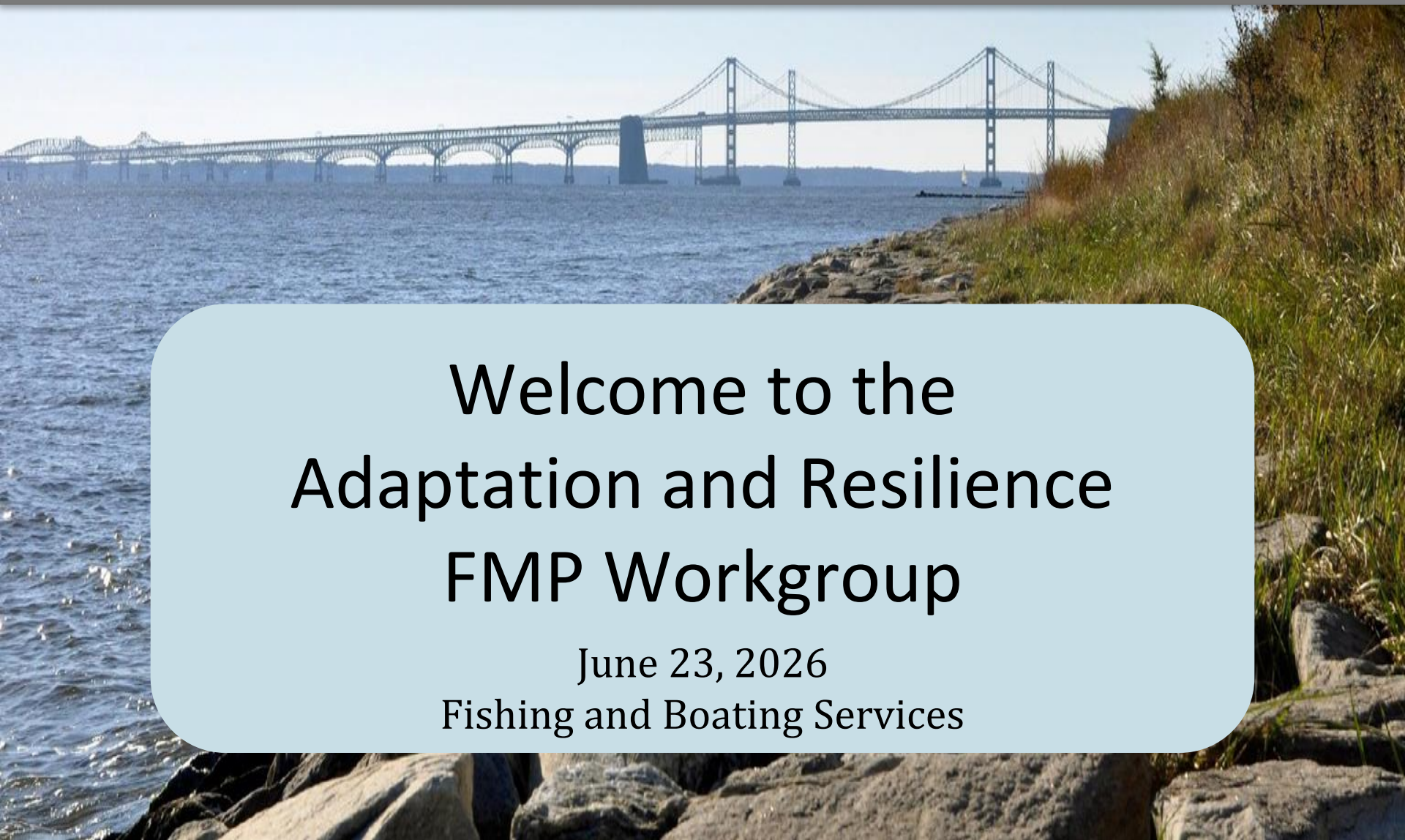

Welcome to the Adaptation and Resilience FMP Workgroup

June 23, 2026

Fishing and Boating Services

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Workgroup Objective

1. Exchange existing climate and fisheries data and industry knowledge

2. Collaboratively develop a climate resilient fishery management plan (FMP) for state-managed fisheries

Geographic Focus: Chesapeake Bay and Atlantic coast




Timeline

Summer 2026

- June 23 - Workgroup Meeting 1 (in person)
- July - Workgroup Meeting 2 (hybrid option)
- August - Workgroup Meeting 3 (virtual)
- September - Workgroup Meeting 4 (virtual)
- October - Develop Summary Input Document
  (DNR staff with review/input of Workgroup)
- November to March - Develop FMP
  (DNR staff with review/input of Workgroup)

Spring 2027

Workgroup Members

First	Last	Affiliation
Greg	Casten	Profish Seafood Company
Kiley	Dancy	Mid-Atlantic Fishery Management Council
Sonny	Gwin	Commercial Fisherman, Ocean City Maryland
Jorge	Holzer	University of Maryland, College Park
Harry	Hornick	Retired DNR
Henry	Legett	Smithsonian Environmental Research Center
Mariah	Livernois	Maryland Coastal Bays Program
Will	Poston	Chesapeake Bay Foundation
Julie	Reichert-Nguyen	NOAA Chesapeake Bay Office
Kenneth	Rose	Horn Point Laboratory of the University of Maryland Center for Environmental Science
Bill	Sieling	Chesapeake Bay Seafood Industries Association
Dave	Sikorski	Coastal Conservation Association
Ward	Slacum	Oyster Recovery Partnership
Troy	Tuckey	Virginia Institute of Marine Science
Taylor	Woods	USGS Eastern Ecological Science Center
Andrew	Loftus	Facilitator (aloftus@andrewloftus.com)

Workgroup Procedures pt. 1

- There is no Workgroup chair. The facilitator will serve as the discussion leader of meetings and work in conjunction with DNR staff to plan and coordinate the meeting process.
- There will not be "votes." The objective of this Workgroup is to gather information to be used in formulating and FMP, not provide ranked policy recommendations.
- Each member will strive to listen actively, be open-minded and be respectful of other members, the public, concepts and ideas. There will be no personal attacks or threats. Keep questions/comments to the point.
- Limit topics to those that contribute to meeting the Workgroup objectives.

Workgroup Procedures pt. 2

- If a topic requires more time than originally allocated on the agenda, the topic may be a candidate for further discussion at a future meeting.
- Workgroup members should plan to participate in every meeting. If unavoidable, a "proxy" may be offered but must be communicated to facilitator at least 1 day in advance of meeting.
- Only Workgroup members or a proxy will sit at the meeting table.
- We will develop mechanisms for members of the public to provide input.

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Getting to Know the Workgroup Members

Please share with us:

- Why did you join the workgroup?
- What is one way the environment has changed over your lifetime?

