Climate Resiliency Quarterly Progress Review

Order of presentations and discussion:

- Climate Adaptation Outcome Progress (12 minutes; Julie Reichert-Nguyen)
- Clarifying Questions (3 minutes)
- Climate Monitoring and Assessment Outcome Progress (12 minutes; Mark Bennett)
- Clarifying Questions (3 minutes)
- Fill the gap for both outcomes (10 minutes; Mark Bennett)
- Discussion and next steps (50 minutes)

QUARTERLY PROGRESS MEETING – November 2022
Chesapeake Bay Program
Presented by Climate Resiliency Workgroup (CRWG)

Climate Adaptation Outcome

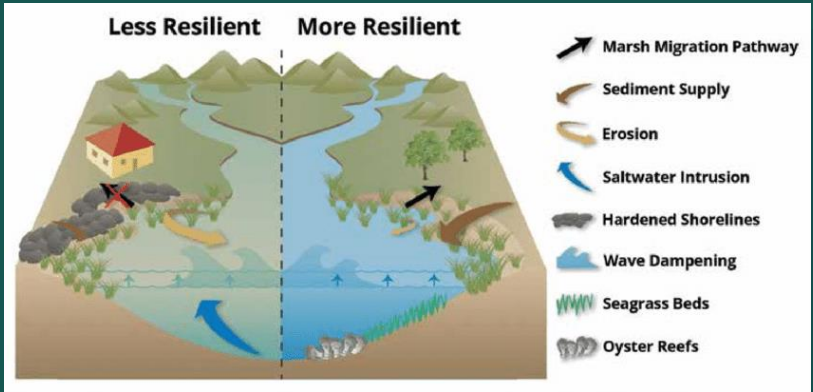
Chairs:
Mark Bennett, USGS
Jackie Specht, TNC

Coordinator:
***Julie Reichert-Nguyen**, NOAA*

Climate Staffer:
Jamileh Soueidan, NOAA Affiliate/CRC

Star Staffers:
Alex Gunnerson & Amy Goldfischer, CRC

Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*



Kister 2016 (Reprinted with permission from the Integration & Application Network, 2013.)

Goal: *Climate Resiliency*

Adaptation Outcome:

Continually pursue, design, and construct restoration and protection projects to enhance the resiliency of Bay and aquatic ecosystems from the impacts of coastal erosion, coastal flooding, more intense and more frequent storms and sea-level rise.

What is our Outlook?

OUTLOOK
UNCERTAIN

Outlook: Uncertain

- Near-term: Need to sort out the means to track individual climate adaptation-related projects:
  - Time-intensive: this information is not readily available - will likely need a way for partners to self-report projects.
  - Need collaboration with other workgroups that focus on tracking natural resource conservation/restoration efforts (e.g., wetlands, fish habitat, black duck, coastal forests, etc.)

- Long-term (system-wide): Need metrics/methods to assess overall resilience enhancement in protecting or minimizing loss of resources given the urgency demonstrated by climate change trends and projections:
  - Will likely need long-term monitoring at project locations and/or analytical modeling support.

What is our Recent Progress?

Progress: Increase

- CRWG GIT-funded “Partnership-Building and Identification of Collaborative Marsh Adaptation Projects” aims to identify marsh restoration and resilience research projects and potential collaborative partnerships to apply for funding.

- CRWG supported several tidal wetland workshop efforts with climate resilience discussions - EPA-ORD, MD Sea Grant, Wetland Outcome Attainability.

- CRWG provided advisory support for several GIT-funded projects led by other workgroups - Targeted Outreach for Green Infrastructure (TOGI), social science assessment.

Learn

What have we learned in the last two years?

