Portal Acidification Data Layers

MACAN

Mid-Atlantic Coastal Acidification Network

Biological Impacts Graphics

Digital Tools for Managers and Decision-Makers: Portal Acidification Data Layers and Biological Impacts Graphics

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Tuesday, February 24 2026

The Coastal Acidification Networks (CANs)

OCEAN ACIDIFICATION POLICY & MACAN TIMELINE

2009 — FOARAM Act

FOARAM Act

Federal Ocean Acidification Research and **Monitoring** (FORAM) Act enacted.

- Established the **NOAA Ocean Acidification Program** (OAP).
- Coordinated national monitoring, research, and education on ocean acidification

2016 — MACAN Formation

MACAN Formation

Mid-Atlantic Coastal Acidification Network (MACAN) established.

A regional virtual network connecting:

- **Scientists**
- Resource managers
- Educators
- Industry professionals

Federal, **Tribal, state** and local govermnents.

2022 — CHIPS & Science Act

CHIPS & Science Act

The **CHIPS and Science Act** recognized Coastal Acidification Networks (CANs) as key components of:

- Acidification monitoring
- Research coordination
- Mitigation strategies
- NOAA OAP outreach framework

Also expanded funding for emerging research areas such as marine carbon dioxide removal (mCDR).

2023–2026 — Infrastructure & Program Support

Major federal investments support MACAN regional activities.

Funding sources include:

- Bipartisan Infrastructure Law (BIL)
- Infrastructure Investment and Jobs Act (IIJA)
- NOAA Ocean Acidification Program

MACAN strengthens regional capacity to monitor, understand, and respond to odean aacan acidification impacts.

MACAN

Mid-Atlantic Coastal Acidification Network

NEW JERSEY OCEAN ACIDIFICATION ACTION PLAN - Leveraging federal funding for state level action

NEW JERSEY

OCEAN ACIDIFICATION ACTION PLAN

2025

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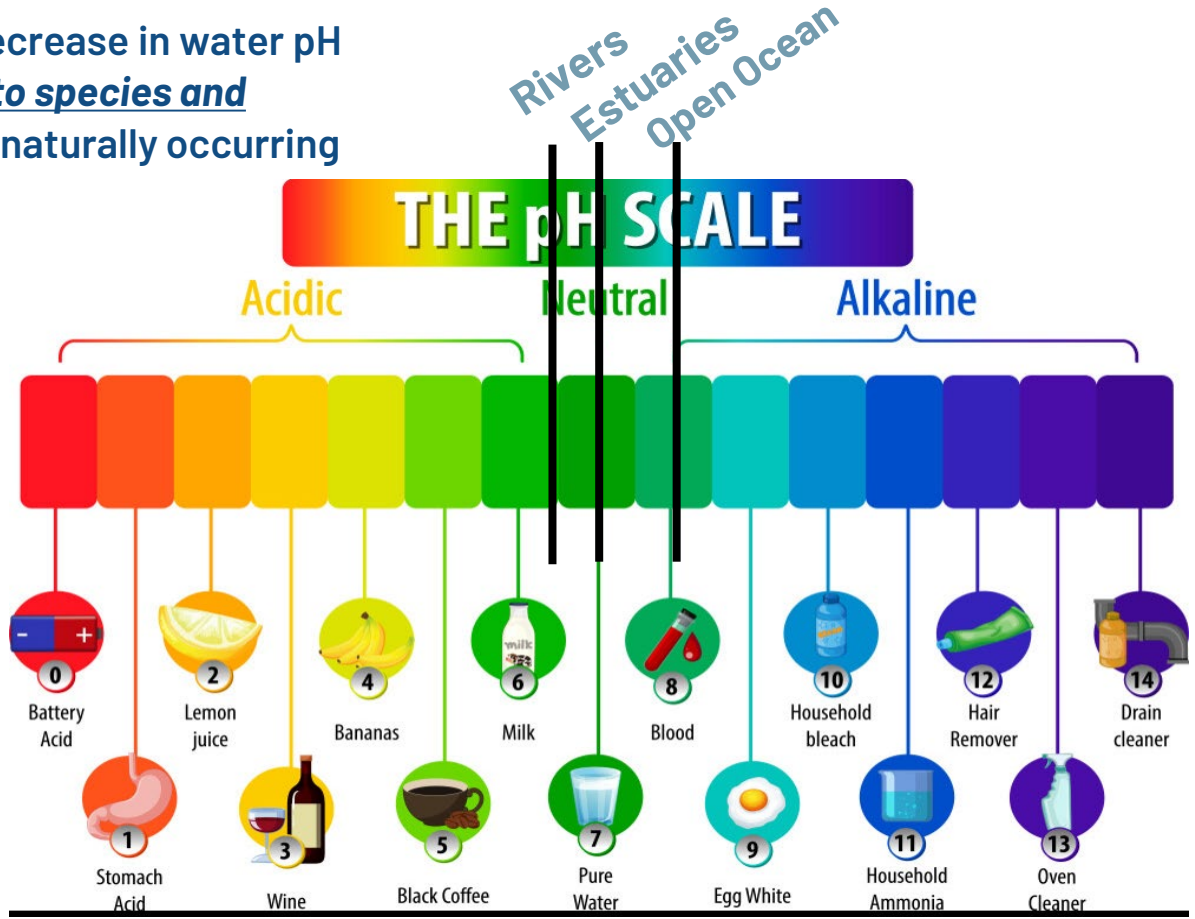
ACIDIFICATION IN GENERAL

- Acidification is a decrease in water pH ***<u>that is detrimental to species and habitats</u>*** that is not naturally occurring

