US Army Corps of Engineers®
St. Paul District

NATIONAL ENVIRONMENTAL POLICY ACT SCOPING INFORMATION

DEMONSTRATION OF THE EFFICIENCY AND FEASIBILITY OF CLAY TECHNOLOGY IN REMOVING AND MANAGING FRESHWATER HARMFUL ALGAL BLOOMS

MINNEAPOLIS, MINNESOTA AND PUT-IN-BAY, OHIO

Section 506 of the Water Resources Development Act (WRDA) of 2000, as amended by Section 5011 WRDA 2007

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1. INTRODUCTION

The National Environmental Policy Act (NEPA) directs federal agencies to initiate "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action." The U.S. Army Corps of Engineers (USACE) is currently conducting a study to determine the feasibility of demonstrating the use of various control methods to manage harmful algal blooms in riverine systems. The locations of the study will vary over the coming years. Efforts in 2026 would focus on storm water ponds in Minneapolis, MN and efforts in 2027 would focus on Put-In-Bay, OH (Figures 1 and 2). The USACE has prepared this scoping information to elicit public and agency concerns and comments, clearly define the environmental issues and alternatives that should be examined, and identify any applicable federal, state and local requirements that may need to be addressed.

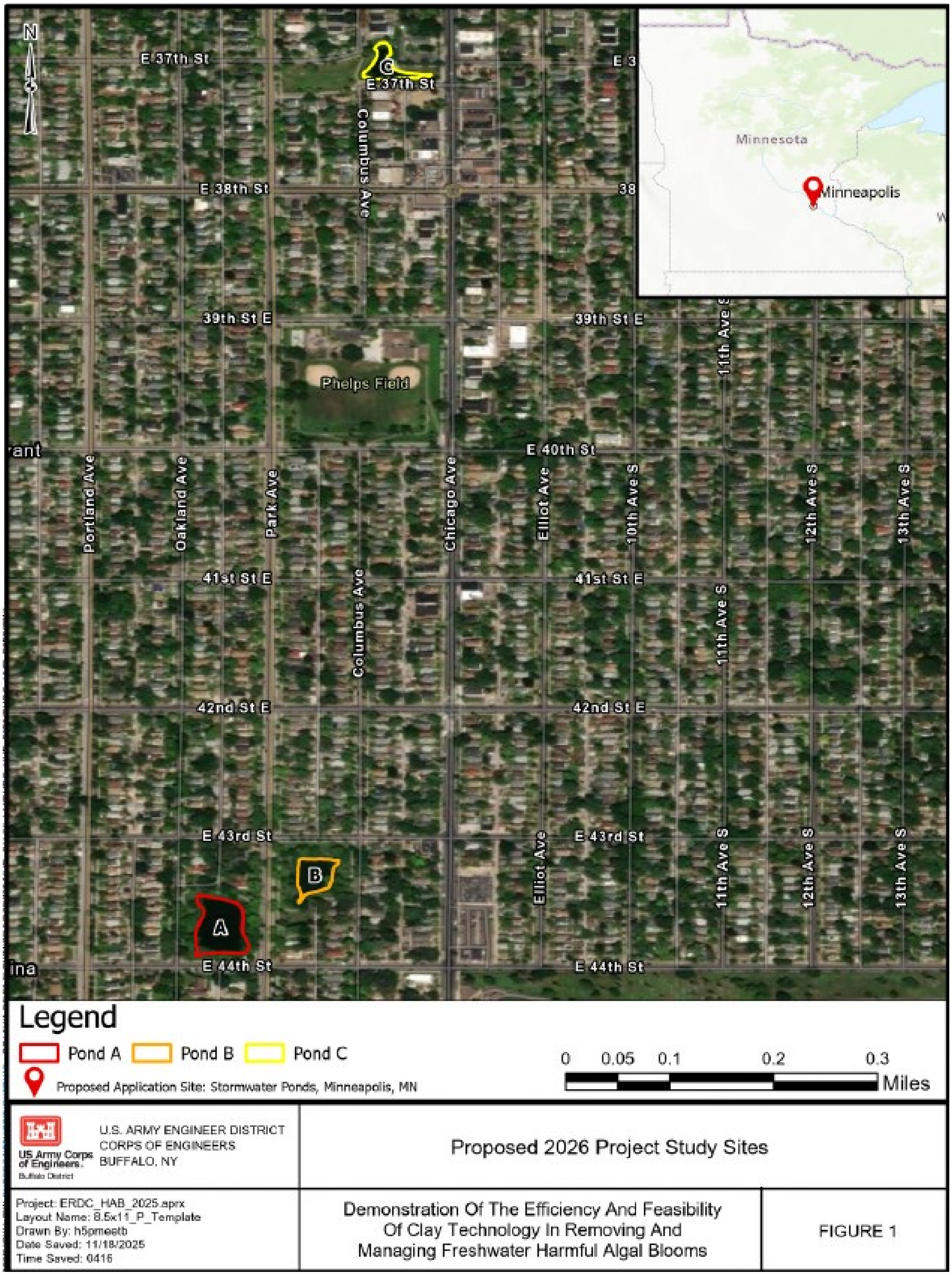

Figure 1: Stormwater ponds identified for modified clay treatment in Minneapolis, MN during 2026.