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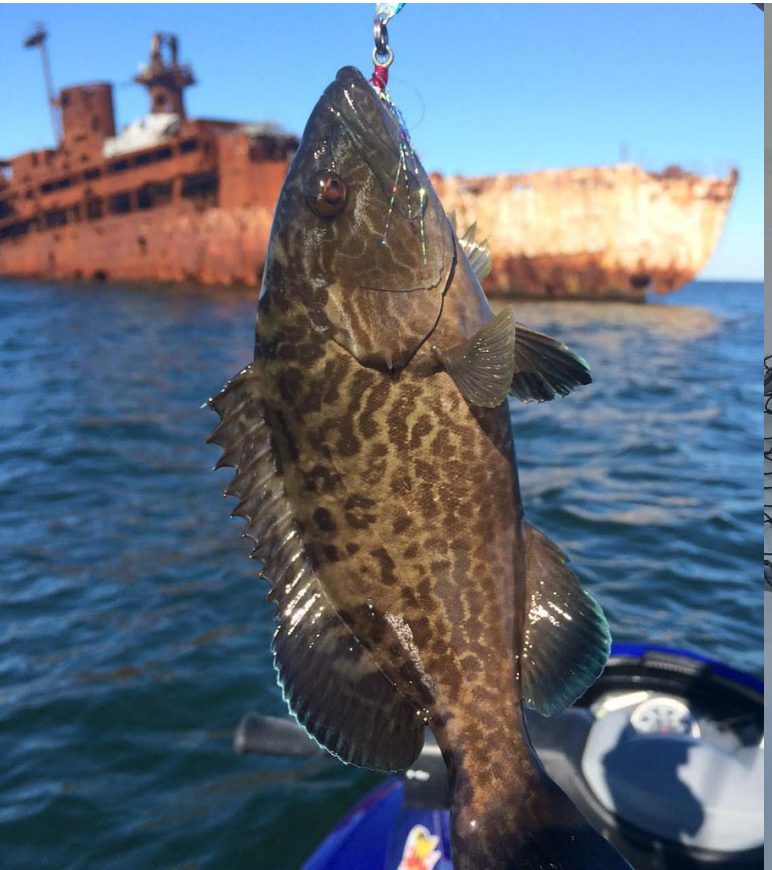
What do you do when you catch a fish you have never seen before?



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Key Message:
Environmental and climate conditions in Maryland are already changing

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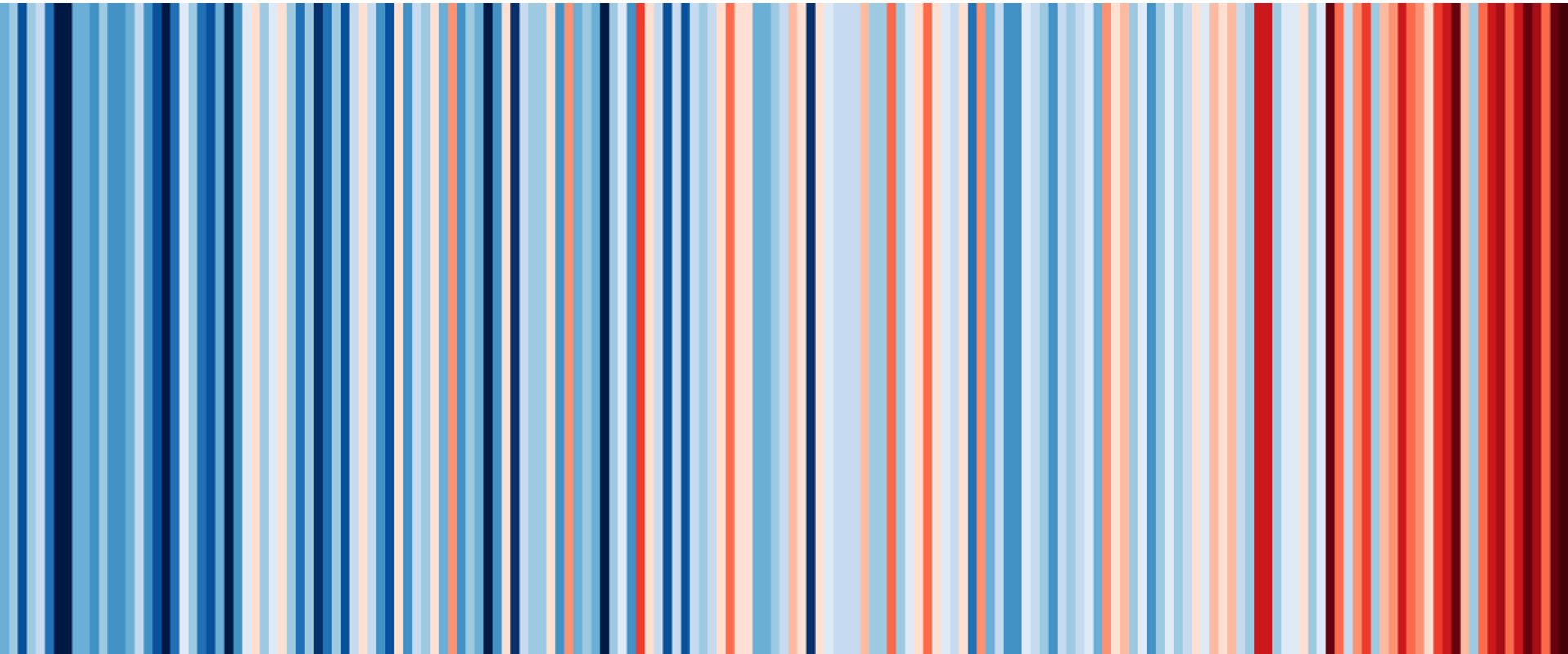
Since the late 1990s, **annual temperature** has been warmer than the average of 1961-2010

(Baltimore, showyourstripes.org)



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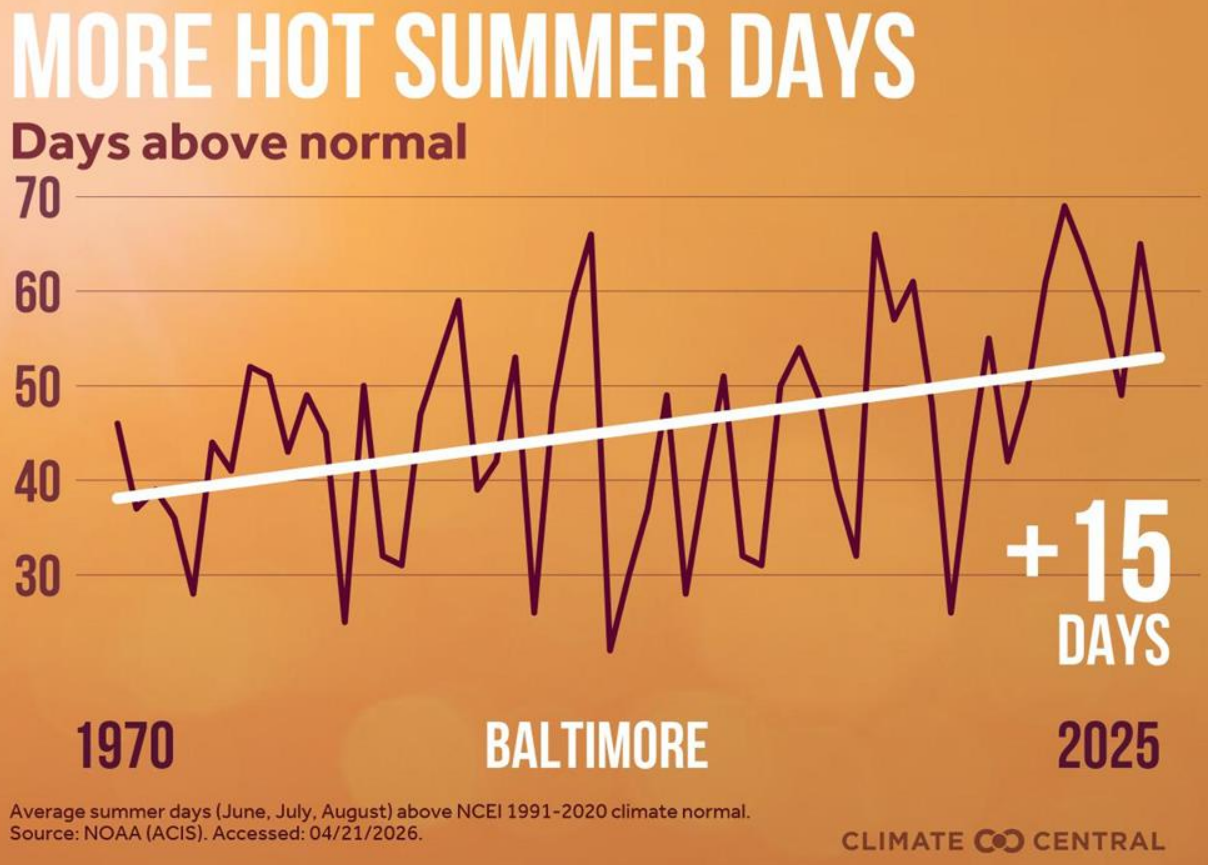