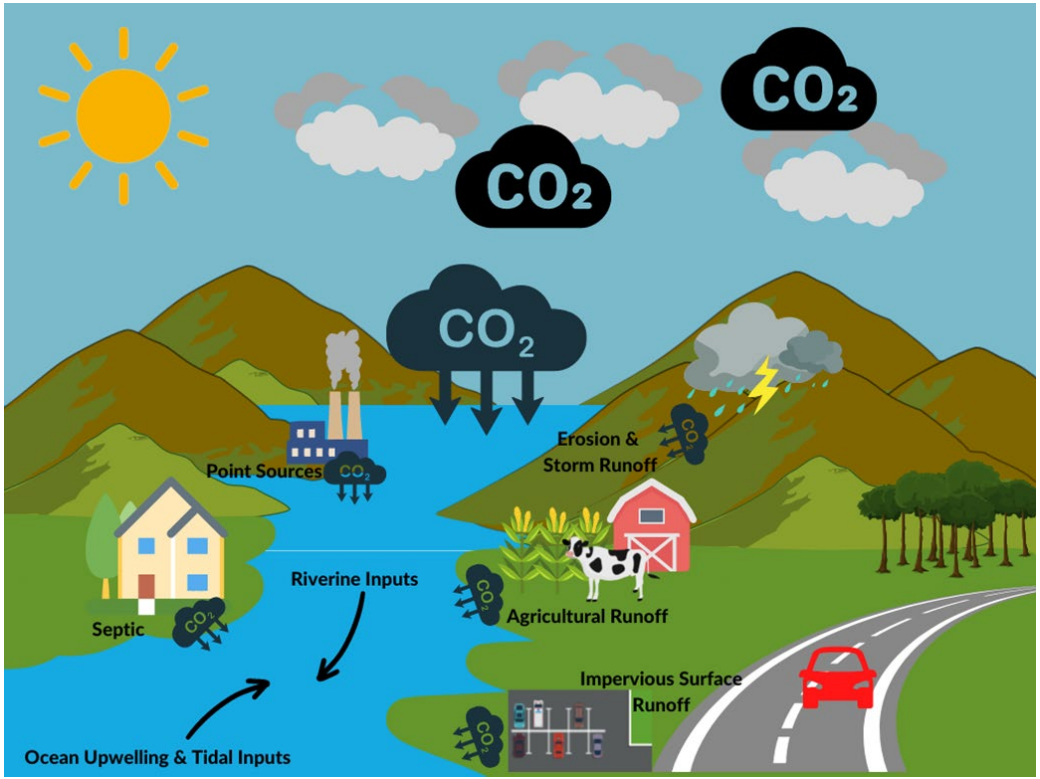


WHAT: COASTAL ACIDIFICATION

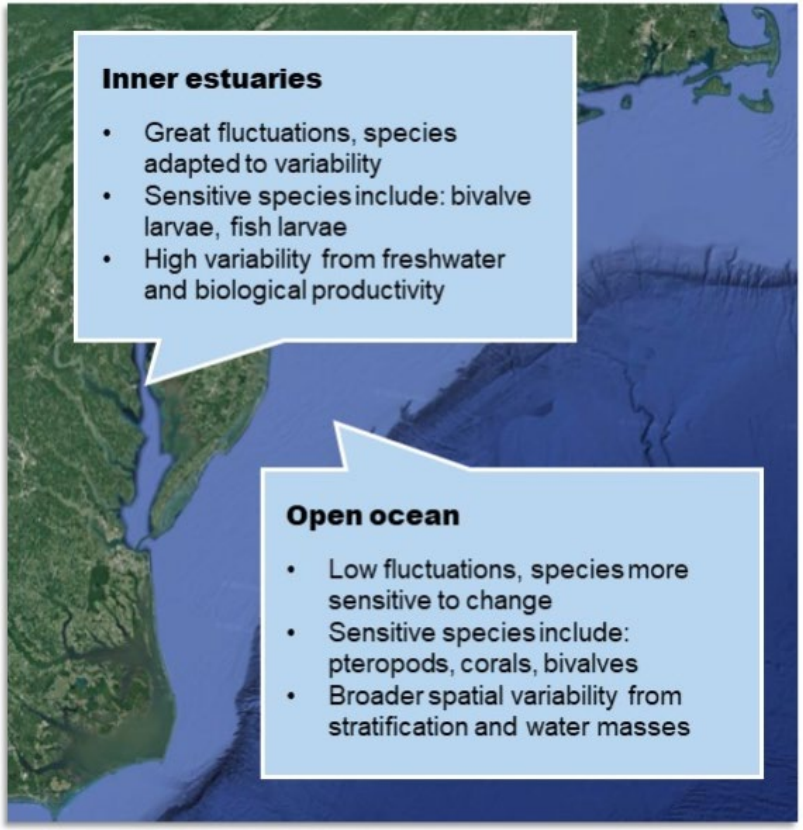
- How does CO_2 get into the water?

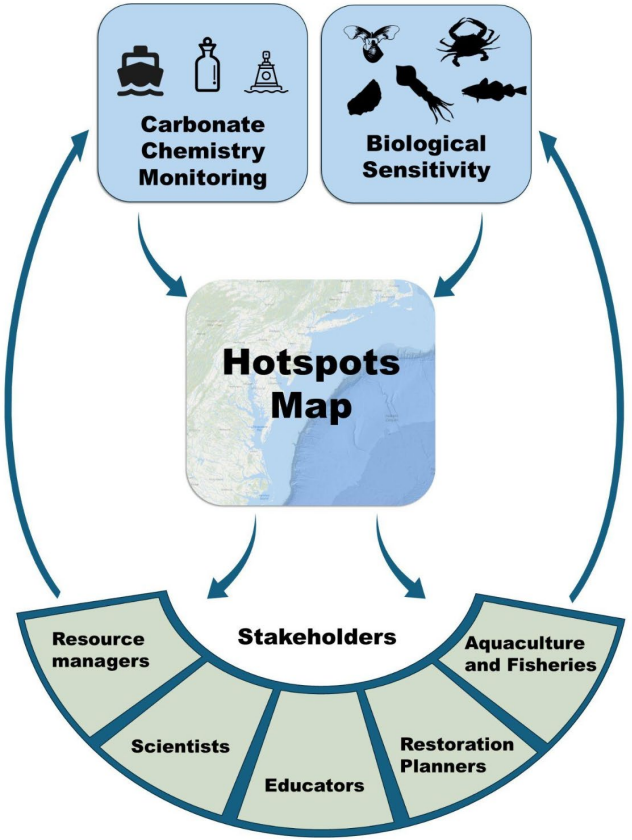
- Coastal processes such as eutrophication (excess nutrient contamination), bacterial decomposition of organic material, rivers, runoff, and other point sources can all contribute to low pH conditions

- But how do we know if low pH is actually impacting species...?