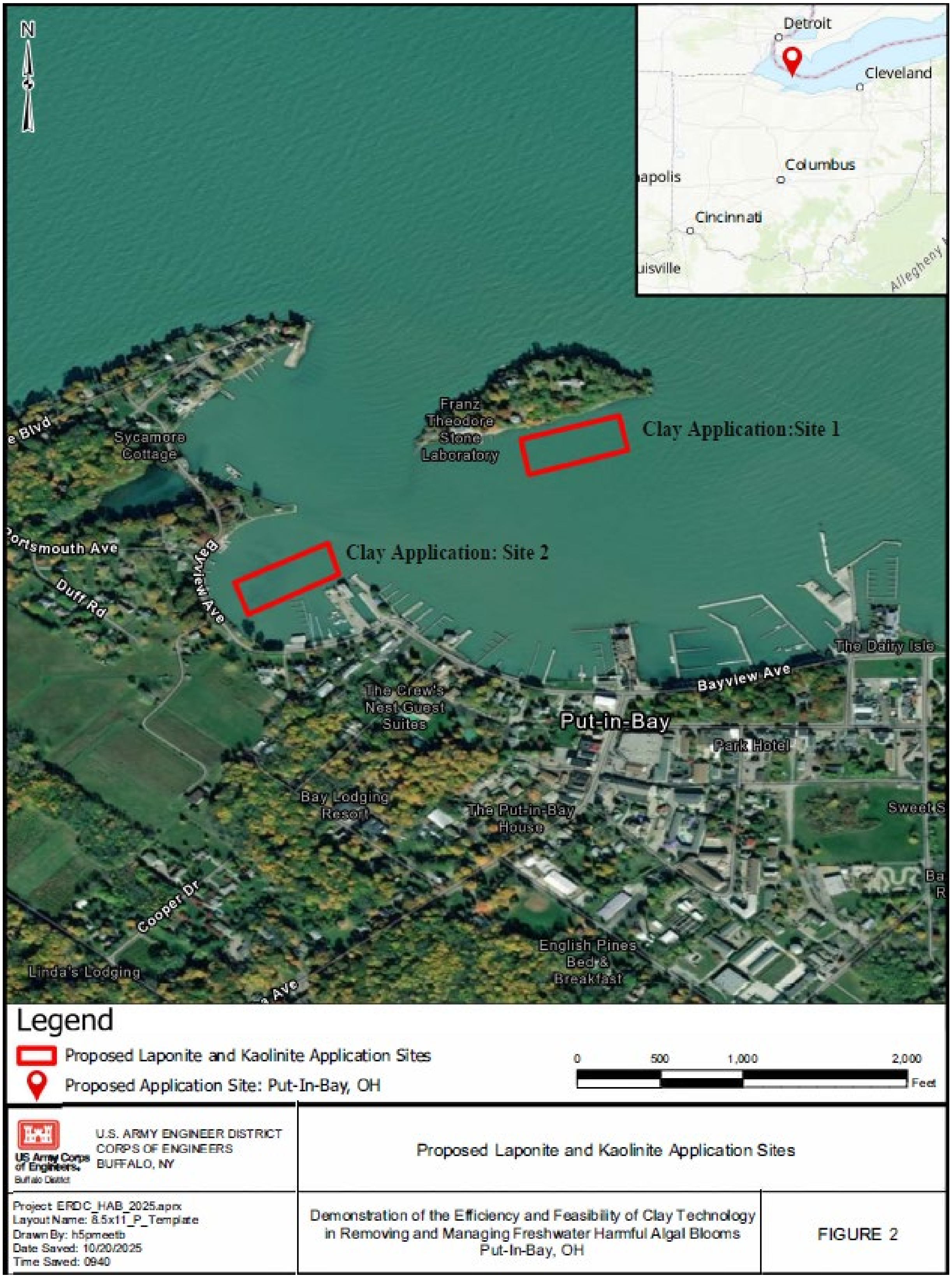

Figure 2: Study locations for modified clay treatment within Lake Erie near Put-In-Bay, OH during 2027. Sites are approximate and the entirety of the areas depicted would not be treated.

2. PURPOSE AND NEED FOR THE PROJECT

2.1. PROBLEM AND NEED FOR ACTION

Severe harmful algal blooms (HABs) have been frequently reported in many streams, ponds, and lakes across the United States, with varying extents and intensities. Due to the excess availability of nutrients such as phosphorus, large aquatic systems like Lake Erie and stormwater ponds, experience frequent harmful algal blooms during periods of low discharge (Laiveling et. al. 2022). The size and consistency of these blooms of phytoplankton are driven by nitrogen and phosphorus presence in eutrophic waters like those of the Lake Erie western basin. HABs are of great concern as they not only impair the aesthetic quality, taste, and odor to the water, but also introduce harmful cyanotoxins into the aquatic environment. If uncontrolled, the presence of HABs can negatively affect freshwater ecosystems as well as terrestrial ecosystems that rely on the affected water. The presence of HABs within waterways that are used by cities, towns, and/or municipalities may prevent the use of the waterway as a source of freshwater or recreation. Cyanobacterial HABs (CHABs) are recognized for their potential to induce acute toxicity in both wildlife and humans. These CHABs create impacts to drinking water, recreation, and the ecosystem, as the phytoplankton that cause these blooms create a cyanotoxin that, in high levels of exposure, can cause skin rashes, toxicity in the liver, and neurological issues. Two of the most prevalent cyanobacterial algae found to cause HABs in Lake Erie, are the *microcystis* and *planktothrix* which can create neurotoxic and hepatoxic cyanotoxins that are associated with poisonings of fish, wildlife, and human populations (U.S. National Office of HAB 2019).

CHAB control by clay flocculation is the most globally widespread method of CHAB mitigation in marine environments. The application has not received much attention in treating CHABs in freshwaters in the United States. Although the technology has been implemented in over 34 countries worldwide, there are no guidelines regarding the optimal dose of specific clay application to effectively mitigate CHABs and toxins, dependency of the successful application of clay technology on site-specific physical and chemical conditions, timing and duration of the practical clay technology application, and determining the success of clay technology quickly and over large areas during and after the application. If correctly applied, clay technology has potentially high CHAB and toxin removal efficiency. It can be locally sourced, has a low environmental impact, and scales over various areas impacted by CHAB.

The Woods Hole Oceanographic Institution, a leading US oceanographic institution, advocates using clay technology to mitigate CHABs (Devillier et al., 2023). When clay is sprayed into the contaminated water, it causes cyanobacterial cells to flocculate or aggregate and sink to the bottom. Clay technology is appealing because it can have high removal efficiency of HABs, low cost, easy to source and transport, scalable over large areas, and has documented low environmental impacts (Devillier et al., 2023). Over the past 30 years, the clay-based method has been used to remove algal cells from mostly coastal areas in many countries, including China, Japan, South Korea, Australia, and the United States. To enhance the removal efficiency of HABs-forming cells, researchers have proposed modifications of natural clays using chemicals such as polyaluminum chloride (PACL). However, adding PACL coagulant with clay can change the total dissolved solids, salinity, and water transparency. Therefore, demonstrating the efficiency of clay without and with the addition of PACL in freshwater environments under field conditions is an urgent priority. Understanding CHAB dynamics with ecological insights is also crucial for the successful management of CHABs in freshwater systems.

