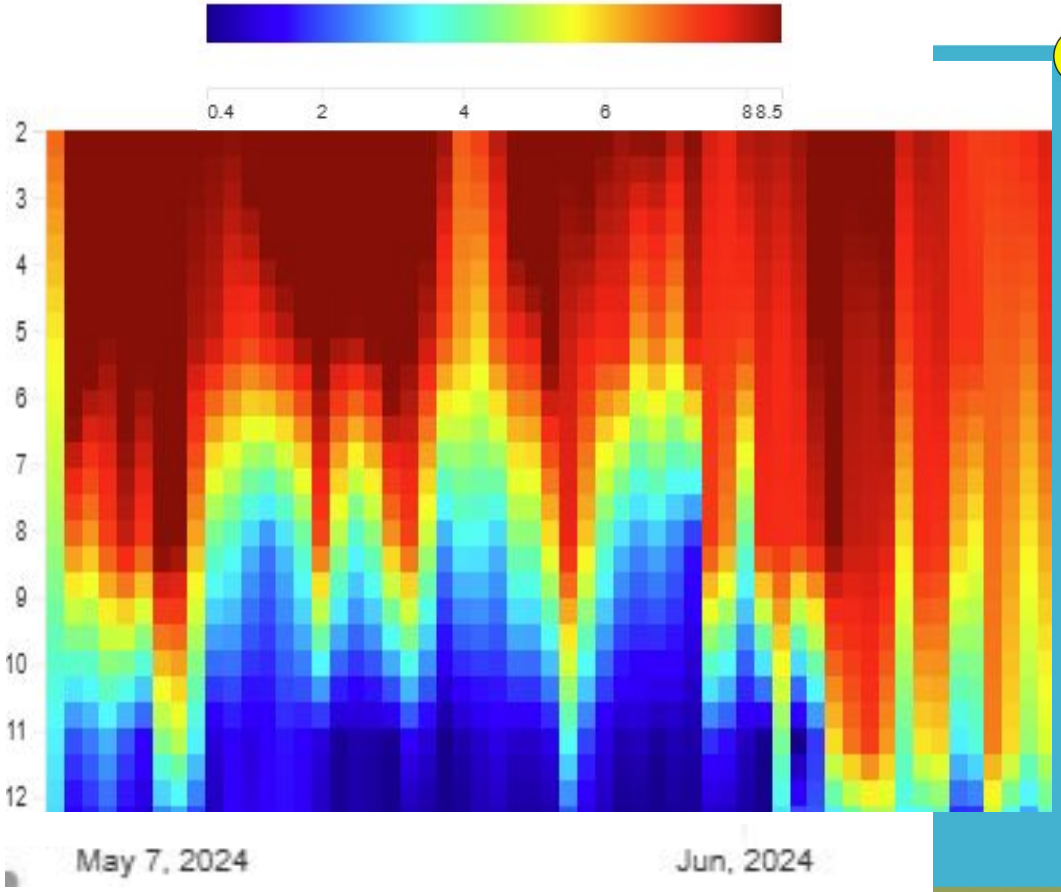
Connecting Water Quality and Living Resources in Shallow Waters with a Water Column Hypoxia Monitoring System: A 2025 Update