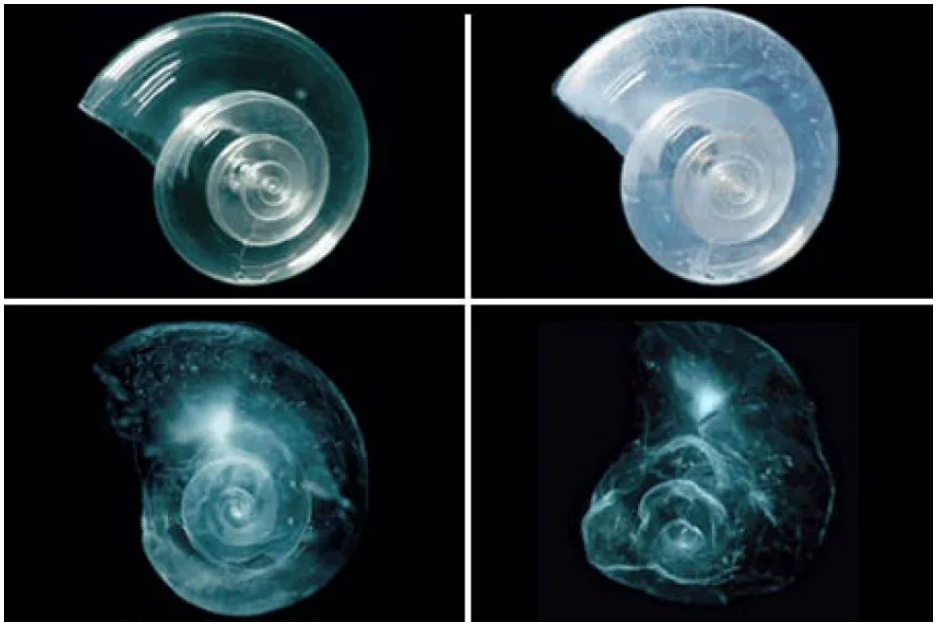


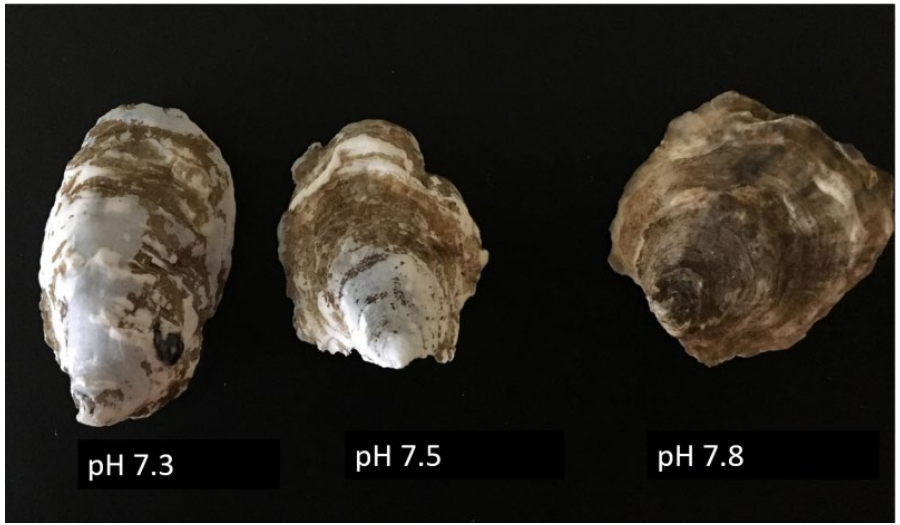
How do we track locations that may be at risk for acidification?



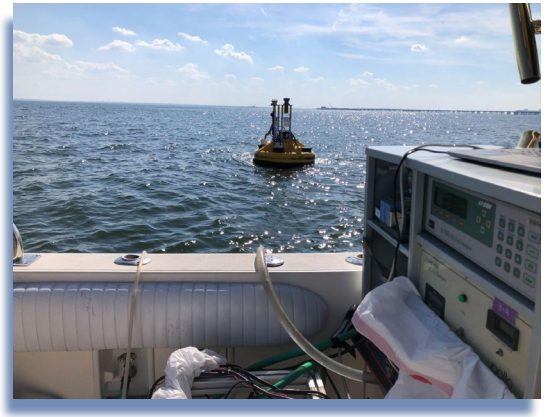


Potential Biological Impacts: Laboratory Studies



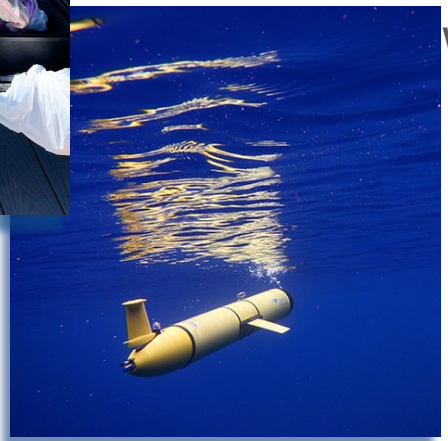


VARIOUS SAMPLE COLLECTION METHODS



Moored
Continuous
& Underway
Cruise

Coastal Samples



Continuous
Gliders

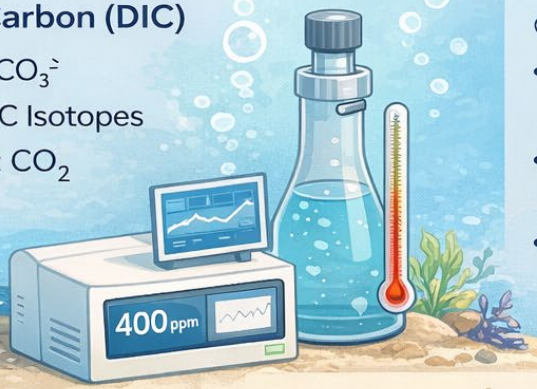
Ocean Discrete
Water Sampling

Measurement of DIC, TA, pCO_2, and pH for Carbonate Chemistry

CO_2

Dissolved Inorganic Carbon (DIC)

- Dissolved CO_2, HCO_3^-, CO_3^{2-}
- Mass Spectrometry: $\partial^{13}C$ Isotopes
- Infrared Gas Analyzer: CO_2 measurement



Partial Pressure of CO_2 (pCO_2)

- pCO_2 (µatm) : partial pressure of carbon dioxide in seawater
- Infrared Gas Analyzer (IRGA); measures CO_2 gas
- Directly related to the exchange of CO_2 between the ocean and atmosphere

Total Alkalinity (TA)

- Sum of all bases able to neutralize acids

+

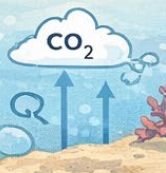
Total Alkalinity (TA)

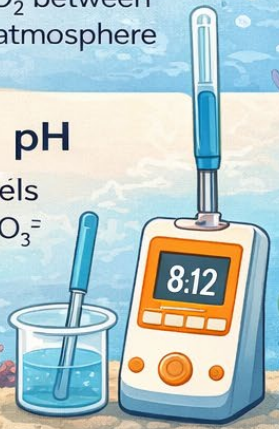
- Major contributors:
- HCO_3^-, CO_3^{2-}, OH^- H_3BO_3, etc.
- Coulometric Titration for TA measurement