In a recent manuscript, researchers reported the effect of a synthetic, transparent, biocompatible, biodegradable, and commercially available smectite clay, laponite, on removing

Microcystis aeruginosa (Li et al. 2024). By conducting clay-algae flocculation experiments, the researchers compared the cell removal efficiencies of laponite, bentonite, and kaolinite. Findings indicated that laponite most effectively removed *M. aeruginosa* cells without compromising water clarity, outperforming both bentonite and kaolinite. To remove 80 percent of *M. aeruginosa* cells from the water column, 0.05 g/L of laponite was sufficient, which was considerably smaller compared to the 2 g/L and 4 g/L needed for bentonite and kaolinite, respectively. The research team demonstrated that the superior performance of laponite clay was because of its smaller particle size compared with bentonite and kaolinite, which led to a higher encounter rate between cells and clay particles. Furthermore, the results showed that to achieve the same 80 percent cell removal efficiency, laponite needs to be 40 to 80 times smaller than natural clays such as bentonite and kaolinite. The same experiment was repeated by adding PACL to bentonite and kaolinite. The results showed superior laponite and PACL-modified kaolinite performance over the PACL-4 modified bentonite clay. Laboratory results were verified with limited field samples collected in Powderhorn Lake, MN, and obtained similar trends.

2.2. PROPOSED PROJECT

The intent of this study is to demonstrate the feasibility and efficiency of modified clay technologies to manage and remove freshwater HABs. The proposed project will explore and discover the optimum dose of natural clay (kaolinite) and synthetic clay (laponite) in removing HABs. Phyllosilicate clay kaolinite is naturally abundant and eliminates microorganisms from marine environments, including cyanobacteria and dinoflagellates (Sengco and Anderson 2004; Devillier 2023). Synthetic hectorite clay nanomaterial, laponite, has high transparency, low cost, does not require chemical modifications, and can coexist harmoniously with living organisms or systems without causing any toxicity or harm (e.g., Khoshakhlagh 2022). The laponite crystals are disk-shaped nanoparticles with a diameter of about 20 nm and a thickness of about 1 nm. Due to smaller particle sizes than kaolinite, laponite presents an appealing solution for potentially managing HABs. Surprisingly, no studies have explored the potential of laponite in removing HABs in freshwater and marine environments. Based on previous laboratory investigations (Li et al. 2024), this project proposes to compare the HABs removal efficiency of kaolinite and laponite under field conditions after completing controlled mesocosm studies. This will demonstrate the removal efficiencies of clay technology to HABs-forming cells, toxins, cell metabolic activities, and the optimal dose of clay application.

2.3. STUDY AUTHORITY

Section 128 of the Water Resources Development Act (WRDA) 2020, directs the Secretary of the Army (Secretary) to implement a demonstration program to determine the causes of, and implement measures to effectively detect, prevent, treat, and eliminate harmful algal blooms (HAB) associated with water resources development projects. Section 128 requires the Secretary to consult with federal and state agencies, and leverage data and activities of the Secretary carried out through the U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center (ERDC) pursuant to Section 1109 of the WRDA of 2018 (33 U.S.C. § 610).

Section 128, as amended, directs the Secretary to undertake program activities in the Great Lakes; tidal and inland waters of New Jersey, to include Lake Hopatcong, New Jersey; coastal and tidal waters of Louisiana; waterways of the counties that compromise the Sacramento-San Joaquin Delta, California; Allegheny Reservoir Watershed in New York; Lake Okeechobee, Florida; Caloosahatchee and St. Lucie Rivers, Florida, Lake Sidney Lanier; the Rio Grande River Basin, New Mexico and Texas; lakes and reservoirs in the State of Ohio; Upper Mississippi River and Tributaries; Detroit Lake, Oregon; and the coastal waters of the United

States Virgin Islands. While preference is given to these identified watersheds, demonstration projects may occur outside of them.

3. PROPOSED ACTIONS

3.1. SITE SELECTION

The proposed project would take place over two years (2026 and 2027) and include treatments in two separate areas. In the 2026 phase, field trials would be conducted in three man-made stormwater ponds in the Minneapolis metropolitan area (Figure 3). The ponds are isolated from the Mississippi River watershed and were chosen because of their size, ease of access, and history of algae blooms. The ponds have water surface areas less than one acre, which makes field trials possible without the need for an experimental use permit from the U.S. Environmental Protection Agency (US EPA) (40 CFR 172.3(c)(2)). In 2021, ponds A and B (Figure 3) experienced relatively high maximum concentrations of Chlorophyll-a concentrations consistent with an algae bloom (157 µg/L). In 2020, Pond C experienced a maximum Chlorophyll-A concentration of 31 µg/L. Pond A would act as a control, Pond B would be treated with laponite, and Pond C would be treated with kaolinite clay. Pond A and Pond B are in close proximity, making them ideal candidates for the control and treatment sites. The Minneapolis Parks and Recreation Board (MPRB) has approved the experimental use of each pond. If neither of the two ponds proposed to be treated experiences an algae bloom, the MPRB has approved using up to two alternative ponds as backup. The alternatives selected would have a history of algae blooms.

In conjunction with the mesocosm tests at the Stone Laboratory, researchers with the University of Minnesota Twin Cities (UMN), University of Minnesota Duluth (UMD), and Ohio State University (OSU) identified two bays in Lake Erie for the field demonstration (Figure 2). These sites are chosen based on their potential for HAB blooms, shelter from wind/seiche, and the proximity to the Stone Laboratory. The selected bay's water surface area for the application of laponite and kaolinite is less than one acre, which makes field trials possible without the need for an experimental use permit. The average water depth at Site 1 is around 2.5 meters, and at Site 2 is 3.0 meters.

