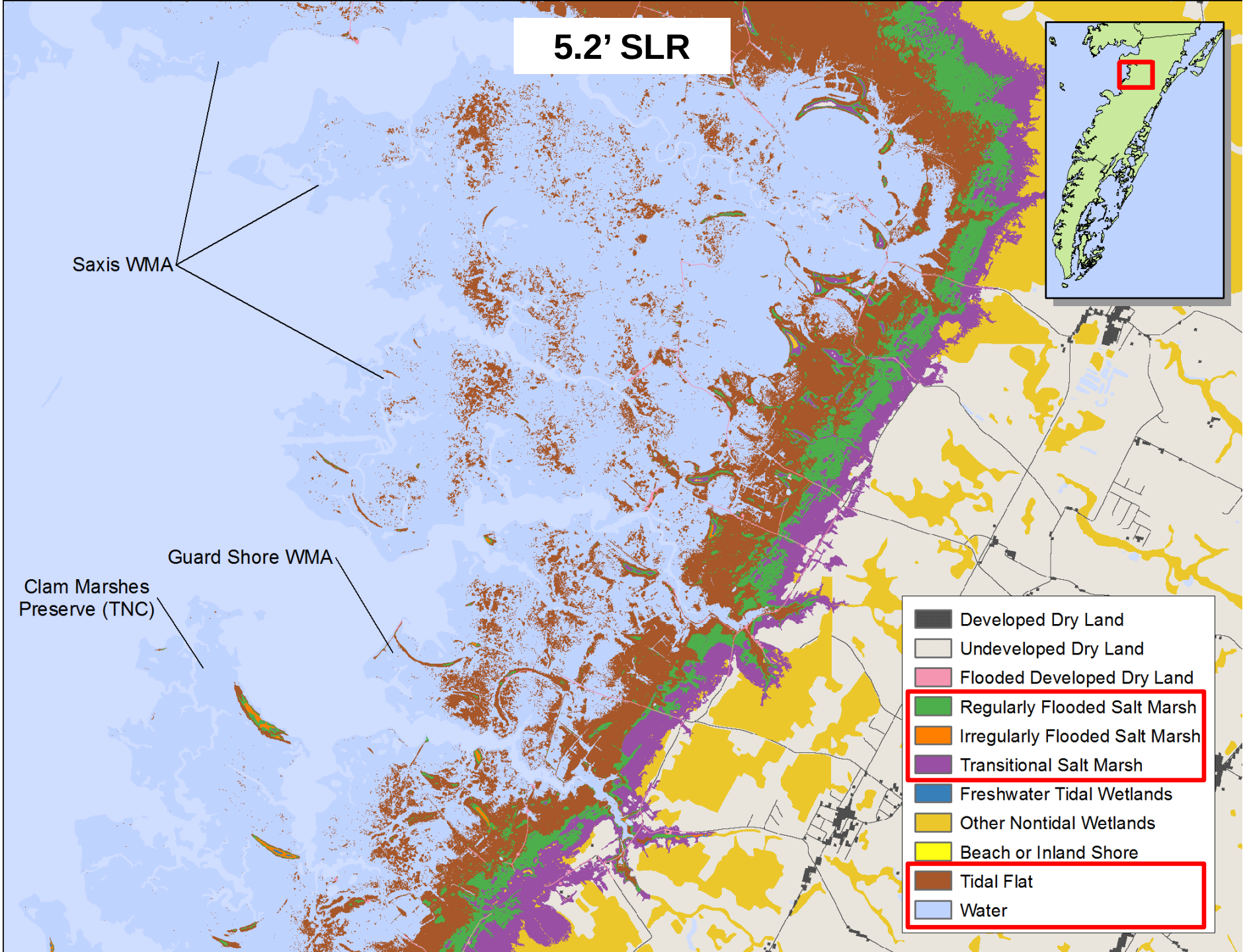


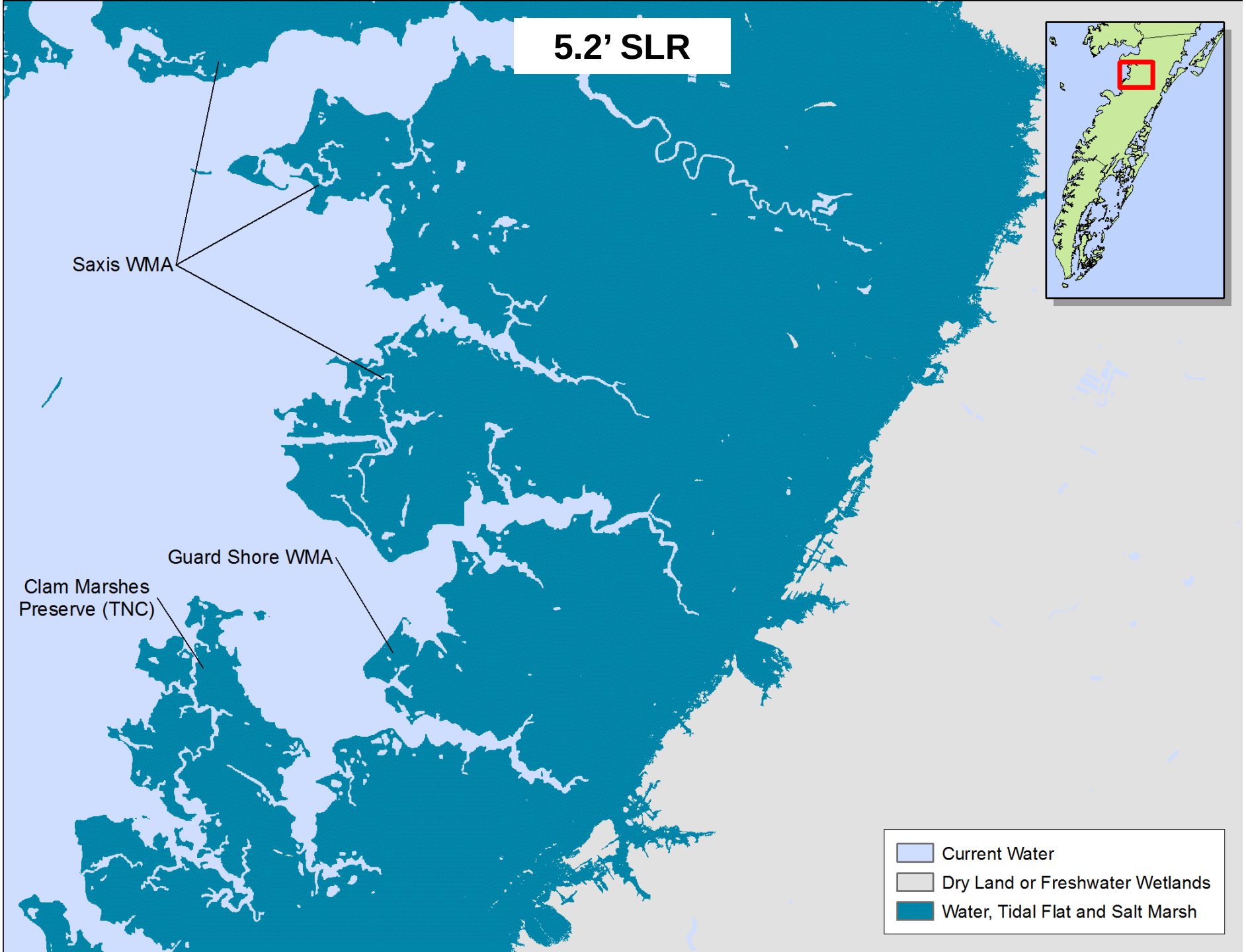
Marsh Retreat Zones Based on 3 SLR Projections