+ **pH** +

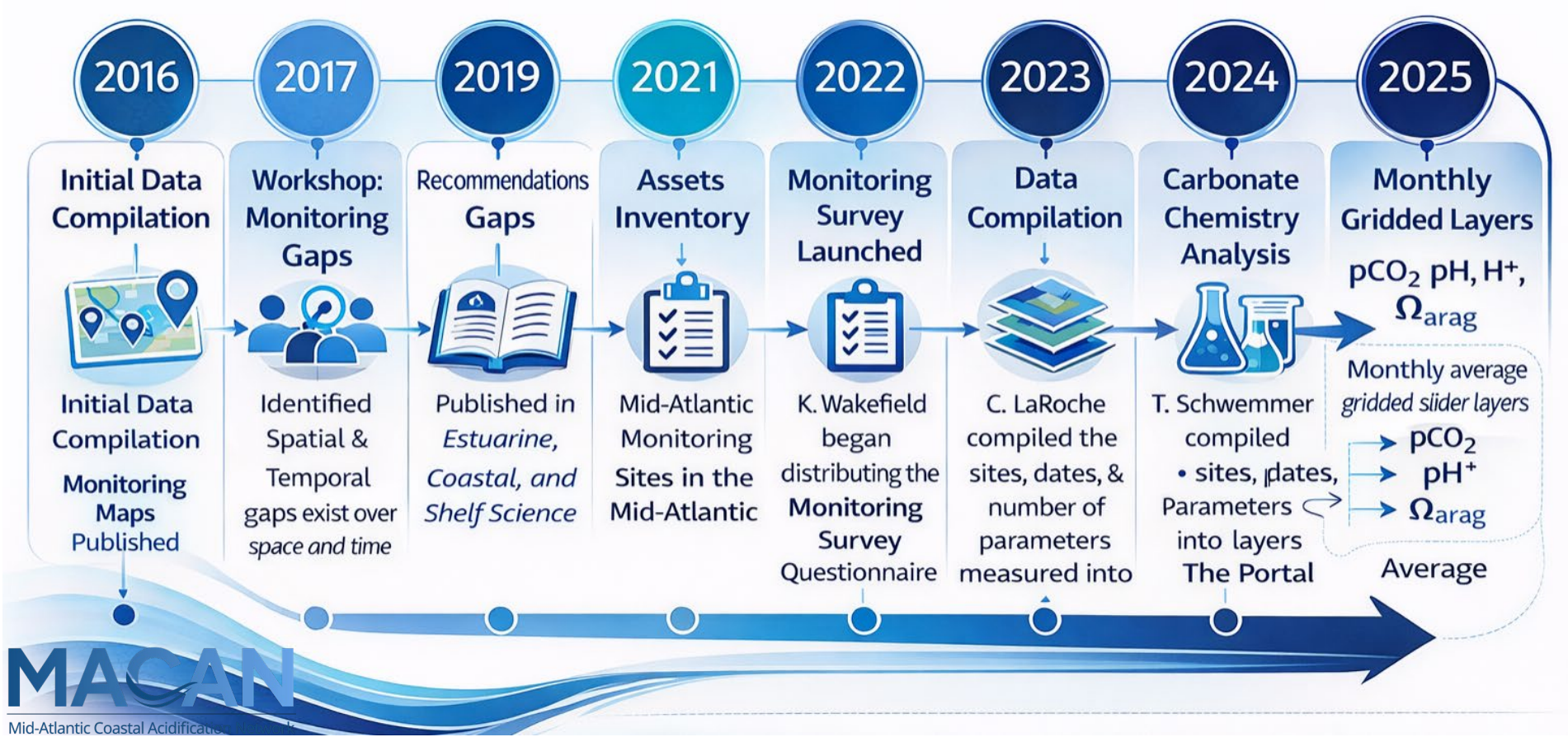
pH

- Determines levels of CO_2, HCO_3^-, CO_3^{2-}



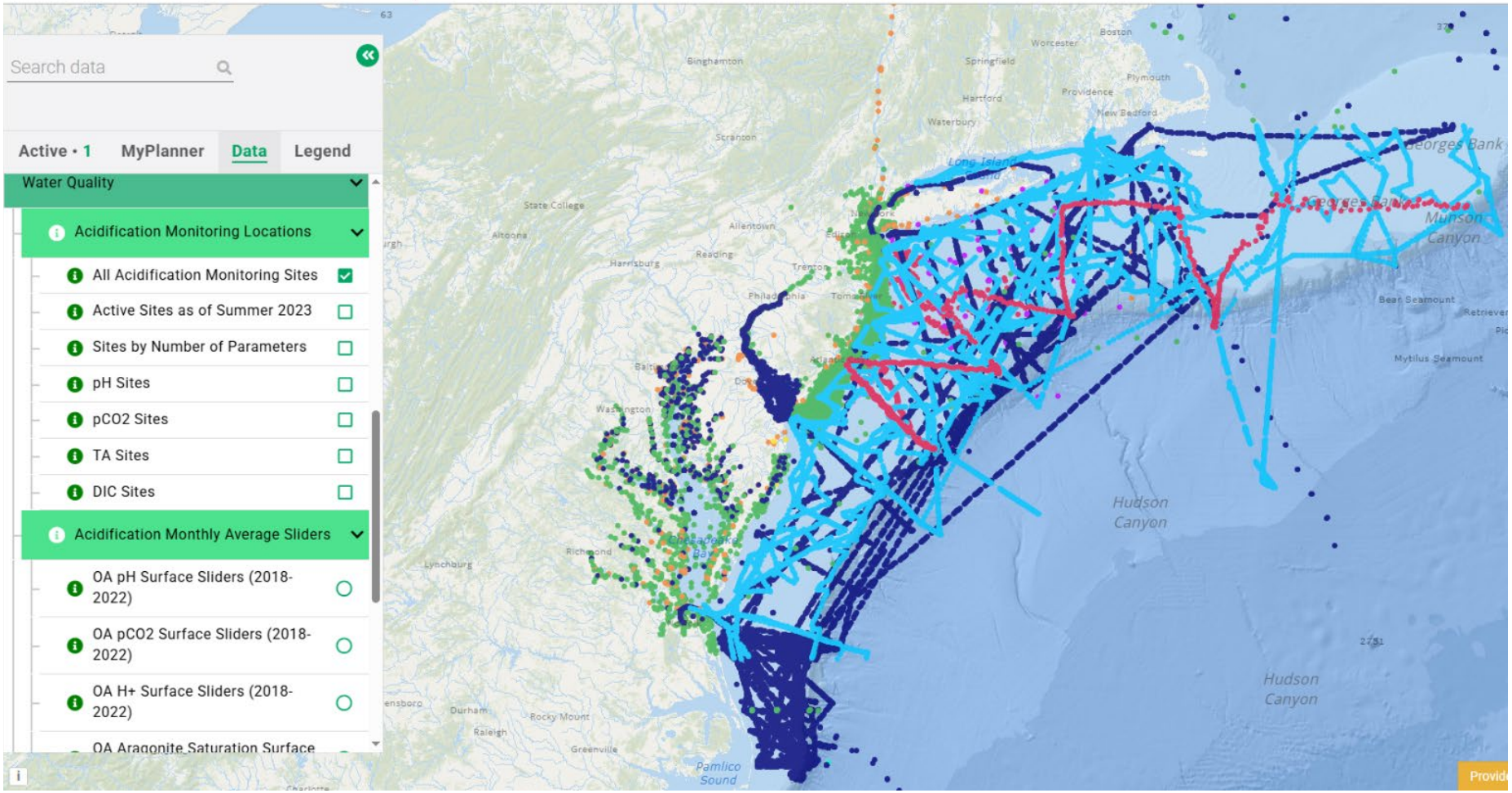


Dissolved Inorganic Carbon + Total Alkalinity + Partial Pressure of CO_2 + **pH**