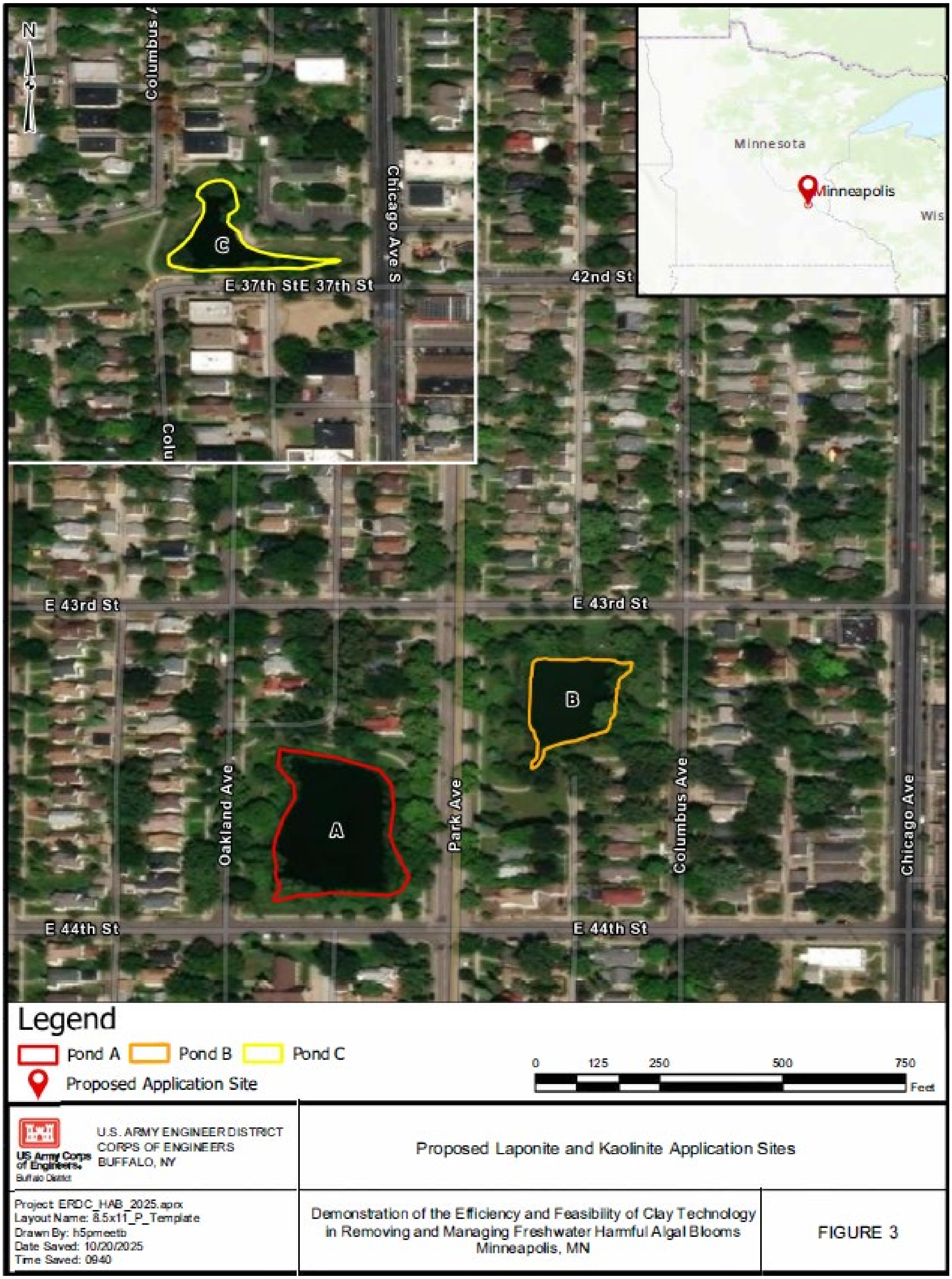

Figure 3: Map of proposed study stormwater ponds in Minneapolis, MN.

3.2. ALTERNATIVES UNDER CONSIDERATION

No Action Alternative: The No Action Alternative provides a baseline to which other alternatives can be compared. Under the No Action Alternative, researchers at UMN, UMD, and OSU would not conduct the demonstration in Minneapolis, MN nor Put-In-Bay, Ohio in 2026 and 2027, which aims to discover the optimum dose of natural clay (kaolinite) and synthetic clay (laponite) in removing HABs.

Alternative 1: Researchers with UMN, UMD, and OSU, aim to study the efficacy of physical removal methods (modified clays) for HABs in pond and lacustrine systems. Sedimentation with clay-based materials has been adopted for this project due to its potential for instant removal of HABs and its potential to have little to no negative effects on organisms and systems at targeted locations. The proposed alternative would use physical methods on stormwater pond sites within Minneapolis, MN in 2026, and lacustrine sites near Put-In-Bay on Lake Erie in 2027 in the summer when HABs are most prevalent. The modified clay used specifically for this study includes a synthetic clay known as laponite and a modified naturally occurring clay known as kaolinite. The study would include multiple sites at one time, but the final treatment site locations may vary. Final decisions on the site would be made after preliminary testing, which would be coordinated with the MPRB and/or ODNR. Application of these treatments would be conducted during the 2026 and 2027 phases of the study. Each phase of the study is described in further detail below.

- *<u>Minneapolis Stormwater Ponds</u>* - To conduct the study, two 330-gallon (1250 intermediate bulk container (IBC) totes would be placed at opposite pond shores at ponds B and C. IBC totes would be fitted internally with a custom-made mechanical stirrers and equipment necessary to spray a clay-water mixture onto the surface of each pond. To achieve the study application, one IBC tote would be filled with 1200 liters of water (317 gallons) and 12 kg of laponite at pond B and 60 kg kaolinite at pond C, representing a loading of 1 wt.% laponite and 5 wt.% kaolinite. While the clay-water mixture from the initial tote is being sprayed onto the pond's surface, a second IBC tote with a clay-water mixture would be prepared for application so that clay is nearly continuously added to the pond until the proper amount of laponite and kaolinite are achieved. Based on preliminary laboratory experiments, researchers anticipate adding between 0.01 – 0.05 g/L of laponite to achieve the algae removal target of 80%. Field trials of untreated kaolinite suggest loadings of 100 – 400 g/m^2 (Na et al., 1997). The volume of pond B is 110,000 ft3, which would require a laponite loading of 31 – 156 kg. Pond C is 1,214 m^2 and thus requires a kaolinite loading of 121 kg – 486 kg. Researchers would conduct laboratory-scale trials using pond water prior to conduct field trials to determine the laponite and kaolinite loading required to achieve 80% algae removal.

  Prior to the field trial, five water samples would be taken at various points across the pond's surface, three around the shore and two in the middle. Locations would be noted and marked for future water sampling. Samples would be retaken 2 and 72 hours after the trial and then weekly for the 8 weeks after the study. This sampling design results in 165 samples (3 ponds x 5 sites x 11 sampling times). Samples would be analyzed for total algae and cyanobacteria biomass, total nitrogen and dissolved inorganic nitrogen, total phosphorus and dissolved reactive phosphorus, total/inorganic/volatile suspended solids, oxygen demand, and dissolved organic carbon. Other variables collected for the study include depth profiles of temperature, dissolved oxygen (DO) concentration and percent saturation, pH, and conductivity. Cyanobacterial populations would be monitored using metatranscriptomics in the initial application of the clays to mimic the mesocosm experiment. Additionally, researchers would monitor the cyanobacterial taxonomy, diversity, communities, and abundance at all other time points. To estimate the post-treatment settling flux of cyanobacteria from the surface to the sediments, researchers would use a gravity coring device to collect sediment cores from the treated sites pre- and post-treatment. Data from the 2026 phase would provide valuable experience and result for the 2027 phase of the study.

