

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

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

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January 02, 2024

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## 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](mailto:noaa.centralregion@noaa.gov).

## Spotlight: Women for the Land Initiative

American Farmland Trust (AFT) is a national 501(C)(3) nonprofit focused on protecting agricultural land, promoting environmentally sound farming practices, and keeping farmers on the land. As a part of the organization, the National Women for the Land Initiative focuses on addressing gender-related barriers to women managing their agricultural land. 43% of U.S. ag land is farmed or co-farmed by women. Additionally, women and girls are outpacing in 4H and ag related land grant programs. Nationally between 2015-2022, NRCS awarded just over 17 percent of EQIP contracts to women, and just over 10 percent of CSP contracts to women\*. Among the women awarded, about 82 percent of EQIP and CSP contracts went to white women\*\*.

In Ohio, work within the Upper Scioto River Watershed is targeting the agricultural nutrient pollution in the Gulf of Mexico. Through 19 different women for the land meetings in the last two years within the watershed, 233 participants were engaged in farmland education events. Meetings cover topics from urban agriculture, soil health, beneficial insects and pollinator habitats, applications for funding, transition planning, conservation planning, improving water quality, woodlot management, and so much more. This education can lead to active on-farm changes to practices which in turn can impact overall soil health and water quality. This is what the farming community is invested in doing with every best management practice they implement. These circles serve as a mechanism for education and networking between resource professionals and landowners of all sizes. In having women who farm 700 acres in the same room as women who farm a quarter acre, AFT is able to open doors for engaging and unique conversations about all types of farming and conservation.

\*USDA Farm Production and Conservation Business Center. (2023b). USDA NRCS Conservation Stewardship Program and Environmental Quality Incentives Program contracts awarded to female participants by race and ethnicity (FOIA Request No. 2023-NRCS-03713-F) [Data set].

\*\*USDA Farm Production and Conservation Business Center. (2023c). USDA NRCS Conservation Stewardship Program and Environmental Quality Incentives Program contracts awarded by gender (FOIA Request No. 2023-NRCS-06039-F) [Data set]



*The American Farmland Trust's National Women for the Land Initiative conducts learning circles around the country. These events are designed to break down gender gaps and expand women landowners' knowledge and confidence related to conservation. (American Farmland Trust)*

Across the U.S., the Women for the Land Initiative is active, or was previously active, in 22 states. AFT and the Women for the Land Initiative hope to continue supporting sound farming practices, protecting farmland, and keeping farmers on the land, through facilitating peer-to-peer learning, researching barriers for women in agriculture, and acting as policy advocates to address the barriers to resources and women's success on the land.

For more information about the Women for the Land Initiative, please visit <https://farmland.org/project/women-for-the-land/> or contact Women for the Land Director, Gabrielle Roesch-McNally at [groeschmcnally@farmland.org](mailto:groeschmcnally@farmland.org).

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## Nutrient Runoff News

### [Hypoxia Task Force Reports Progress to Congress](#)

In its [2023 Report to Congress](#), the Hypoxia Task Force (HTF) provides updates on progress made toward the goals of the Gulf Hypoxia Action Plan. This report includes federal and state actions as well as newly-published science advancements.

Progress has been made toward the goal of reducing the 5-year average size of the hypoxic zone in the Gulf to less than 5,000 square kilometers by 2035 and the interim target for reducing total nitrogen (TN) and total phosphorus (TP) loads by 20% by the year 2025. To date, TN loads have been reduced by 20%, although TP loads have actually increased. This report also summarizes how the new Infrastructure Investment and Jobs Act, also referred to as the Bipartisan Infrastructure Law, has provided funding to improve water quality in the Mississippi River Basin and reduce hypoxia in the Gulf of Mexico.

This Report to Congress is one important tool for describing the HTF's progress toward reducing nutrient loads to the northern Gulf, amplifying state summaries of progress, sharing lessons learned in implementing nutrient reduction strategies, and adaptively managing strategies for improving water quality in the Gulf.