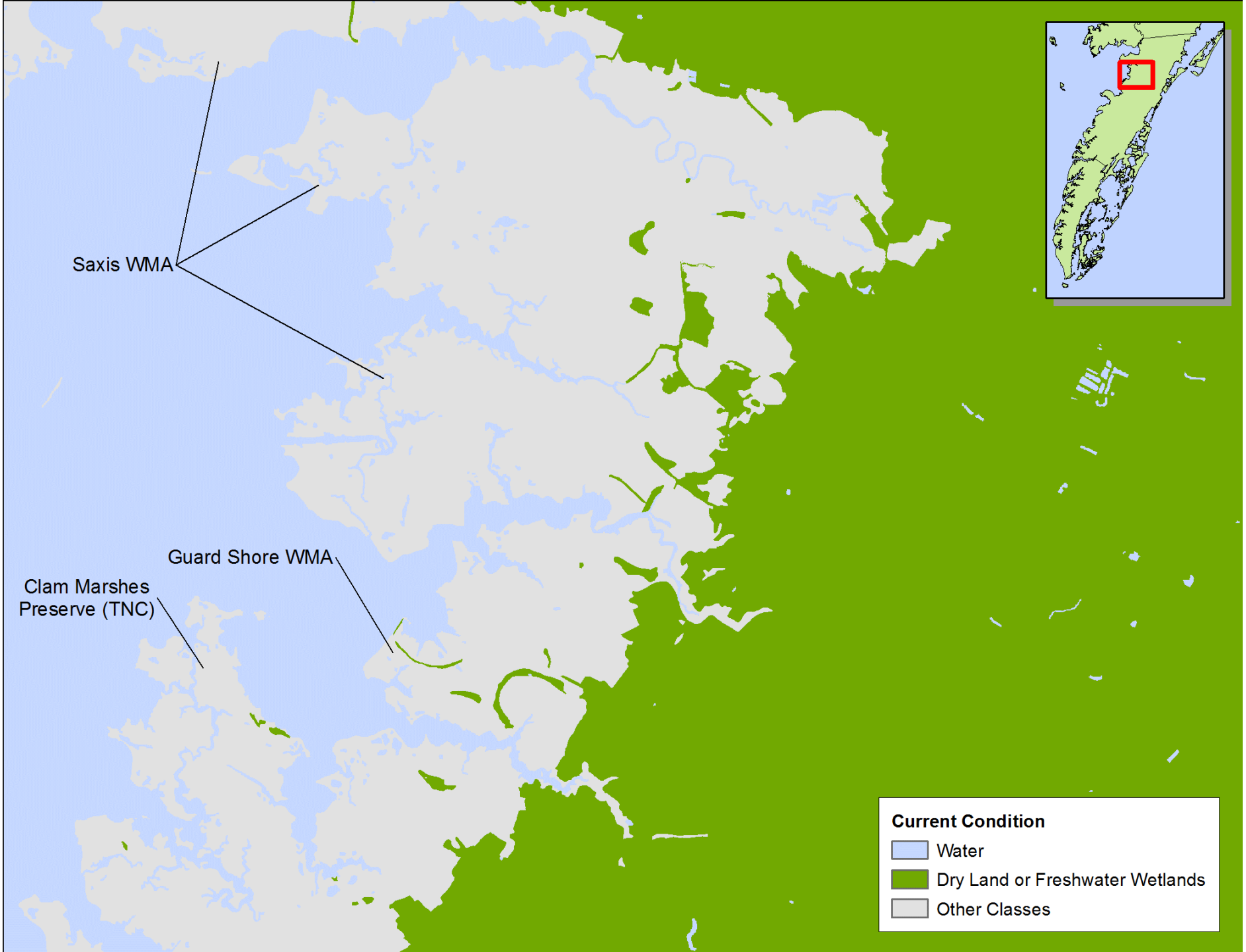


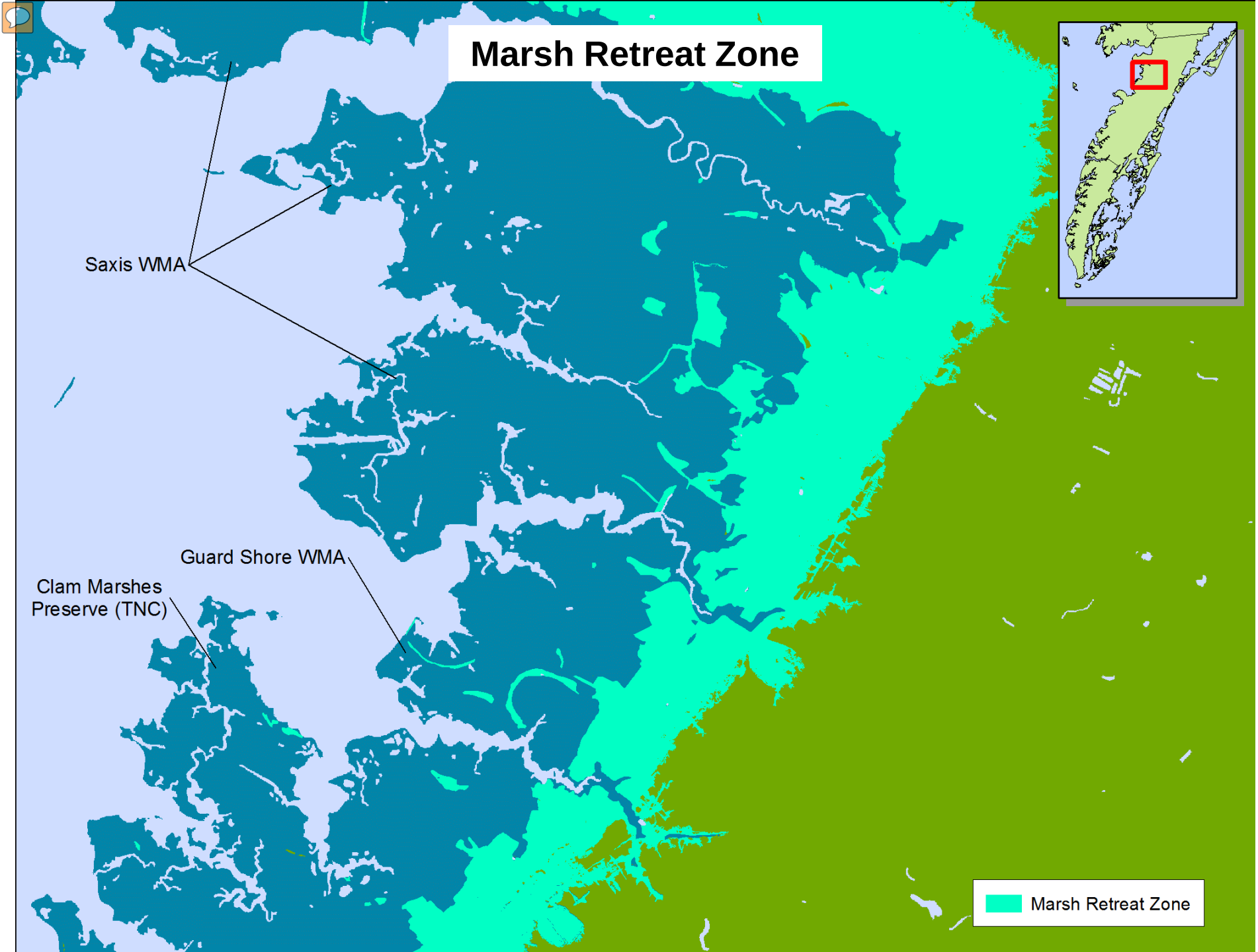

Current Condition
Saxis WMA
Guard Shore WMA
Clam Marshes Preserve (TNC)
Current Condition
Developed Dry Land
Undeveloped Dry Land
Regularly Flooded Salt Marsh
Irregularly Flooded Salt Marsh