- *Put-In-Bay, Lake Erie* - In conjunction with the mesocosm tests at the Stone Laboratory, researchers identified two bays in Lake Erie for the field demonstration (Figure 2). Due to the movement of algal blooms in Lake Erie, researchers would identify the location of HABs within the bays prior to initiating the study. The amount of clay needed for application would be approximately 0.01 – 0.05 g/L of laponite and 100 – 400 g/m^2 of kaolinite. Since Lake Erie is an open system, researchers would inject rhodamine dye to detect water and particle movements due to natural currents in the lake. It is anticipated that clay application would require two boats, one equipped with a self-contained clay sprayer (Figure 4), and the second containing the necessary research instruments. The clay-sprayer boat would be equipped with a portable compressor that can take in water from the lake, suspend clay in real-time, then spray it back onto the surface of the lake. It is anticipated that the application of kaolinite and laponite would be completed independently within the proposed bays. Timing of the experiment would be determined in collaboration with Stone Laboratory, aiming to apply the clay at the study location in early Spring and late Summer of 2027. Physical, chemical, and biological parameters would be collected before, during, and up to seven days after the application of clay. To overcome natural wind currents and seiche, researchers would use drone technology to visually track the dispersed bloom in relation to the boat. Additionally, an *in situ* LISST-200 Particle Size Analyzer with a HAB detector would be used to enable the detection of the three-dimensional distribution of HABs and clay algal aggregates over the treated bay area. Researchers would collect additional grab water samples to calibrate drone sensors, determine toxin and phycocyanin concentrations, identify algal species, and determine clay-alga aggregates' geometry.

  All sampling locations would be marked with a GPS so the spatial reference of each measuring point will be available. An existing *in situ* multiparameter sonde will record water temperature, pH, conductivity, dissolved oxygen, phycocyanin, total dissolved solids, and chlorophyll-a. A Self-Contained Microstructure Profiler would measure turbulence characteristics at 100 Hz frequency in the water column. Collected data would provide the basis for quantifying clay-algal aggregate particle size and distribution at the tested site's depth and horizontal directions. Triplicate grab water samples (100 mL) at specific water depths will be collected for the microscopic analysis of aggregates, cell counts, phycocyanin, and toxin concentrations. To estimate the post-treatment settling flux of cyanobacteria from the surface to the sediments, researchers would use a gravity coring device to collect sediment cores from the treated sites pre- and post-treatment. Post-sequencing, researchers would analyze the abundance and taxonomy of the cyanobacterial populations and compare pre- and post-treatment cyanobacterial communities.

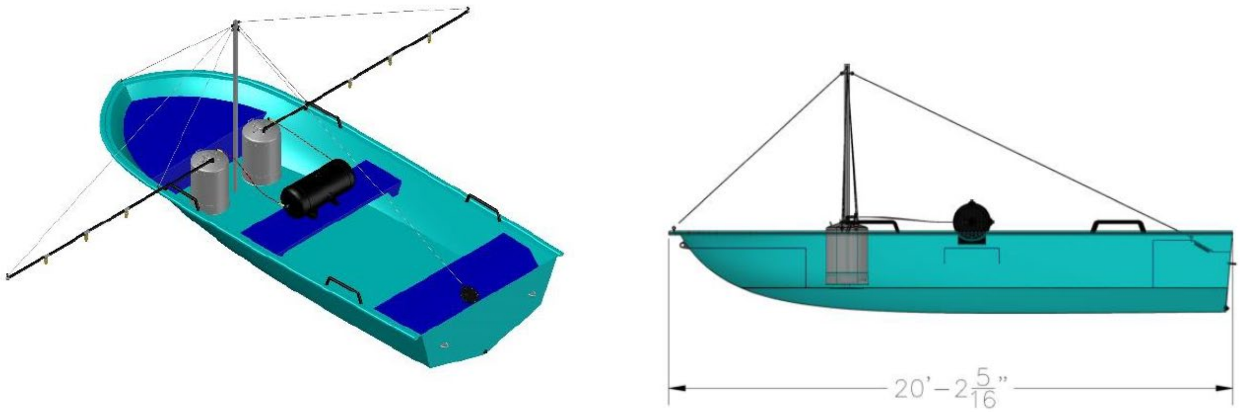

Figure 4: Self-contained clay spraying boat.

4. PUBLIC PARTICIPATION AND INTERAGENCY COORDINATION

Throughout the scoping process, stakeholders and interested parties are invited to provide comments on this study. Potential social, economic, and environmental benefits and adverse impacts that may result from each alternative that is selected for detailed analysis would be addressed in future documentation. Interested parties are welcome to contact USACE to discuss their views and recommendations regarding this study. Comments will be accepted by mail/email until the close of this scoping period on February 27, 2026. A supplemental environmental assessment (EA) will be completed to document the evaluation of any potential social, economic, and environmental benefits and potential adverse impacts that may result from the proposed action.

5. IMPACT ASSESSMENT

Future conditions and anticipated potential effects of the proposed action will be assessed and compared to a No Action Alternative. The No Action Alternative represents the anticipated condition that may result from UMN, UMD, and OSU taking no action to complete the demonstration. Alternatives would be evaluated for several social, economic, and environmental categories, including but not limited to:

- Fish and Wildlife Resources
- Historic Properties
- Water Quality
- Property Values and Tax Revenues
- Employment
- Geology and Soils
- Community Cohesion and Growth
- Contaminated Materials
- Transportation
- Air Quality
- Public Facilities and Services
- Noise
- Aesthetics
- Recreation

6. COMPLIANCE WITH ENVIRONMENTAL PROTECTION STATUTES

Federal environmental protection statutes that will be addressed are listed below, with additional potentially applicable public laws, executive orders, and policies listed below:

- *National Environmental Policy Act (NEPA).* In accordance with the National Environmental Policy Act (NEPA; 42 USC § 4321 et seq.) and the Department of Defense NEPA Implementing Procedures, USACE will assess the potential environmental effects of the proposed action on the quality of the human environment. Using an interdisciplinary approach, an assessment will be made of the potential environmental impacts of the proposed action(s) by comparing the plans with the "without-project" conditions. The impact assessment process will determine if an environmental impact statement is required, or if an environmental assessment and finding of no significant impact is appropriate.