MACAN

Mid-Atlantic Coastal Acidification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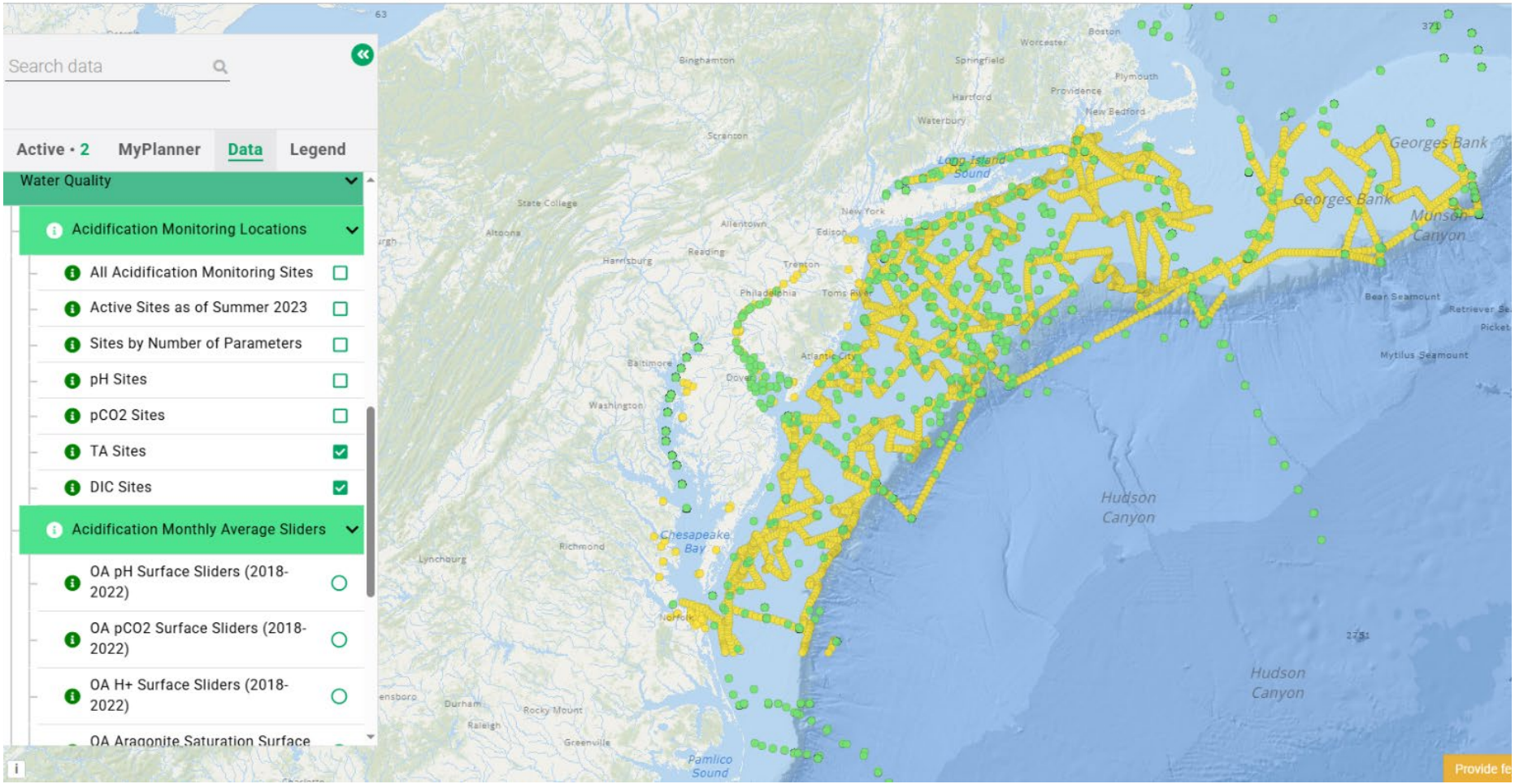
Acidification Monitoring Locations
All Acidification Monitoring Sites
Active Sites as of Summer 2023
Sites by Number of Parameters
pH Sites
pCO2 Sites
TA Sites
DIC Sites
Acidification Monthly Average Sliders
OA pH Surface Sliders (2018-2022)
OA pCO2 Surface Sliders (2018-2022)
OA H+ Surface Sliders (2018-2022)