Transitional Salt Marsh
Freshwater Tidal Wetlands
Other Nontidal Wetlands
Beach or Inland Shore
Tidal Flat
Water

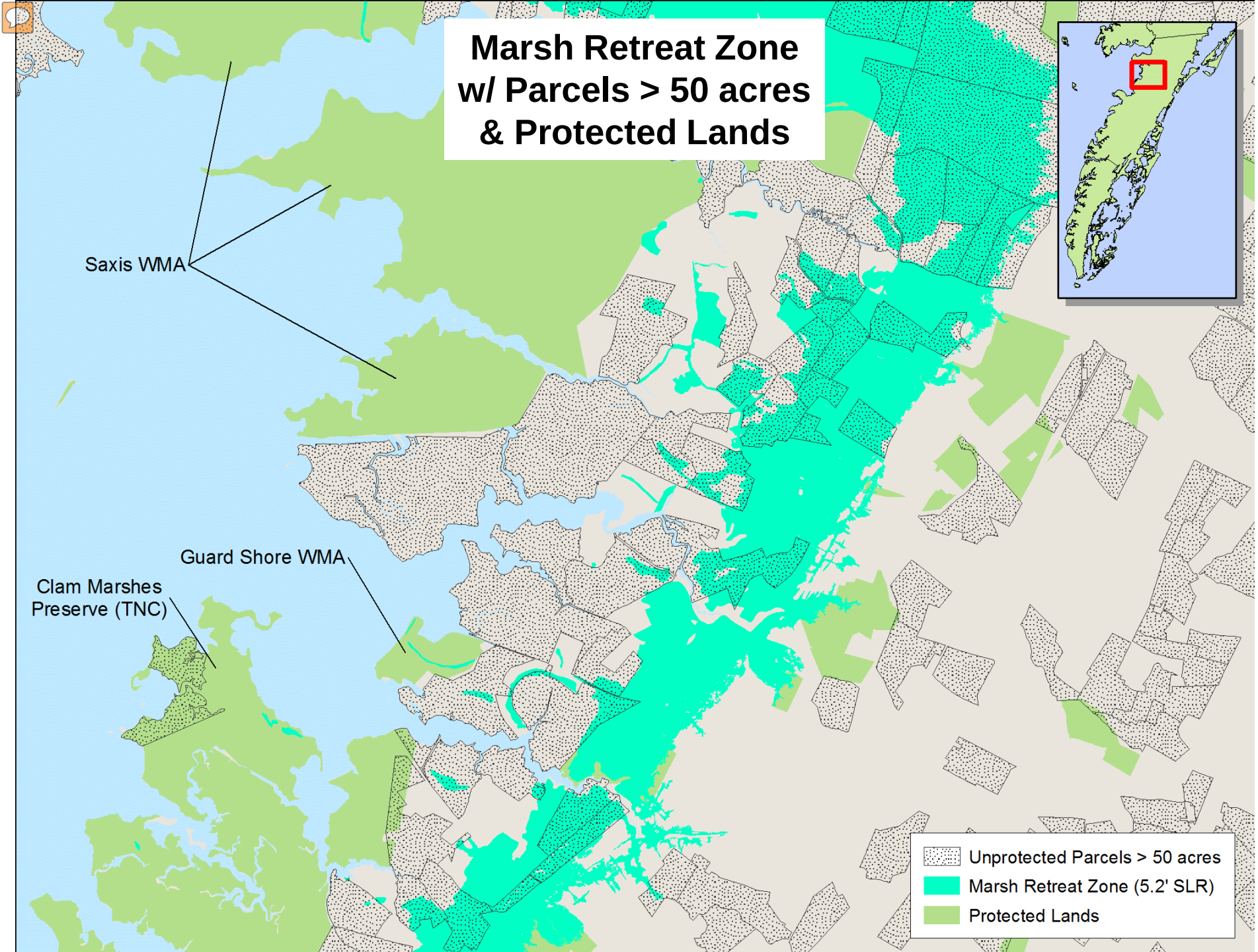

Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Current Condition
Water
Dry Land or Freshwater Wetlands
Other Classes