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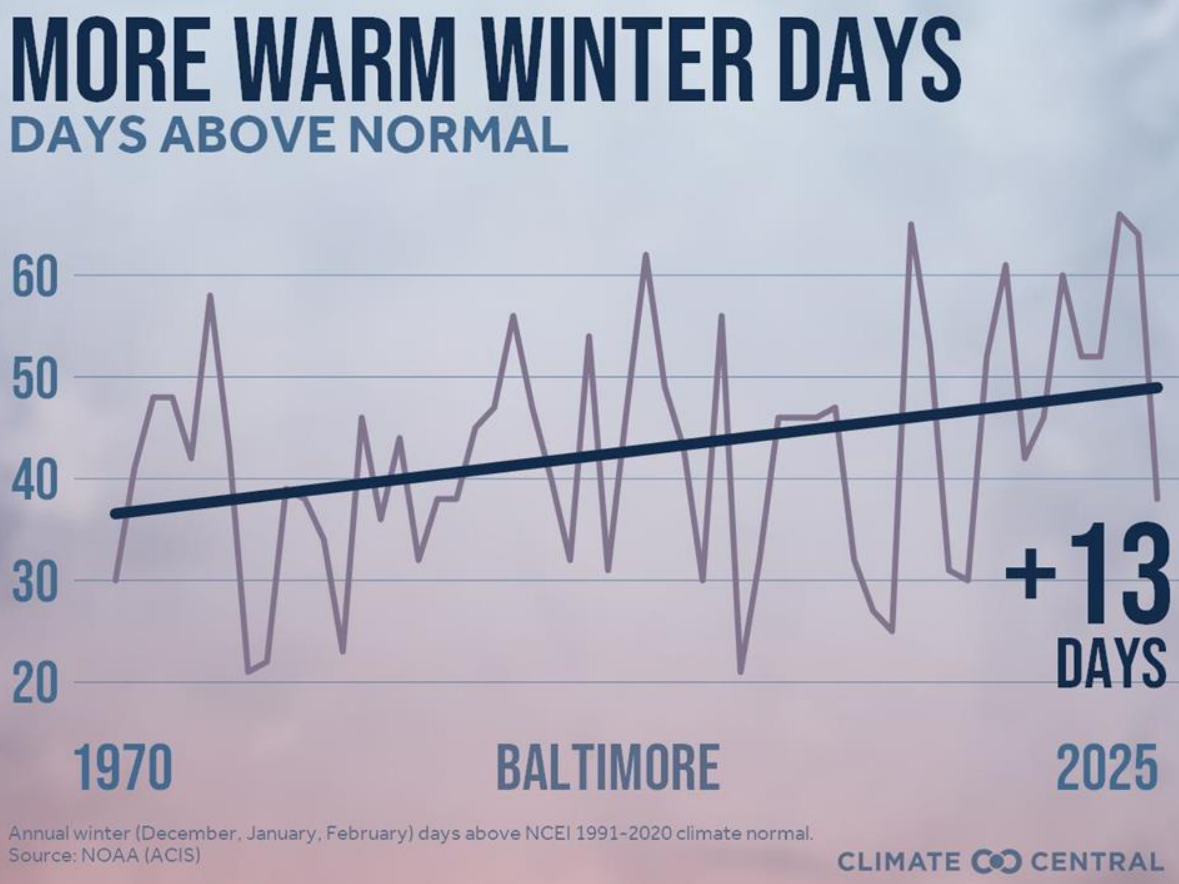

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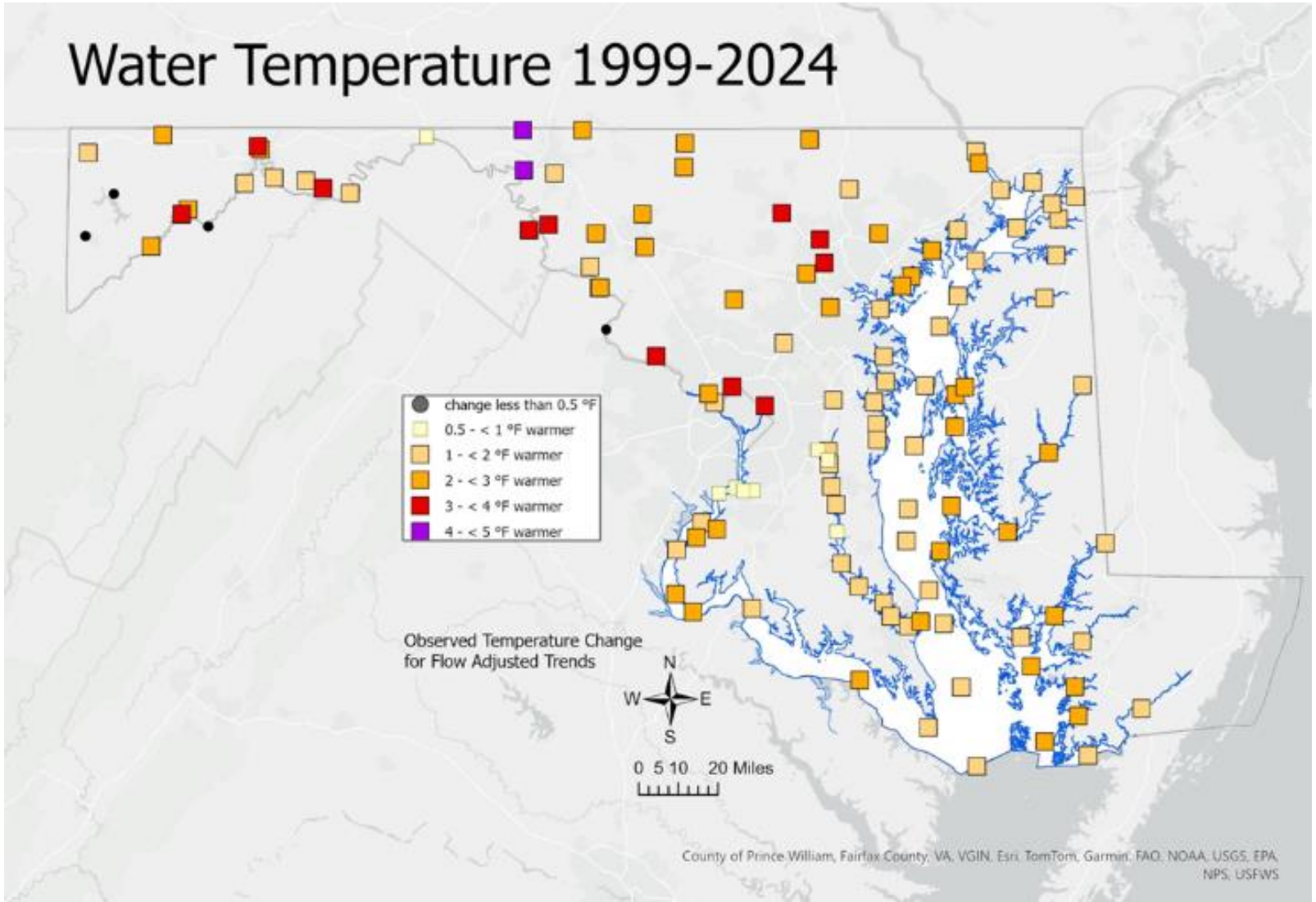

Rainfall intensity has increased by 11% from 1970-2024 (Climate Central). By 2050, annual average precipitation could be 5-10% higher, but concentrated in more frequent extreme events (>2 inches).