OA Aragonite Saturation Surface
Hudson Canyon
Hudson Canyon
Georges Bank
Munson Canyon
Bear Seamount
Mytilus Seamount
Pamlico Sound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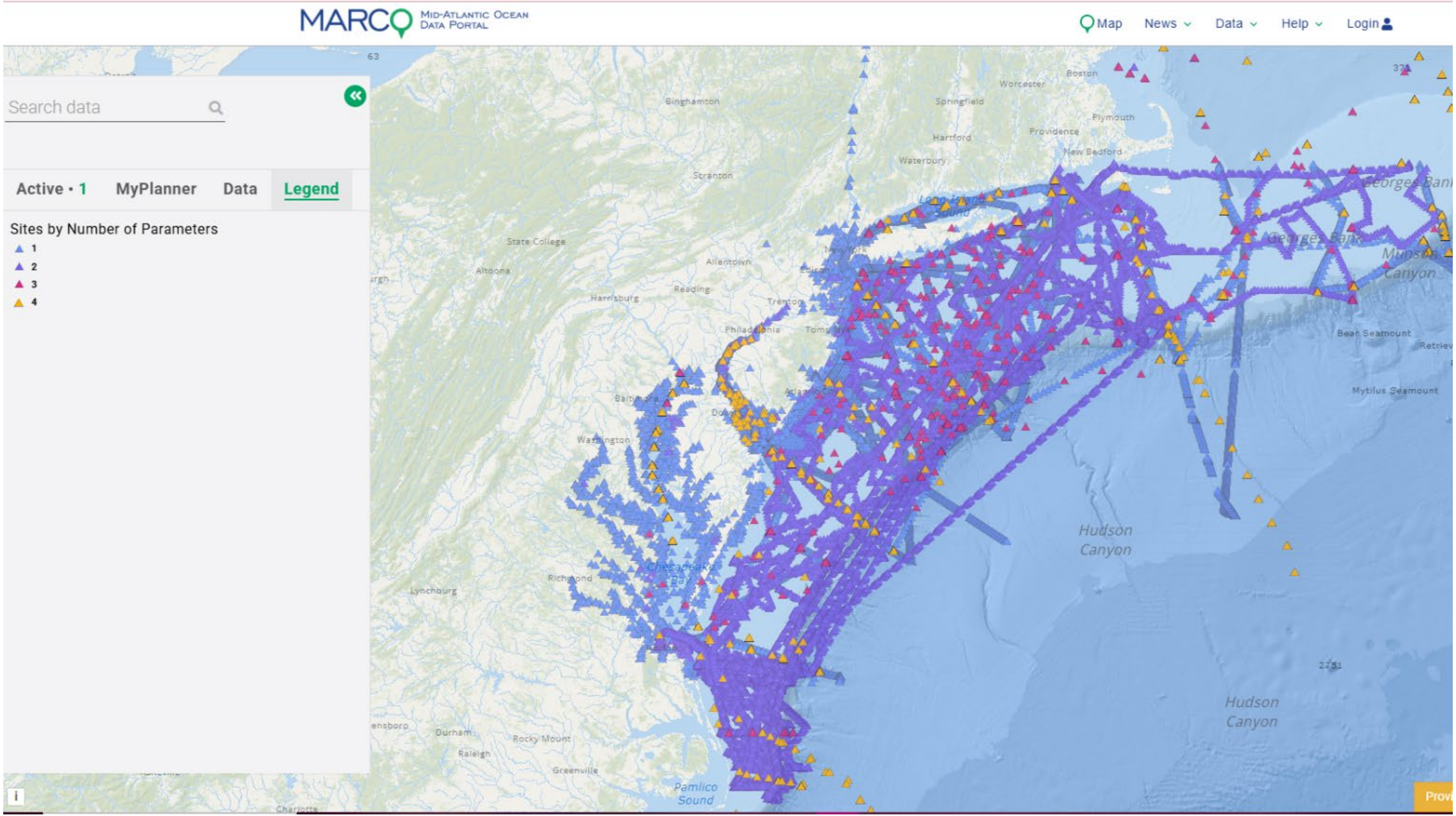
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Altoona
Allentown
Reading
Harrisburg
Trenton
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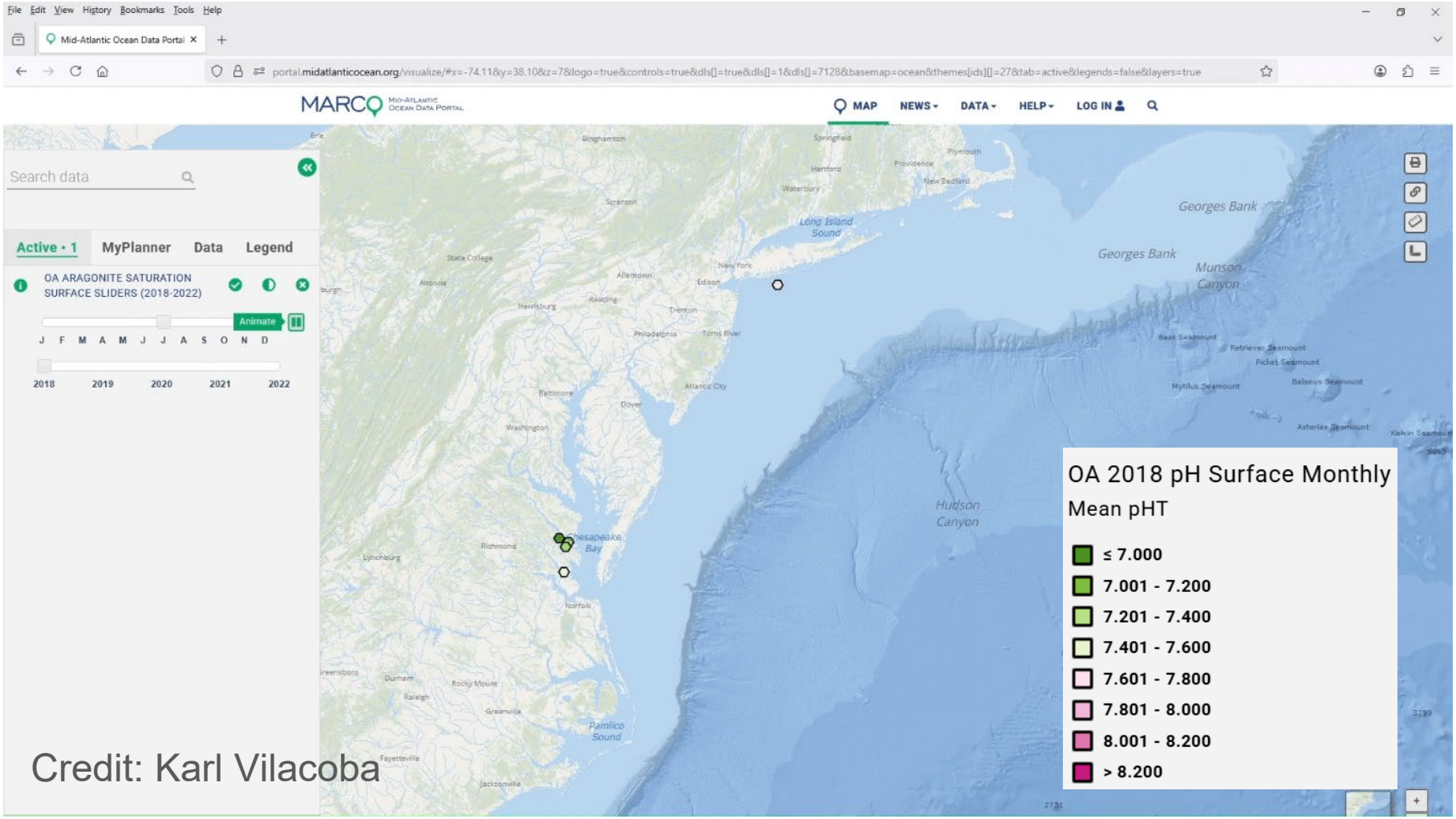