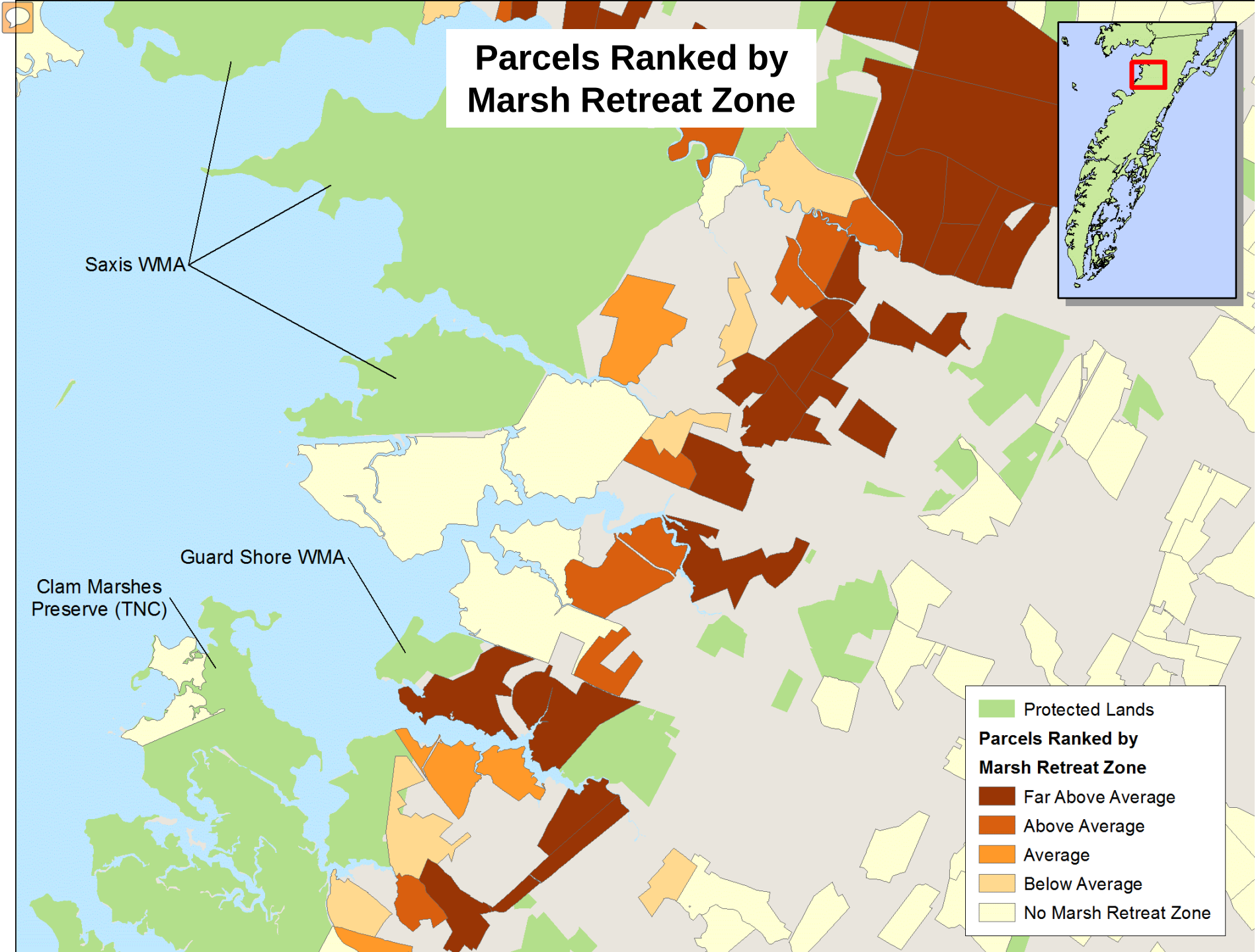

5.2' SLR
Saxis WMA
Guard Shore WMA
Clam Marshes Preserve (TNC)
Developed Dry Land
Undeveloped Dry Land
Flooded Developed Dry Land
Regularly Flooded Salt Marsh
Irregularly Flooded Salt Marsh
Transitional Salt Marsh
Freshwater Tidal Wetlands
Other Nontidal Wetlands
Beach or Inland Shore
Tidal Flat
Water

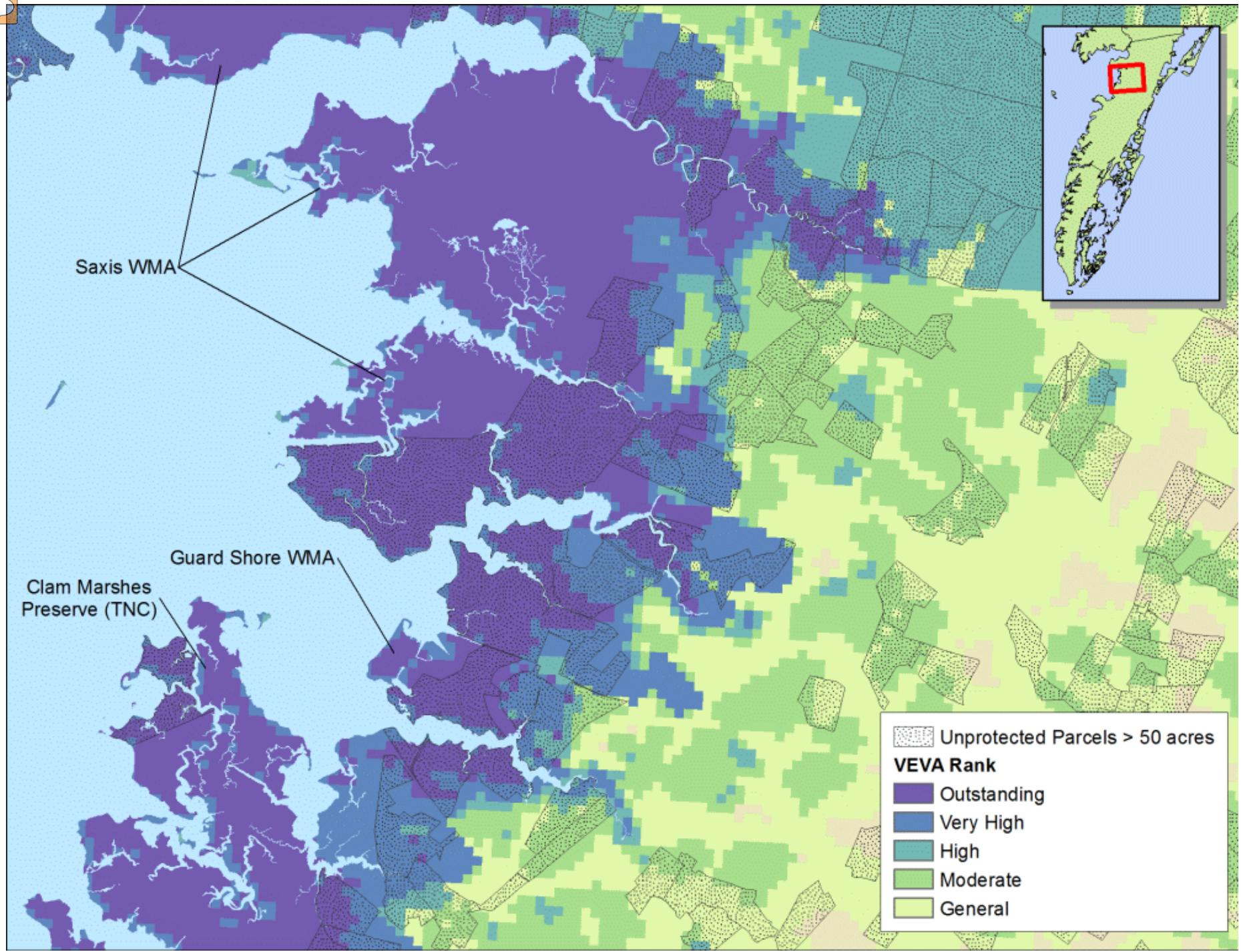

5.2' SLR
Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Current Water
Dry Land or Freshwater Wetlands
Water, Tidal Flat and Salt Marsh

