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

Sharing information and making connections from the headwaters to the gulf

July 5th, 2023

Welcome!

This bulletin is designed as a way to share information with those interested in nutrient runoff issues and impacts. ***We hope 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.

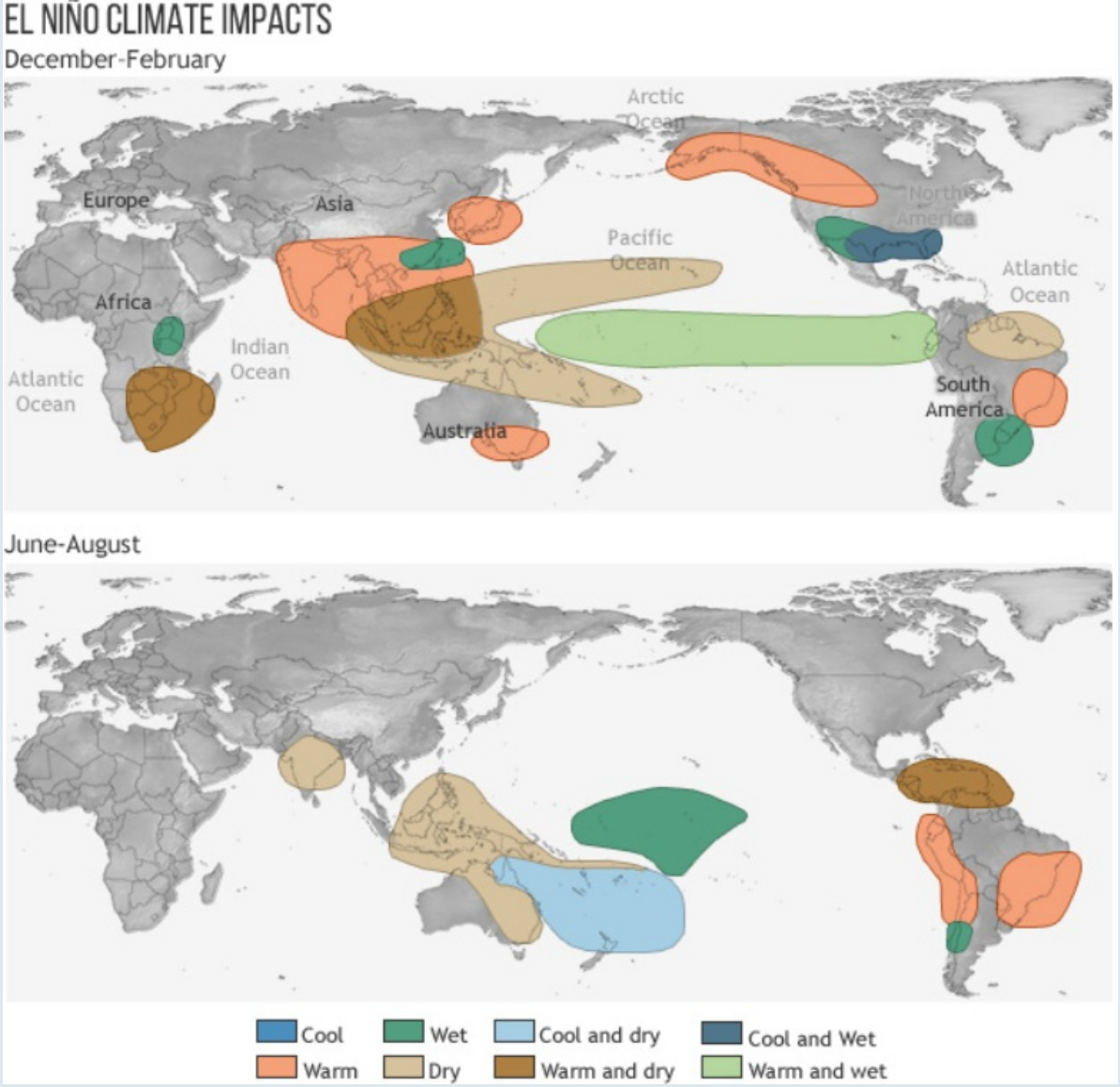
Outlooks and Forecasts

Smaller than Average 'Dead Zone' Forecast for Gulf of Mexico in 2023

Scientists at NOAA's National Centers for Coastal Ocean Science**are forecasting** this summer's Gulf of Mexico hypoxic zone or "dead zone"—an area of low to no oxygen that can kill fish and other marine life— to be approximately 4,115 square miles, nearly 25% smaller than the 36-year average measured size of 5,364 square miles. These annual predictions are based on U.S. Geological Survey Mississippi River flow and nutrient data. This summer's dead zone is expected to be smaller-than-average because springtime levels of flow, nitrogen, and phosphorus have all been below long-term averages (1980-2022).

El Niño: It's Here, and Could Get Even Stronger

El Niño, a climate pattern driven by above-average sea-surface temperatures in the central and eastern tropical Pacific Ocean, can have significant impact on global weather. Approximately four years after its last occurrence, El Niño is **back**, and expected to intensify by this fall and winter. Should this happen,**likely impacts** could include elevated global temperatures and a wetter winter for the lower Mississippi River basin and Gulf of Mexico.



Maps depicting how El Niño commonly affects Northern Hemisphere winter and summer climate patterns around the globe. Notice that there are no consistent impacts on North America during the summer months, while areas around the tropics and Southern Hemisphere subtropics (Australia, for example) experience impacts in both seasons. (NOAA Climate.gov)

For more insight on El Niño and how scientists go about forecasting it and its counterpart, La Niña, check out **this blog** by Emily Becker (University of Miami Cooperative Institute for Marine and Atmospheric Studies). While we are already in an El Niño, Emily notes that there is a 56% chance of it becoming a strong event and an 84% chance of a moderate event by this fall and winter. Typically, the stronger an El Niño, the more likely we are to see the weather impacts shown in the above maps.

