

Ohio Department of Higher Education

Harmful Algal Bloom Research Initiative

Call for Research Pre-proposals October 2017 – June 2020

On behalf of the Chancellor of the Ohio Department of Higher Education (ODHE), the Ohio Sea Grant College Program, the Ohio State University, and the University of Toledo, we are requesting pre-proposals for one- to two-year research projects from Ohio colleges and universities seeking solutions to: (1) reduce nutrient loading to Lake Erie, (2) learn about algal toxins formation and human health impacts, (3) study bloom dynamics, (4) better inform water treatment plants how to remove toxins, and (4) aid the efforts of state agencies. We anticipate \$1.4 million to be available for this competition (likely funding between 8 to 12 projects).

PRE-PROPOSAL DEADLINE: Ohio Sea Grant must receive a PDF version on its web page ohioseagrant.osu.edu/research/submit by **5:00 p.m. Thursday, 27 July 2017**.

FULL PROPOSAL DEADLINE: Ohio Sea Grant must receive a PDF version on its web page ohioseagrant.osu.edu/research/submit by **5:00 p.m. Thursday, 12 October 2017**.

Research Priorities

Please keep in mind that the application and use of research results, as well as the societal and economic impacts, are important considerations for this funding opportunity. Additionally, collaborations between university researchers in Ohio, industry, and state agencies is strongly encouraged. Priorities below are a result of consultation with key agency personnel that are working on harmful algal bloom related issues:

Ohio Environmental Protection Agency Priorities (OEPA) ---- Agency Contact: Heather Raymond; Heather.Raymond@epa.ohio.gov

- Fate of microcystins in water treatment plant residuals and potential for plant uptake of microcystins from residuals used as soil amendments.
- In consultation with Ohio EPA, develop a sampling protocol and collect samples to determine listing criteria that the agency would use to declare the Western Basin of Lake Erie as "Impaired" under Great Lakes Clean Water Act (303d)
- Evaluate saxitoxin adsorption capacity for different types of PAC.
- Determine freshwater sources of saxitoxins in Ohio source waters and triggers for saxitoxins production and extracellular release.
- Evaluate effect of permanganate on cell lysis and microcystins destruction for genera other than microcystis.

Ohio Department of Natural Resources Priorities (ODNR) ---- Agency Liaison: Chris Winslow;
winslow.33@osu.edu

- Assess how harmful algal blooms (HABs) impact aquatic systems: How do HABs influence fish behavior, fish recruitment, the ability of anglers to catch fish within blooms, and trophic interactions?
- Assess impacts of nutrient dynamics and sediments on recruitment of economically important sportfish.

Ohio Department of Health Priorities (ODH) ---- Agency Contact: Rebecca Fugitt;
Rebecca.Fugitt@odh.ohio.gov

- Cyantoxin reaction kinetics (Item 1) – Expanding these studies to application for:
 - o smaller scale (lower volume) drinking water treatment systems such as ponds or springs
 - o application for treatment at low level detections in a public water system that exceed drinking water health advisory levels where healthcare facilities or food service/retail food operations want to install treatment to remove low levels of cyantoxin
- Various media treatment efficacy for microcystin, saxitoxin, cylindrospermopsin and anatoxin-a (Item 3) removal for use in:
 - o smaller scale drinking water treatment systems such as ponds or springs
 - o application for treatment at low level detections in a public water system that exceed drinking water health advisory levels where healthcare facilities or food service/retail food operations want to install treatment to remove low levels of cyantoxin
- Infiltration of cyantoxin into ground water beneath the Lake Erie Islands and potential impacts on drinking water wells. Identification of infiltration pathways and mechanisms can also be applied to inland lakes hydraulically connected to ground water.
- Human health and toxicity – health effects of consumption of low levels of cyantoxins at or exceeding US EPA Health Advisory Levels (microcystin, saxitoxin, cylindrospermopsin, anatoxin-A) on sensitive populations including pregnant women, nursing mothers, immune compromised individuals, individuals with liver and/or kidney impairment or disease.
 - o Development of test for detecting microcystins and their predicted metabolites in human biological samples (urine, liver biopsy, etc.)
- Human Health & Toxicity – health effects of cyanotoxins on children and adults from recreational exposures including incidental ingestion, inhalation and from dermal contact.
- Prevalence and occurrence of algal blooms and cyanotoxins in ponds and springs used for private drinking water supplies. These systems are commonly shallower and have less water volume and may be more susceptible to the formation of algal blooms.

