

## Draft Outline - Wetlands Adaptation Strategy

1. Purpose of strategy
  - a. Have in one place all of the existing, forthcoming, and recommended projects, policies, programs and initiatives needed to achieve quantitative goals for successful wetland migration and wetland preservation in Maryland as sea level rises and salinization increases.
    - i. Why? Maryland would like to minimize the loss of carbon sequestration, wildlife habitat, and other ecological services provided by Maryland's coastal wetlands as climate changes.
    - ii. Consider different strategies (not goals) for helping different types of wetlands.
2. Definitions
  - a. Present definitions
  - b. Suggest changes or highlight where our definitions differ
3. Basics of wetlands role in climate adaptation and resilience
  - a. Past trends
  - b. Challenges (in regard to achieving the purpose of the strategy)
    - i. Hardened shorelines
    - ii. Climate Change
      1. Sea level rise
      2. Associated salinization (uncertainty as climate changes) - see this [link](#)
      3. Precipitation patterns threaten inland wetlands
      4. Invasive species
      5. Coldwater resources threatened by warming
      6. Erosion rate and worsening severity
      7. Changes in natural community composition
    - iii. Existing land use/management/ownership (including different goals) within the wetland migration corridor
    - iv. Funding (see section x)
4. Existing/upcoming plans/goals (and state coordination approach)
  - a. 2014 Chesapeake Bay Agreement
    - i. "Create or reestablish 85,000 acres of tidal and non-tidal wetlands and enhance the function of an additional 150,000 acres of degraded wetlands by 2025."
  - b. Beyond 2025 Bay Program effort
  - c. Next Generation Adaptation Plan (10 years)
  - d. 2023 Climate Solutions Now Act (final expected December 2023)
    - i. Actions to maximize carbon sequestration to meet Maryland's 2031 and 2045 GHG limits.
    - ii. Mention Climate Pathways Report here.
  - e. Audubon Marshes for Tomorrow initiative - see this [link](#) - tidal portions of the Chesapeake Bay and Coastal Bays

- f. The Nature Conservancy's Resilient Landscapes initiative - possibly covers both tidal and nontidal wetlands
  - g. Chesapeake Bay Trust tidal wetland strategic plan
  - h. Revised State Wildlife Action Plan due in fall 2025
  - i. USGS Coastal Change  
Tool/Data-<https://storymaps.arcgis.com/stories/02d5f2b51dc1415b8d5ca285d2f19ed2>
5. What do updated mapping/data/analysis/projections indicate?
- a. 2021 SLAMM results
    - i. Persistent Wetlands
    - ii. Upland to Wetland Conversion
    - iii. Identify priority areas in Maryland for wetland migration
    - iv. Additional findings from SLAMM analyses
  - b. TNC Resilient Landscape Analysis
  - c. [...ask Nicolo Carlozo and Dylan Taillie regarding additional information to add here...]
6. Quantitative goals to achieve and tracking progress
- a. Quantitative goal options include:
    - i. Protect x percent of the Persistent Wetlands and x percent of the projected (2070? 2100? Under which emission scenario?) Upland to Wetland Conversion acres by x date and maintain that level of protection moving forward.
    - ii. Goals for restoration and enhancement for nontidal (including vernal pools) and tidal wetlands impacted by climate change - connect to Bay Program effort.
  - b. Tracking progress options include:
    - i. Tracking actual wetland protection annually. Determine what additional work is necessary to do this. Make a decision regarding type and level of protection (e.g., permanent protection versus 15-year easement).
    - ii. Overall national land cover and national wetland cover updates
    - iii. CBP land cover data set (Chesapeake Conservancy's)
    - iv. Proposal by Chesapeake Conservancy - an AI-supported classification and mapping scheme - input data includes aerial imagery, digital elevation models, etc. and is 94% accurate. This would inform 5-year NLCD/NWI updates (national land cover effort).
      - 1. Clarify what ended up getting funded so far
    - v. NOAA Coastal Change and Analysis Program (C-CAP) - informed by national land cover effort - currently being updated to include Ches. Conservancy's high res land-use mapping (1m) - annual updates but those are interpolated between longer-term regular updates
  - c. Modify projections and goals over time
    - i. When SLAMM (ideally) is updated every 10 years by DNR (next ideally by 2033)
7. Existing/modified/new policies/programs to reach these goals