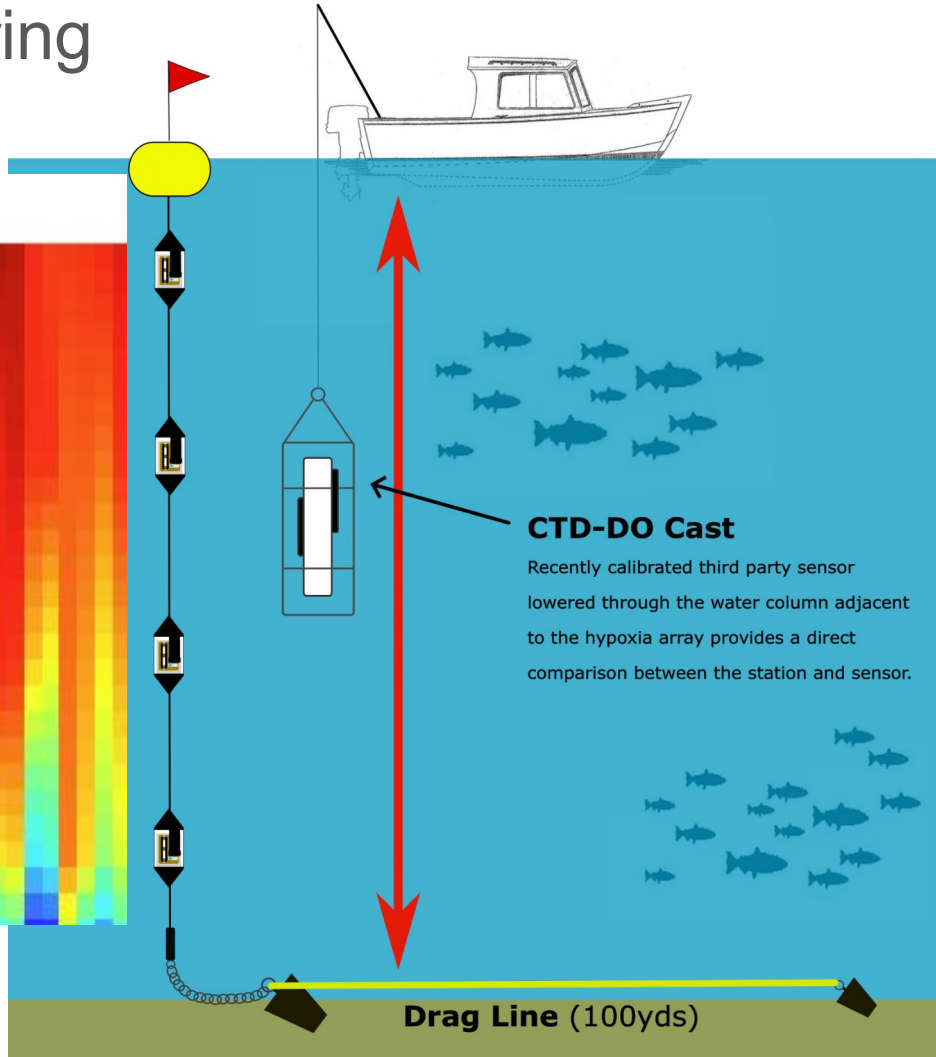
CBP
Fisheries Goal Implementation Team Spring Meeting

Hypoxia Collaborative Team
Jay Lazar

March 25, 2025

Water Column Hypoxia Monitoring





The Reasons Behind this Monitoring

- Each station, no matter where it is located, is **providing significant improvements for modeling hypoxic volume**. Some locations are better than others.

- The more closely located stations are within and/or near a segment of interest, the more likely the data will **inform our understanding of whether we are or are not reaching our attainment goals**.

- A station location's **connection to Living Resources** and any response in WQ improvements from restoration likely depends on how tightly coupled that location is to some of the focused and large scale restoration projects occurring within a tributary and its watershed.