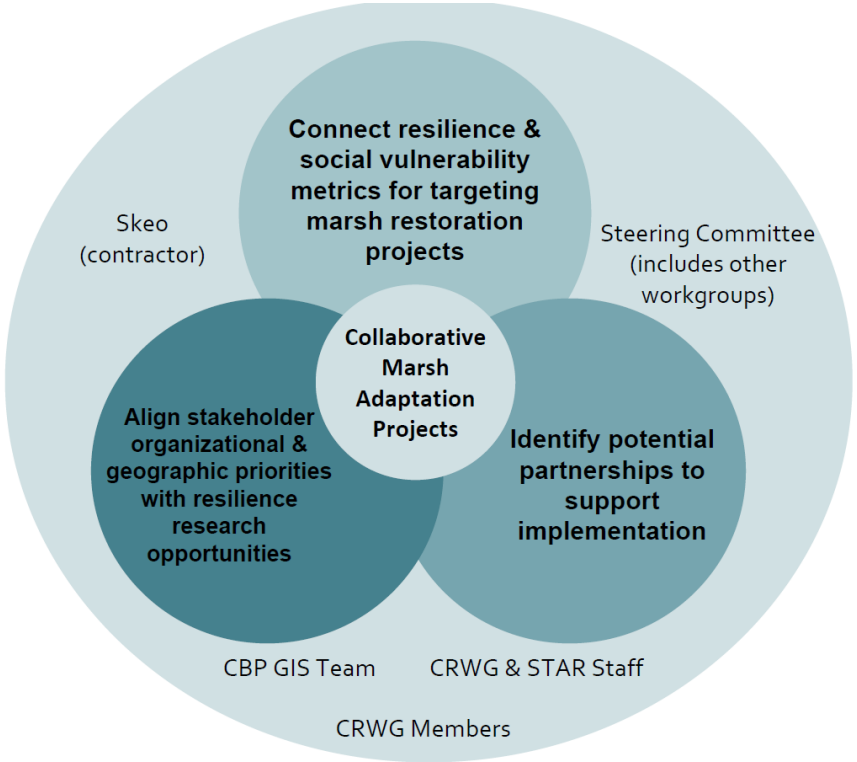
Successes: Adaptation Project Support

- Supported targeted outreach for green infrastructure GIT-funded project with Habitat GIT
  - Worked with 4 communities that led to conceptual designs and organizations supporting communities in pursuing grants.

- Supporting efforts for coastal wetland resilience
  - Collaborated with Wetlands Workgroup on the GIT-Funded for Marsh Migration Data Synthesis project.
  - Successful in getting GIT-funding for the Partnership-Building for Collaborative Marsh Adaptation project.

Successes: Partnership-Building for Collaborative Marsh Adaptation Projects

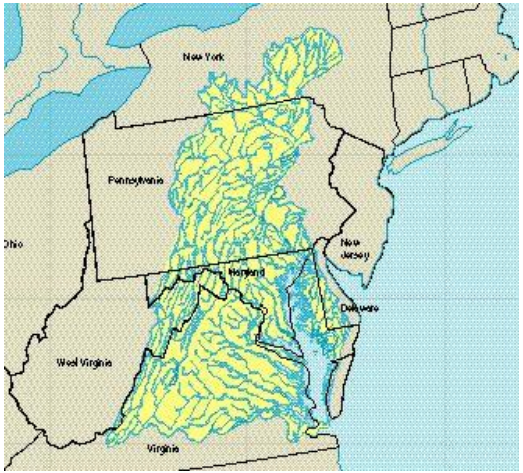
- Timeline: June 2022-September 2023
- Framework and metrics to support the identification of marsh adaptation projects.
- Stakeholder survey to increase understanding of partner marsh priorities.
- Workshop to identify projects and identify partners for 2 focus areas in MD and VA.



Successes: Local Engagement Coordination

- The CRWG provided resources to the Strategic Engagement Team (formerly, Local Engagement Team) supporting:
  - Educational modules: A Local Government Guide to the Chesapeake Bay
  - Climate webinars: 1) Plan Integration for Resilience AND Equity and 2) Leveraging Hazard Mitigation for Water Quality Benefits.
  - Local Leadership meeting on resilience information to climate related flooding (Aug 2021).
  - Maryland Municipal League Panel on Equity in Climate Resilience (June 2021) and Magazine Article, 'Seeking Solutions for Addressing Stormwater-related Flooding Challenges' (Dec 2021).