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Precipitation influences stream flow and water quality (e.g., temperature, salinity, oxygen, sedimentation, pollution)

Sideling Hill Creek in the spring

Sideling Hill Creek during a summer drought

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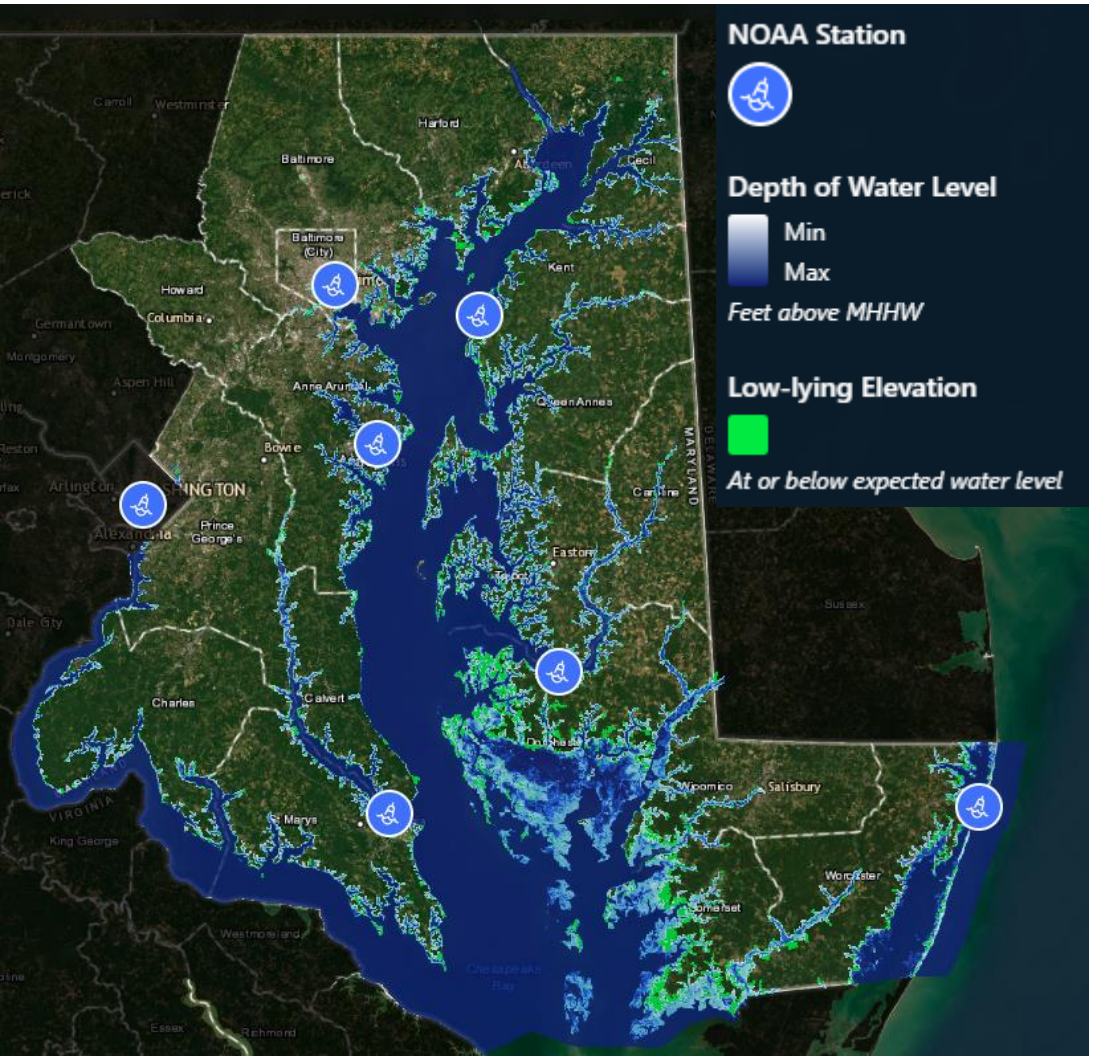
Maryland Coastal Flood Explorer



Rising sea levels have converted 25,600 acres of forests and 3,500 acres of farmland into tidal marsh between 1984 and 2020.

The best estimate for Annapolis is an increase of 1.2-1.5 ft by 2050.

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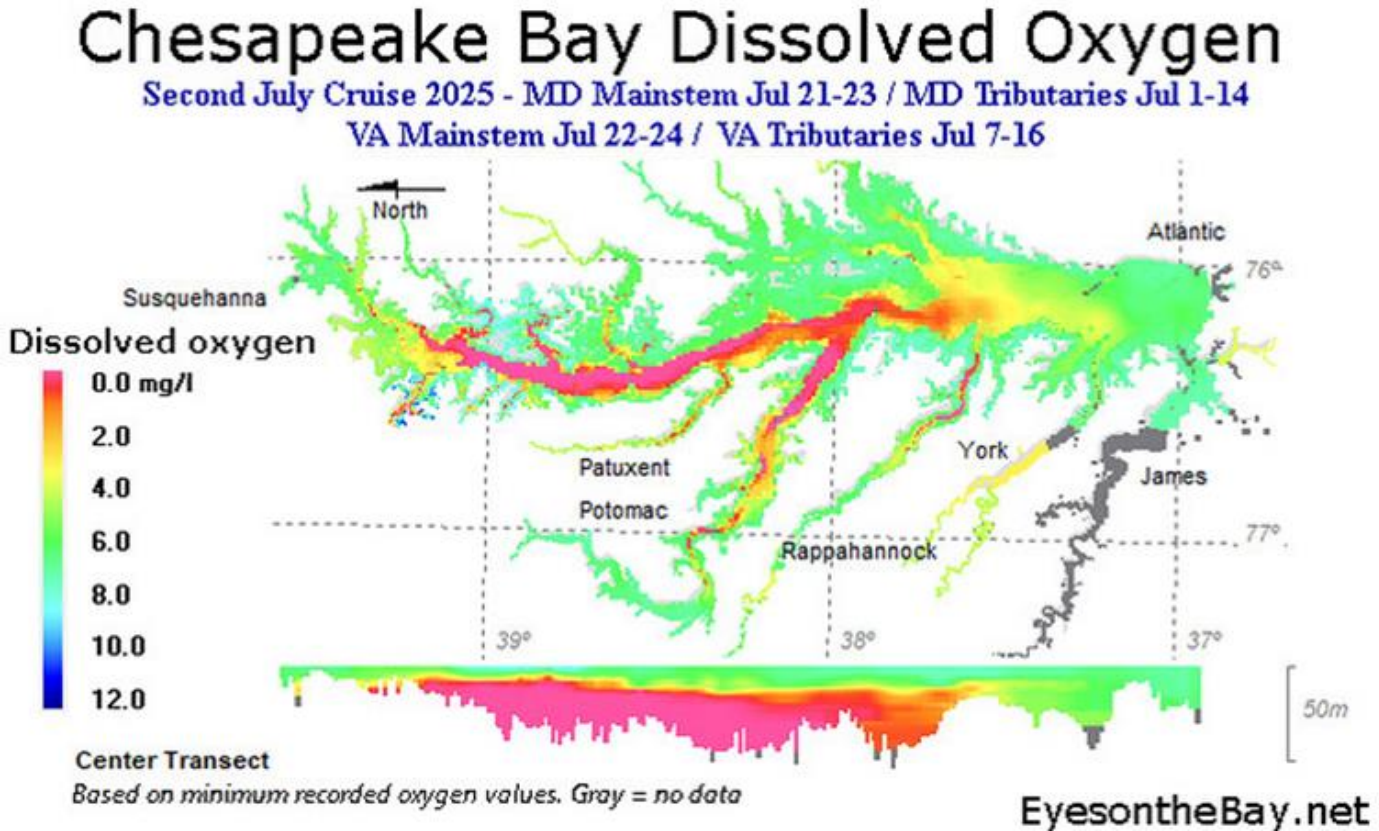
Acidification of water bodies is associated with low oxygen "bad" water, especially in the summer.