2023 Atlantic Hurricane Season Expected to Be 'Near Normal'

NOAA forecasters with the Climate Prediction Center are calling for a range of 12 to 17 named storms to occur in the Atlantic Basin between June 1st and November 30th, 5 to 9 of which will be hurricanes and 1 to 4 major hurricanes. This **'near-normal' forecast** will be less active than recent years, thanks in part to the development of El Niño, which typically acts to suppress tropical storm development. However, there are factors favorable for storm development, including above-normal west African monsoon and warmer-than-normal sea surface temperatures. NOAA has 70% confidence in this year's hurricane season outlook, which it should be emphasized is for overall seasonal activity and is not a landfall forecast. No matter the total number of storms predicted, even a single hurricane can bring devastating impacts, even inland. It's important to understand risks, be prepared, and listen to the warnings of state and local officials.

Nutrient Runoff News

Supreme Court Limits Protections for US Wetlands

On May 25th, the US Supreme Court ruled issued a 5 to 4 decision **significantly limiting the federal government's authority to regulate millions of acres of wetlands**. The case, Sackett v. Environmental Protection Agency, stemmed from a disagreement over the application of the Clean Water Act (CWA) to wetlands on the plaintiff's property, a residential lot near Priest Lake in Idaho. While all 9 justices agreed the property was not covered by the CWA, the majority opinion sets the definition of "Waters of the United States" as those directly adjacent to a “relatively permanent” waterway “connected to traditional interstate navigable waters” such as a river or ocean. They also must have a “continuous surface connection with that water, making it difficult to determine where the ‘water’ ends and the ‘wetland’ begins.” Prior to this ruling, wetlands and other waterbodies were covered if they had "significant nexus" to larger bodies of water. Defining waterbodies eligible for protection under the CWA in this more-restrictive way eliminates federal protection for an estimated 45 million acres of wetlands, according to the Southern Environmental Law Center.