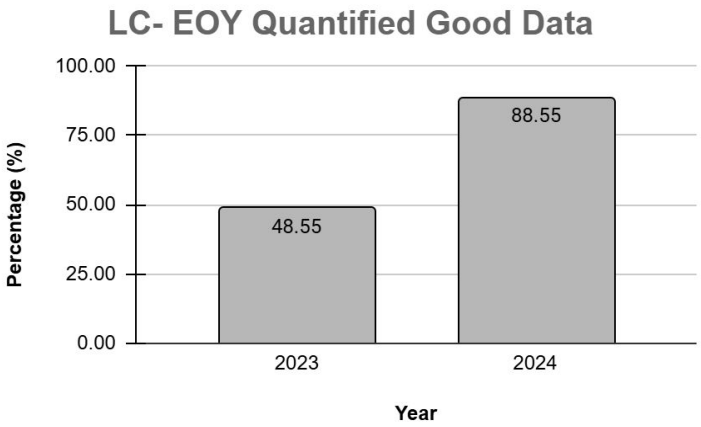
Hypoxia Data Review 2023 v 2024

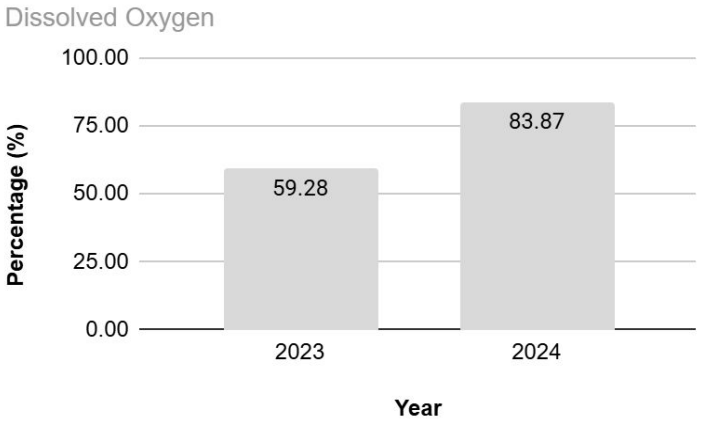
Significant Overall Improvements are attributed to spare sensor availability

We averaged 2.5 sensor replacements per depth monitored which helps guide the 2025 work

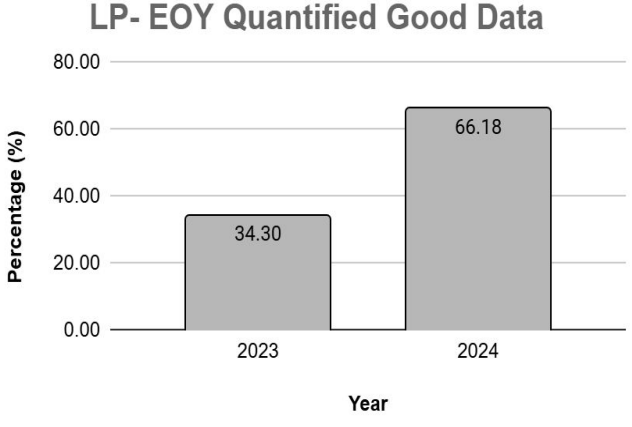
We continue to evolve with our maintenance & deployment efficiency

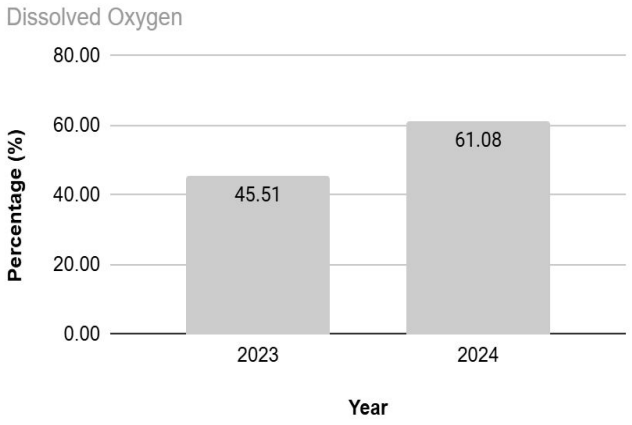
Lower Choptank





Lower Potomac





Access

CSV flat files of QC'd annual station data (2024 coming soon)

