

**Request for Statements of Interest
Funding Opportunity Announcement**

Federal Awarding Agency:

U.S. Army Corps of Engineers,
Engineer Research and Development Center
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Funding Opportunity No: W81EWF-20-SOI-0030

CFDA No: 12.630

Statutory Authority: 10 USC 2358

Program Title: Studies on Nutrient & Algae/Cyanobacteria Removal in Backwater Areas of the Mississippi River

Announcement Type: Initial announcement

Issue Date: 04 June 2020

Statement of Interest/Qualifications Due Date: 3 July 2020, 1PM CDT

Full Application Package Due Date, if Invited: 7 August 2020, 1PM CDT

Estimated Award Ceiling: \$40,000

Estimated Total Program Funding: \$190,000: (\$40,000 base and \$150,000 in optional years.

Estimated Number of Awards: One award

Section I: Funding Opportunity Description

Background:

As the largest river in North America in length and flow, the Mississippi River plays a critical role as a water source for the United States. Several large cities as well as numerous smaller ones rely directly on the river as a water source. The Mississippi River Basin is also used indirectly as a water source by municipalities that use water sources hydrologically linked to the Mississippi River, including surface and groundwater. The basin also serves as a massive source of irrigation water through highly productive farming areas of Wisconsin, Illinois, Missouri, Mississippi and Louisiana.

The Mississippi River also receives large quantities of wastewater, both municipal and industrial, both direct and indirect. The Mississippi River receives agricultural return flow and urban runoff. However, probably the most significant impact to the Mississippi River is runoff from agricultural lands. This runoff can contain agricultural chemicals like fertilizers (nitrogen forms and phosphate), pesticides and sediment.

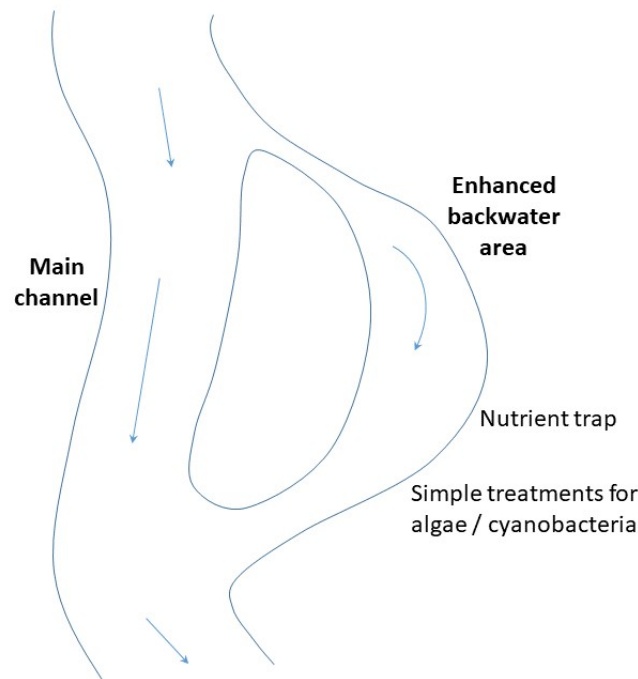
The Mississippi River runs from north (originating in Minnesota) to south (discharging into the Gulf of Mexico). As it moves southward, pollutants in the river water tend to accumulate. Because of this, the focus of this study will be in the southern portion of the Mississippi River.

As a municipal water source, the water quality of the Mississippi River is generally acceptable and conventional water treatment processes can readily produce potable water. However, built up nutrients in the water can cause water quality issues, such as algal blooms. . The discharge of the Mississippi River into the Gulf of Mexico creates such a high concentration of nutrients and algae/cyanobacteria that it frequently causes a dead zone where the only life is the algae/cyanobacteria itself, and there are concerns that projects designed to address other concerns may result in increased blooms (Roy et al. 2016).

