2017 Hypoxic Zone Conditions: Monitoring and Modeling Results

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NOAA
National Ocean Service
National Centers for Coastal Ocean Science

Mississippi River Gulf of Mexico Watershed Nutrient Task Force

Hypoxia Task Force Winter Meeting
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JOINT NEWS RELEASE
NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION
U.S. GEOLOGICAL SURVEY

-- June 20, 2017 –

NOAA, USGS and partners predict third largest Gulf of Mexico summer 'dead zone' ever

Federal scientists forecast that this summer's Gulf of Mexico dead zone – an area of low to no oxygen that can kill fish and other marine life – will be approximately 8,185 square miles [21,199 square kilometers], or about the size of New Jersey.

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-- August 2, 2017 –

Gulf of Mexico 'dead zone' is the largest ever measured

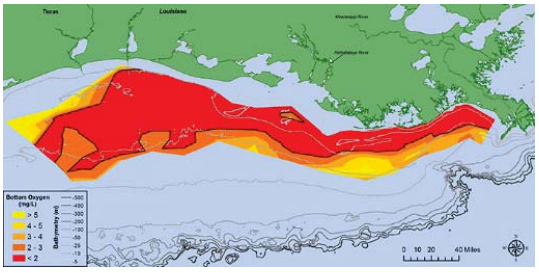
Scientists have determined this year's Gulf of Mexico "dead zone," is 8,776 square miles [22,720 square kilometers], an area about the size of New Jersey. It is the largest measured since dead zone mapping began there in 1985.

Hypoxic Zone Monitoring Results

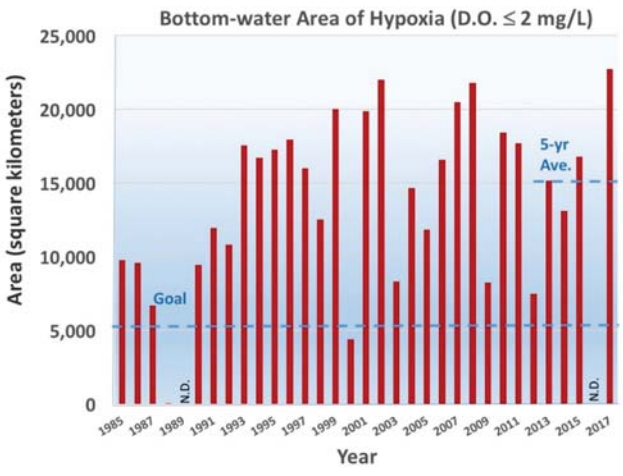
Maximum annual areal extent of hypoxic zone – metric to assess progress toward HTF Coastal Goal

2017 Hypoxic Zone areal extent = 22,720 km^2

Bottom-water dissolved oxygen from ship survey 24-30 July 2017. Black line denotes 2 mg/L



Long-term monitoring data set



From Nancy Rabalais (LSU/LUMCON)

Model Simulations of 2017 Hypoxic Zone Dynamics

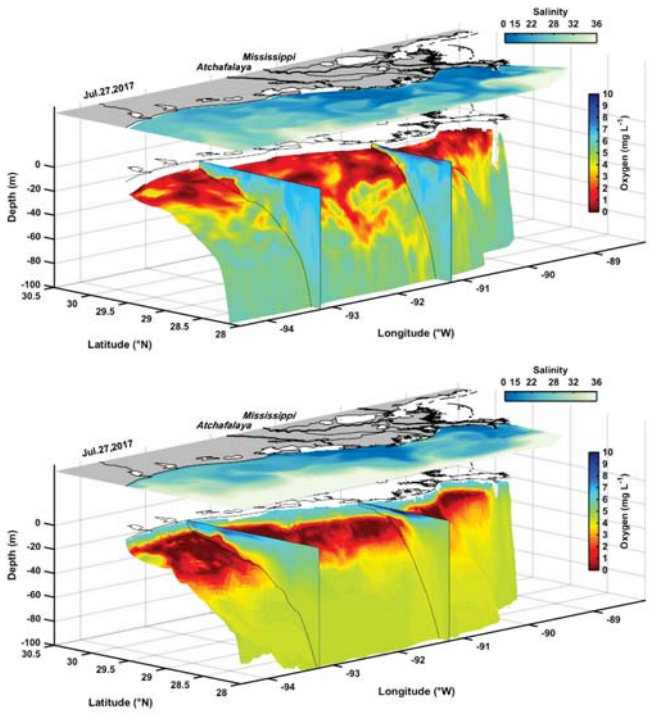
NOAA supported modelers:

- Katja Fennel (Dalhousie U)
- Dubravko Justić (LSU)
- Robert Hetland (Texas A&M)

Biogeochemical model coupled to:

1. ROMS Hydrodynamic Model
2. FVCOM Hydrodynamic Model

Simulated 3D view at midpoint of July 2017 ship survey



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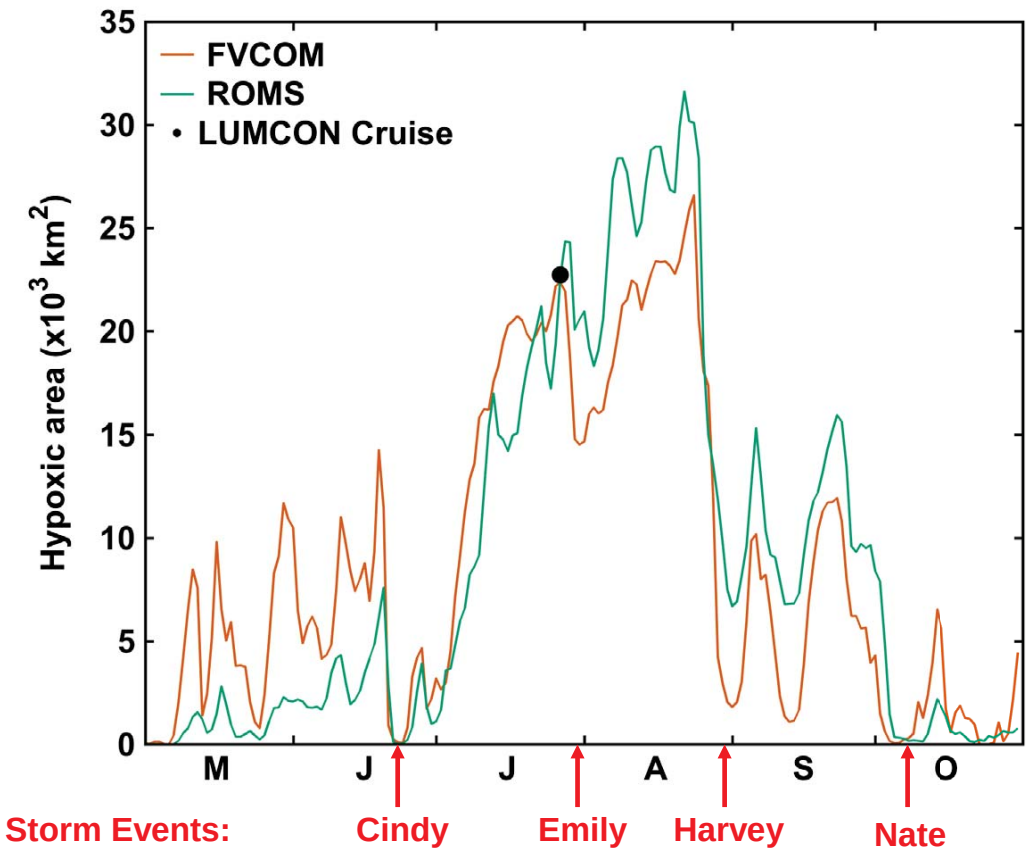
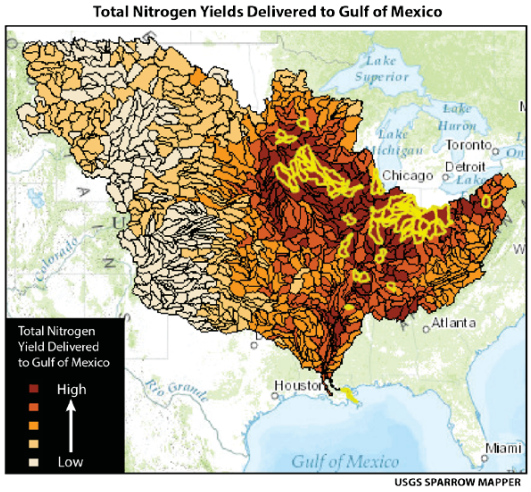


Task Force Coastal Goal

- **Coastal Goal: reduce the five-year running average areal extent of the Gulf of Mexico hypoxic zone to less than 5,000 km² (1,928 mi²) by 2035;**
- **an Interim Target of a 20% reduction of N and P loading by 2025 is a milestone for immediate planning and implementation actions…**

Watersheds contributing the highest nitrogen yields to the Gulf



Nutrient Reduction Guidance from Ensemble of Scenario Forecast Models

Question 1: What reductions in N and P loading are needed to shrink the Dead Zone to 5,000 km² (Coastal Goal)?

- **Models confirmed the importance of a dual nutrient reduction strategy:**
  - **Targeting N alone would require a ~60% reduction to reach 5,000 km² goal;**
  - **Targeting both N and P would require a 48% reduction of each nutrient, close to the 45% reduction recommended in 2008 Action Plan.**

Nutrient Reduction Guidance from Ensemble of Scenario Forecast Models

Question 2: How much will 20% reductions in N and P loading shrink the zone (Interim Target)?