- a. Introduction - reasons for policies/programs
  - b. 2022 subteam effort of the state agency saltwater intrusion team to identify possible modified or new policies and programs to facilitate wetland migration.
    - i. Inventory created by the 2022 subteam to create a list of existing policies/programs, including:
      - 1. Coastal resilience easements (DNR)
      - 2. Critical Area requirements for state agency development projects to consider wetland adaptation areas
      - 3. MDE online tool indicating where hard shorelines are and are not allowed- Shoreline Stabilization Mapper
      - 4. [add others from the inventory]
    - ii. Possible modified or new policies and programs identified by the 2022 subteam, including: see separate table below (after the outline) from September 2022 presentation to ARWG
  - c. Wetland park idea (work with DNR POS as a priority)
- 8. Prioritization/ranking of approaches to meet goals - might be overlapping with item 7 (policies and programs to meet goals) - how we're going to apply and use data resources - and new data tools that might be necessary - interpret existing datasets and tools and then use it to prioritize geographic areas, particular wetland types for the strategy
  - a. Persistent Wetlands and Upland to Wetland Conversion from the 2023 SLAMM results will guide where specific wetland protection and/or wetland enhancement efforts should occur.
  - b. Marsh Protection Index (incorporates protection of communities, wave attenuation, and marsh stability) and Marsh Protection Potential Index for future conditions
  - c. Shoreline Inventory
- 9. Outreach/training so all parties and partners can assist (e.g., CCS hosting a living shoreline implementation training this fall).
  - a. This covers voluntary measures as well as ensuring successful implementation of any proposed mandatory measures.
  - b. Some of the 2022 subteam ideas (see table after this outline) fit here.
  - c. Better messaging to convince local governments and property owners to take action (including funding, data and research, cost-benefit analyses, quantify economics of the co-benefits, etc.) for both tidal and nontidal wetlands.
  - d. Discuss Virginia survey of permit recipients (hard versus soft shoreline protection) and their reasons for choosing the shoreline protection type - economic study forthcoming.
  - e. Study demonstrating similar ecological value/makeup of natural marshes compared to living shorelines.
- 10. Funding needs/approaches
  - a. MDA cost-share (Federal programs as well - wetland reserve program and other relevant programs)
  - b. Blue Carbon feasibility in MD/ecosystem service market solutions/risk reduction

- c. Property acquisition (DNR POS help with this?)
  - d. Partnerships - building on success with NGOs and other partners who can receive specific funds, and expand capacity
  - e. Both tidal and nontidal wetlands
11. Data and research needs/questions to resolve
- a. Cost Benefit Analysis showing consequences of not conducting restoration, implementation of nature based solutions compared to gray infrastructure or no action (given 7,500 miles of shoreline in Maryland).
    - i. Chesapeake and Climate Corps intern at MDE putting together economic information
    - ii. Hazard (flood and storm surge) reduction
  - b. USFWS wetland benefits study - spending by sectors (birdwatching, hunting, fishing, etc.)

