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NOAA Update on Gulf of Mexico Hypoxic Zone

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Outline

- Hypoxic Zone Monitoring Results
- Retrospective Analysis
- Climate Impacts on Gulf Hypoxia
- Emerging Technologies for Hypoxia Monitoring

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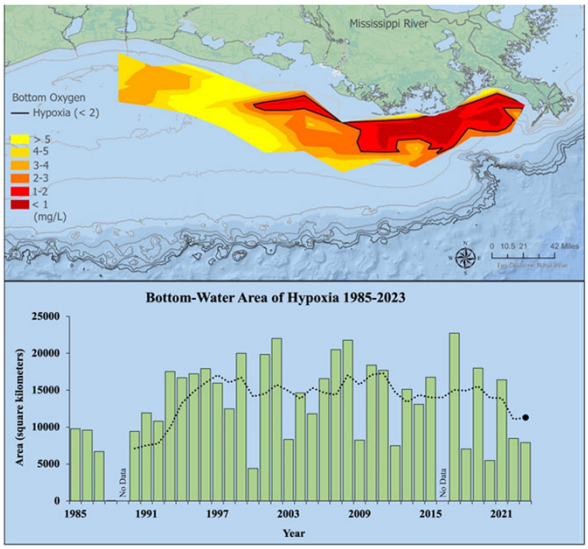
Hypoxia Zone Monitoring Results



Source: (Rabalais, LSU, NOAA)

Measured mid-summer extent of hypoxic zone – Key metric to assess progress toward the 2035 HTF Coastal Goal (5,000 km^2)

Predicted Size = 10,761 km^2
Measured Size = 7,920 km^2
5-Year Average = 11,259 km^2

Forecast models within margin of error but overall hypoxic zone was smaller than expected
Still impacting close to 2 million acres of habitat

Outreach Efforts
Two Press Releases and Media Teleconference
~27 news articles written with reach >88M

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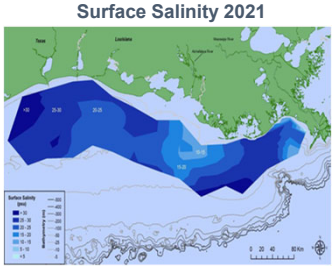
Retrospective Analysis

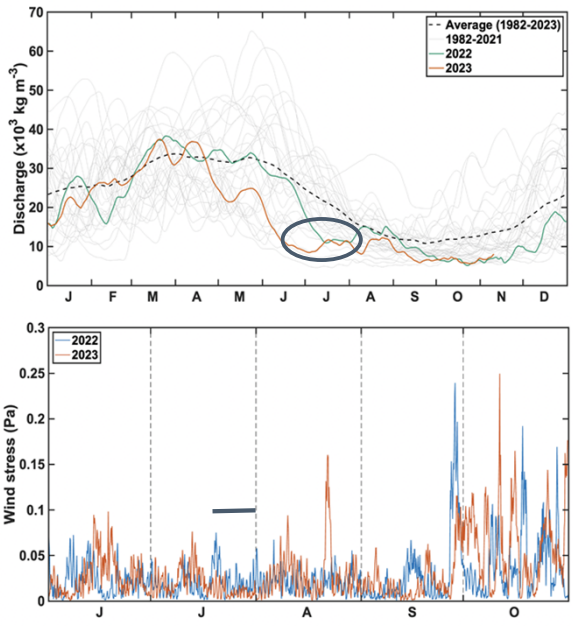
- Extremely low Mississippi River discharge resulted in high surface salinities
- Stratification was reduced even with calm winds and high temperatures
- River discharge and nutrient loading, both controlling factors of hypoxia size, were reduced in response to prolonged drought conditions

Surface Salinity 2021



Surface Salinity 2023

Source: (Rabalais, LSU)



Source: (Fennel, Dalhousie; Justic, LSU)

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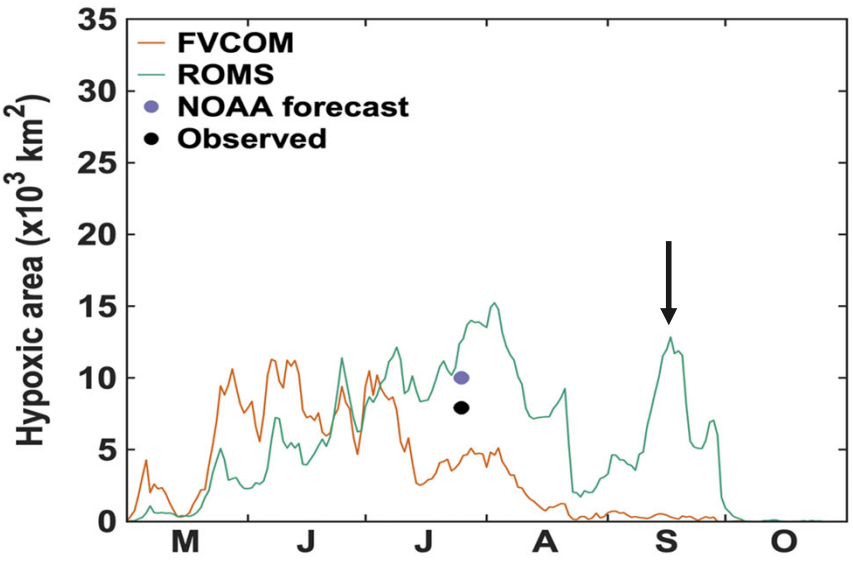
Retrospective Analysis



