

2022 COOPERATIVE SUMMER FELLOWSHIP PROGRAM – PROJECT PROPOSAL

APPLICANT TYPE: ESA;

PROJECT TITLE: TAKING ADVANTAGE OF HIGH WATER LEVELS IN THE GREAT LAKES TO IMPROVE MANAGEMENT OF A PERSISTENT INVASIVE WETLAND GRASS

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Discipline: Ecology;

PROJECT DESCRIPTION

BACKGROUND

Expansion of the invasive *Phragmites australis* is a significant problem in the Great Lakes basin and nationally, where it spreads rapidly through underground structures (i.e., rhizomes) and threatens biodiversity and critical wildlife habitat. In the Great Lakes basin, non-native *Phragmites* took advantage of low water levels in the 2000s and early 2010s, expanding from shorelines into exposed bottomlands, creating dense monocultures with extensive root and rhizome systems. With rising Great Lakes water levels since 2013, many expanded *Phragmites* populations have since been submerged, presumably facilitating natural dieback. Given this, record high water levels may offer a unique opportunity to control large swaths of *Phragmites* across the basin. Thus, some managers have begun cutting *Phragmites* stems under the water or cutting and then manipulating water levels above the cut stems to drown the plant. Cutting stems below the water surface cuts off the flow of oxygen to the rhizomes, rendering that stem unable to grow. These actions have been shown to be very effective in reducing the size of *Phragmites* patches. However, there are some knowledge gaps that are necessary to explore to ensure that this management action is effective across a wide variety of conditions in the Great Lakes. For instance, are rhizomes still viable after cutting and drowning and if so for how long? Will previously cut-to-drown plants resprout if/when water levels decline? If drowned plants maintain connection to emergent plants, can the emergent plants 'save' the drowned ones? In what season is cut-to-drown most effective? What is the extent can this management technique be applied throughout the Great Lakes basin? The U.S. Geological Survey and the U.S. Fish and Wildlife Service are addressing these questions through a series of controlled experiments and large-scale field studies that include opportunities for summer fellows.

Objectives: The successful candidate will assist with on-going projects related to cut-to-drown and other innovative *Phragmites* management strategies. Specifically:

- (1) Assist with field studies implementing cut-to-drown management strategies in natural areas across the Great Lakes basin.
- (2) Assist with design, implementation, and data collection of greenhouse studies exploring the impacts of high water on *Phragmites* health.
- (3) Assist with field and greenhouse studies pertaining to other innovative controls for *Phragmites* (e.g., microbial symbiosis, genetic biocontrol).
- (4) Assist with operations and management of research greenhouse specimens.

INTERN TASKS

Water level impacts:

- (1) Work closely with USGS scientists and partners to plan and deploy field and greenhouse experiments exploring the effects of Great Lakes water levels on Phragmites performance
- (2) Collaborate with team members to develop standardized field methods
- (3) Assist with preparation and application of potential treatments
- (4) Monitor health and growth of Phragmites and competing plant species over the duration of the experiment
- (5) Harvest and process plants at conclusion of field studies
- (6) Prepare plant matter for final analyses (clean, dry, weigh, etc.)
- (7) Analyze field data as part of a collaborative team
- (8) Prepare findings for poster and/or internal presentation for GLSC and partners

General greenhouse operations / maintenance:

- (1) Grow Phragmites plants from seeds and rhizomes to supply current experiments
- (2) Maintain basic greenhouse operation including overall plant care, watering, pruning, and basic greenhouse maintenance

Microbial manipulation / genetic biocontrol:

- (1) Assist field team with plot set-up, treatment application, or data collection as needed throughout field season

Wetland ecology:

- (1) Work with USGS and USFWS staff to monitor wetland restoration projects and characterize the condition of plants, fish assemblages, water quality, and other parameters

BENEFITS TO INTERN

This collaborative project will yield important insights into alternative, innovative invasive species management strategies of great importance to the land management community. The Great Lakes Science Center engages in partner-focused science, providing a unique opportunity for an intern to learn how to craft a research project with high relevance to current management needs while gaining valuable experience in laboratory and field settings. The intern will work closely with mentors to craft an experimental design and research plan that aligns with land management needs and is feasible in a single field season. The intern will gain experience with data collection, data management, and analysis. In addition, the intern will be able to take advantage of close relationships to the wildlife and land management communities to present findings to relevant groups (e.g., Great Lakes Phragmites Collaborative, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineer scientists). This is a wonderful opportunity to add research experience, gain exposure to high-priority federal science, and build a professional network within the research and land management communities.

MENTORING PLAN

The selected intern will be integrated as a regular member of the lab group and as part of the project team. In addition to regular weekly lab meetings, the intern will meet regularly with the lead scientist to discuss aspirations and develop goals for the internship. Lead scientist will work closely with the intern to achieve desired goals and encourage development of a final product (e.g., poster or oral presentation to our science center or to project partners, outreach materials, fact sheet) to maximize the value of this position to the intern and to the project partners.

ADDITIONAL DETAILS

STUDENT SKILLS AND INTERESTS

The desired candidate should be pursuing a degree in biology, ecology, environmental or wildlife sciences or similar with a strong interest in invasion ecology, microbial ecology, and/or habitat restoration. A basic understanding of botany, plant physiology, microbiology, and/or genetics is desirable.

LOCATION: Ann Arbor, MI

ACTIVITY LEVEL:

Level 8-2: The work requires some physical exertion such as long periods of standing, walking over rough, uneven, or rocky surfaces; recurring bending, crouching, stooping, stretching, reaching, or similar activities; or recurring lifting of moderately heavy items. The work may require specific, but common, physical characteristics and abilities such as above-average agility and dexterity.

FIELD WORK	25-50%	VIRTUAL?	No
LAB WORK	25-50%		
OFFICE WORK	25-50%		
OTHER	0-25%		

PROJECTED START DATE 5/16/2022

EXPECTED DURATION 12 weeks