Ohio Department of Agriculture Priorities (ODA) ---- Agency Liaison: Chris Winslow;
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- Design edge-of-field studies to better understanding of how different agronomic practices affect nutrient loading.
- Assess updated of Tri-State nutrient standards to be sure that nutrient recommendations are adequate and a balance between production and environmental needs.
- Assess if agricultural drainage retention ponds/dry dams are practical. What are barriers for implementing them, can they help remove nutrients, what sizes are necessary to be effective based on field size, could they be incorporated into a permanent buffer/riparian corridor program, does this strategy require compensating the farmer?
- Assess financial incentives for multiple adjacent farmers in the same tributary to implement

- controlled drainage.
- Assess the effectiveness of controlled drainage on a landscape scale.
- Examine the effectiveness of natural and constructed wetlands in removing excess nutrients.
- Pilot test unique economic incentive programs to reduce nutrient runoff at the watershed or sub-watershed level.
- Assess nutrient movement in dredged materials
- Assess the impacts of soil health on water quality and quantity. How does soil, both increased organic matter and increased biological activity, influence water holding capacity (increasing water availability for crop use and decreasing peak storm flows) and nutrient cycling (increasing nutrient retention)?
- Assessing the placement of fertilizers: what cost share rate would incentivize adaption of subsurface fertilizer placement, are there non-financial incentives that could increase adoption of subsurface fertilizer placement, what are the barriers to adaption of subsurface fertilizer placement, does fertilizer application method affect yield, and what are the effects of fertilizer placement on traditional soil tests?

Investigators are strongly encouraged to develop proposals that meet requirements identified by OEPA, ODNR, ODA, and ODH and/or the recommendations of the Objectives and Targets Task Team of Annex 4 of the Great Lakes Water Quality Agreement (combined list attached). The amount of funding allocated to each focus area will be determined by the number and quality of the proposals received. The HABRI Agency Advisory Board has previously recommended funding proposals that were not specifically highlighted by agencies in the RFP. If any investigator(s) plan to propose projects that are not listed priorities, they are encouraged to consult with Ohio Sea Grant (Dr. Chris Winslow) or the agency contacts listed above prior to submission of their proposal.

Proposals that are aligned with the research priorities outlined under the “Agency Priorities” section or have sought guidance from state agencies will be given funding priority.

Current Projects Supported by ODHE

To date, the ODHE provided \$4 million in support for this initiative; two rounds of consisting of 32 projects. These projects have addressed issues captured by four focus areas: (1) improve the use of existing technologies and to develop new methods to detect, track, prevent and mitigate harmful algal blooms and their impacts; (2) assessment of the health impacts of toxins associated with harmful algal blooms; (3) develop new treatment methods for toxin contaminated drinking water; and (4) develop ways to better keep nutrient inputs on the landscape. More information on these projects can be found on the Ohio Sea Grant website at: <https://ohioseagrant.osu.edu/research/collaborations/habs>.

Deadlines and Planned Schedule

- **Thursday, 27 July 2017 by 5 p.m.** --- Applicants should submit a single PDF by accessing ohioseagrant.osu.edu/research/submit and uploading files.
- **Friday, 25 August 2017** --- Researchers will be notified of the status of their pre-proposals (encouraged or discouraged from submitting a full proposal).
- **Thursday, 12 October 2017 by 5 p.m.** --- Applicants should submit a PDF version of their full proposals by accessing ohioseagrant.osu.edu/research/submit and uploading files.
- **Friday, 31 October 2017** --- Researchers will be notified as to whether their proposal will be included in the proposal submitted by Ohio Sea Grant to the Chancellor of the Ohio Department of Higher Education.