### [The Big Brown Spot: What Is It and How Do We Fix It?](#)

Basin are commonly bare for much of the year; crops are planted in the spring and harvested in the fall, leaving a majority of the year when the soil is bare. [According to Friends of the Mississippi River \(FMR\)](#), this bare soil, or what they are calling "the big brown spot," is the largest contributor of pollution to Minnesota's groundwater and river systems. During the times of year when crops are absent, there is little to stop soil and agricultural chemicals from washing off into lakes and streams and into the Mississippi River. Clean-water crops, which can be perennials or winter annuals, are a potential solution to this problem. In addition to reducing nutrient runoff, clean-water crops can be an additional revenue stream for farmers.

Incorporating clean-water crops into already-existing farming practices, means that there will be live plants on the ground at all times - covering the big brown spot, providing new revenue streams for farmers, and cutting how much agricultural pollution reaches the Mississippi River and the Gulf of Mexico. (*Photo: The "big brown spot" in the Upper Mississippi River Basin consists of areas where bare soil is on farm fields in the Upper Midwest for up to 8 or 9 months per year. Friends of the Mississippi River*)



### [Measurable Progress on Iowa Nutrient Reduction Strategy](#)

In 2013, Iowa set out its Nutrient Reduction Strategy. New results indicate [tangible progress is being made](#) toward meeting the state's water quality goals. According to the Iowa Department of Agriculture and Land Stewardship, adoption of conservation practices is increasing, and they expect progress to continue building over the next decade. Progress they highlight includes a jump from 10,000 acres of cover crops in the state over a decade ago to more than 2.8 million acres today, and they report similarly large increases in artificial wetlands and other edge-of-field conservation practices. Over the past decade, funding has grown to support the Nutrient Reduction Strategy, nitrate loads are down, and the number of point-source facilities meeting targets for both phosphorus and nitrogen have increased. You can see more details about the progress Iowa has made on the state's new [Nutrient Reduction Strategy Online Dashboards](#).

### [Free Soil Sampling Program for Indiana Farmers](#)

The Indiana State Department of Agriculture (ISDA) and partners throughout Indiana worked with the Gulf Hypoxia Program to [develop a no-cost program](#) with a focus on increasing the knowledge and use of soil sampling as a nutrient management practice to benefit farm operations. ISDA emphasizes nutrient management and promotes the principle of the 4R Nutrient Stewardship and its "Right Source, Right Rate, Right Time, and Right Place" system. This new program provides soil sampling and testing as the first step of developing a nutrient management plan. Assessing the soil's fertility can help with fertilizer application recommendations, assessing available nutrients over time, and can ultimately increase farmer profitability and enhance environmental protection by reducing the risk of nutrient loss.

### [\\$20 M for Harmful Algal Bloom and Hypoxia Research, Monitoring](#)



Harmful algal blooms (HABs) and their toxins are a growing problem, damaging ecosystems, communities, and coastal economies. Furthermore, when the blooms die off, the decomposing algal cells can lead to hypoxia, or low oxygen conditions. To help address these challenges, the National Oceanic and Atmospheric Administration (NOAA) is providing [\\$20.1 M to fund HAB and hypoxia research projects and monitoring](#) throughout U.S. coastal and Great Lakes waters. (*Photo: A beach on Saint Martin in the Caribbean (east of Puerto Rico) covered in Sargassum seaweed. NOAA Atlantic Oceanographic and Meteorological Laboratory*)

### [New! Nutrient Runoff Learning Module](#)

The Environmental Protection Agency (EPA) published a [new learning module](#) on nutrient runoff as part of its [Watershed Academy](#) training hub. This module goes over nutrient runoff and its associated water quality and human health impacts. It gets into the science behind nitrogen and phosphorus, how these nutrients can negatively impact human health and the environment, the sources of this pollution, and the ongoing actions aimed at addressing the impacts of nutrient runoff. It also includes information on how climate change may

