

Mississippi River Basin / Gulf of Mexico Nutrient Runoff Network Info Bulletin

Sharing information and making connections from the headwaters to the gulf.

July 6, 2021

Welcome!

This bulletin is designed as a way to share information with those interested in nutrient runoff issues and impacts. ***We hope that you find this a valuable resource and encourage you to be a part of the exchange!*** You can share resources or information for inclusion in future bulletins, or join the distribution list, by sending an email to noaa.centralregion@noaa.gov.

Outlooks and Forecasts

NOAA Releases 2021 'Dead Zone' Forecast for Gulf of Mexico

NOAA scientists are forecasting this summer's Gulf of Mexico hypoxic area or 'dead zone' - areas of low to no oxygen that can kill fish and other marine life - to be approximately 4,880 square miles. The 2021 forecasted area is smaller than, but close to the five-year averaged measured size of 5,400 square miles.

This forecasted size is also substantially less than the 8,776-square-mile 2017 Gulf hypoxic zone, which was the largest zone measured since mapping began in 1985. The annual prediction is based on a suite of models that incorporate U.S. Geological Survey (USGS) river-flow and nutrient data.

River discharge in May and the associated nutrient load to the Gulf of Mexico has been shown to be a major contributing factor to the size of the dead zone which forms each summer. In May 2021, discharge in the Mississippi and Atchafalaya rivers was about 2% below the long-term average between 1980 and 2020. The USGS estimates that this smaller-than-average river discharge carried 90,500 metric tons of nitrate and 15,600 metric tons of phosphorus into the Gulf of Mexico in May alone. These nitrate loads were about 32% below the long-term average, and phosphorus loads were about 9% below the long-term average.

While the hypoxic zone forecast assumes typical



USGS Image of Mississippi River near Vicksburg, MS

Spotlight: National Centers for Coastal Ocean Science

NCCOS Background

The [National Centers for Coastal Ocean Science \(NCCOS\)](#) deliver ecosystem solutions to sustain thriving coastal communities and economies. They provide coastal managers the information and tools they need to balance society's environmental, social, and economic goals - protecting environmental resources and public health, preserving valued habitats, and improving the way communities interact with the coastal system.

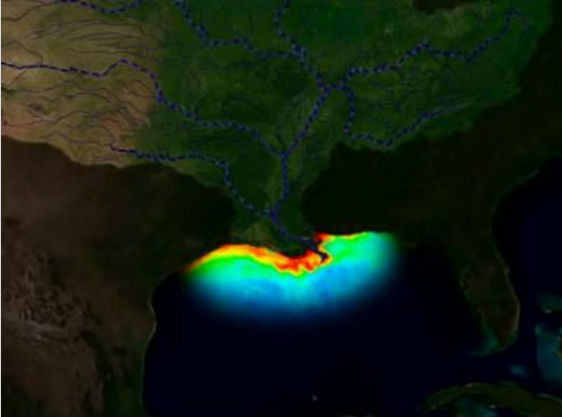
Formed in 1999 as the focal point for NOAA's coastal ocean science efforts, NCCOS helps NOAA meet its coastal stewardship and management responsibilities. Their work focuses on four areas:

- Coastal Change: Vulnerability, Mitigation, and Restoration
- Marine Spatial Ecology
- Social Science
- Stressor Impacts and Mitigation

Within these four areas, NCCOS supports an

coastal weather conditions, the measured dead zone size could be disrupted and its size changed by major weather events, such as hurricanes and tropical storms, which mix ocean waters, as occurred in 2018, 2019 and 2020. A NOAA-supported monitoring survey, scheduled for later this summer, will confirm the size of the 2021 dead zone and is a key test of the accuracy of NOAA's models.

Check out the [NOAA News Release](#) for additional details.



This is the fourth year NOAA is [producing its own forecast](#), using a suite of NOAA-supported hypoxia forecast models jointly developed by the agency, teams of researchers from multiple universities, and the USGS, who provided the Mississippi River loading data for the models. The NOAA forecast integrates the results of these multiple models into a separate average forecast and is released in coordination with these external groups, some of which are also developing independent forecasts.