Challenges: Adaptation Tracking

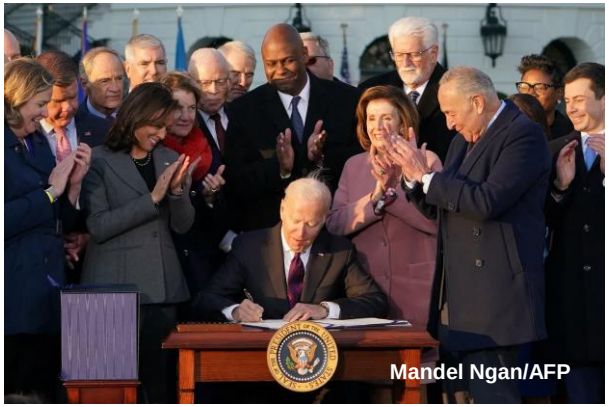


- Past efforts to track resilience were too broad in scope making it hard to develop an end product
  - Need to sort out how best to use the CRWG team to effectively track resilience enhancement - where can we add the most value? What is feasible?

- Lesson Learned: Narrowing focus on priority adaptation strategies (e.g., marsh migration, natural/green infrastructure) increased success in making progress on adaptation outcome.

On the Horizon

- Influx of resilience funding through Infrastructure Law and Inflation Reduction Act and other funding sources:
  - Determine the role of the CRWG to support partners in being successful in getting funding and be more competitive for larger national grants.



- Establishment of the Executive Council Climate Change Directive:
  - CRWG can support aspects of Partnership-wide plan related to climate science needs
  - It is outside the workgroup's capacity, scope, and membership to address entire plan - need jurisdictional and Federal commitments and separate coordinating body and process.

Adapt

How does all of this impact our work?

Based on what we learned, we plan to …

- Continue to support the GIT-funded Marsh Adaptation Project:
  - Synthesize and promote use of common resilience and social vulnerability metrics for selecting marsh restoration locations and measuring success.
  - Build partnerships to pursue marsh restoration projects under the influx of resiliency funding.
- Synthesize findings from various tidal wetland/marsh resilience tools through possible GIT-funding to assist with restoration targeting.
- Provide advisory support and summarize lessons learned on the grant application process for projects identified through the CRWG's GIT-funded Marsh Adaptation Project.
- Coordinate with Habitat GIT/Wetlands Workgroup on tidal wetland resilience efforts to align with broader wetland goals.

Based on what we learned, we plan to …

- Plan discussions during future CRWG meetings on how the CRWG can feasibly track progress on the Adaptation outcome.
- Invite researchers to present on how they are quantifying resilience effectiveness in relation to habitat and community resilience.
- Invite representatives from the Local Government Advisory Committee to present on recommendations from the Local Government Forum: Integrating Resilience into Local Planning.
- Explore opportunities to identify and discuss gaps in resiliency work (e.g., ghost forests/forest loss, marsh migration tradeoffs, benefits of living shorelines versus hardened shorelines, equitable adaptation) in collaboration with respective workgroups.

Equitable and inclusive restoration …

- The Targeted Outreach for Green Infrastructure project included outreach and conceptual designs with two underserved community areas and two tribes.

- The Marsh Adaptation Project incorporates goals to work with the Diversity Workgroup to identify and reach out to leaders of underrepresented groups to participate in stakeholder engagement efforts to identify projects. Also set aside a portion of the budget for compensation of their time.

Clarification Questions

QUARTERLY PROGRESS MEETING – November 2022
Chesapeake Bay Program

Climate Monitoring & Assessment Outcome

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Goal: *Climate Resiliency*

Monitoring & Assessment Outcome:

Continually monitor and assess the trends and likely impacts of changing climatic and sea level conditions on the Chesapeake Bay ecosystem, including the effectiveness of restoration and protection policies, programs and projects.

What is our Recent Outlook?

Outlook: On Course

- Progress is being made on assessing climate change trends related to physical change (e.g., temperature, precipitation, sea level rise)
- Based on trends, recommendations have been developed related to restoration and protection policies, programs, and projects (e.g., Rising Water Temperature STAC Workshop, BMP climate uncertainty report)
- To stay on course, recommendations need to be reviewed and implemented by respective partner programs (e.g., natural resource agencies, federal agencies, local governments, etc.)

What is our Recent Progress?

Progress: Increase

- Worked with Management Board in prioritizing which climate change indicators for the workgroup to focus on.
- Near completion of updates for the Air Temperature Change and Precipitation Change climate change indicators.
- CRWG co-led the Rising Water Temperature STAC Workshop effort leading to recommendations on assessment needs to support program effectiveness in addressing climate change impacts.
- CRWG identified ocean acidification and blue carbon science needs for STAR's Monitoring Program Review effort.