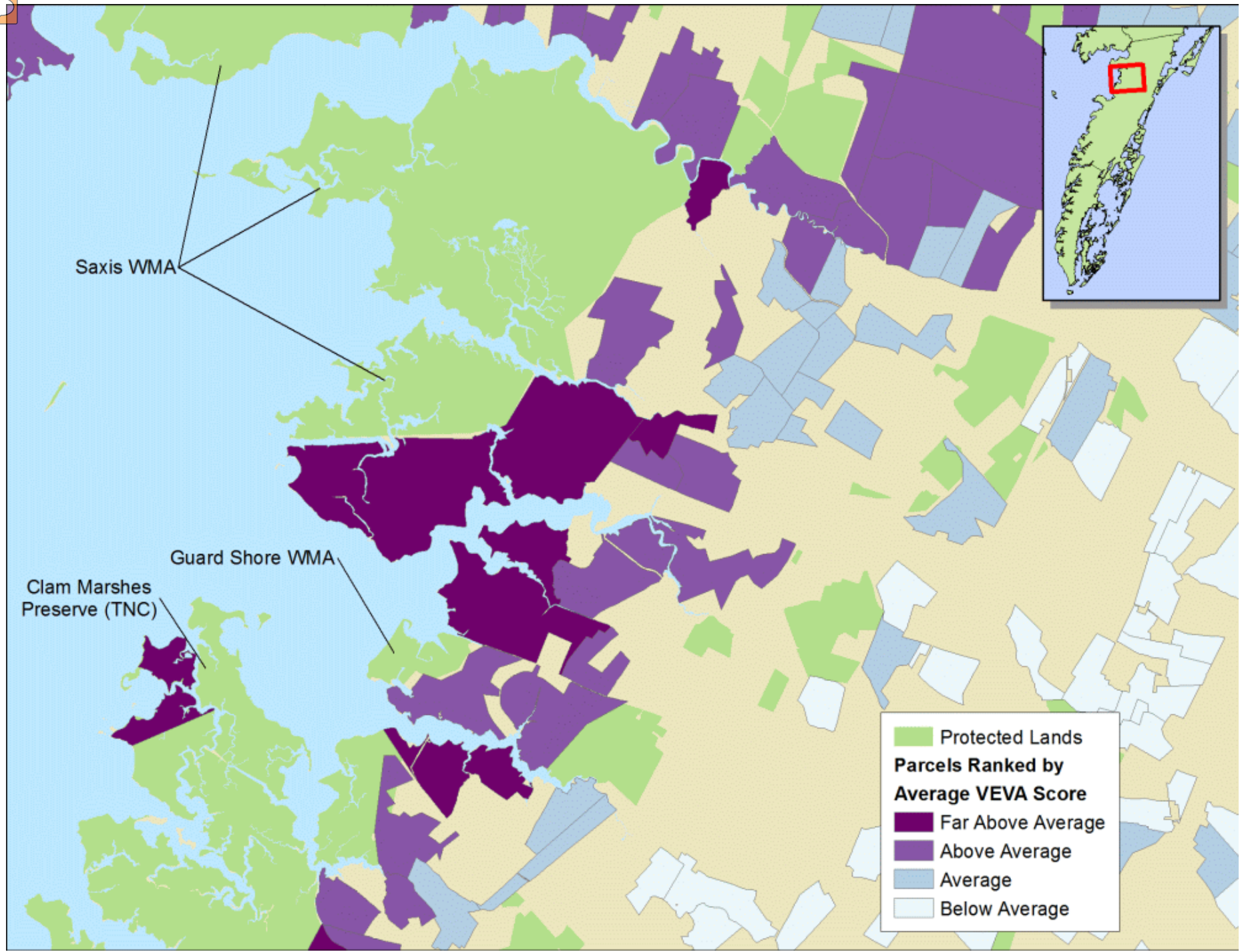

Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Current Condition
Water
Dry Land or Freshwater Wetlands
Other Classes