NOAA and its partners continue to develop additional hypoxia forecast capabilities to understand [impacts on living marine resources](#) and how [combining multiple modeling approaches can better predict the hypoxic zone](#).

USGS Collaboration and Partnership

The 'Dead Zone' forecast is the result of close collaboration with the [U.S. Geological Survey](#). The USGS operates more than [3,000 real-time stream gauges](#), [60 real-time nitrate sensors](#), and [38 long-term monitoring sites](#) to measure nutrients in rivers throughout the Mississippi-Atchafalaya watershed. Data from these networks are used to track long-term changes in nutrient inputs to the Gulf and to help build models of nutrient sources and hotspots within the watershed.

[Recent results from USGS models](#) show that agricultural sources together are the largest nutrient sources to the Gulf, and that much of that originates in the upper Midwest and areas along the Mississippi River. But urban areas, human waste

impressive number of projects. If you are interested in learning more, visit the [NCCOS Project Explorer](#), which provides a snapshot of official, discrete lines of research. You can filter by research category, region, or contact.

NCCOS Coastal Ocean Quarterly

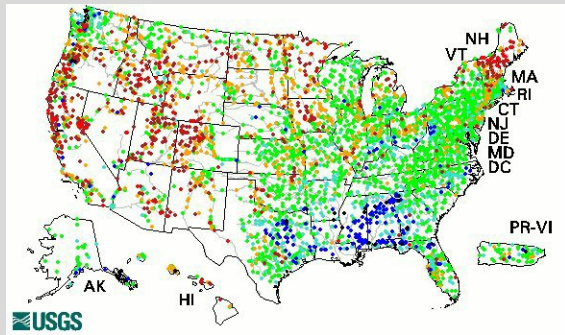
News from NCCOS is available on a quarterly basis. [Subscribe here](#) and enjoy a few selected stories below.

Spotlight: National Harmful Algal Bloom Observing Network Framework

The [National Harmful Algal Bloom Observing Network \(NHABON\) Framework](#) offers a high-level regional analysis of existing efforts to monitor and forecast harmful algal blooms (HABs) and identifies gaps in observing capabilities that can best be addressed with a national network. The framework is the product of an internal [NOAA workshop](#) hosted by NOAA's Integrated Ocean Observing System (IOOS) and National Centers for Coastal Ocean Science (NCCOS), with representatives from five NOAA Line Offices (NESDIS, NMFS, NWS, NOS, and OAR). Observations and measurements of HAB species and toxins are critical to support early warning, forecasting (e.g., initializing models, validating model outputs), and research on HAB growth and toxin dynamics. Many regional observing assets currently in use are funded through short-term research projects, which will lead, in the near future, to the loss of critical observing and data acquisition infrastructure used by forecasters and decision makers.

A National HAB Observing Network (NHABON) is needed to efficiently and effectively integrate local, state, regional, and federal HAB observing capabilities and deliver products operationally. The Framework document has been used recently (December 2020) to support development of an "Implementation Strategy for a National Harmful

treatment, precipitation and atmospheric dust, and natural sources also contribute large amounts,” said Don Cline, associate director for the USGS Water Resources Mission Area. “Information on where these sources contribute in the watershed can help guide management approaches to reduce nutrients in local rivers and ultimately in the Gulf.” [The new USGS models can be viewed online.](#)



Real-time streamflow maps, along with maps for other conditions, are available through [USGS WaterWatch](#)

Your Attention Please: CLEAR30 Pilot Now Available Nationwide

Enrollment is currently open for USDA Farm Service Agency’s Clean Lakes, Estuaries, and Rivers (CLEAR30) pilot program to address water quality concerns through agricultural land management. Previously limited to the Great Lakes and Chesapeake Bay watersheds, CLEAR30 is now available nationwide. Under CLEAR30, landowners and agricultural producers with Conservation Reserve Program (CRP) or Conservation Reserve Enhancement Program (CREP) contracts expiring September 30, 2021 are eligible to receive incentive payments in exchange for a 30-year commitment to maintaining water quality practices on their land. [CLEAR30 signup can be done through your local USDA Service Center](#) and closes on August 6, 2021.