PRE-PROPOSALS: The pre-proposal process allows investigators to outline projects and receive feedback without spending the time required to prepare a full proposal. Successfully completing the pre-proposal process (i.e., being asked to submit a full proposal) does not, however, guarantee funding.

A PDF version of the pre-proposal (with all pieces of the pre-proposal in one PDF document) must be submitted to Ohio Sea Grant by **5 p.m. on Thursday, 27 July 2017**. Applicants must submit by accessing ohioseagrant.osu.edu/research/submit and uploading files. Pre-proposals should include:

All of the documents listed below should be included in the single PDF file:

- A cover page of your own design that includes the project title, and the name, affiliation, address, telephone numbers, and email address of each investigator; this “title page” must be signed by the lead/principal investigator;
- A maximum of three pages of summary narrative (form 90-2) explaining the objectives, methodology, and rationale for the proposed project (11 point, Times New Roman font preferred); 90-2 is available on our web site at ohioseagrant.osu.edu/research/funding;
- A Sea Grant budget form (form 90-4) for each year of the project (max 2 years) and a summary budget combining both years; 90-4 available on our web site at ohioseagrant.osu.edu/research/funding;
- A two-page vita for each investigator; and
- Letters of support from partners in management agencies and/or industry are encouraged but not required at the pre-proposal stage.

Instructions for the Research Summary Form (90-2)

The 90-2 summary form is intended to provide a brief but concise description of the project in a form useful to a variety of readers. Prepare only one summary form for the proposal, no matter how many years are proposed. **This form should not exceed three pages.**

KEYWORDS are required on the summary form and should identify the project scientifically and geographically.

OBJECTIVES should state what the investigator(s) intends to do and that it is aligned with a state agency requirements. Measurable objectives are preferred. The heading “Objectives” should be interpreted as “The objectives of this proposal are,” and each objective should begin with the word “To”, followed by a verb. Quantifiable and hypothesis-based objectives are well received.

METHODOLOGY should outline the steps and approaches to be taken. Specific questions that an interested person would ask should be answered under methodology—which heavy metals, which pollutants, which pathogens, what species of fish, what kind of model, location, etc.? The methodology should be specific enough to allow peer reviewers to accurately evaluate the likely success of your proposal.

RATIONALE should be a concise statement of why this is an appropriate ODHE project. That is, what problem or opportunity is being addressed and why is it important. The project need not promise to fully solve a problem but it should be shown as a logical step toward a solution. Include the potential end users (management agencies, private sector, etc.) of project information if they

have been identified. Collaboration with industry and/or state, regional, and federal agencies is strongly encouraged and rewarded.

Instructions for the Budget Form (90-4)

Prepare a budget form for each year of funding proposed and a cumulative form for all years combined. The budget must have the approval of appropriate university administrators (i.e., sponsored program officer) at the full proposal stage, but Ohio Sea Grant DOES NOT for the pre-proposal. The investigator is expected to adhere to the budget category amounts as they appear in the approved budget. Any proposed changes to the budget categories that collectively exceed 10% of the total budget will require prior written authorization. Funds spent in excess of the approved total budgeted amount will be the responsibility of the PI and associated awarded unit. Again, Sponsored Program Officer approval is not required by Ohio Sea Grant at the pre-proposal stage; however, please provide the name and contact information for the Sponsored Program Officer you work with at your University.

SENIOR PERSONNEL: The first Principal Investigator listed is responsible for the research outlined in the proposal and will receive correspondence regarding the project. Associates (faculty or staff) are professional persons who are full-time but who do not share the responsibility of the project.