Credit: Karl Vilacoba

www.midacan.org

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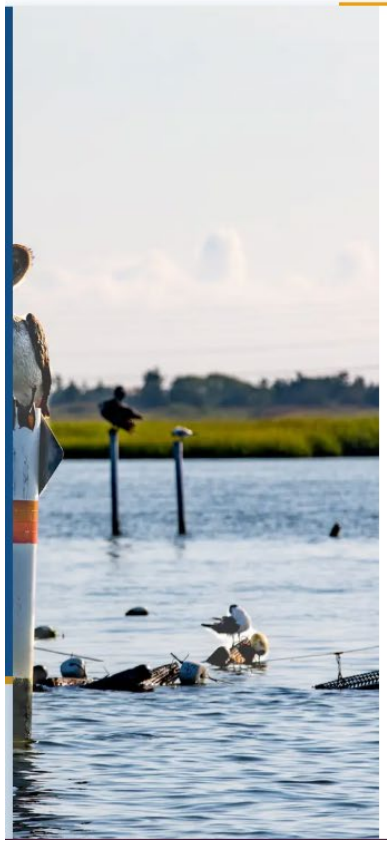


All Species

Converting ocean acidification data into insights about the species living in our water.

Biological Impacts from Acidification

Ocean acidification changes water chemistry in ways that can hinder how marine species grow, reproduce, and survive.

Marine Phytoplankton

Microscopic marine plants that form the base of ocean food webs.

Crustaceans

Blue crabs are crucial to Mid-Atlantic ecology and economy.

Deep-Sea Corals

Gorgonian sea fans and bamboo corals create vital deep-sea habitats.

Mollusks

A diverse group of animals vital to fisheries.

Finfish

Mid-Atlantic finfish are essential to marine ecosystems and economies alike.

Zooplankton

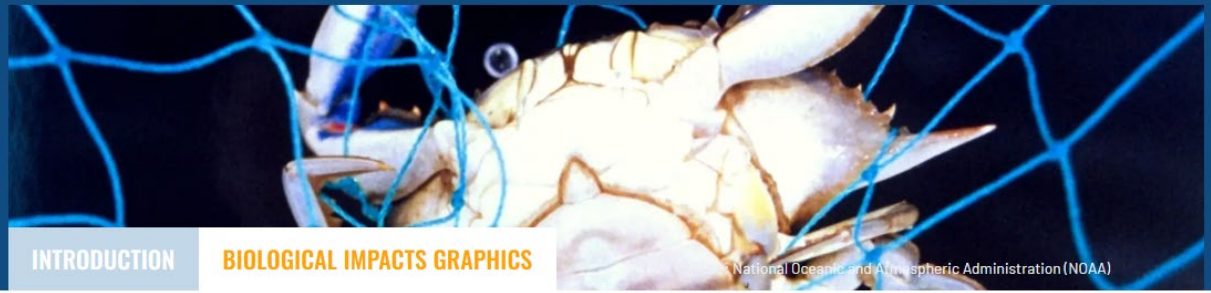
Vital food web organisms with varying responses.

Submerged Aquatic Vegetation (SAV)

SAV, including eelgrass, provide vital

BIOLOGICAL IMPACTS FROM ACIDIFICATION

Ocean acidification changes water chemistry in ways that can hinder how marine species grow, reproduce, and survive.



INTRODUCTION BIOLOGICAL IMPACTS GRAPHICS

National Oceanic and Atmospheric Administration (NOAA)

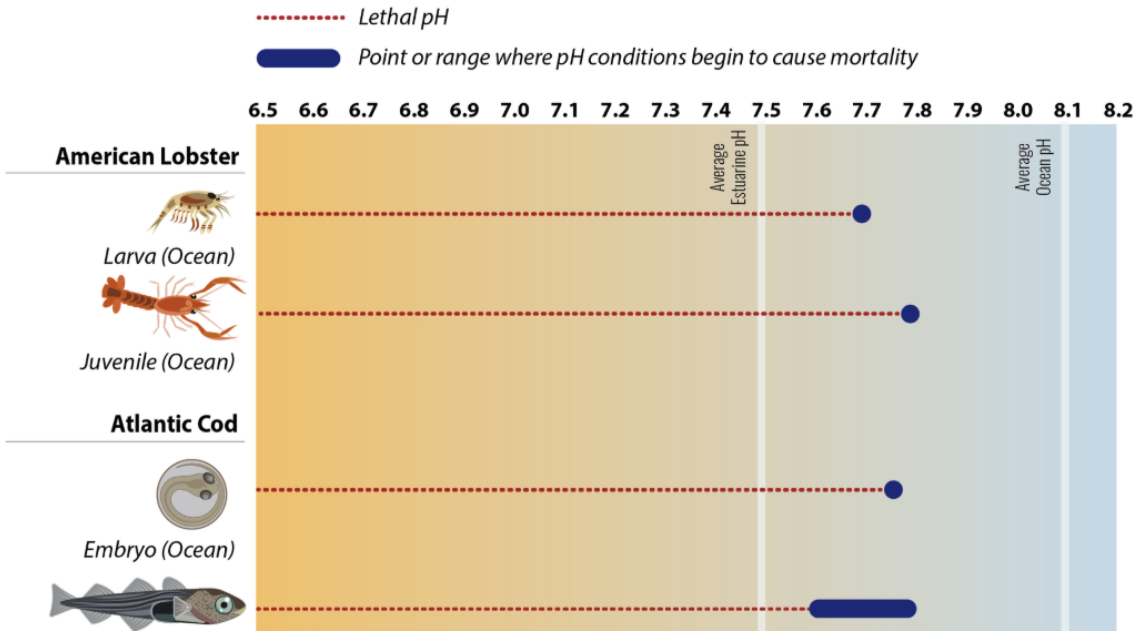
Introduction to Biological Impacts from Acidification