Hypoxia Related Highlights

These updates are selected from the Hypoxia Task Force Quarterly Newsletter

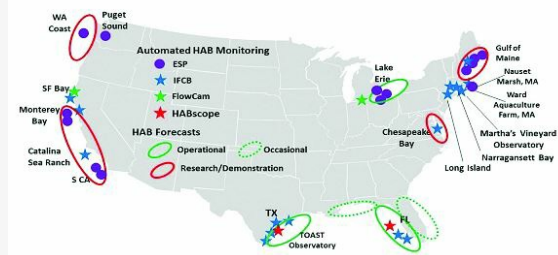
[Subscribe here....](#)

New Survey Shows the Value of Investing in Watershed Professionals

Sand County Foundation and partners organized an in-depth survey of over 100 watershed leaders in Illinois, Iowa, Minnesota, and Wisconsin and the findings of this survey can guide needed investment

Algal Bloom Observing Network (NHABON)”, through an effort led by the IOOS Association with input from NOAA, NGOs, and academic institutions. Implementation of the NHABON will achieve the following benefits: enable HAB forecasting and early warning; leverage economies of scale and enhance information transfer between regions; determine algal community baselines and discern trends to help assess the impacts of climate change, eutrophication, and other environmental forcings; and provide observations to support NOAA’s mission of understanding and predicting changes in our oceans.

Coastal HAB Monitoring and Forecasting



Regions with HAB monitoring and forecasting. These efforts are supported primarily with research funding. Operational forecasts are those that are consistently conducted. Occasional forecasts are those that may be conducted sporadically in response to bloom dynamics. The Environmental Sample Processor (ESP) uses molecular or antibody probes to detect HAB cells or toxins, while the Imaging FlowCytobot (IFCB), FlowCam, and HABscope are automated or semi-automated microscopes that capture images of HAB cells. Credit: NOAA.

Featured Project: Building Partnerships to Track Hypoxia in Marine Ecosystems

Smart and rugged dissolved oxygen sensors developed by a NCCOS-funded project have expanded deployments from the waters off Oregon to the states of Washington and Massachusetts. Dissolved oxygen levels can strongly affect habitat use by fish and invertebrates. Knowing where and when hypoxic (low oxygen) zones form is an important priority for fishermen and managers.

Hypoxia is not only an issue in the Oregon Dungeness crab fishery, but also being experienced by the Washington Dungeness crab

in a workforce of watershed coordinators across the Midwest. Those surveyed are paid professionals focused on agricultural lands within watershed or county boundaries, often employed by county conservation districts or departments, non-profits, or state agencies. A majority have a background in environmental science, and some have expertise in agronomy, engineering, or social science. One-fifth have less than two years' experience in their role, and nearly half have worked or grew up on a farm. Findings indicate: watershed professionals want to lead; communication is a key skill; watershed professionals learn from their peers; confidence varies by topic and background; agriculture has a seat at the table; and stable funding for watershed professionals is needed. [Read more here...](#)

Indiana Announces Updates to State Nutrient Reduction Strategy

The Indiana State Nutrient Reduction Strategy (SNRS) is the product of an inclusive effort of the Indiana Conservation Partnership (ICP) under the leadership of the Indiana State Department of Agriculture (ISDA) and the Indiana Department of Environmental Management (IDEM) to capture statewide the present and future endeavors that positively impact the State's waters, as well as gauge the progress of conservation, water quality improvement and soil health practice adoption in Indiana. The state has just updated the strategy with Version 6. [Learn More...](#)

Ohio Releases 2020 Nutrient Mass Balance Study for its Major Rivers

The biannual state-mandated study examines nutrients from nonpoint sources (NPS) and encompasses 11 watersheds across the state, which drain 66 percent of Ohio's land area. Highlights from the [2020 report](#) include: Nutrient loads from point sources were higher in the Ohio River basin than the Lake Erie basin; the watershed with the highest NPS contribution of phosphorus and nitrogen had the highest proportion of land in agricultural production; the increased NPS loads for both total phosphorus and total nitrogen in 2019 further document that hydrology - especially due to higher precipitation- drives a large share of the nutrient loads.