Addressing water quality in such a large and changing river like the Mississippi is a highly challenging task. To date, most effort has focused on controlling discharges and runoff. Any form of treatment has been considered highly impractical.

Recently, interest has increased in learning about dynamic processes within backwater areas of the Mississippi River. These are hydrologically linked lakes, ponds and wetlands to the river. The Water Quality & Engineering Research Team is interested if these are a viable means for nutrient removal (Figure 1).

Figure 1. Conceptual Sketch of Backwater Area for Nutrient Removal



This project proposes to build upon the study by studying a broader range of conditions, applying the processes to a broader swath of the southern Mississippi River, and exploring the possibility of simple engineering enhancements to increase nutrient removal and exploring its effect of algal/cyanobacterial growth (Burford, M.A., et al. 2019).

Brief Description of Anticipated Work:

Objective 1: Refine and broaden a model similar to the backwater model developed for a backwater pond in Northwest Mississippi. Using Ochs and Shields (2019 and 2020) or a similar starting point, we expect the proposer to develop or use an existing numerical model to estimate on water quality parameters in the backwater system and conduct simulations for a broad number of conditions. The work of Ochs and Shields focused on nitrogen. We ask that the model be expanded to a wider range of constituents, particularly phosphate, and algae. However, simulations on other parameters such as dissolved solids, suspended solids, bacteria (*E. coli*) and pesticides are also desired. We also propose to study a wide range of flow conditions and different fluxes of nutrients and sediments from runoff.

Objective 2: Apply backwater nutrient, algae/cyanobacteria, and other water quality parameters to estimate effect on the southern Mississippi River. The backwater assumptions determined from Objective 1 will be applied to the southern Mississippi River (900 miles, from Cairo, IL to its discharge) to gain a perspective of the overall impact of backwater areas along the river. A shorter stretch can be agreed upon.

Objective 3: Development of models to assess effects of engineering approaches for small and large scales. This objective would involve a modeling effort to assess engineering approaches that could be used to enhance the beneficial properties of the backwater areas. Some engineering approaches could include:

- Increasing retention time of water in backwater system.
- The use of inexpensive materials to bind or remove nutrients from water, such as molecular sieves or ionic exchange materials.
- Use of algal precipitation or removal technologies to remove algae, cyanobacteria, and their associated nutrients from a water system (Thomas et al. 2020).
- Use of macrophytic vegetation to remove nutrients.

Public Benefit:

These products will benefit the public through improved access to technical information, better informed decision making. Understanding the water quality in Mississippi River and its backwater areas will maximize ecological benefits, and contribute to the overall Mississippi River viability and sustainability. An added benefit could be overall improvement of water quality, reducing the negative impacts such as the dead zone formation. In addition, knowledge gained as a direct result of the project will provide public benefits through improved state-of-the-science models and decision support systems to be used by academia and state and local resource agencies to promote a reduction in future costs for recovery actions thus providing cost saving measures for the public.

Section II: Award Information

Responses to this Request for Statements of Interest will be used to identify potential investigators for studies to be sponsored by the Mississippi Valley Division and the Engineer Research and Development Center to further the research goals and understanding of the Mississippi River in order to enhance the management of the river for the people of the lower Mississippi Valley. The estimated level of funding for FY20 is approximately \$40,000. Additional funds of \$150,000 may be available over the next 4 years.

Government Involvement:

The Government will work cooperatively with the investigator to address technical requirements of each objective of the study, conduct literature based studies, and assist with allied field studies. The Government will also assist in data analysis, document review, with the goal of joint publications of findings.

Section III: Eligibility Information

1. Eligible Applicants – This opportunity is restricted to non-federal partners of the Gulf Coast Cooperative Ecosystems Studies Unit (CESU).
2. Cost Sharing – This action will be 100% funded by USACE.

Section IV: Application and Submission Information – Two Phase Process

Phase I: Submission of a Statement of Interest/Qualifications.