L

Learn

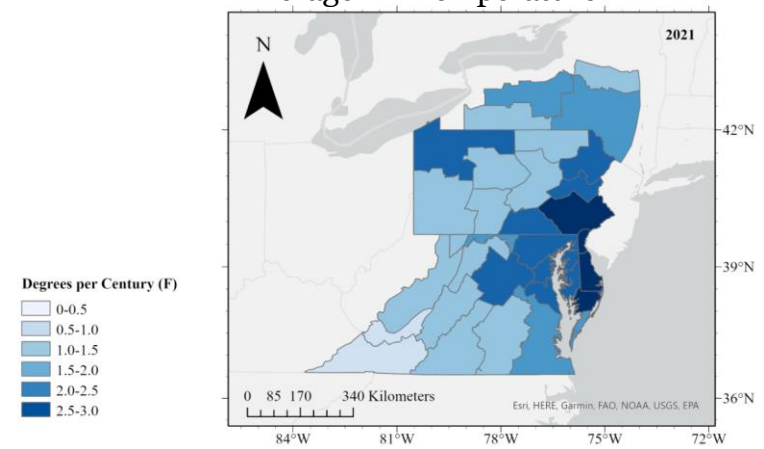
What have we learned in the last two years?

Successes: Progress on Assessing Climate Change Impacts

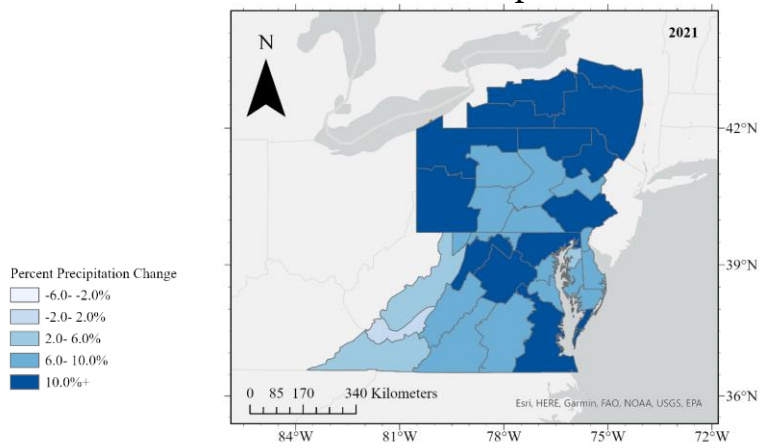
- Piloted new climate staffer position - greatly improved workgroup's capacity to support climate change indicator efforts and cross-workgroup support on projects and workshops.

- Progress on assessing utility of a Bay Water Temperature Change Indicator
  - Developed synthesis paper identifying data sources and conceptual ideas (supported by climate interns and NOAA).
  - Identified fisheries and SAV management needs through Rising Water Temperature STAC Workshop effort.

Average Air Temperature



Total Annual Precipitation



Successes: Cross-Workgroup Efforts

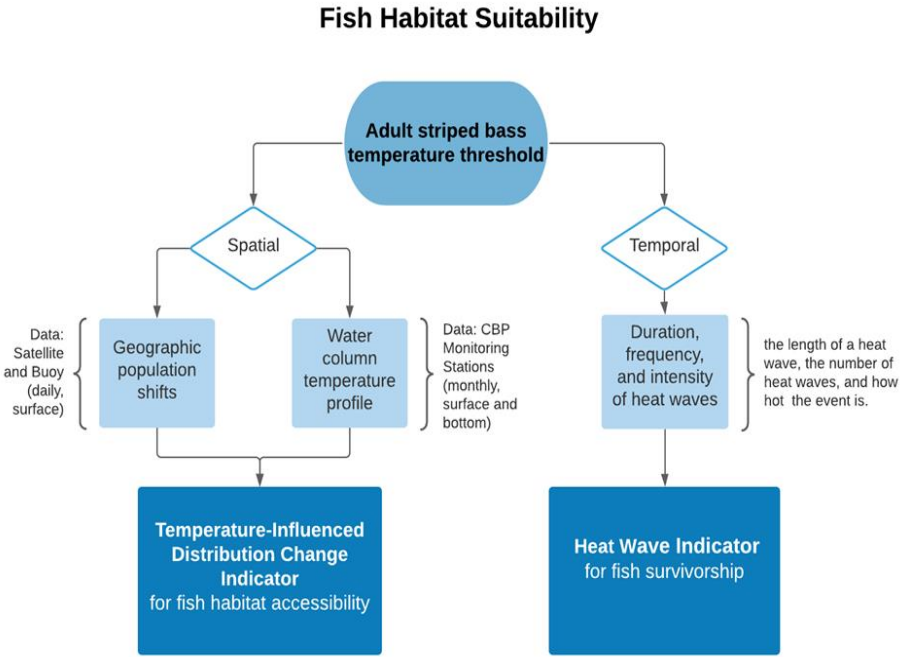
- Co-led the Rising Water Temperature STAC Workshop
  - Hosted full-day special meeting with multiple workgroups to discuss rising water temperature effects on living resources and habitats
  - Facilitated tidal workshop discussions and led draft of tidal chapter for STAC report.