Substantial state and federal dollars continue to be allocated to nutrient reduction efforts to address both point and nonpoint sources in many of the state's watersheds. Launched in 2019, [H2Ohio](#) is a

and spot prawn fisheries and the Massachusetts lobster fishery. Project scientists are collaborating with fishery managers from Washington's Department of Fish and Wildlife to monitor dissolved oxygen levels in Puget Sound during their Dungeness crab and spot prawn pre-season surveys. Across the country, through the project's technology partner, the lobster fleet in Massachusetts has been equipped with dissolved oxygen sensors to detect and track the progression of hypoxic zones in Cape Cod Bay.

Arming managers and fishermen with new low-cost and user-friendly sensors represents a new tool for coping with the challenges of a changing ocean. By knowing dissolved oxygen levels, managers hope to better account for the potential effects of hypoxia on the distribution and catchability of some of their state's most valuable shellfish.

This project is part of the NCCOS Coastal Hypoxia Research Program and led by Oregon State University.



Smart dissolved oxygen sensor deployed on spot prawn traps by Washington Department of Fish and Wildlife (WADFW) managers as part of the Puget Sound pre-season fishery survey. Credit Washington DFW.

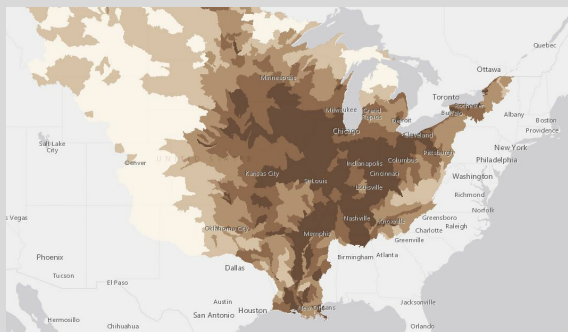
Education and Outreach

collaborative water quality effort to provide clean and safe water to Ohio. This plan gives the Ohio Department of Natural Resources, Ohio Department of Agriculture, Ohio Environmental Protection Agency, and Ohio Lake Erie Commission each a significant role in H2Ohio through the natural infrastructure of wetlands, the reduction in nutrient runoff, and increasing access to clean drinking water and quality sewer systems.

SPARROW Items of Interest

Updated SPARROW Model Results: Homing in on Sources of Nitrogen and Phosphorus in the Mississippi/Atchafalaya River Basin

A new USGS study uses [SPARROW \(SPAtially Referenced Regression On Watershed attributes\) models](#) to estimate total nitrogen (N) and total phosphorus (P) yields from catchments throughout the Mississippi/Atchafalaya River Basin (MARB), which drains about 41% of the conterminous United States. SPARROW modeling and mapping tools assist researchers estimating the amount of contaminant transported from inland watersheds to larger water bodies by linking monitoring data with information on watershed characteristics and contaminant sources. A [recent USGS study](#) describes where within the MARB nutrients originate and identifies the relative importance of different nutrient sources—e.g., fertilizers, manure, wastewater treatment plants, or atmospheric deposition—throughout the Basin. Nutrients exported from the Basin contribute to hypoxia in the Gulf of Mexico. Results of this study are based on catchment activities updated to reflect 2012 (the most recent data available) and a much finer spatial scale than previous studies—the mean catchment size now is ~2 km² as opposed to ~300 km² in earlier models. An associated online mapping tool can be used by water-quality managers to identify where the largest sources of nutrients are throughout the MARB and to guide actions to reduce nutrient loading to the Gulf of Mexico. [online mapping tool](#).