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When carbon dioxide dissolves in water, it triggers a chemical reaction that increases the water's acidity.

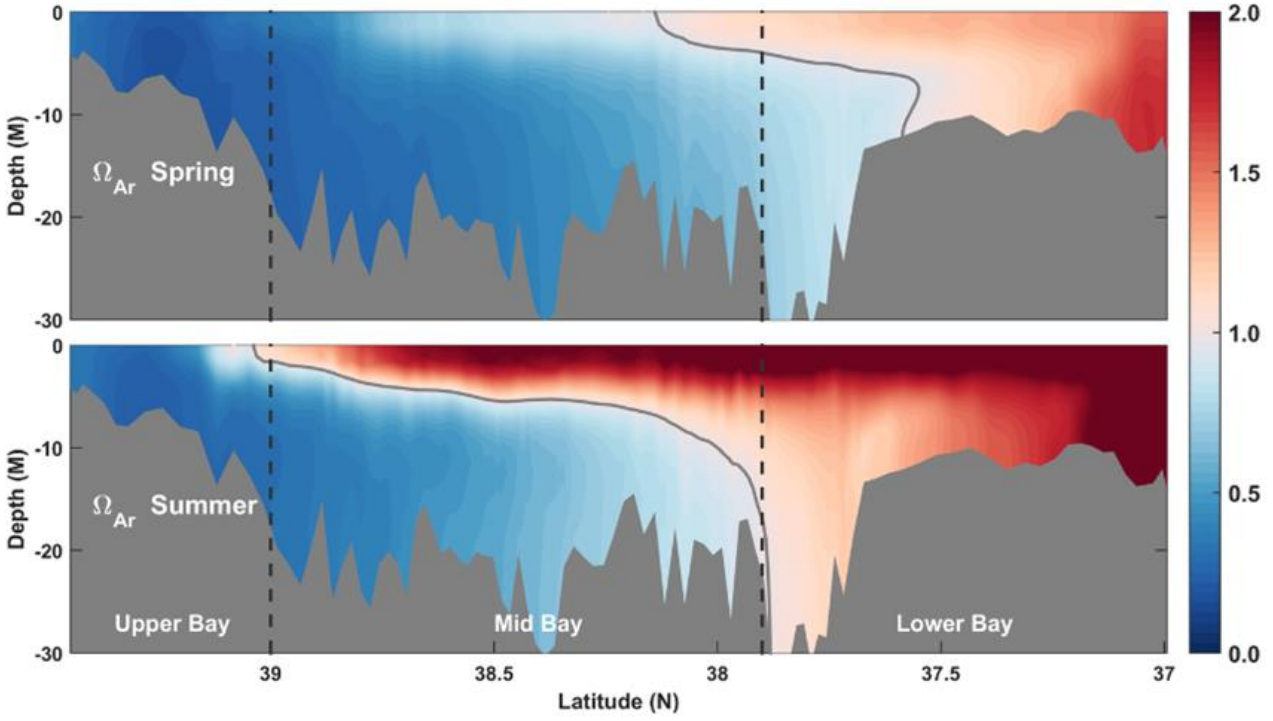

Figure 4. Along-channel distribution of long-term averaged aragonite saturation state (Ω_{Ar}) during spring (upper panel) and summer (lower panel). The gray line represents the saturation horizon of $\Omega_{Ar} = 1.0$.

Acidity can be measured using aragonite saturation.
A lower number indicates higher acidity.
(Shen et al. 2020)

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To summarize, we can already observe some environmental changes.

- Water temperature is increasing in tidal and nontidal waters
- Precipitation events and storms are becoming more intense
- The increase in coastal flooding indicates that sea level is rising
- Ocean acidification is associated with low oxygen and low calcium availability

Climate Change is changes in long-term average weather patterns on a global, continental, regional, or local scale occurring as a result of greenhouse gas emissions.

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Key Message:

Changes in the environment impact Maryland's fisheries resources, fisheries users, and fisheries management

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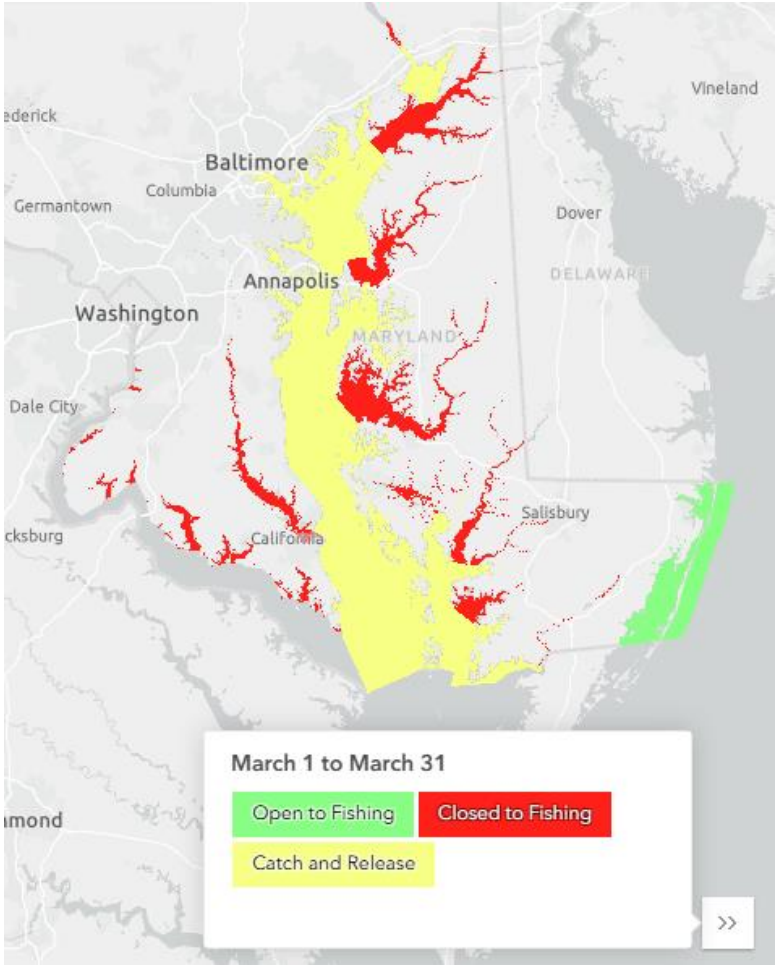
Impact: Altered Stock Dynamics

- Spawning behavior, egg production, recruitment
- Survival, growth, maturation
- Stock assessments



Striped bass spawning areas are closed during the spawning season.