End of Year Data Review Reports

An API key is available for direct server access

Chesapeake Bay
INTERPRETIVE BUOY SYSTEM

HOME | ABOUT ▼ | LOCATIONS ▼ | EXPLORE ▼ | DATA ▼

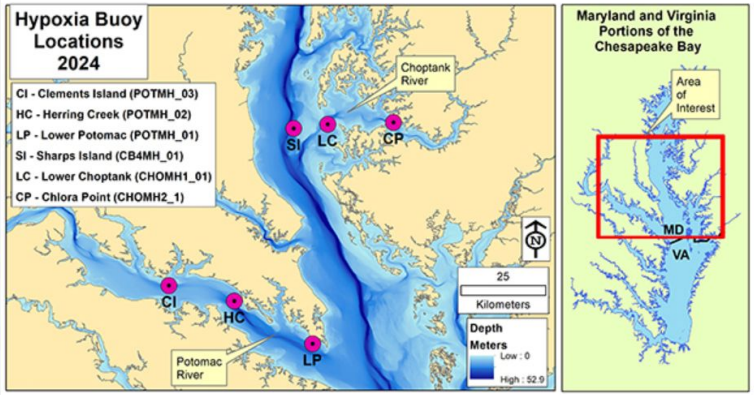
Home > Data > Water-Column Habitat Data

Water-Column Habitat Data

The NOAA Chesapeake Bay Office team deploys and maintains buoys to monitor dissolved oxygen, temperature, and salinity from the surface of the water to the bottom of the Bay by using "hypoxia buoys." Measuring and tracking hypoxia—very low levels of dissolved oxygen in the water—helps scientists more fully understand how levels vary from the surface to the bottom, and how they change throughout the year. This information can help identify where, and how big, the "dead zone" of hypoxic water in the Chesapeake is each year. Data from these buoys can help the Chesapeake Bay Program model how dissolved oxygen levels change over time and space. Fisheries scientists can use the data to learn more about the effects of hypoxia and changes in water conditions on different species, because the water column provides important fish habitat.

2024 Data

In 2024, NCBO deployed buoys in two river systems. Three buoys each were deployed in the Choptank River and in the Potomac River. Data from these locations will be available for you to download in the near future:



Real-Time Buoy Data
AT YOUR FINGERTIPS

GRAPHING
DOWNLOAD
MOBILE APPS

Buoy Status

AN	ANNAPOLIS	ONLINE
GR	GOOSES REEF	ONLINE
PL	POTOMAC	ONLINE
SR	STINGRAY POINT	OFFLINE
YS	YORK SPIT	ONLINE

DATA IN THE Classroom
Use buoy data to learn about the Bay ecosystem

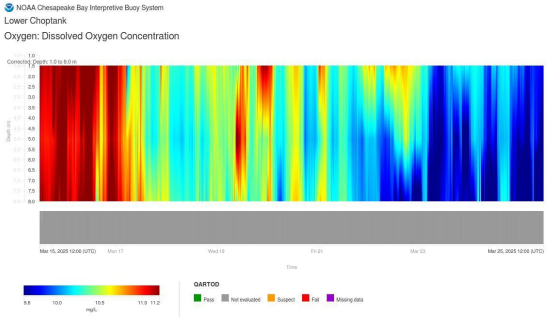
ARE YOU A FAN ?
See us on Facebook

https://buoybay.noaa.gov/data/2023-water-column-data

Access

Near Real-time raw data imagery in curtain and line plots

Near Real-time raw data access



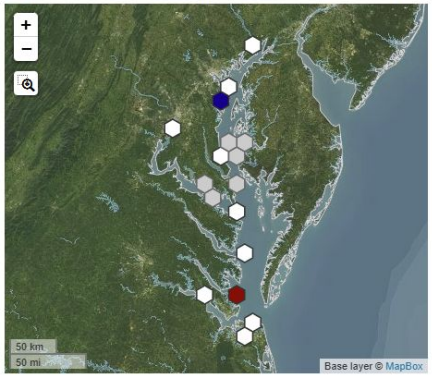
IOOS | Integrated Ocean Observing System

Environmental Sensor Map

Home | Catalog | Map 2 | Data views 5 | Downloads 0 | Settings

Sensor Stations 14,034 | Variable Types 127 | Affiliates 200

NOAA Chesapeake Bay Interpretive Buoy System



Web site	http://buoybay.noaa.gov/
Contact	cbibs@noaa.gov
Sector	Federal Government

410 Severn Ave #207-A, Annapolis, MD 21403, USA

Stations | Inventory

Search:

Station	Start	End
44043 - Patapsco, MD	Dec 31, 2014 19:10 (EST)	Dec 10, 2024 09:18 (EST)
44061 - Upper Potomac, MD	Apr 15, 2015 15:00 (EDT)	Aug 14, 2017 14:18 (EDT)
44063 - Annapolis, MD	Dec 31, 2014 19:00 (EST)	Mar 25, 2025 07:54 (EDT)
44072 - York Spit, VA	Jul 21, 2016 16:50 (EDT)	Mar 25, 2025 07:54 (EDT)
Annapolis (Historic CBIBS)	Nov 16, 2015 20:10 (EST)	Dec 5, 2016 07:50 (EST)
Chlora Point	Apr 9, 2024 13:10 (EDT)	Mar 25, 2025 07:50 (EDT)
Clements Island	Jun 11, 2024 12:50 (EDT)	Dec 17, 2024 12:30 (EST)
East Gooses (2021)	Dec 1, 2021 12:10 (EST)	Dec 15, 2021 10:20 (EST)
East Gooses (2022)	May 16, 2022 12:00 (EDT)	Aug 31, 2022 22:50 (EDT)
First Landing (Historic CBIBS)	Mar 15, 2016 12:10 (EDT)	Dec 14, 2016 16:40 (EST)
Gooses Reef (Historic CBIBS)	Mar 15, 2016 12:10 (EDT)	Jan 3, 2017 17:00 (EST)
Herring Creek	Jun 25, 2024 23:00 (EDT)	Dec 4, 2024 04:00 (EST)
Jamestown (Historic CBIBS)	Mar 15, 2016 12:10 (EDT)	Jan 3, 2017 17:00 (EST)
Lower Choptank	Apr 18, 2023 18:30 (EDT)	Mar 25, 2025 07:30 (EDT)
Lower Potomac	May 25, 2023 11:30 (EDT)	Nov 26, 2024 05:50 (EST)