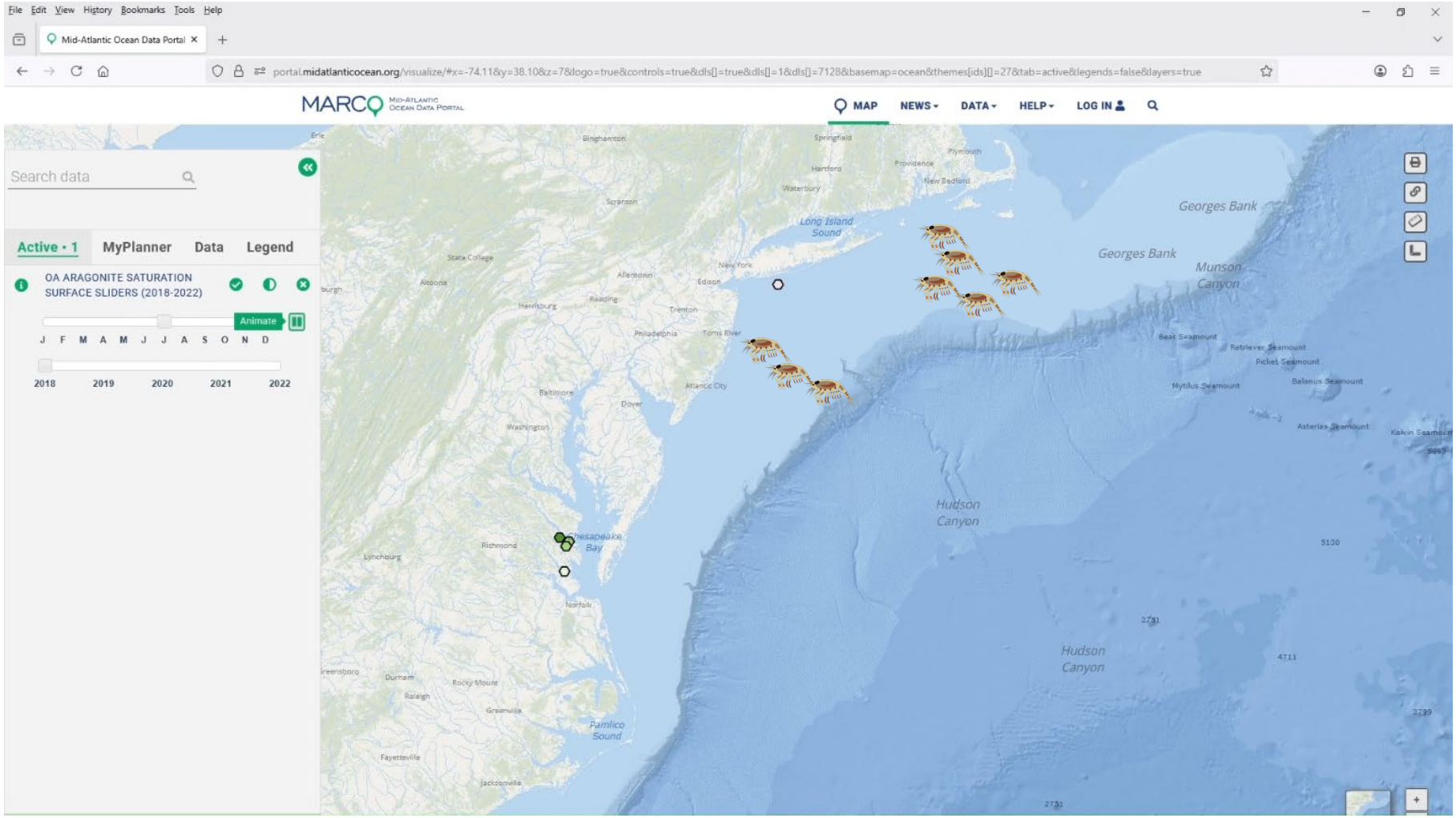
How to Use These Graphics ?

Previous
Aragonite range at which growth is hindered for various life stages o...

Next
pH range at which mortality occurs for various life stages of Mid-...

pH Range At Which Mortality Occurs For Various Life Stages Of Mid-Atlantic Species

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Retriever Seamount
Pickel Seamount
Balanus Seamount
Mytilus Seamount
Asterias Seamount
Kelvin Seamount
Binghamton
Springfield
Providence
Plymouth
Hartford
New Bedford
Waterbury
Scranton
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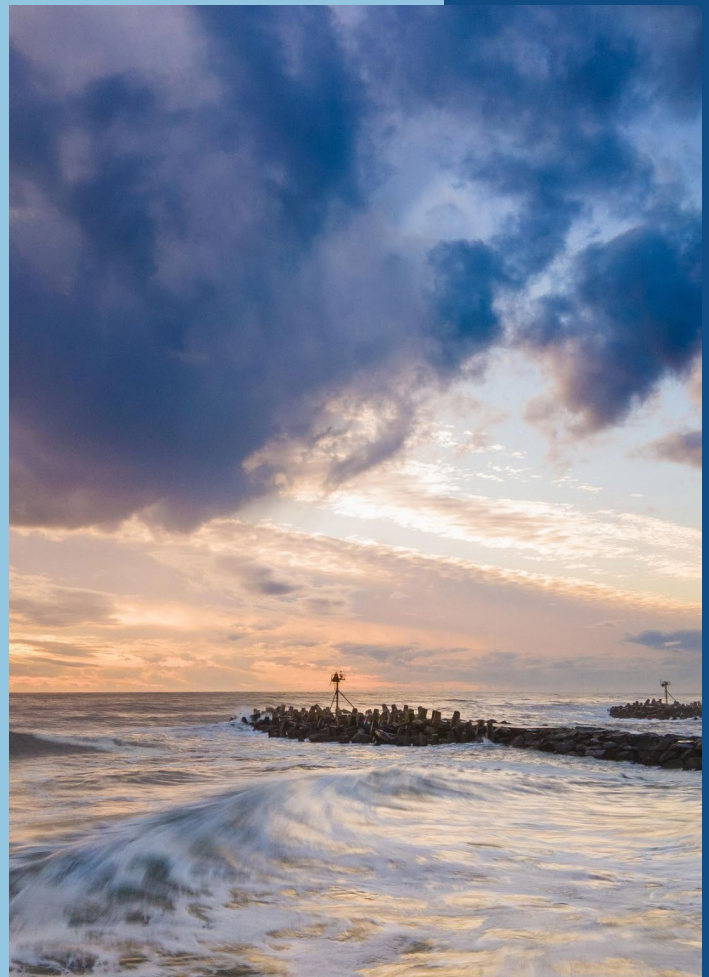

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