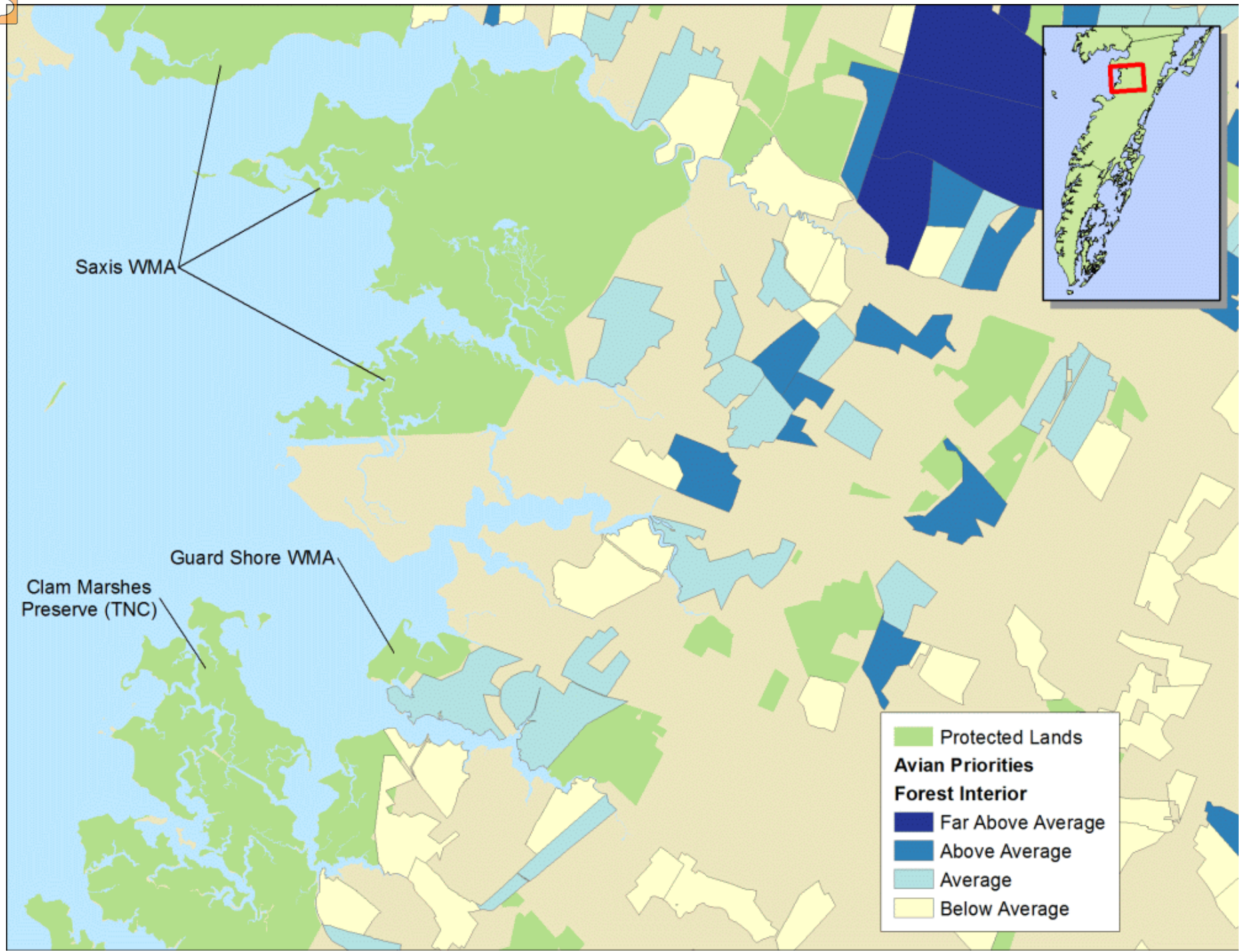

Marsh Retreat Zone
Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Marsh Retreat Zone

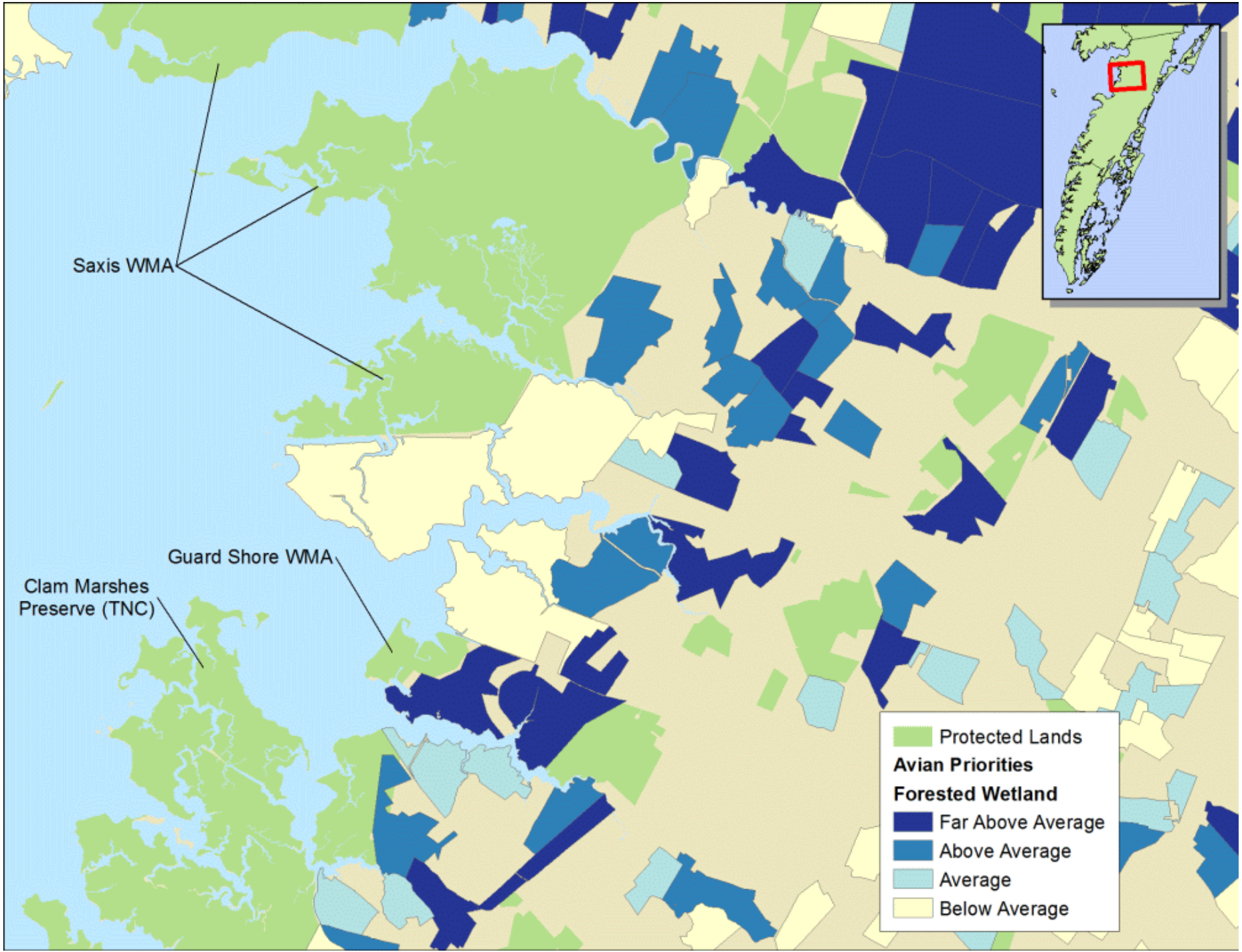

Marsh Retreat Zone
w/ Parcels > 50 acres
& Protected Lands
Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Unprotected Parcels > 50 acres
Marsh Retreat Zone (5.2' SLR)
Protected Lands


Parcels Ranked by
Marsh Retreat Zone
Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Protected Lands
Parcels Ranked by
Marsh Retreat Zone
Far Above Average
Above Average
Average
Below Average
No Marsh Retreat Zone


Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Unprotected Parcels > 50 acres
VEVA Rank
Outstanding
Very High
High
Moderate
General


Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Protected Lands
Parcels Ranked by
Average VEVA Score
Far Above Average
Above Average
Average
Below Average