## Farm Fertilizer May Be Source of PFAS-Pollution

Human-made chemicals per- and polyfluoroalkyl substances (PFAS) are used in a variety of products such as non-stick cookware and firefighting foam. These chemicals, which have been linked to a variety of health problems, are ubiquitous in the environment and are often called "forever chemicals" because they don't break down. A new report by the nonprofit Minnesota Center for Environmental Advocacy and a University of Minnesota professor [states that one of the pathways for PFAS pollution is farm field runoff of a specific type of fertilizer](#): biosolids from treated wastewater (often called sewer sludge). Samples from three streams where use of biosolids on farm fields is widespread found higher PFAS levels than rivers in areas where biosolids were not applied. Wastewater treatment plants are not equipped to remove PFAS from water received from industries, landfills, and airports; after wastewater containing these chemicals is treated, the leftover biosolids are often spread on farm fields as fertilizer. The PFAS from these biosolids can then leach into groundwater or nearby surface waters. The U.S. Environmental Protection Agency is currently assessing the risk of two common PFAS chemicals in biosolids to human health and is expected to release its findings this winter.

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## **Drought in the Mississippi River Basin**

By this past fall, months of dry, hot weather had led to a second straight year of [low water levels on the Mississippi River](#). Global summer temperatures were the hottest on record, coming in 12° C warmer than average, and this heat coupled with lack of rainfall caused the river to reach levels of concern even earlier than during the 2022 drought. At New Madrid, MO, was already as low as -5' on that river gauge by early September 2023; in 2022, the river did not get that low until mid-October. Additionally, this second year of drought has led to even greater negative hydrologic impacts: At Memphis, TN, the river reached -11.91 feet, which is the lowest level ever recorded on the Memphis river gauge.

These abnormally hot, dry conditions and resulting low river levels have widespread economic and environmental impacts:

- This [PBS NewsHour video](#) describes how the recent drought has impacted farmers, barge operators, and the Army Corps of Engineers dredging crews working to maintain enough river depth for the navigation industry.
- [This blog](#), written in January 2023 (before the second year of drought had increased impacts) touches on a variety of the environmental outcomes both in the Mississippi River Basin and the Gulf of Mexico.
- At least 50 cities along the Mississippi River depend on it for drinking water, and for some of these communities in Louisiana this long-running drought has put water supplies at risk. The reduced flow from the Mississippi River [allowed a "wedge" of saltwater to move upstream](#) requiring the construction of an underwater levy to slow the progression of saltwater as well as prompting the delivery of 15 million gallons of freshwater to residents of impacted areas.
- As we touched on in the [April 2022 edition of this bulletin](#), droughts can allow nutrients to build up in soils; this can lead to excess nitrate runoff in following years, and potentially contribute to Gulf of Mexico hypoxia.

Droughts of this size and magnitude bring widespread impacts to humans and ecosystems in the Mississippi River Basin and the Gulf of Mexico. These impacts can vary, as no two droughts are completely alike. Many factors, such as timing, can effect the economy and environment differently. For example, a drought in the summer can limit crop yield, while a fall drought can more heavily impact a farmer's ability to move crops to market. What the weather does for the remainder of this winter and into spring, and what happens with the current El Niño we are in, will determine if drought continues into a third year in the Mississippi River Basin.



*NASA satellite images from September 10th, 2021 (left) and September 16th, 2023 (right) illustrate how far below normal the water level of the Mississippi River at Memphis, TN reached this past fall. (NASA Earth Observatory)*

### [It's All Connected: Minnesota Drought Threatens Communities in S. Louisiana](#)

Awareness is growing in the Mississippi River Basin about how actions taken and events occurring far from the River's mouth can have downstream impacts on communities and ecosystems. To highlight this connection during this past fall's drought, Peter LaFontaine with Friends of the Mississippi River, a Minnesota-based nonprofit, interviewed Matt Rota with Healthy Gulf, a Louisiana-based organization. [This interview](#) delves into the connection between things that happen in Minnesota (and other Midwest locations) and the effects down the Mississippi River and into the Gulf of Mexico.

### [Cover Cropping in Dry Years](#)

Drought in the Mississippi River Basin impacts agriculture in a variety of ways, from affecting crop yield to reducing transportation along the river. For those farmers growing cover crops, the last two years of drought have potentially meant cash crops face an even greater water deficit. The good news is over the long-term, cover cropping still provides a lot of economic and environmental benefit to a farmer. Anna Cates, University of Minnesota Extension soil health specialist, [talks about the challenge of cover cropping in dry years](#) and gives advice for farmers to maximize the benefit of this conservation practice.