OTHER PERSONNEL: Professionals are non-faculty and non-staff associated with the project. Research associates are professional persons participating in the project who are part-time employees or persons retained solely for the project or staff members of participating organizations. Research associate/graduate students are part- or full-time students who hold at least a bachelor's degree or equivalent, are enrolled in a program leading to an advanced or professional degree, and are integral to the project as research assistants. Professional school students are students enrolled in medical, legal, and other professional schools. Pre-bachelor students may be employed as aides or assistants on a project either on salary as part-time employees or on an hourly basis. Pre-baccalaureates are undergraduate students enrolled either part or full-time in a course leading to a degree, including an Associate Degree in the case of students in two-year programs or a certificate in the case of some vocational students. Secretarial/Clerical is a category for office personnel (Research projects can no longer request federal funds for positions in this personnel category.) Technical/Shop is a category for technicians, shop personnel, and other persons with special but nonprofessional skills. Other persons are all others not included in the previous categories.

FRINGE BENEFITS: are those customarily paid by the grantee institution following its usual practices in the payment of such benefits. This amount is provided in total, not for each person included in the proposal. Include the fringe benefit rates for each person in the proposal.

PERMANENT EQUIPMENT (Capitalized Assets): included here as a total figure. Capitalized assets are defined as moveable equipment with a useful life of one or more years with an original cost or value of \$5,000 or more.

EXPENDABLE SUPPLIES AND EQUIPMENT: should be justified in the body of the budget justification. Only the total is shown on the budget form.

TRAVEL: State the justification for travel and the basis for the cost of the travel in the body of the proposal. Identify destination and include all costs involved. Per Diem for travel must be based on the regulations of the proposing institution and included in the travel budget. Domestic travel includes North America and travel to all U.S. Possessions or Trusts, including Puerto Rico, the Virgin Islands, the Trust Territories, Guam, and Samoa. All travel anywhere outside the U.S., its possessions, and Canada is considered international and will require prior approval.

PUBLICATION AND DOCUMENTATION COSTS: Costs incurred during the project for posters at conferences, page charges for publications, etc.

OTHER COSTS: List such items as consultants, computer time, reimbursement of participating organizations outside the proposing institution (subcontracts), equipment rental and maintenance, telephone and other communication costs, etc.

INDIRECT COSTS: Indirect costs are not allowed as a sponsor cost on these projects, but unrecovered indirect costs can be listed in the “matching funds” column.

MATCHING FUNDS: The Ohio Department of Higher Education’s Harmful Algal Bloom Research Initiative funding requires at least \$1 of matching support for every \$1 of ODHE support requested.

Matching support may include:

- salaries, wages, and benefits of those working on the project;
- expendable supplies and equipment;
- donated supplies, space, or equipment; and
- unclaimed indirect costs.

FULL PROPOSALS: Full proposals will be due by **5:00 p.m. on Thursday, 12 October 2017** and will require the following sections:

- Updated/revised summary form (90-2) based on pre-proposal reviewer feedback
- Budget forms (90-4) and justification
- Proposal (5-pages max): introduction/background/rationale, objectives, methodology, timeline/project schedule, role of personnel, deliverables, education/outreach component, and literature cited
- A two-page vita for each investigator/project member
- A minimum of two support letters from interested agencies, municipalities, industry, constituencies, collaborators, etc.

REVIEW PROCESS: A panel composed primarily of the members of our agency advisory committee (representatives from Ohio Environmental Protection Agency, Ohio Dept. of Natural Resources, Ohio Dept. of Agriculture, and Ohio Dept. of Health) will review and rank the pre-proposals for funding and determine which projects can move forward to the full proposal stage. It is possible that requests to modify projects and even combine projects will occur at this step. We do not anticipate requesting many more full proposals than can be funded. The first investigator listed on each pre-proposal will be contacted with the results of the review by **Friday, 25 August 2017**. It is expected that with a few exceptions, the same group will evaluate full proposals.

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