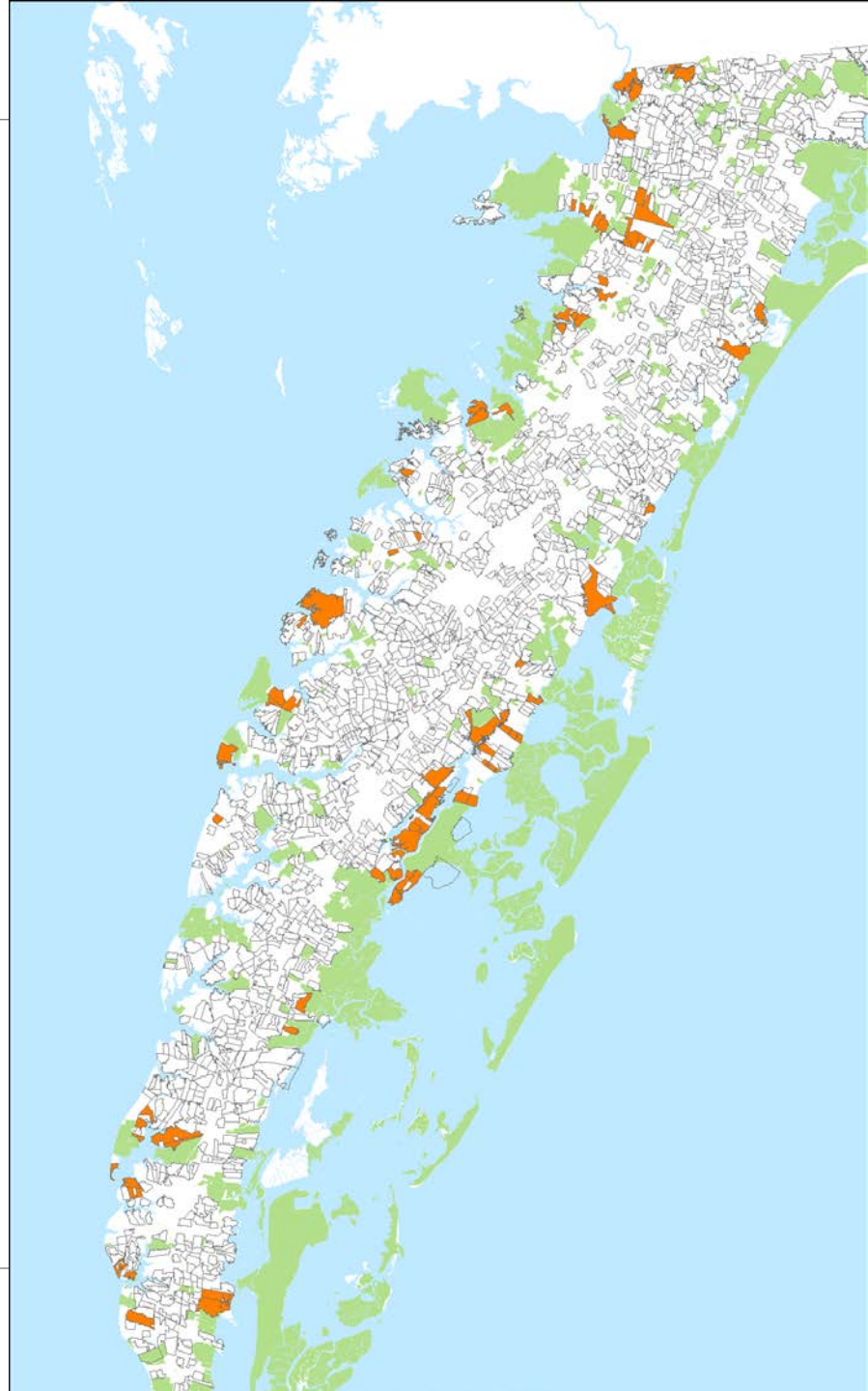

Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Protected Lands
Avian Priorities
Forest Interior
Far Above Average
Above Average
Average
Below Average


Saxis WMA
Guard Shore WMA
Clam Marshes
Preserve (TNC)
Protected Lands
Avian Priorities
Forested Wetland
Far Above Average
Above Average
Average
Below Average

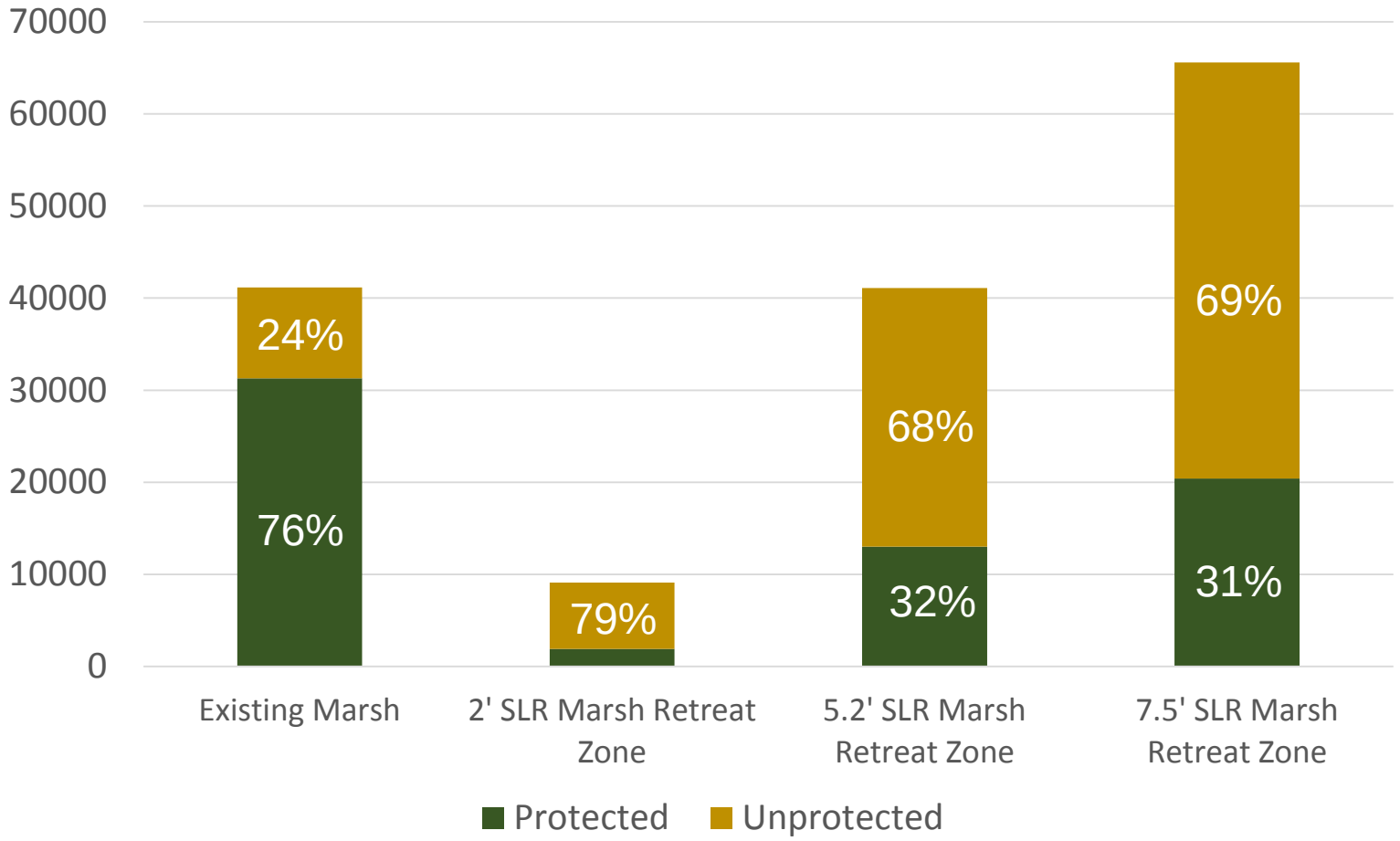
Integration (one possibility)

Highest priority parcels meeting the following criteria:

- At least one avian guild “far above average”
- Either marsh retreat zone or VEVA score “far above average” and the other at least “above average”

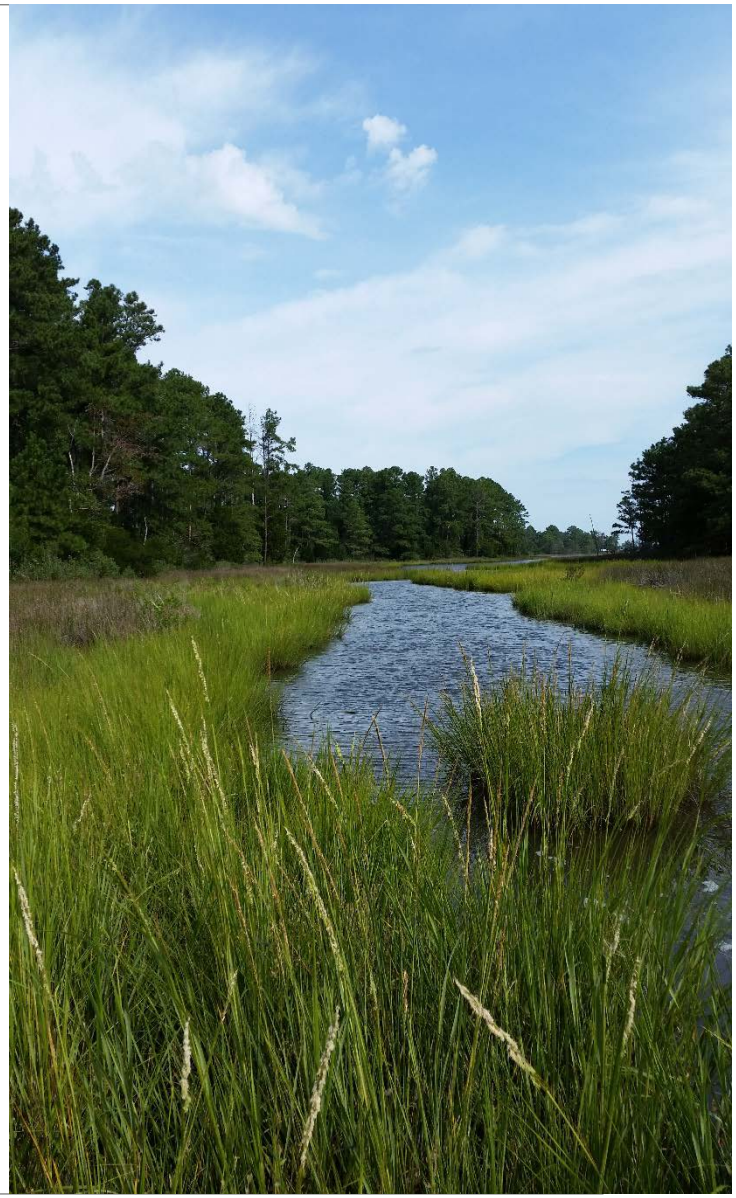


Protected areas for marsh retreat zones vs. current marsh (mainland only)



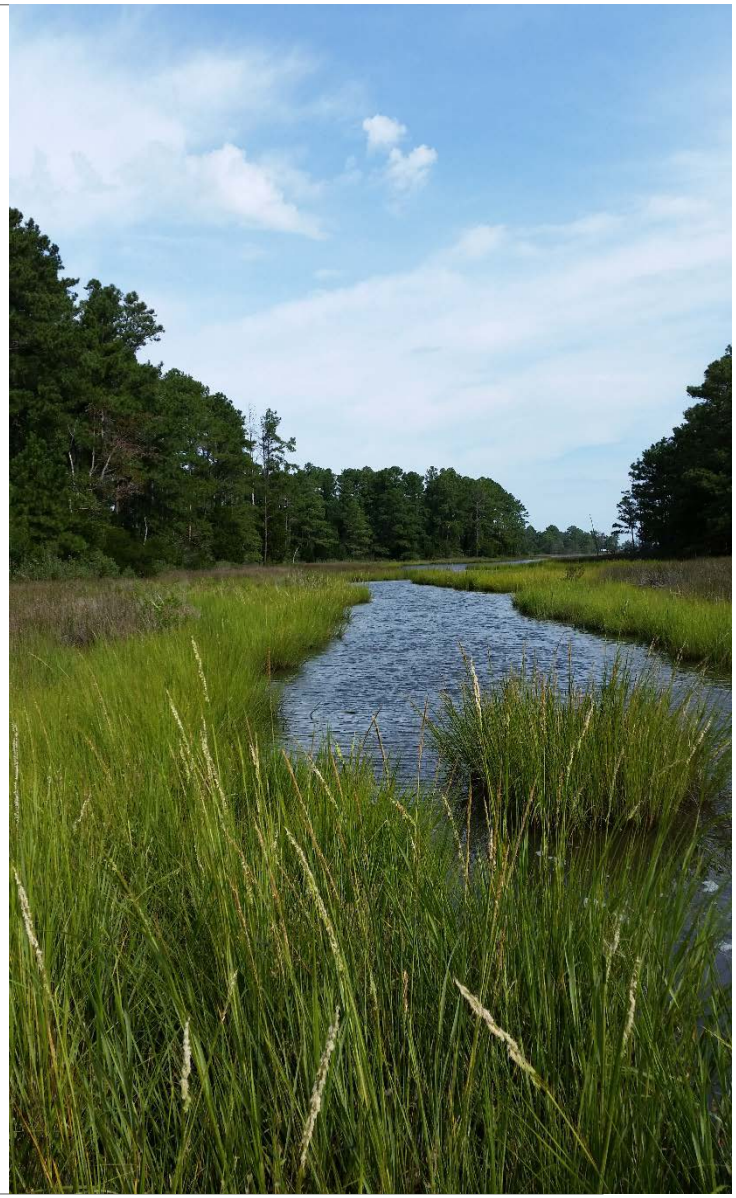
Some Initial Conclusions

- Analysis shows high adaptive capacity in Virginia Eastern Shore landscape for marsh retreat
- However, the spatial distribution and extent of marsh retreat zone varies dramatically from existing marsh distribution
- The majority of the potential future marsh retreat zones are on the bayside in private ownership
- Whether marshes will expand or contract in response to future SLR depends on whether landowners and society will allow them to migrate inland



Next Steps

- Re-run SLAMM using 2015 LiDAR
- Uncertainty analysis
- Update Future Habitat app on Coastal Resilience
- Re-run marsh retreat zones with scenarios based on new National Climate Assessment SLR curves plus local subsidence
- Decide on internal prioritization scheme to drive acquisition
- Identify willing land owners and funding sources



Further Information

Land Protection Tool:

Map package - http://bit.ly/1zPIJuU

Geodatabase - http://bit.ly/1IF1V63

Coastal Resilience Portal:

maps.coastalresilience.org/virginia

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