### [Midwest Drought Raises Risk of On-Farm Fires](#)

As we've noted, the ongoing drought in the Mississippi River Basin has brought numerous impacts to communities, ecosystems, and the economy. One of the perhaps less-known impacts is the increased risk of on-farm fires. During times of reduced precipitation and high temperatures, fires can start in equipment and spread on fields through dry vegetation. It's important for farmers to be aware and prepared during these periods of drought, and the [U.S. Department of Agriculture's Midwest Climate Hub has information to help manage your risk](#). Resources provided allow farmers to check current conditions before heading out into the field and to keep up-to-date with weather and climate forecasts.

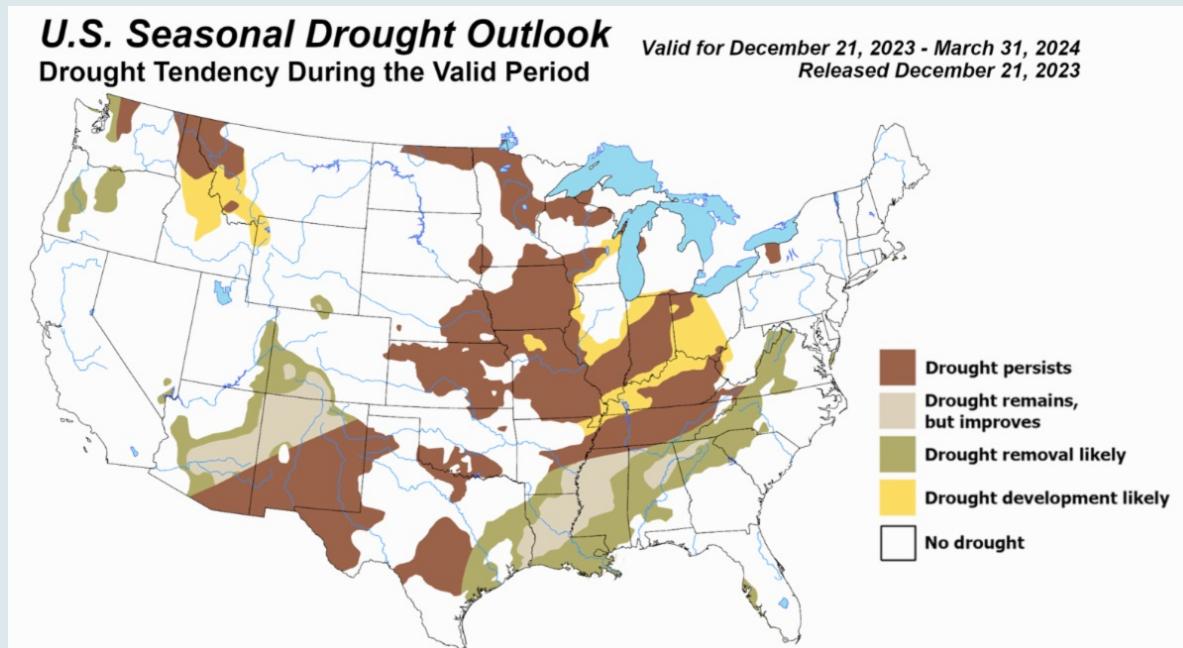
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## Outlooks and Forecasts

### [Seasonal Drought Outlook](#)

[The U.S. Seasonal Drought Outlook](#) for the period between December 21, 2023 and March 31, 2024 predicts drought improvement or removal entirely across much of the lower Mississippi River Basin. However, drought is likely to persist or develop across large portions of the upper Mississippi River Basin

during the first few months of the year. At the time of the outlook's publication (December 21, 2023), short-term precipitation deficits were growing in the Midwest and Ohio Valley, while temperatures had been consistently above average for the first three weeks of December. El Niño conditions will continue to influence our weather for the next few months, and this outlook is consistent with the typical El Niño pattern: wetter conditions in the southern U.S. and warmer, drier conditions in the northern states.