1. Materials Requested for Statement of Interest/Qualifications:
 - a. Please provide the following via e-mail attachment to:
Chelsea.M.Whitten@usace.army.mil
 (Maximum length: 2 pages, single-spaced 12 pt. font).

1. Name, Organization and Contact Information

2. Brief Statement of Qualifications (including):
 - Biographical Sketch,
 - Relevant past projects and clients with brief descriptions of these projects,
 - Staff, faculty or students available to work on this project and their areas of expertise,
 - Any brief description of capabilities to successfully complete the project you may wish to add (e.g. equipment, laboratory facilities, greenhouse facilities, field facilities, etc.).

Note: A proposed budget is NOT requested at this time.

The administrative point of contact is Chelsea Whitten, 601-634-4679;
Chelsea.M.Whitten@usace.army.mil

2. Statement of Interest/Qualifications shall be submitted NO LATER THAN 3 July 2020, 1PM CDT.

Based on a review of the Statements of Interest received, an investigator or investigators will be invited to move to Phase II which is to prepare a full study proposal. Statements will be evaluated based on the investigator's specific experience and capabilities in areas related to the study requirements.

3. Phase II: Submission of a complete application package to include a full technical proposal including budget, if invited.

The complete funding opportunity announcement, application forms, and instructions are available for download at Grants.gov.

The administrative point of contact is Chelsea Whitten, 601-634-4679;
Chelsea.M.Whitten@usace.army.mil

4. Content and Form of Application Submission

All mandatory forms and any applicable optional forms must be completed in accordance with the instructions on the forms and the additional instructions below.

- a. SF 424 R&R - Application for Federal Assistance
- b. Full Technical Proposal – Discussion of the nature and scope of the research and technical approach. Additional information on prior work in this area, descriptions of available equipment, data and facilities, and resumes of personnel who will be participating in this effort should also be included.
- c. Cost Proposal/Budget – Clear, concise, and accurate cost proposals reflect the offeror's financial plan for accomplishing the effort contained in the technical proposal. As part of its cost proposal, the offeror shall submit cost element breakdowns in sufficient detail so that a reasonableness determination can be made. The SF 424 Research & Related Budget Form can be used as a guide.

The cost breakdown should include the following, if applicable:

1. Direct Labor: Direct labor should be detailed by level of effort (i.e. numbers of hours, etc.) of each labor category and the applicable labor rate. The source of labor rates shall be identified and verified. If rates are estimated, please provide the historical based used and clearly identify all escalation applied to derive the proposed rates.
2. Fringe Benefit Rates: The source of fringe benefit rate shall be identified and verified.
3. Travel: Travel costs must include a purpose and breakdown per trip to include destination, number of travelers, and duration.
4. Materials/Equipment: List all material/equipment items by type and kind with associated costs and advise if the costs are based on vendor quotes and/or engineering estimates; provide copies of vendor quotes and/or catalog pricing data.
5. Subrecipient costs: Submit all subrecipient proposals and analyses. Provide the method of selection used to determine the subrecipient.
6. Tuition: Provide details and verification for any tuition amounts proposed.
7. Indirect Costs: Currently the negotiated indirect rate for awards through the CESU is 17.5%.
8. Any other proposed costs: The source should be identified and verified.

Application package shall be submitted NO LATER THAN 7 August 2020, 1PM CDT.

9. Submission Instructions

Applications may be submitted by e-mail, or Grants.gov. Choose ONE of the following submission methods:

a. E-mail:

Format all documents to print on Letter (8 ½ x 11”) paper. E-mail proposal to Chelsea.M.Whitten@usace.army.mil

b. Grants.gov: <https://www.grants.gov/>:

Applicants are not required to submit proposals through Grants.gov. However, if applications are submitted via the internet, applicants are responsible for ensuring that their Grants.gov proposal submission is received in its entirety.

All applicants choosing to use Grants.gov to submit proposals must be registered and have an account with Grants.gov. It may take up to three weeks to complete Grants.gov registration. For more information on registration, go to <https://www.grants.gov/web/grants/applicants.html>.