- *Clean Water Act.* The project will be evaluated in accordance with the Clean Water Act Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material under (CWA; 40 CFR Part 230). If the proposed federal action will result in the discharge of dredged or fill material into a water of the United States, a Section 404(a) public notice would be issued, and the public will be afforded the opportunity to comment and/or request a public hearing. In the event of the need for Section 404 fill, the grantee would acquire appropriate Federal permits and state water quality certification from the Minnesota Pollution Control Agency and the Ohio Environmental Protection Agencies under Section 401 of the Act. As of right now, it is believed that the application of the clay into the Minneapolis stormwater ponds, and Lake Erie would not constitute a fill under the CWA. This is because the application of <1 cy of clay as a slurry over 1 acre would not create any measurable change to the bathymetry beneath the application areas.

- *Coastal Zone Management Act.* The Act requires that federal actions reasonably likely to affect any land or water use or natural resource of the coastal zone, regardless of location, be consistent with approved state coastal management programs. A federal consistency determination documenting consistency with coastal management program policies will be submitted to the Ohio Department of Natural Resources (ODNR) for their concurrence.

- *Endangered Species Act.* The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consulting (IPaC) website was consulted on 15 December 2025 to identify the potential presence of Federally-listed threatened and endangered species that may occur within the study area and be affected by the implementation of the project. The results of the IPaC review indicate that the stormwater pond sites in Mineapolis, MN, lies within the range of the Federally-endangered northern long-eared bat (*Myotis septentrionalis*), rusty patched bumble bee (*Bombus affinis*), Higgins eye (*Lampsilis higginsii*) and salamander mussel (*Simpsonaias ambigua*); proposed threatened tricolored bat (*Perimyotis subflavus*) and monarch butterfly (*Danaus plexippus*); and a non-essential proposed experimental population of whooping cranes (*Grus americana*, Table 1). The study area is located within an area of proposed critical habitat of the rusty patched bumble bee.

  The sites under consideration for the phase of the study slated for 2027 in Put-In-Bay, OH, lie within the range of the federally endangered Indiana bat (Myotis sodalis), proposed threatened monarch butterfly (*Danaus plexippus*), and the threatened rufa red knot (*Calidris canatus rufa*). The study area for this phase of the project does not contain any known critical habitat (Table 2). The bald eagle was also identified as occurring within the Lake Erie watershed. Although it is no longer listed on the endangered species list, it is protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668) and by the Ohio Department of Natural Resources Code.

- **Table 1:** Federally Listed Species and Critical Habitat(s) in the proposed study areas of Minneapolis, MN.

Common Name	Scientific Name	Group	Status
Northern Long-eared Bat	*Myotis septentrionalis*	Mammal	Endangered
Tricolored bat	*Perimyotis subflavus*	Mammal	Proposed endangered
Whooping Crane	*Grus americana*	Bird	Proposed experimental population, non-essential
Monarch butterfly	*Danaus plexippus*	Insect	Proposed Threatened
Rusty Patched Bumble Bee	*Bombus affinis*	Insect	Endangered
Rusty Patched Bumble Bee	*Bombus affinis*	Critical Habitat	Proposed Critical Habitat
Higgins Eye Mussel	*Lampsilis higginsii*	Clams	Endangered
Salamander Mussel	*Simpsonaias ambigua*	Clams	Endangered

Table 2: Federally Listed Species and Critical Habitat(s) in the proposed study areas of Put-In-Bay, OH.

Common Name	Scientific Name	Group	Status*
Indiana bat	*Myotis sodalis*	Mammal	Endangered
Monarch butterfly	*Danaus plexippus*	Insect	Proposed Threatened
Rufa Red Knot	*Calidris canutus rufa*	Bird	Threatened

- *Fish and Wildlife Coordination Act.* USACE is coordinating this study with the USFWS, ODNR, and the Minnesota Department of Natural Resources. USACE will collaborate with these agencies to identify any fish and wildlife concerns, relevant information on the study area, obtain their views concerning the significance of fish and wildlife resources and anticipated project impacts, and identify those resources which need to be evaluated in the study.
- *National Historic Preservation Act (NHPA).* The NHPA of 1966, as amended by Public Law 96-515 (94 Stat. 2987), established a national policy for historic preservation, authorized the Secretary of the Interior to expand and maintain a National Register of Historic Properties (NRHP) designation, and created the Advisory Council on Historic Preservation. Section 106 specifies that Federal agencies, before approving any expenditure or issuing any license, must consider the effect of the action on any property included in or eligible for the NRHP. The project's potential effects on historic properties will be evaluated in accordance with appropriate laws and regulations.

  Pursuant to 36 CFR 800, historic property identification efforts to inform plan formulation included reviewing the NRHP online database, the Minnesota State Historic Preservation Office (MNSHPO), and the Ohio State Historic Preservation Office (OSHPO) historic online databases. The project sites are located entirely within aquatic locations in Hennepin County, MN and Ottawa County, OH. No historic properties are located within the project sites; however, several architectural properties are located adjacent to each project site (Figures 7-9). No known archaeological sites are within or surrounding the project sites.

Five Federally recognized Tribal nations have been identified that might attach religious and cultural significance to historic properties within in Hennepin County, MN: Lower Sioux Indian Community, Prairie Island Indian Community, Shakopee Mdewakanton Sioux Community, Sisseton-Wahpeton Oyate, and Upper Sioux Indian Community. Nine Federally recognized Tribal nations have been identified that might attach religious and cultural significance to historic properties within Ottawa County: Absentee Shawnee Tribe, Delaware Nation, Eastern Shawnee Tribe of Oklahoma, Ottawa Tribe of Oklahoma, Wyandotte Nation, Seneca Nation of Indians, Tonawanda Seneca Nation, Peoria Tribe of Oklahoma, and the Seneca-Cayuga Nation. Pursuant to its obligations under the NHPA, USACE will coordinate with the Minnesota and Ohio SHPOs, as well as the Tribal Historic Preservation Offices (THPOs) of any Federally-recognized Tribe that may attach cultural or religious significance to the proposed sites.