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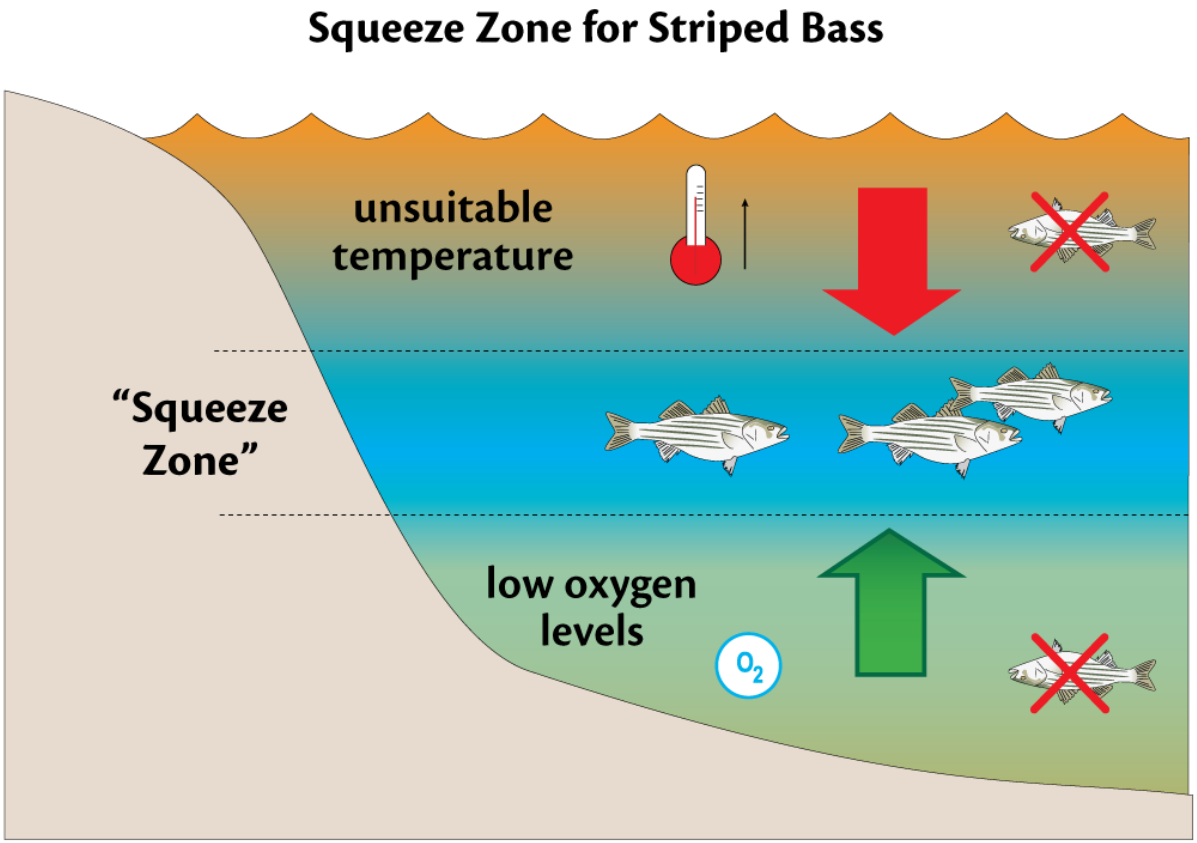
Impact: Habitat Stress

- Habitat squeeze, release mortality, food availability



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Impact: Habitat Stress

- Species have varying sensitivity thresholds to acidification (State of the Ecosystem 2025)

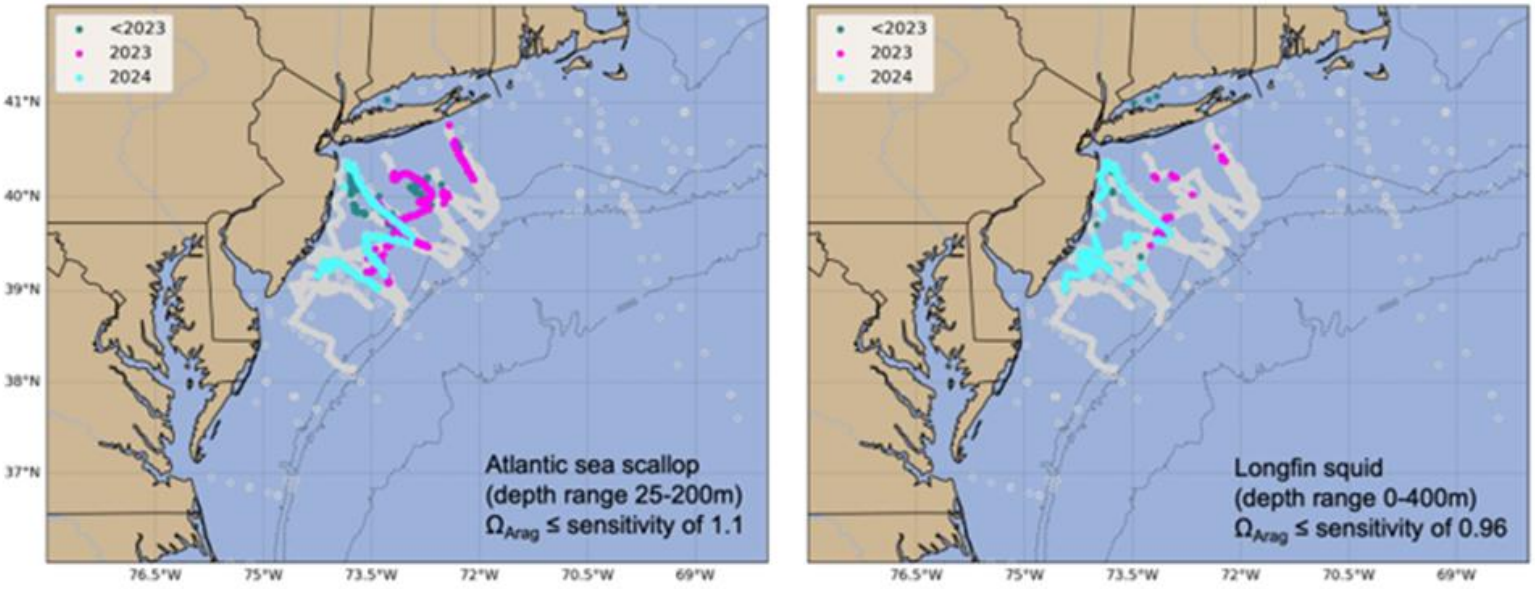

Figure 48: Locations where bottom aragonite saturation state (Ω_{Arag}; summer only: June-August) were at or below the laboratory-derived sensitivity level for Atlantic sea scallop (left panel) and longfin squid (right panel) for the time periods 2007-2022 (dark cyan), 2023 only (magenta) and 2024 only (cyan). Gray circles indicate locations where bottom Ω_{Arag} values were above the species specific sensitivity values..

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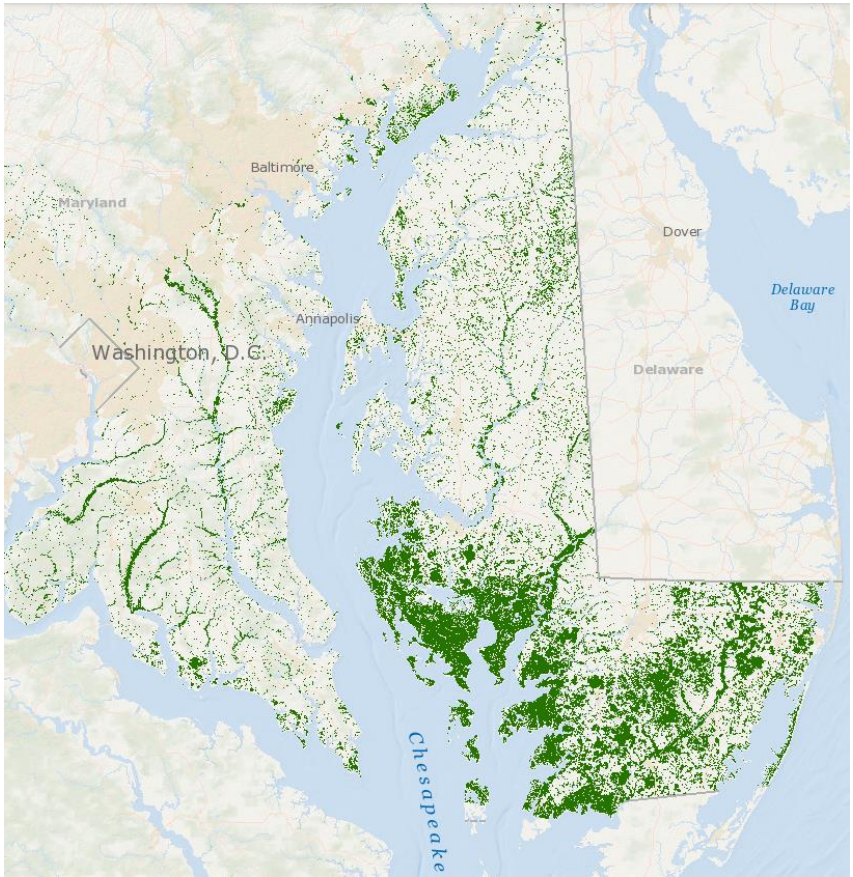
Impact: Habitat Stress