Section V: Application Review Information

1. **Peer or Scientific Review Criteria:** In accordance with DoDGARS 22.315(c), an impartial peer review will be conducted. Subject to funding availability, all proposals will be reviewed using the criteria listed below (technical and cost/price). All proposals will be evaluated under the following two criteria which are of descending importance.

a. **Technical (items i. and ii. are of equal importance):**

- i. Technical merits of proposed R&D.
- ii. Potential relationship of proposed R&D to DoD missions.

b. **Cost/Price:** Overall realism of the proposed costs will be evaluated.

2. Review and Selection Process

a. **Categories:** Based on the Peer or Scientific Review, proposals will be categorized as Selectable or Not Selectable (see definitions below). The selection of the source for award will be based on the Peer or Scientific Review, as well as importance to agency programs and funding availability.

i. **Selectable:** Proposals are recommended for acceptance if sufficient funding is available.

ii. **Not Selectable:** Even if sufficient funding existed, the proposal should not be funded.

Note: The Government reserves the right to award some, all, or none of proposals. When the Government elects to award only a part of a proposal, the selected part may be categorized as Selectable, though the proposal as a whole may not merit such a categorization.

b. No other criteria will be used.

c. Prior to award of a potentially successful offer, the Grants Officer will make a determination regarding price reasonableness.

Section VI: Award Administration Information

1. Award Notices

Written notice of award will be given in conjunction with issuance of a cooperative agreement signed by a Grants Officer. The cooperative agreement will contain the effective date of the agreement, the period of performance, funding information, and all terms and conditions. The recipient is required to sign and return the document before work under the agreement commences. **Work described in this announcement SHALL NOT begin without prior authorization from a Grants Officer.**

2. Administrative Requirements

The cooperative agreement issued as a result of this announcement is subject to the administrative requirements in 2 CFR Subtitle A; 2 CFR Subtitle B, Ch. XI, Part

1103; and 32 CFR Subchapter C, except Parts 32 and 33.

3. Reporting

See 2 CFR Sections 200.327 for financial reporting requirements, 200.328 for performance reporting requirements, and 200.329 for real property reporting requirements.

Section VII: Agency Contact

Chelsea Whitten, Grants Officer
US Army Corps of Engineers, Engineer Research and Development Center
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Chelsea.M.Whitten@usace.army.mil
601-634-4679

Section VIII. References

Bargu, S., et al. 2010. Effects of freshwater input on nutrient loading, phytoplankton biomass, and cyanotoxin production in an oligohaline estuarine lake. *Hydrobiologia*. 661:377-389.

Burford, M.A., et al. 2019. Solutions for managing cyanobacterial blooms: scientific summary for policy makers. IOC/UNESCO, Paris (IOC/INF-1382).

Ochs, C. and D. Shields. 2019. Fluxes of nutrients and primary production between the main channel and floodplain backwaters of the Lower Mississippi River—Development of a simulation model. *River Res Applic.* 35(7), 979-988.

Ochs, C. and D. Shields. 2020. LMR Floodplain Backwaters Nitrogen Sequestration Model. Briefing from ERDC and MVD, USACE.

Roy, E.D. et al. 2016. Will Mississippi River Diversions designed for coastal restoration cause Harmful Algal Blooms? *Ecological Engineering*. 91:350-364.

Thomas, C.C., V.F. Medina, and J. Broussard. 2020. Chitosan as a Coagulant and Precipitant of Algae Present in Backwater. Submitted and under review as an MGR&P/ERDC Technical Note. Vicksburg, MS.

U.S. Army Corps of Engineers- New Orleans District (USACE-NOD). 2016. The 2016 Bonne Carre Diversion – Water Quality of Lake Pontchartrain Associated with Openings. 2008-2016. Presentation for National Engineers Week. New Orleans, LA.