- Worked with Water Quality GIT, Urban Stormwater Workgroup, and Virginia Tech to assess BMP climate resilience uncertainties.
  - Supported joint meeting discussing stormwater BMP vulnerabilities to climate change and next steps for more resilient designs.
  - Managed the completion of the report by Virginia Tech reviewing literature on BMP performance and climate uncertainty (January 2022).

Challenges

- Climate change indicator work is time and staff resource intensive - need partners to help make progress: commit as long-term data providers and assist with analysis.

- Lessons Learned:
  - Important to establish end purpose of indicator with potential users to make effort worthwhile.
  - Need other workgroups' support in connecting climate change indicators with relevant ecological impacts to natural resource outcomes.



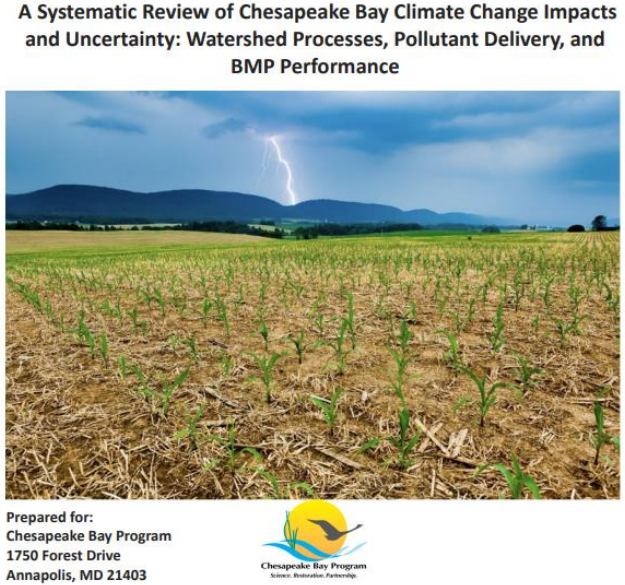
Challenges Cont.

- Capacity to support all monitoring and assessment needs - partnership support is needed
  - Lessons Learned:
    - Connect with established networks - e.g., Mid-Atlantic Coastal Acidification Network
    - Blue carbon financing science and monitoring needs are resource-intensive requiring long-term investments with uncertain returns - what is the CBP role?

- Research sparse on climate change impacts on BMP effectiveness based on systematic literature review by Virginia Tech
  - Lesson Learned: Need dedicated funding to support BMP climate change performance research/mechanistic modeling to further knowledge for Phase 7 Watershed Model and WIP strategies.

On the Horizon

- Incorporation of climate data in Chesapeake Bay Water Quality and Watershed Model for 2025.
- EPA planning a Request for Applications to support research on ag and natural BMP effectiveness related to climate change impacts. Refers applicants to consider recommendations in the Virginia Tech report.
- Climate science needs identified through SRS and the Monitoring Program Review report.



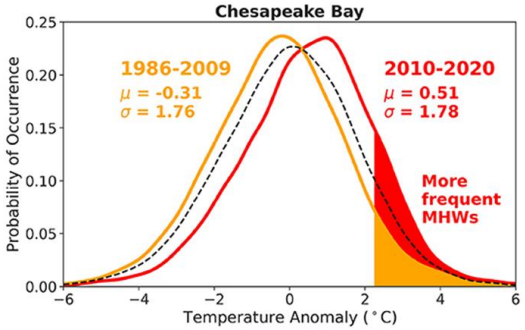
Adapt

How does all of this impact our work?