#### Findings and Recommendations from the 2022 subteam:

1. Within the Maryland Watershed Resources Registry (and all state and federal maps that have relevance to wetlands), the state agencies shall ensure that priority wetland restoration areas encompass the entirety of new wetland areas (2050 and 2100) forecasted by SLAMM.
  - a. Note: the "New Wetland Areas" is within the WRR now - as a GIS layer, not in the model; however, it seems there is something wrong with the data (e.g., look at Talbot Co). This needs to be addressed before it should be added to the model.
2. \* The state agencies shall ensure statewide coordination between DNR Coastal Resilience Easement efforts, MALPF, MDA MACS funding for wetland restoration/creation or wetland buffers, MDE Maryland Shoreline Stabilization Mapper (MSSM) restrictions, MDE/DNR/CBT financing, DNR Forest Cons Plans, CAC resiliency efforts, MDEM Office of Resilience, e.g., joint communications such as developing text for use across all state websites, joint outreach.
3. The Critical Area Commission shall look into the issue of wetland migration corridors.
4. The CoastSmart Construction Program shall be reviewed by the CoastSmart Council to consider and develop any needed changes related to wetland migration. The CoastSmart Construction Program's siting and design criteria don't prohibit building within wetland migration corridors, or require design measures that could allow for wetland migration when building must occur.
5. \* The state agencies shall request confirmation of our federal partners' (e.g., NRCS) timeline to review and adopt new design standards for agricultural BMPs to account for wetland migration, saltwater intrusion, etc.
6. \* The state agencies shall create guidance for local governments on incorporating wetland migration areas into local green infrastructure plans, comprehensive plans, hazard plans, etc.; adjusting zoning; MDE and CAC regulatory limitations; and seeking funding. The guidance should describe recommendations for plan language and plan implementation mechanisms and approaches (e.g., model zoning ordinances), should

encourage governments to identify research gaps and data gaps as they arise, and should incorporate the adaptation pathways approach.

7. The state agencies shall use the new SLAMM model results to map which coastal buildings, natural resources and infrastructure (roads, bridges, wells, septic systems, hardened shorelines, etc.) are threatened by wetland migration. The state agencies shall reach out to critical infrastructure in the path of wetland migration to ensure they adapt and shall incorporate risk tolerance analyses discussed in the 2022 Maryland Sea Grant Sea Level Rise Guidance document.
8. The state agencies shall develop guidance for local practitioners (state agencies, consultants, scientists, etc. who are responsible for on-the-ground restoration and maintenance).
9. The state agencies need to determine government responsibility to coastal property owners/dwellers whose property is and will be impacted by wetland migration - what options should the government provide? Should disadvantaged communities be prioritized for adaptation projects? The sooner we provide information to communities, the sooner they can make decisions (e.g., create a tool that looks at the 30-year mortgage timeframe) and the sooner they can access resources.
  - a. Any analysis shall consider existing active management by government now (e.g., spray irrigation, easement efforts) to help property owners/dwellers adapt. There are other tools, such as water/sewer plan regulations, local hazard mitigation planning, etc.; however, need to consider impact of government action on real estate values.
10. The state agencies shall create and provide guidance and outreach to property owners/dwellers, describe what to look out for on the property and adaptation options (both early and late in the land change process); coordinate discussions among all service providers (including state agencies, SCDs, land trusts, NRCS, TNC) who assist all types of coastal property owners (local government, farmers, forest land owners, residential land owners, business land owners, etc.); and adjust the guidance to reflect lessons learned from similar initiatives, e.g., the Georgetown Climate Center's guidance on wetland migration.
  - a. The guidance should include a cost-benefit analysis tool to assist coastal property owners with land management decisions (e.g., making the decision of whether to continue to grow crops/harvest trees/plant wetlands). The tool should identify thresholds or management tipping points that show when it is time for a management shift, e.g. a tide gate is overtopped (VIMS is working on this in Virginia).
11. How we talk about this issue with property owners is very important (some farmland is no longer arable, some properties can no longer be permitted for septic systems, cost of coastal living is increasing, etc.) Pair with efforts (e.g., UMD anthropology/ ethnography research) to generate community buy-in and learn concerns.
  - a. A team shall be assigned by the ARWG to develop the guidance and an outreach plan and to develop a set of objectives that will guide the state's future assistance to property owners/dwellers.