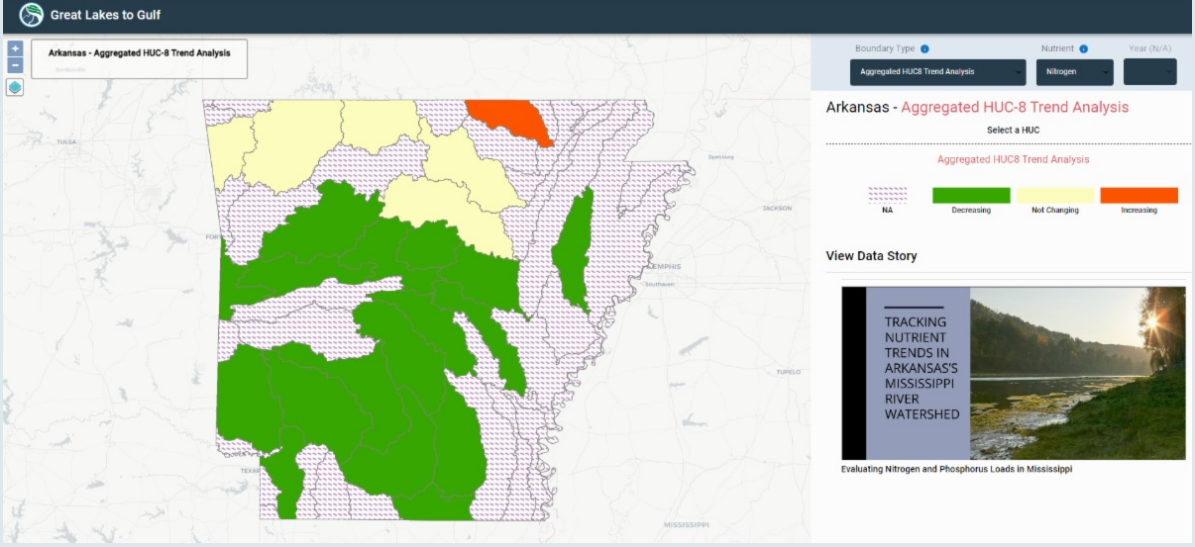
Some of the challenges to come as a result of this decision were outlined in an **amicus brief** filed by professional associations representing water regulators and managers. They say that critical efforts to prevent flooding and maintain water quality will be significantly compromised with this removal of federal authority: "The Upper Mississippi River system drains an area of 190,000 square miles in Minnesota, Wisconsin, Iowa, and Missouri and a small portion of Indiana and South Dakota. Only about 1,300 miles—less than 1% of the system—are navigable. The remaining 99% comprises the non-navigable tributaries, ditches, and noncontiguous wetlands that would be excluded by Petitioners’ interpretation of WOTUS." This means that these aquatic areas, which are critical for mitigating flooding and filtering nutrient runoff, are no longer protected under the CWA. Furthermore, individual states' decisions on water pollution often differ from one another, which could lead to upstream states allowing pollution affecting downstream states thereby shifting the cost of regulation. This piecemeal approach could lead to greater costs and uncertainty as many states will be regulating areas previously covered by the federal government.

The Gulf of Mexico is Rapidly Warming

Hypoxia in a water body occurs when levels of dissolved oxygen are diminished below the point where aquatic life can survive. Factors leading to hypoxia include excess nutrient runoff as well as high water temperatures. The 2nd-largest hypoxic zone in the world is located in the Gulf of Mexico, where surface water temperatures have been **increasing at approximately twice that of the global ocean** between 1970 and 2020. In this 50-year period, sea surface temperatures in the Gulf increased approximately 1.8°F, equivalent to a warming rate of approximately 0.34°F per decade. While warming occurred at all studied depths from the sea surface to bottom, the largest warming rates were found in the upper 164 feet. This rate of warming has significant potential for impacting hurricane development and rapid-intensification, the hypoxic zone, and the entire Gulf of Mexico ecosystem. Understanding how this major climate driver is impacting and will continue to impact the Gulf is necessary for effective management.

New Data Portal Tracks Nutrients in Arkansas

A new data portal was just released to to show nutrient concentration trends in Arkansas. The **Great Lakes to Gulf (GLTG) Arkansas data portal** allows for the tracking of nitrogen and phosphorus concentrations in state waterways, providing useful information about nutrient reductions and water quality that will help assist with future monitoring and restoration. There are three data layers available: Tier 1 watersheds (defined by the Arkansas Nutrient Reduction Strategy as those with the highest need for nutrient reduction); aggregated HUC-8 watersheds; and individual water quality stations across the state. Arkansas, one of 12 member states in the **Hypoxia Task Force**, is only the second after Illinois with a nutrient-tracking data portal; however, GLTG is working to create a portal for all 12 Hypoxia Task Force states.