Showing 1 to 25 of 25 entries

https://sensors.ioos.us/?new_session=true#metadata/156/sensor_source

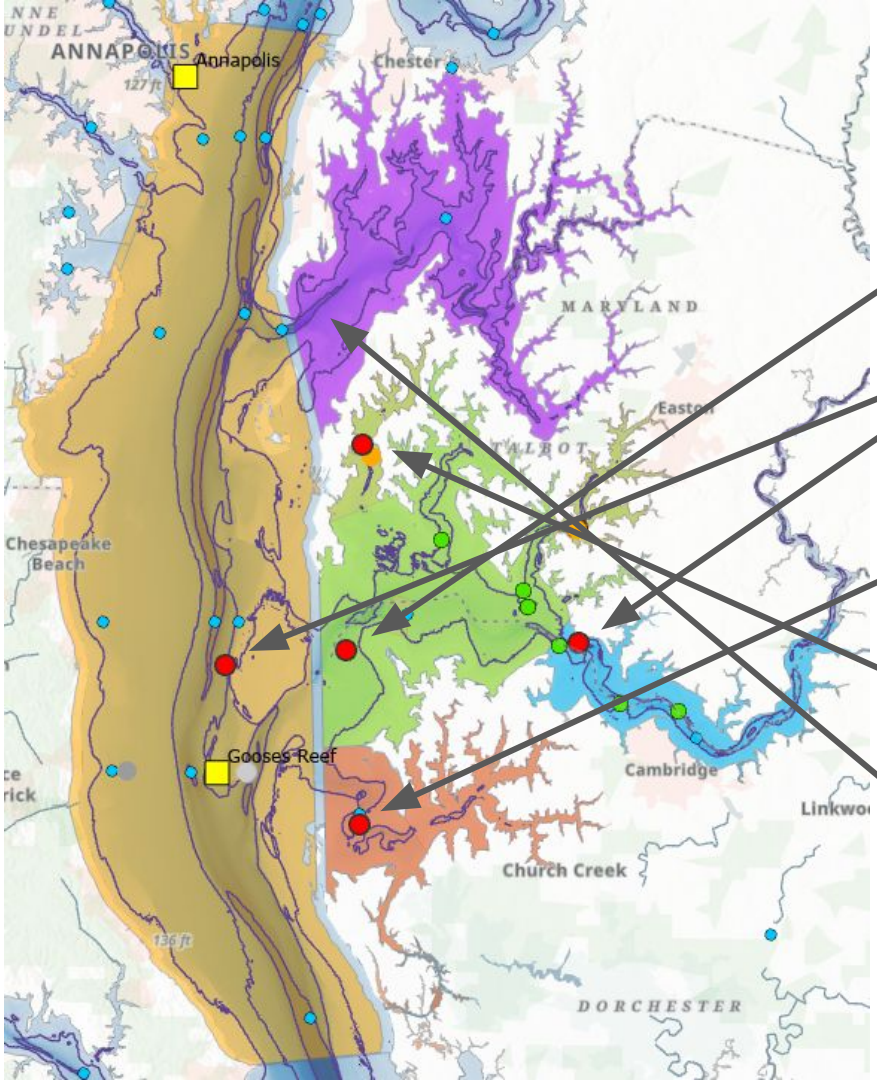
Hypoxia Monitoring 2025

3 Choptank locations from 2024 are out collecting data in 3 segments

We do not have the capacity to return to the Potomac River this year

We are working to partner in VA for 1-2 station deployments

We intend to deploy additional stations, likely within the map vicinity



Remained out over Winter

Deployed 3/14