- Marsh migration, seagrass species, oyster reefs



Projected marsh distribution in 2050, Maryland Coastal Atlas, SLAMM Model

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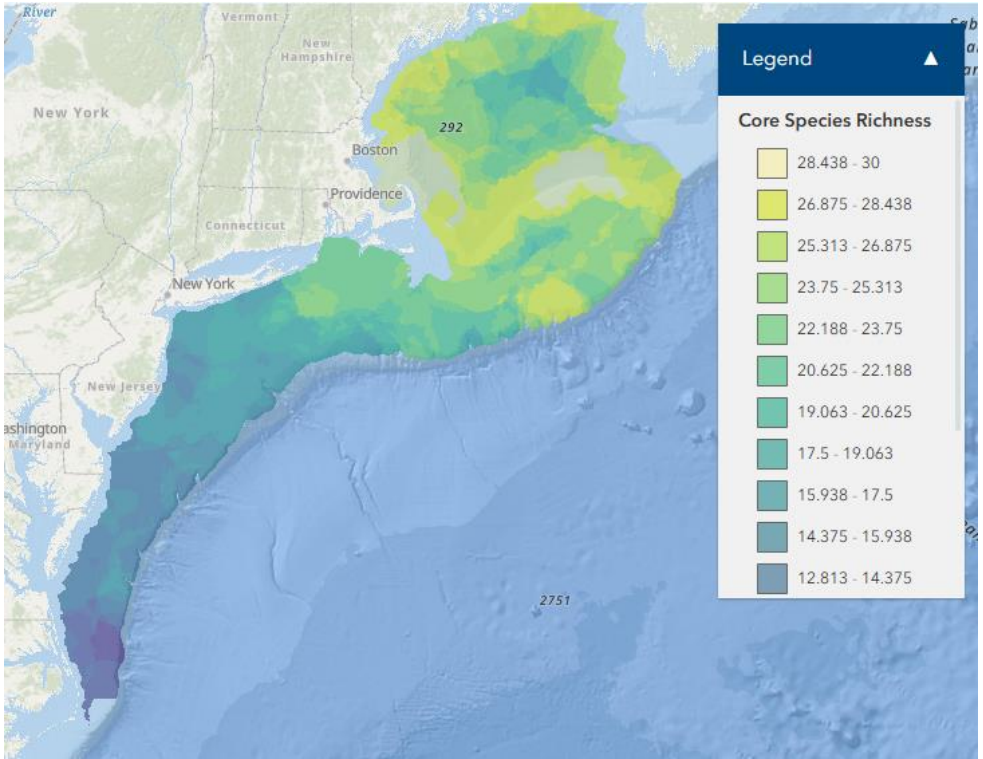
Impact: Coastal Migrations and Emerging Fisheries

- Abundance has shifted 56 km north and 22.45 m deep
- The portfolio of available species could fluctuate



disMAP, NOAA

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Impact: Weakened Coastal Infrastructure

- Flooding, storm damage

High tide flooding in Stevensville, 2024 (mycoast.org/reports/159370)

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Impact: Reduced Fishing Access

- Severe weather (heat, cold, storms)
- Travel distance to fishing grounds

Article by The Baltimore Banner
thebanner.com/community/climate-environment/chesapeake-bay-ice-breakers-3LJER3AGYFAXVG6WQBHCL7E43U/

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Impact: Challenges to Monitoring & Data

- Strained capacity

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Impact: Management Action

- Consider innovative options
- Limited authorities
- Regulatory timeline


Recreational Regulations


Blue Crab Regulations


Commercial Chesapeake Bay Regulations


Commercial Coastal Regulations


Seafood Dealers Regulation Summary

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To summarize, we have currently identified these potential challenges and opportunities:

- Altered stock dynamics (low recruitment)
- Habitat stress
- Coastal migrations and emerging fisheries
- Weakened coastal infrastructure
- Reduced fishing access
- Constraints in monitoring and data collection/sharing
- Management action

Vulnerability is the characteristics of exposure, sensitivity, and adaptive capacity that make a system, asset, or the natural environment more or less susceptible to harm or change.

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Key Message:
Environmental and climate change amplifies existing challenges

Natural resources are impacted by natural and human influences.

- Natural Cycles
  - North Atlantic Oscillation
  - Atlantic Multidecadal Oscillation
- Human Influence
  - Habitat Loss / Development
  - Pollution (toxins, microplastics, nutrients, etc.)
  - Invasive Species

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Key Message:

Taking adaptation actions now reduces our risk in the future

Adaptation is action to prepare for and adjust to new conditions, thereby reducing harm or taking advantage of new opportunities.

Climate adaptation refers to those actions taken to reduce vulnerability to the impacts of climate change, aimed to enhance the resilience of natural and human-based systems.

Resilience is the capacity of natural and human-based systems to anticipate disturbances, reduce vulnerability, and respond to and recover from heavy disturbances and chronic stresses.

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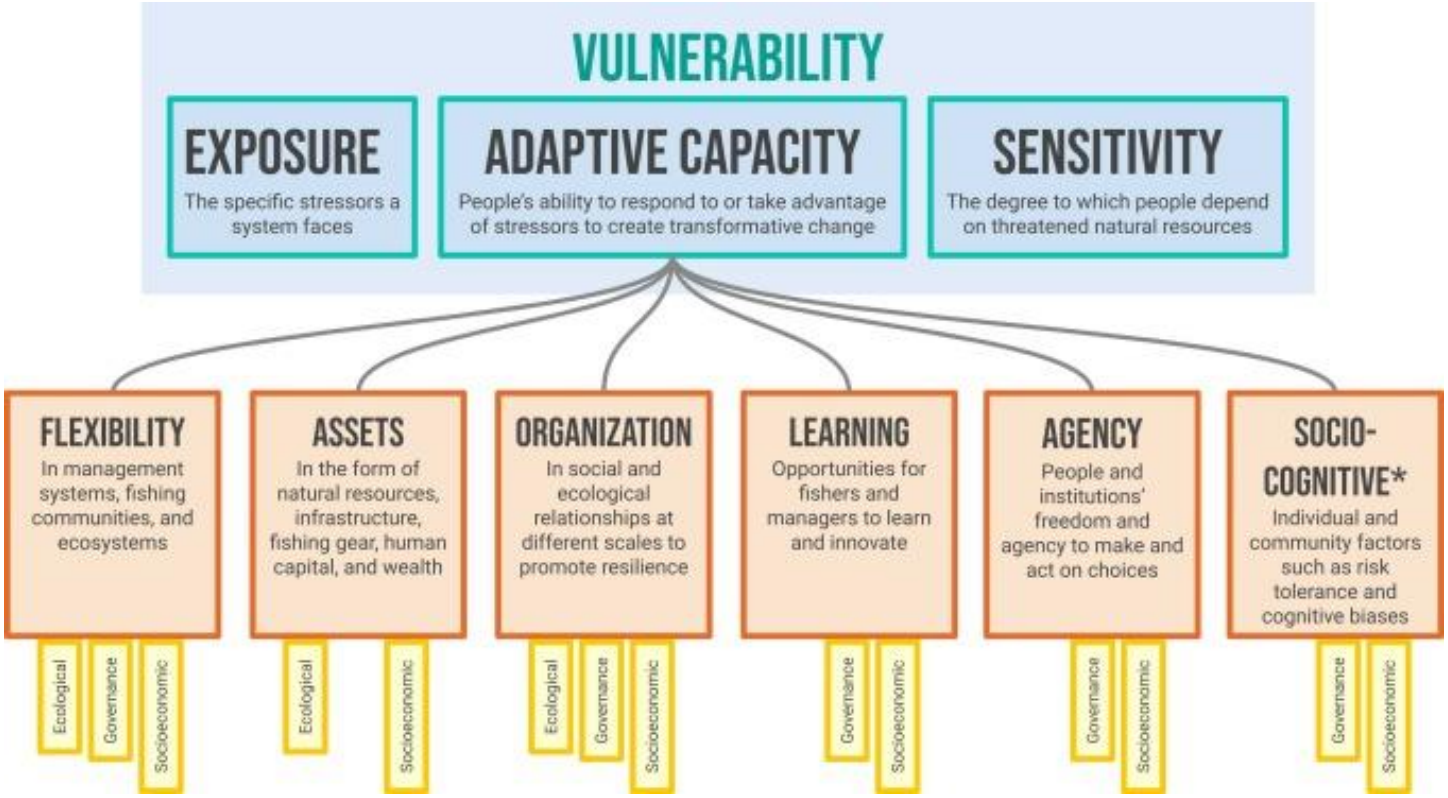
Adapting to environmental changes reduces our vulnerability and makes us more resilient in the long term