The new Great Lakes to Gulf Arkansas data portal, showing a decreasing trend in nitrogen for most of the HUC-8 watersheds where data is available. (National Great Rivers Research and Education Center)

Implementing Louisiana's Nutrient Reduction and Management Strategy

Through its Gulf Hypoxia Program, the Bipartisan Infrastructure Law of 2021 directs funding to each of the 12 Hypoxia Task Force states. For Louisiana, this funding will go toward implementing the state's **Nutrient Reduction and Management Strategy** through the application of agricultural best management practices (BMPs) in northeast Louisiana and transect monitoring on the coast. The first project will utilize agricultural BMPs in an around the Lake St. Joseph watershed in order to reduce nutrient and sediment loading and improve the ecology and water quality downstream. The second project will help close a critical data gap in nutrient monitoring through data collection along an established monitoring transect running from Barataria Pass to the inner Gulf of Mexico shelf; this monitoring data will be used to enhance baseline characterization and better model the effects of Mississippi River diversions.

Illinois Study Finds Cover Crops Could Reduce Nitrogen Runoff by 30%

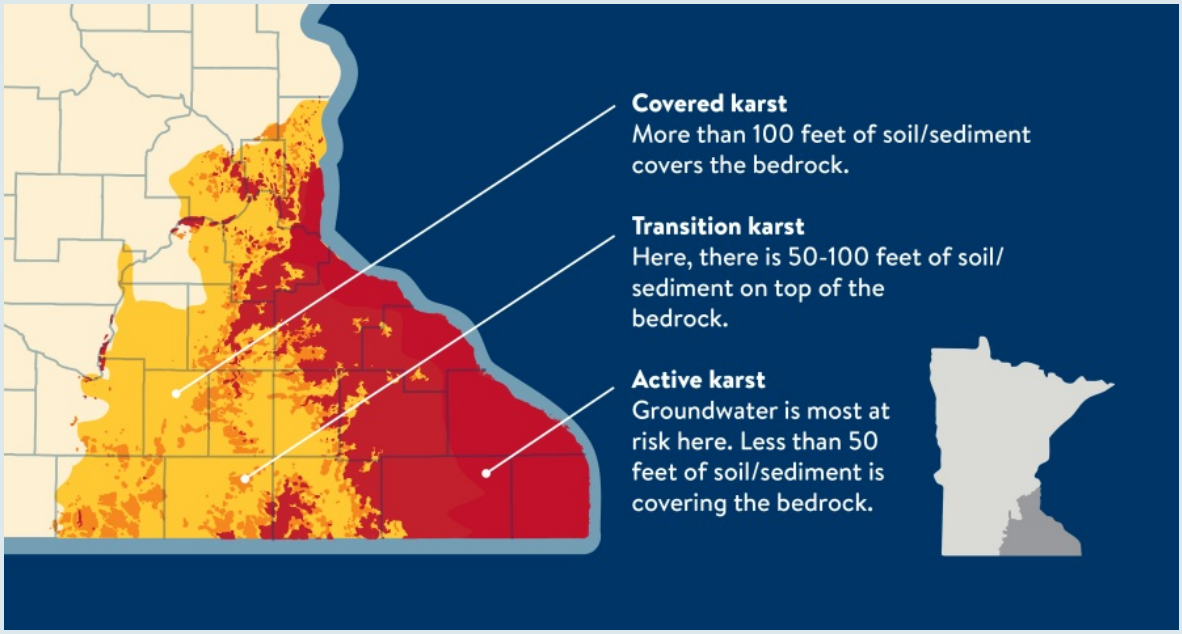
The first state-wide study estimating the benefit of **using cereal rye as a cover crop to reduce nitrogen runoff** was recently published. Researchers on the University of Illinois team took the knowledge of nitrogen reduction from small-scale studies a step further by using a crop simulation model to investigate the impact of cover crop seeding and fertilizer application timing nitrogen runoff and crop yield. The study simulated both cover crop seeding and no seeding and either fall or spring fertilizer applications under actual climatic conditions in Illinois between 2001 and 2020. Results indicate that Illinois farmers planting a winter cover crop could expect a 30% reduction in nitrate loss, and that applying fertilizer in the spring should minimize nitrate loss (compared to fall applications). With regard to corn and soybean yields, this study found slight increases to both crops from using cereal rye as a cover crop, regardless of fertilizer application timing.