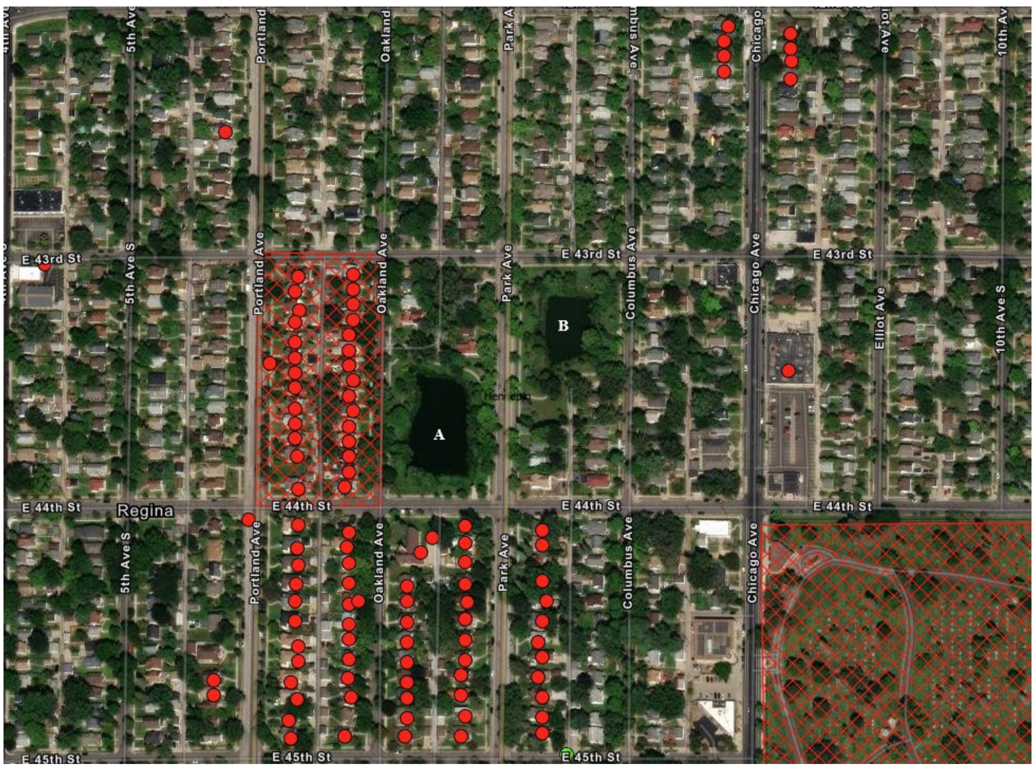

Figure 5: Cultural resource map from the Minnesota Statewide Historical Inventory Portal (MnSHIP) showing sites A and B of the proposed 2026 study in Minneapolis, MN. Red dots represent potential historic sites or areas that have been previously surveyed.

Figure 6: Cultural resource map from the Minnesota Statewide Historical Inventory Portal (MnSHIP) showing site C of the proposed 2026 study in Minneapolis, MN. Red dots represent potential historic sites or areas that have been previously surveyed.

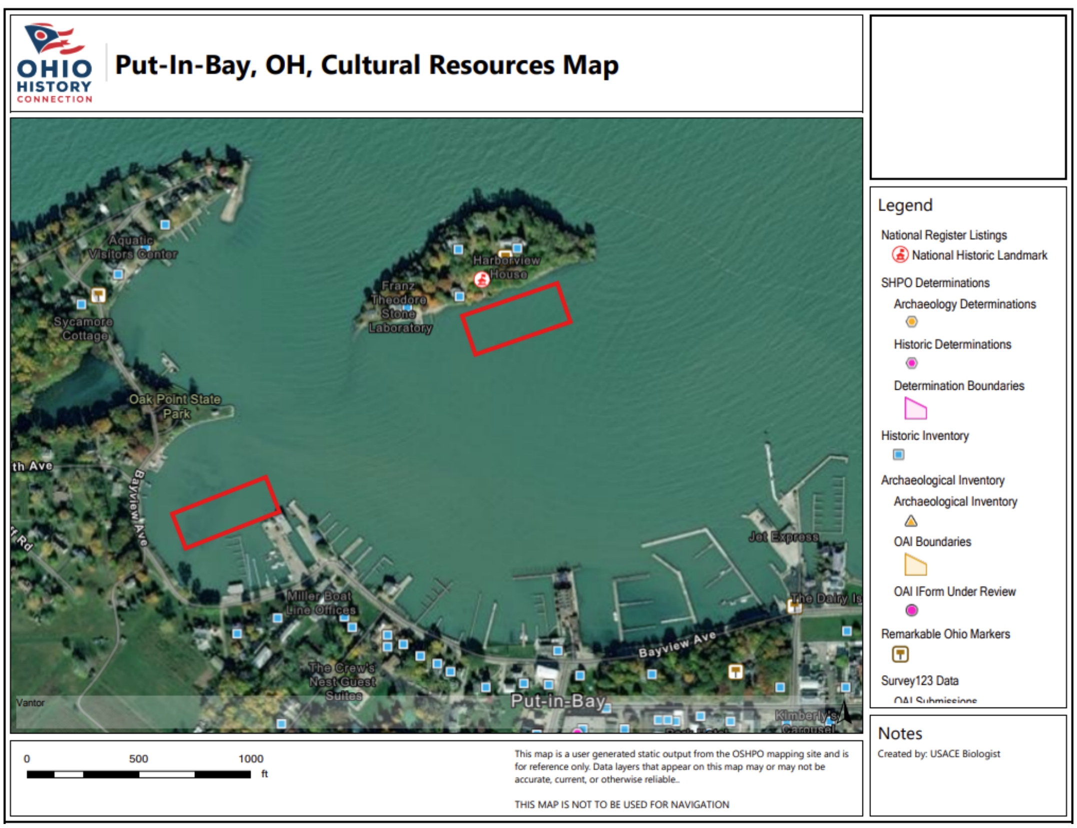

Figure 7: Cultural resource map of a potential site for treatment, with cultural and historic resources adjacent to the proposed 2027 Put-In-Bay sites. Map sourced from the Ohio History Connection Online Cultural Resource Mapper.