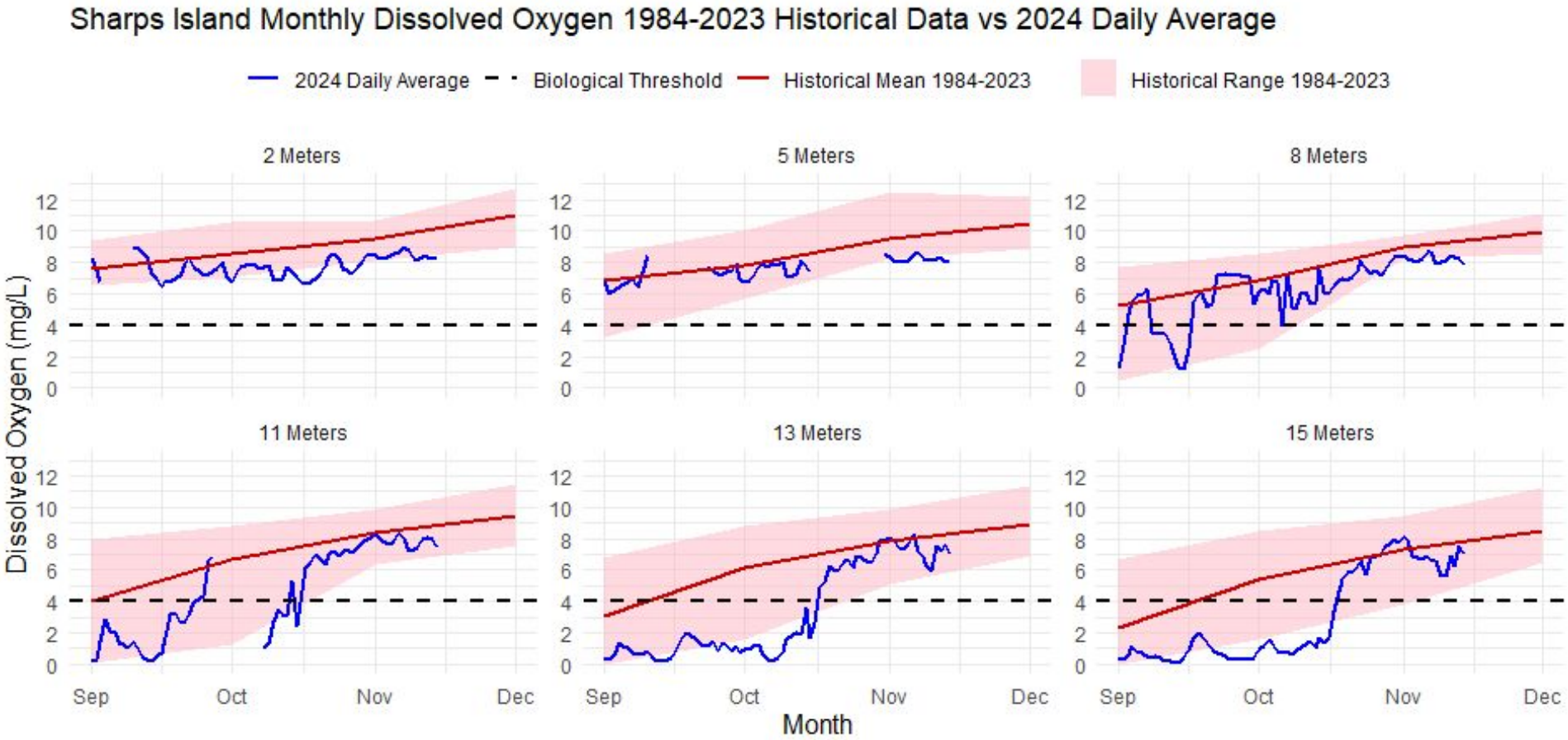
Likely next Deployment in 4th Segment

Optional LR Deployment

Aspirational 5th Segment or Deeper Water site

Connecting to Living Resources

CBO Seasonal Summary Quarterly Reports



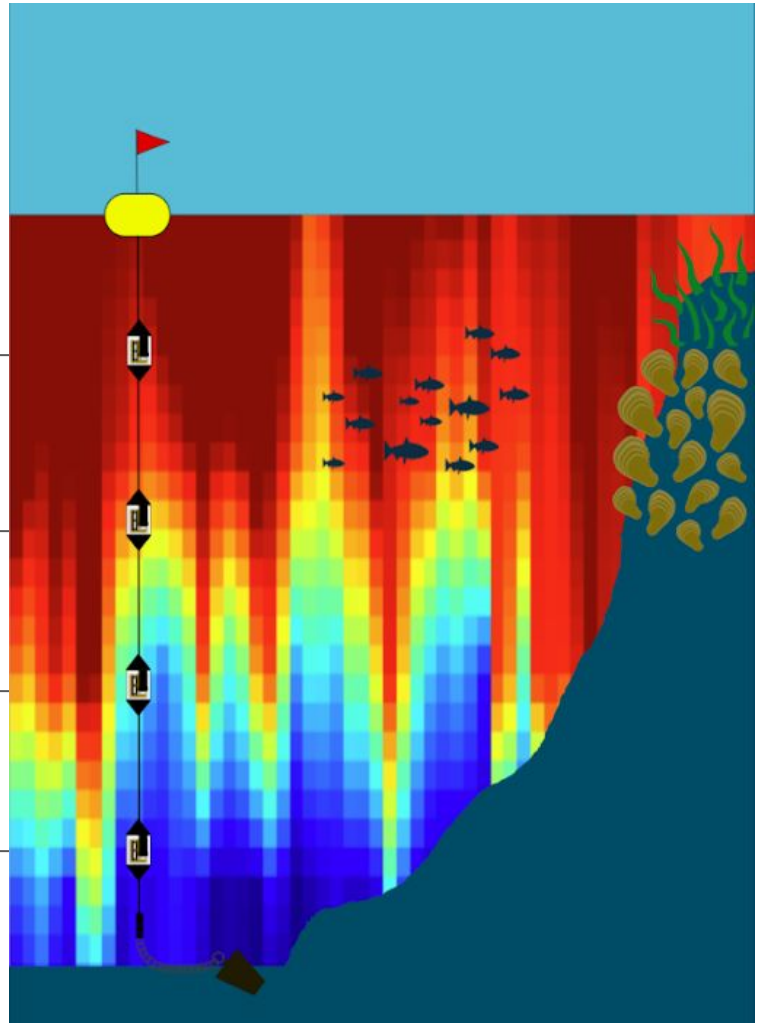
Sensor Logic and Living Resources

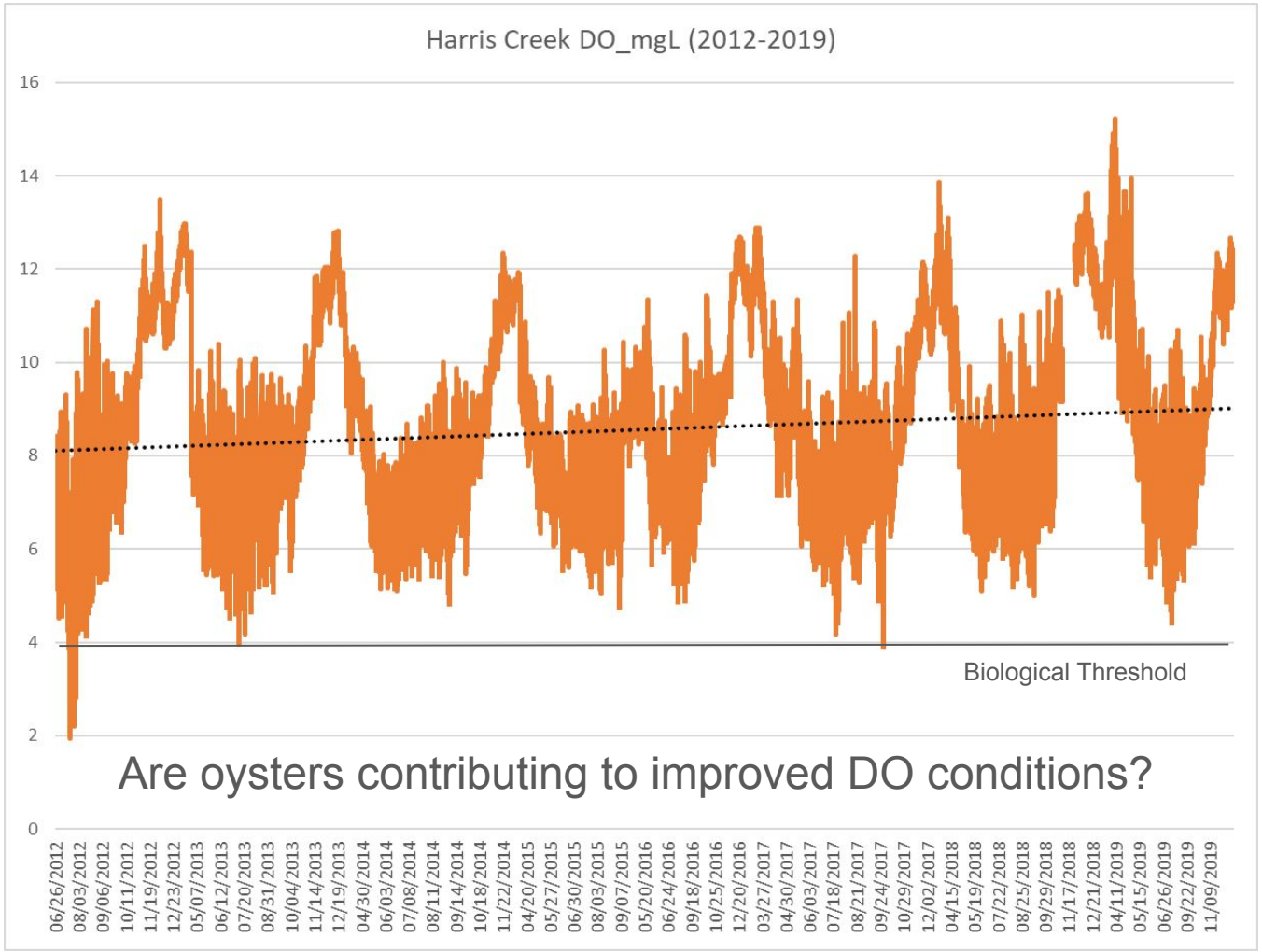
~2m approximates the limit of light penetration for SAV recovery

~5m represents the limit of oyster restoration to protect from low DO

~8m represents the depth of intermittent periods of low DO

~11m represents the depth of extended periods of low DO





Harris Creek
MDDNR

2012-2019

Diagnostic Monitoring of Shallow Water (0.5-2m)

For Restored Oyster Reefs

Shows Improving DO Conditions

HABITAT FOCUS AREA

Building off of Focused Restoration and Robust Partnerships

Are we making a measurable difference?

Are we seeing a Living Resource response?

What's the sweet spot for the available resources?

Thank You & Any Questions?