Drought outlook in the continental U.S. for the period between December 21, 2023 and March 31, 2024.  
(NOAA/NWS/NCEP Climate Prediction Center, Adam Hartman)

### How Long Will El Niño Last?

We have been experiencing an El Niño event for much of the past year, and this one may turn out to be historically-strong. As [this recent "ENSO Blog"](#) from the National Oceanic and Atmospheric Administration explains, a primary metric for the strength of an El Niño event is the Oceanic Niño Index (ONI) anomaly; an ONI anomaly of  $1.5^{\circ}\text{C}$  is considered a strong El Niño, while one of  $2.0^{\circ}\text{C}$  or greater considered "historically strong." Currently, many models predict this event's ONI anomaly to reach or even exceed  $2.0^{\circ}\text{C}$ . So how long can we expect this event to last? Current projections indicate El Niño is likely to end by this summer, with neutral conditions or even a La Niña developing. How this shakes out is likely to impact the weather, hydrology, and nutrient runoff for the Mississippi River Basin in 2024.

### How Do El Niño and La Niña Impact Our Weather?

Ever wanted to learn more about El Niño and La Niña? These opposing climate patterns can have large impacts on weather in the United States, and it all depends on water temperatures in a single area of the ocean. [This educational video](#) provides a simple and easy-to-follow explanation of what makes these climate patterns and how they can drive the weather where we live.

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### In Case You Missed It...

#### The Fifth National Climate Assessment

Released last November, the [Fifth National Climate Assessment](#) is the U.S. Government's preeminent report on climate change impacts, risks, and responses. National Climate Assessments were mandated to be released approximately every four years by 1990's Global Change Research Act.

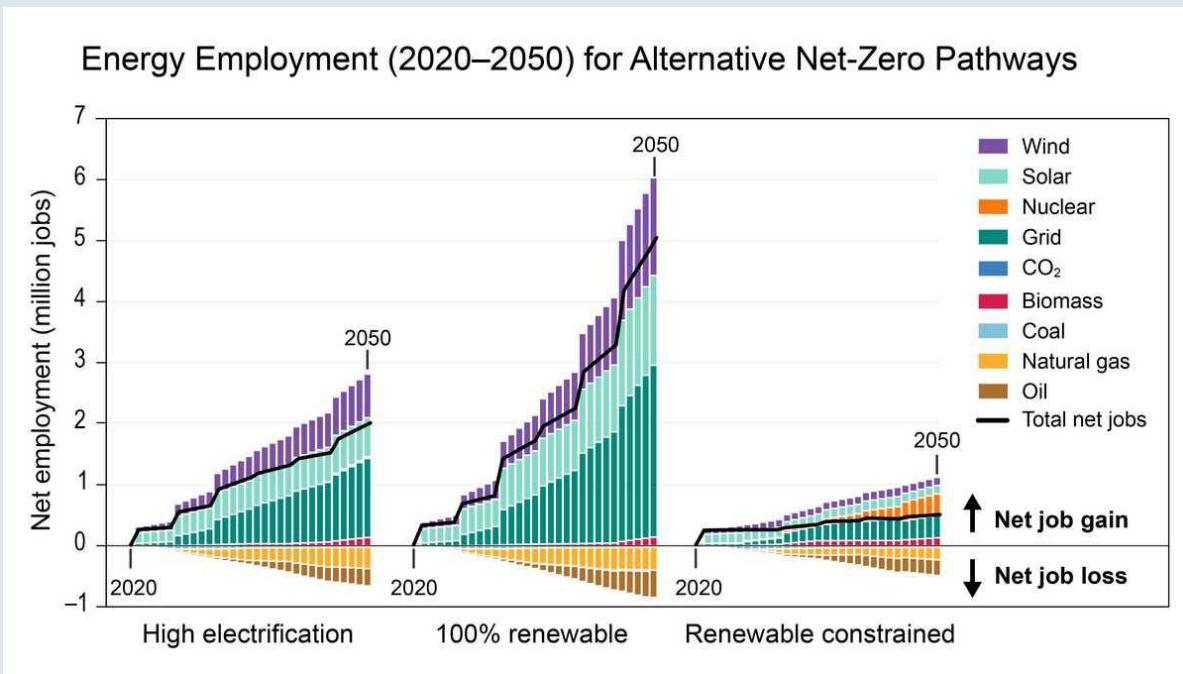
Takeaways for those in the Mississippi River Basin include the fact that we are already seeing increased average annual temperatures



and an increase in number of heavy precipitation events for all of the Basin. Along with other numerous negative effects, these two changes have contributed to an increase in harmful algal blooms; heavy precipitation increases nutrient runoff, and warmer water temperatures can allow algae to grow thicker and faster.