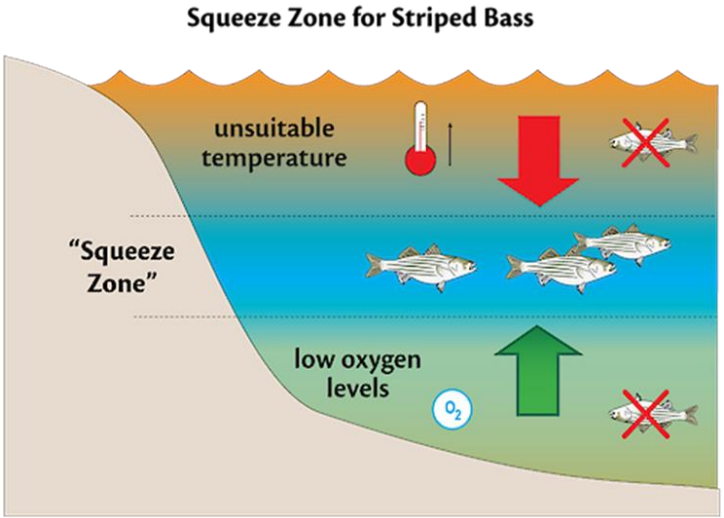
Based on what we learned, we plan to …

- Determine how the workgroup can support science recommendations from the Rising Water Temperature STAC Workshop report.

- Meet with other workgroups to identify how best to build water temperature change indicators in relation to resource-related outcome needs.
  - Initiate discussions with Integrated Trends Analysis Team (ITAT) on temperature trends
  - Assess the inclusion of multiple stressor-type information related to marine heat waves (MHWs) and dissolved oxygen based on science needs expressed during Rising Water Temperature STAC workshop.



Source: Mazzini and Pianca 2022

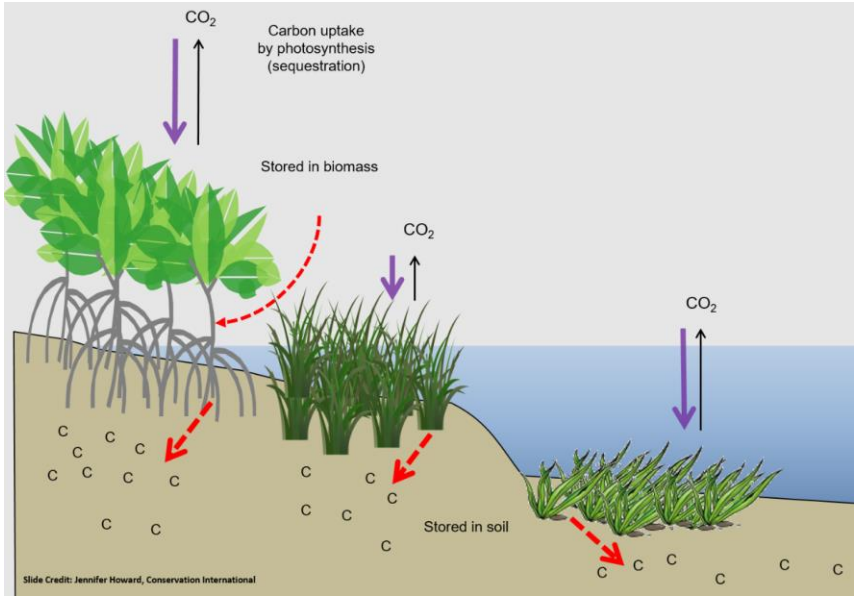


Conceptual diagram illustrating the compressed habitat of the striped bass from the low oxygen levels from the bottom, and the unsuitable unsuitiable tempatures on the top waters.
Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Enviromental Science. Source: Boesch, D.F. (editor). 2008. Global Warming and the Free State: Comprehensive Assessment of Climate Change Impacts in Maryland. Report of the Scientific and Technical Working Group of the Maryland Commission on Climate Change. University of Maryland Center for Environmental Science, Cambridge, Maryland. This report is a component of the Plan of Action of the Maryland Commission on Climate Change, submitted to the Governor and General Assembly pursuant to Executive Order 01.10.2007.07.