Nitrate Levels in Southeast Minnesota Nearing 'Crisis Point'

A group of environmental organizations have petitioned the Environmental Protection Agency (EPA) to address nitrate pollution in drinking water which **they say has reached crisis proportions** in 8 southeastern Minnesota counties. Groundwater in this area is particularly vulnerable to nitrate pollution due to its underlying karst landscape which connects water at the surface with groundwater. This region's karst can facilitate groundwater contamination by allowing surface pollutants (such as nutrient runoff) to enter groundwater through the many sinkholes and fractures in the porous limestone. Nitrate contamination in Minnesota has been an issue for some time, with pollution impacting lakes, rivers, aquifers, and drinking water wells. In 2019, the state enacted rules aimed at preventing nitrate pollution, but private well testing continues to find high nitrate levels. Drinking water with high nitrate has the well-known effect of blue-baby syndrome, in which infants are starved of oxygen, and research has found links between lower-levels of nitrate in drinking water and other negative health effects. Approximately 80,000 Minnesota residents in the impacted area rely on private wells for drinking water, and according to the group filing the emergency request, rural residents have been largely left out of the state's major nitrate control efforts.

This official request asks the EPA to take emergency action under the federal Safe Drinking Water Act to address the dangerous nitrate levels in groundwater which the group says state and local regulators have

failed to lower with voluntary measures meant to curb pollution from farms. Specifically, they ask the EPA to investigate the problem, pinpoint the parties responsible for contamination, and determine why the state's permitting and mitigation efforts haven't been successful in protecting the groundwater.



Most karst landforms in Minnesota are found in "active karst" (red) and "transition karst" (orange) zones. In karst landscapes, there is a direct connection between surface water and groundwater, which allows for surface pollutants such as nutrient runoff to easily enter groundwater and pose a health risk to those using it for drinking. (Figure based on a map created by E. Calvin Alexander Jr., Yongli Gao, and Jeff Green; obtained from the Minnesota Pollution Control Agency)

Funding Opportunities

NOAA Inflation Reduction Act Funding Opportunity: NOAA Climate Resilience Regional Challenge- Letter of intent due August 21, 2023

NOAA Inflation Reduction Act Funding Opportunity: Climate-Ready Workforce- Letter of intend due November 30, 2023

Jobs, Fellowships, and Graduate Assistantships

Oyster Hatchery Research Assistant (Oyster Production and Water Quality)- Grand Isle, LA; application deadline August 30, 2023

EPA Fellowship on Coastal Acidification and Hypoxia: Evaluation at a National Scale- Newport, OR; application deadline September 15, 2023

NOAA Student Opportunities Database - For students of any level (grade school through graduate school, even recent graduates), this database includes one-day events, summer internships, multi-year fellowships, and more!

Upcoming Meetings and Events

Harmful Algal Blooms in the Great Lakes- Webinar: July 17, 2:00 pm - 3:00 pm EDT

Developing Offshore Wind in U.S. Waters Part 1: The Planning and Regulatory Framework- Webinar: July 19, 2023, 12:00 pm - 1:00 pm EDT

[Oceans 2023 Gulf Coast Conference](#) - September 25-28, 2023 in Biloxi, MS

[Climate, Water, Equity and Opportunity Workshop](#) - October 12-13 in Denver, CO

Nutrient Runoff Quiz!

Are you an expert on Mississippi River Basin nutrient runoff and Gulf of Mexico hypoxia?
Test your knowledge with our trivia quiz!

CLICK HERE : Nutrient Runoff Quiz - July 2023

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