This report makes it clear climate change is already occurring, and details the negative impacts being experienced. It also emphasizes that while climate change poses risks, action taken to limit warming and reduce risks presents opportunities for the U.S.

*(Photo: Algal scum visible on the Maumee River as it flows under the Veterans' Glass City Skyway in Toledo, OH. Warmer temperatures and more heavy rain events are intensifying harmful algal blooms. Aerial Associates Photography Inc. by Zachary Haslick)*



Despite decreases in the number of fossil fuel–related jobs, the overall number of energy jobs (specifically those involved in the supply of energy) relative to 2019 is generally projected to increase in net-zero-emissions energy scenarios between 2020 and 2050, although by much more in some scenarios than in others. (Fifth National Climate Assessment; Figure adapted from [Jenkins et. al. 2021](#))

## Funding Opportunities

[The 2025 Bower Award and Prize for Achievement in Science](#) - Submission deadline March 31, 2024

[Fiscal Year 2024 NOAA Gulf of Mexico Bay Watershed Education and Training \(B-WET\)](#)- Proposals due February 5, 2024

## Jobs, Fellowships, and Graduate Assistantships

[Executive Director for the Marine Resources Council](#) - Palm Bay, FL; application deadline January 31, 2024

[Program Manager \(Great River Greening\)](#) - St. Paul, MN; application deadline January 31, 2024

## [\*\*Program Manager - Global Nitrogen Innovation Center for Clean Energy and the Environment\*\*](#)

Frostburg, MD; application deadline February 29, 2024

[\*\*Master's Opportunity in Plant Community and Ecosystem Ecology\*\*](#) (nutrient runoff, nutrient retention, etc.) - Bellingham, WA; application deadline February 1, 2024

[\*\*Master's Opportunity in Limnology\*\*](#) - Moscow, ID; application deadline February 16, 2024

[\*\*EPA Fellowship on Water Quality Modeling in Puget Sound Watersheds\*\*](#) - Corvallis, OR; application deadline January 26, 2024

[\*\*USDA-ARS Research Field Crop Scientist Internship\*\*](#) - Urbana, IL; application deadline March 29, 2024

[\*\*PhD Student Position in Nitrogen Information Systems\*\*](#) - Frostburg, MD; application deadline June 28, 2024

[\*\*Post-Doctoral Researcher in Integrated Nitrogen Modeling\*\*](#) - Frostburg, MD; application deadline March 1, 2024

[\*\*Research Hydrologist \(Post-doc\)\*\*](#) - Tucson, AZ; application deadline February 1, 2024

[\*\*Postdoctoral Research Associate – Forest Hydrology and Biogeochemistry\*\*](#) - Starkville, MS; application deadline May 31, 2024

[\*\*2024 Spring and Summer: LTER Plant Community Ecology Internships\*\*](#) - East Bethel, MN; application deadline March 1, 2024

[\*\*EPA Treatment and Water Quality of Drinking Water Systems Fellowship\*\*](#) - Cincinnati, OH; application deadline February 23, 2024

[\*\*The Gulf Research Program's Science Policy Fellowship program\*\*](#) - Gulf of Mexico Region; application deadline February 7, 2024

[\*\*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!

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## **Upcoming Meetings and Events**

[\*\*Gulf of Mexico Conference 2024\*\*](#) - February 19-22 in Tampa, FL

[\*\*Webinar Series: Findings of the 5th National Climate Assessment \(NCA5\)\*\*](#) - These NCA5 chapter webinars are an opportunity for you to hear about the findings of each chapter from the authors themselves. Each virtual event is expected run for one hour, including time for Q&A. January - March, 2024

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## **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 - January 2024**

**Presenting....the top quiz scorers from 2023!**

- 1) Kristen Laursen (NOAA) - 15 points total
- 2) Kelly Drinnen (NOAA) - 7 points total
- 3) Janette Marsh (EPA) - 6 points total



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