7. FEDERAL ENVIRONMENTAL PROTECTION LAWS, ORDERS, AND POLICIES

7.1. PUBLIC LAWS

(a) American Folklife Preservation Act, P.L. 94-201; 20 U.S.C. 2101, *et seq.*
(b) Anadromous Fish Conservation Act, P.L. 89-304; 16 U.S.C. 757, *et seq.*
(c) Antiquities Act of 1906, P.L. 59-209; 16 U.S.C. 431, *et seq.*
(d) Archaeological and Historic Preservation Act, P.L. 93-291; 16 U.S.C. 469, *et seq.*
(e) Bald Eagle Act; 16 U.S.C. 668.
(f) Clean Air Act, as amended; P.L. 91-604; 42 U.S.C. 1857h-7, *et seq.*
(g) Clean Water Act, P.L. 92-500; 33 U.S.C. 1251, *et seq.* (Also known as the Federal Water Pollution Control Act; and P.L. 92-500, as amended.)
(h) Coastal Barrier Resources Act of 1982, 16 U.S.C. 3501 *et seq.* 12 U.S.C.
(i) Coastal Zone Management Act of 1972, as amended, P.L. 92-583; 16 U.S.C. 1451, *et seq.*
(j) Endangered Species Act of 1973, as amended, P.L. 93-205; 16 U.S.C. 1531, *et seq.*
(k) Estuary Protection Act, P.L. 90-454; 16 U.S.C. 1221, *et seq.*
(l) Federal Environmental Pesticide Control Act, P.L. 92-516; 7 U.S.C. 136, et seq.
(m) Federal Water Project Recreation Act, as amended, P.L. 89-72; 16 U.S.C. 460-1(12), *et seq.*
(n) Fish and Wildlife Coordination Act, as amended, P.L. 85-624; 16 U.S.C. 661, *et seq.*
(o) Land and Water Conservation Fund Act, P.L. 88-578; 54 U.S.C. 200302, et seq.
(p) Migratory Bird Conservation Act of 1928; 16 U.S.C. 715, et seq.
(q) Migratory Bird Treaty Act of 1918; 16 U.S.C. 703, *et seq.*
(r) National Environmental Policy Act of 1969, as amended, P.L. 91-190; 42 U.S.C. 4321, *et seq.*
(s) National Historic Preservation Act of 1966, as amended, P.L. 89-655, 80 Stat. 915 (1966), 16 U.S.C. 470aa, *et seq.*
(t) Native American Religious Freedom Act, P.L. 95-341; 42 U.S.C. 1996, *et seq.*
(u) Resource Conservation and Recovery Act of 1976, P.L. 94-580; 42 USC 6901, *et seq.*
(v) Rivers and Harbors Act of 1899, 33 U.S.C. 403, *et seq.*
(w) Submerged Lands Act of 1953; 43 U.S.C. 1301, *et seq.*
(x) Surface Mining and Reclamation Act of 1977, P.L. 95-87; 30 U.S.C. 1201, *et seq.*
(y) Toxic Substances Control Act, P.L. 94-469; 15 U.S.C. 2601, *et seq.*
(z) Watershed Protection and Flood Prevention Act, as amended, P.L. 83-566; 16 U.S.C. 1001, *et seq.*
(aa) Wild and Scenic Rivers Act, as amended, P.L. 90-542; 16 U.S.C. 1271, *et seq.*

7.2. EXECUTIVE ORDERS

(a) Executive Order 11593, Protection and Enhancement of the Cultural Environment. May 13, 1979 (36 FR 8921; May 15, 1971).
(b) Executive Order 11988, Floodplain Management. May 24, 1977 (42 FR 26951; May 25, 1977).
(c) Executive Order 11990, Protection of Wetlands. May 24, 1977 (42 FR 26961; May 25, 1977).
(d) Executive Order 12088, Federal Compliance with Pollution Control Standards, October 13, 1978.

(e) Executive Order 12372, Intergovernmental Review of Federal Programs, July 14, 1982.

7.3. OTHER FEDERAL POLICIES

(a) Council on Environmental Quality Memorandum of August 11, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act.
(b) Council on Environmental Quality Memorandum of August 10, 1980: Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the National Inventory.
(c) Migratory Bird Treaties and other international agreements listed in the Endangered Species Act of 1973, as amended, Section 2(a)(4)

8. POINT OF CONTACT

Interested parties are encouraged to contact the USACE-St. Paul District's Regional Planning and Environmental Division North and USACE-Buffalo District Environmental Analysis Team with any comments regarding the demonstrations project. Questions or requests for additional information may be directed to:

St. Paul District Regional Planning and Environmental Division North

E-mail: CEMVP_Planning@usace.army.mil

Buffalo District Environmental Analysis Team

E-mail: PutInBayHABStudy@usace.army.mil

Please review the study information and present any comments to the attention of the USACE-St. Paul District's Regional Planning and Environmental Division North **and/or** Buffalo District Environmental Analysis Team to the emails above or addresses below by 27 February 2026:

U.S. Army Corps of Engineers, St. Paul District
332 Minnesota Street, Suite E1500
St. Paul, Minnesota 55101
ATTN: Regional Planning and Environmental Division North

U.S. Army Corps of Engineers, Buffalo District Environmental Analysis Team
478 Main Street
Buffalo, NY 14202-3278
ATTN: Put-In-Bay HABs Study

Thank you for your interest and review of this project.

9. REFERENCES

Devillier, M.V., Hall, R.E., Anderson M.D., and K.A. Lewis (2023). Exposure of blue crab (*Callinectes sapidus*) to modified clay treatment of *Karenia brevis* as a bloom control strategy. *Harmful Algae*, 128, 102492.

Khoshakhlagh, P. (2022). Laponite-Based Nanomaterials for Drug Delivery. *Advanced healthcare materials*, *11*(7), e2102054-n/a.

Li, Y., M. Hondzo, and J. Yang (2024). A synthetic clay removes *Microcystis Aeruginosa* efficiently. *Harmful Algae,* 137, 102667, 1-12.

Laiveling, A., Nauman, C., Stanislawczyk, K., Bair, H.B., Kane, D.D., Chaffin, J.D. 2022. Potamoplankton of the Maumee River during 2018 and 2019: The relationship between cyanobacterial toxins and environmental factors. Journal of Great Lakes Research. Volume 48, Issue 6. 1587-1598. https://doi.org/10.1016/j.jglr.2022.08.015.

United States National Office for Harmful Algal Blooms (U.S. National Office of HAB). 2019. Mycrocystis. https://hab.whoi.edu/species/species-by-name/microcystis/. Accessed November 18, 2025.

National Sanitation Foundation (NSF). 2025. NSF product listings NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects https://info.nsf.org/Certified/PwsChemicals/Listings.asp?Company=C0720649&Standard=060. Accessed November 19, 2025.

Sengco, M.R., and D.M. Anderson (2004). Controlling harmful algal blooms through clay flocculation. *J. Eukaryot. Microbiol,* 51, 169–172.

U.S. Department of Housing and Urban Development (USHUD). 2025. Tribal Directory Assessment Tool (TDAT).

United States Environmental Protection Agency (USEPA). 1993. Peroxy compounds. Prevention, Pesticides and Toxic Substances (7508W). EPA-738-F-93026. Washington DC

United States Environmental Protection Agency (USEPA). 2009. Peroxy Compounds Summary Document: Registration Review. Docket Number: EPA-HQOPP-2009-0546. Prevention, Pesticides and Toxic Substances (7510P). Washington DC

U.S. Fish and Wildlife Service (USFWS). 2025. Information for Planning and Consultation (IPaC). Available at: https://ipac.ecosphere.fws.gov/