(Golden et al. 2024)



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Activity

Reflect on your experience with a changing environment. Write your experience(s) on sticky notes.

- What is one way the environment has changed over your lifetime?
- What have you done to cope with or adapt to it?

Place your note on the board that it most closely relates to: fishing resources, fishing industry, or management.

Maryland's Vision for a Climate-Resilient Future

Strategic Resilience Plans

Moore-Miller Administration State Plan (2024)

- Making Maryland a leader in clean energy and the greenest state in the country
- **Goal:** Increase resilience through adaptation

Next Generation Adaptation Plan (2024)

- 10-year roadmap that prioritizes the most urgent actions for advancing statewide climate change adaptation
- **Goal:** Expand climate-ready natural resources-based economies
    - Explore opportunities to develop new markets emerging for fisheries as a result of climate impacts

Resilient Maryland Strategy (2026)

- Collaborative strategy for promoting statewide resilience, including resilience for climate change and food security
- **Goal:** Increase sustainable local food production and access

The Climate Resilient Fisheries Management Plan (FMP)

Supports statewide goals for climate adaptation through:

- **Adaptive Stewardship:** Systematic flexibility to adjust seasons and limits for shifting species (e.g., shrimp, blue catfish)
- **Resilience Integration:** Connecting science and industry to maintain the heritage of fishing communities

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What do we want from this workgroup?

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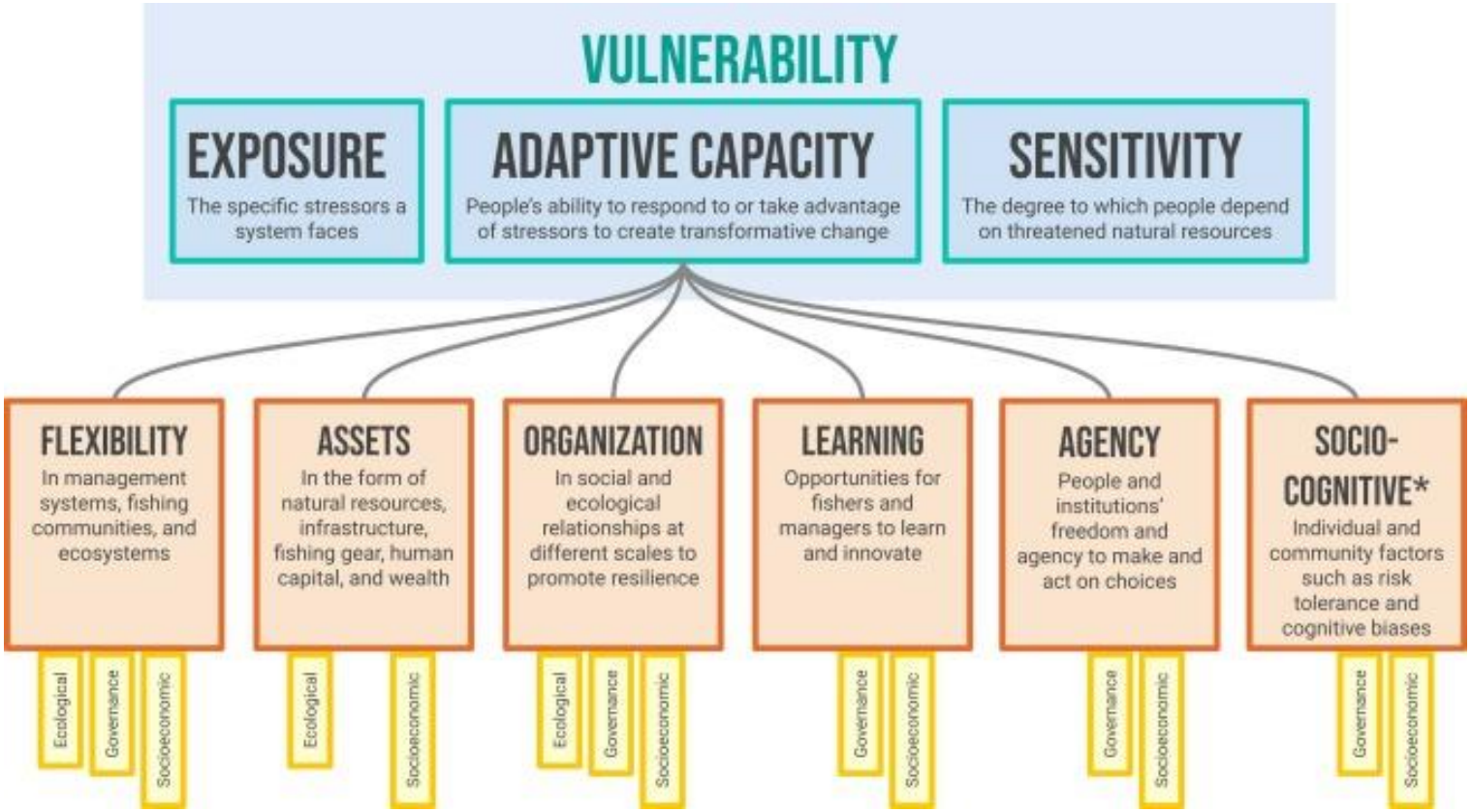
Outcomes

Help to identify challenges and opportunities that DNR could address in a fishery management plan

- Needs assessment
- Management objectives
- Visioning and goal setting

Discuss how DNR can expand our adaptive capacity

(Golden et al. 2024)



Address each fishing component (Adapted from Mason et al. 20)

Ecology
Fish resource
Habitats

Industry
Recreational
Commercial
Dealing/
Processing

Governance
Monitoring
Licensing
Gear
Regulations

Center discussions within the plan's scope

- Focus on what DNR has the authority to implement
- Follow statutory requirements

Use existing plans as a model:

- California MLMA Master Plan, Chapter 11
- NOAA Northeast Regional Action Plan
- Scenario Planning Potential Actions Menu

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What topics should we discuss at future meetings?

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Thank you for participating