Source: (Fennel, Dalhousie; Justic, LSU)

Models captured seasonal dynamics but differed in hypoxia area magnitude

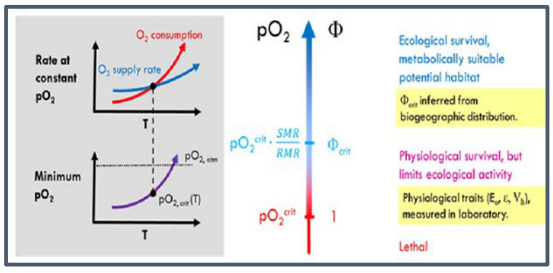
Unlike previous years, neither model had good agreement with cruise data

Differences in how mixing and stratification strength are modeled affected calculated hypoxia area

Climate Impacts on Gulf Hypoxia

- New NOAA Coastal Hypoxia Research Program (CHRP) project that will explore the combined effects of climate warming, ocean deoxygenation and eutrophication on hypoxia and ecosystems
- A trait-based ecophysiological framework for temperature-dependent hypoxia impact on species habitability will be utilized
- Will provide information to coastal managers and stakeholders to plan for nutrient reduction strategies to minimize the hypoxic zone within the context of climate change and species health

Title: Biological Vulnerability to Hypoxia from Climate Warming and Eutrophication in the Northern Gulf of Mexico
Institutions: LSU, Princeton University, University of Louisiana Lafayette, USGS
Project Period: 2023 – 2027



Ecophysiological Response Framework

Source: (Liang, LSU)

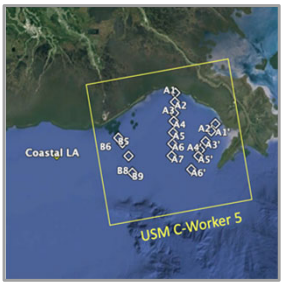
Emerging Technologies for Hypoxia Monitoring

C-Worker 5 (ASV)

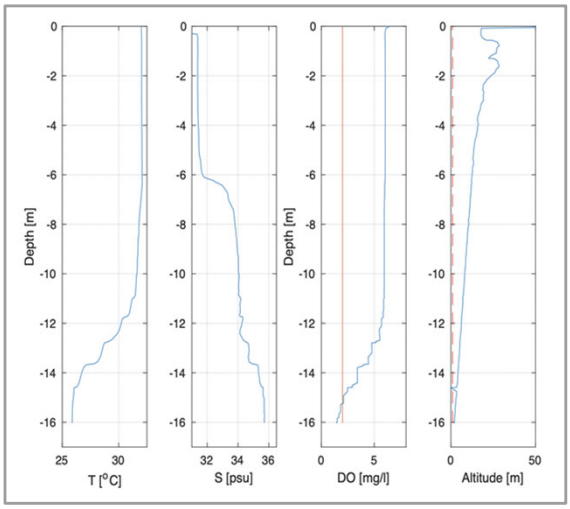
- Diesel powered with winch-based system
- Conducted initial near-shore field trial last year
- Offshore field trial was conducted in August

https://ioos.noaa.gov/project/ott-asv-hypoxia

USM Sea Eagle



Offshore Testing Locations



USM C-Worker 5 Winch Data

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Emerging Technologies for Hypoxia Monitoring

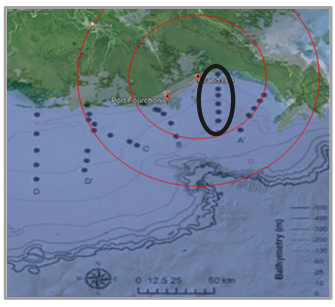
Triton (AUSV)

- Sail capability and solar charging with keel sensors
- Conducted first near-shore field trial in 2022

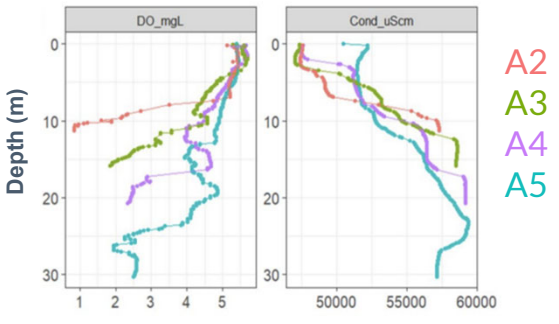
SP-48 (ASV)

- Solar charging with winch system and AML sonde
- Offshore testing in Sept on hypoxia A transect

Concurrent Triton and SP-48 offshore testing is planned for next week and in conjunction with the survey cruise next year



SP-48 Offshore Testing Location



SP-48 Winch Data (AML Sonde)

Triton (top) and SP-48 (bottom)

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Thank you
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