The SPARROW Models for the Midwest: Total

2021 Hurricane Awareness Webinar Series - Recordings Now Available!

Each year the NOAA Southeast & Caribbean Regional Collaboration Team hosts a fascinating series of webinars to prepare for the upcoming hurricane season. This year's webinars were a fascinating combination of topics. [All of the recordings are now available](#), and details about each are included below with direct links. Enjoy!!



This combination of satellite images provided by the National Hurricane Center shows 30 hurricanes that occurred during the 2020 Atlantic Hurricane Season

[One for the record books: The 2020 hurricane season](#)

Tune in to hear about how the 2020 hurricane season broke the records! Ken Graham, Director of NOAA's National Hurricane Center speaks about their efforts. Roger Erickson, Warning Coordination Meteorologist from the Lake Charles, LA Weather Forecast Office shared his local perspective and Tim Callaghan who serves as the Disaster Response Team Lead for USAID discussed how the season went for his team.

[Post-storm damage assessments: documenting high water marks from storm surge impacts](#)

National Weather Service forecasters, Jeff Evans and Robbie Berg, along with Texas' Harris County Flood Control District meteorologist, Jeff Lindner discuss the importance of gathering high water marks for storm surge forecast validation.

[Marine navigation and forecasting during hurricane events](#)

Tune in to listen to how NOAA keeps mariners safe during hurricane events. You'll hear from Chris Landsea, Chief, Tropical Analysis and Forecast Branch of the National Hurricane Center on issuing marine forecasts and working with the US Coast Guard and from Kyle Ward, Southeast Navigation Manager from the Office of Coast Survey, on marine navigation.

USDA Invests \$28M to Restore Wetlands Functions to Agricultural Landscape

USDA recently announced a \$28 million investment in 10 Wetland Reserve Enhancement Partnership projects – six new and four ongoing – to support work that will return essential wetland functions to agricultural landscapes in the Mississippi River and/or Gulf of Mexico watersheds. USDA's investment will be bolstered by an additional \$2.82 million partner contribution. New projects supported by this funding include restoring forested wetlands in the Mississippi Alluvial Valley, increasing habitats for a myriad of plants and animals in floodplain wetlands and grasslands, and landscaping floodplains to reduce nutrient runoff into the Mississippi River. Through this initiative, USDA will partner with several well-established organizations to protect, restore, and enhance wildlife habitat on eligible lands. [Read the article...](#)

How good was the forecast? Hurricane forecast and model verification

Hear how hurricane forecasts and weather model predictions are verified by NOAA's National Hurricane Center's Hurricane Specialist, John Cangialosi. Enhancements to NOAA's weather models are also presented by NOAA researcher, Jason Sippel.

Collaborations across NOAA: An overview of the Weather Prediction Center and the National Water Center

Have you ever wondered how NOAA offices work together during extreme events? Tune in and learn about how the Weather Prediction Center (WPC) and the National Water Center (NWC) collaborate with the National Hurricane Center on issuing rainfall forecasts and messaging during hurricane events. Warning Coordination Meteorologist, Alex Lamers presents for WPC, and Service Coordination Hydrologist of the Water Prediction Operations Division, Paula Congitore represents the NWC.

Brought to you by...



**NOAA Regional
Collaboration
NETWORK**

This bulletin is compiled by the NOAA Central Region Collaboration Team and Gulf of Mexico Regional Collaboration Teams nutrient runoff working group.

Members represent Minnesota, Louisiana, and Mississippi-Alabama Sea Grant Programs, National Water Extension Program, Northern Gulf Institute, Mississippi State University, University of Minnesota Water Resources Center, NOAA National Center for Coastal Ocean Science, NOAA National Weather Service Forecast Offices and River Forecast Centers.

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