Based on what we learned, we plan to …

- Evaluate workgroup's role in supporting ocean acidification and blue carbon/carbon sequestration monitoring and assessment discussions in coordination with STAR.

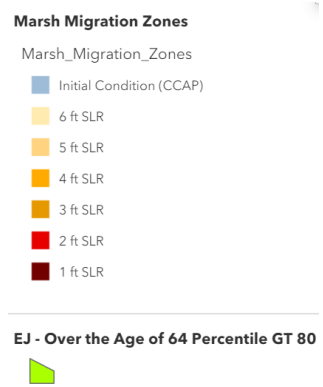
- Provide advisory support to the Water Quality GIT and Modeling Workgroup on BMP performance research related to climate change impacts and any updates to climate projections in water quality and watershed model.

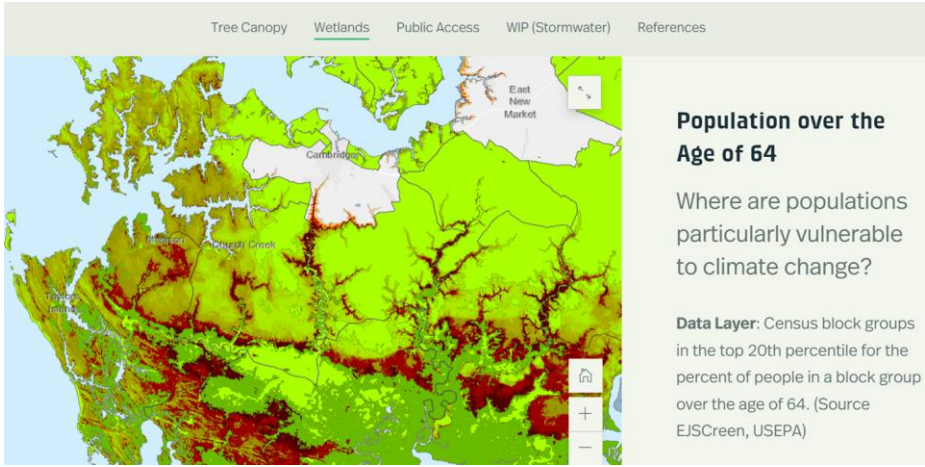


Equitable and inclusive restoration …

- Consider social vulnerability and environmental justice-related data when developing and using climate change indicators.

Conceptual Ideas from CBP GIS Team (John Wolf)



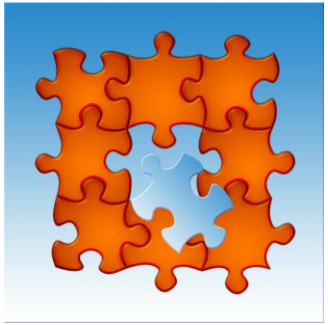


Clarification Questions

Fill the Gap

How can the Management Board help achieve the Outcomes?

Filling the Gap: For Awareness



For Awareness (no response needed):

- The dedicated **climate staffer position has been a critical asset** in supporting progress on climate resilience activities allowing the workgroup to better function in assessing climate change impacts and engage in cross-workgroup efforts in support of adaptation projects.

- **If contacted, support the CRWG Marsh Adaptation Project requests:**
  - Identify staff working on tidal/coastal wetland projects being implemented or planned.
  - Encourage your organization to participate in the stakeholder outreach questionnaire (tentatively planned for January 2023).

Filling the Gap: For Response

Management Board Response Options

1. Acknowledge that the MB is not committing to take specific action; Express gratitude for the work and information.
2. Handle the outcome request
3. Elevate to the PSC
4. Refer to another team/workgroup

- **Define accountable parties for actions identified under the Climate Change Directive** - this is a Partnership-wide plan that requires high-level coordination beyond the scope of the CRWG.
- Identify potential **data-providers and/or analysis support** within your organization that could potentially **assist with prioritized climate change indicators**:
  - Flooding related to community resilience (no partners yet)
  - High temperature extremes related to urban tree canopy and environmental justice (initial conversations with Forestry Workgroup)

Potential partners identified (no commitments yet):

- Bay water temperature change indicator related to fish and/or SAV habitat
- Stream temperature change indicator related to brook trout habitat
- Relative sea level rise indicator related to wetland loss and gains (marsh migration)

Discussion