- **3D Model simulations showed that the sensitivity of changes in hypoxia to nutrient load reductions is variable –**
  - **Reaching the 20% interim nutrient reduction goal will not reduce hypoxia significantly, but will bring us closer to the point where the amount of hypoxia reduction per unit nutrient reduction increases**

    (i.e. moving beyond 20% reduction will have an impact on the size of the hypoxic zone)

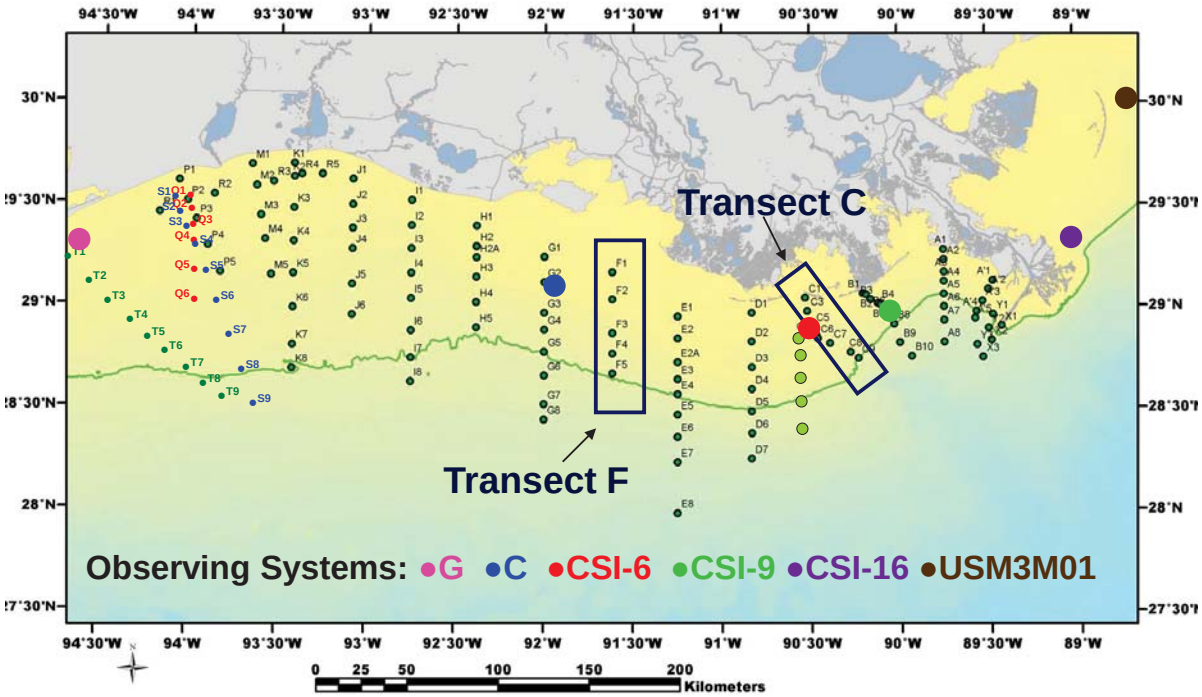
7th Annual NOAA/NGI Hypoxia Research Coordination Workshop

Building the Cooperative Hypoxia Assessment and Monitoring Program (CHAMP)

9-10 January 2018 at Stennis, Mississippi

Goal: assess progress of workgroups toward building the CHAMP, and further advance strategic planning to meet remaining CHAMP programmatic and financial needs

Hypoxic Zone Monitoring Activities in Recent Past



Hypoxia Monitoring Workgroups

Workgroup	Lead(s)
Louisiana	Angelina Freeman (LA CPRA), Dubravko Justić (LSU)
Mississippi/Alabama	Steve Ashby (MSU/NGI), Stephan Howden (USM), Brian Dzwonkowski (DISL)
Texas	Steve DiMarco (TAMU)
Autonomous Vehicles	Steve DiMarco (TAMU)
Fisheries	Kevin Craig (NOAA), Chris Brown (NOAA)
Hypoxia Task Force	Katie Flahive (EPA), Danny Wiegand (EPA)
Ocean Acidification	Barb Kirkpatrick (GCOOS), Nancy Rabalais (LSU/LUMCON), Steve DiMarco (TAMU)
Gulf Restoration	Steve Giordano (NOAA), Becky Allee (NOAA)

Fisheries Monitoring Workgroup Workshop

24-25 January 2018 at Stennis, Mississippi

Purpose:

- **Forum between Gulf hypoxia researchers and fisheries managers to share the latest research advances and ensure research approaches and tools are informed by management guidance;**
- **Advance monitoring capacity in the Gulf to enable scientists to better understand hypoxia effects on fish biology/physiology and fisheries stocks.**

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[Postponed]

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FY18 Activities

- Convene Fisheries Monitoring Workgroup Workshop
- Ongoing NGOMEX research on hypoxia effects on fisheries
- Coastal Hypoxia Research Program (CHRP) national competition on hypoxia ecosystem impacts
- SBIR competition for autonomous vehicle mapping of hypoxic zone
- NOAA seasonal forecast and mid-summer survey
- Continue operationalization of scenario forecast models within NOAA