

## 2019 Cooperative Summer Field Training Program

● <b>Project Title:</b>	Developing new, sustainable control strategies for invasive <i>Phragmites australis</i>
● <b>Project Scientists:</b>	Kurt Kowalski
● <b>USGS Center:</b>	Great Lakes Science Center
● <b>Location:</b>	Ann Arbor, MI, USA

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### Project Description:

#### **Background Information:**

Control of invasive plant species is important to preserve native habitats and is a high priority for many management agencies. The non-native *Phragmites australis* (common reed) is an aggressive invader of high quality wetlands and lakeshores and a major nuisance species along roadsides and public access areas. Conventional treatment approaches such as burning, manipulating water levels, mowing, and herbicides are expensive and not effective long-term. Additionally, conventional methods are not species-specific, which leads to off-target effects on native plant communities. Therefore, the development of novel management strategies is of significant value and interest to land managers across North America. The USGS – Great Lakes Science Center is engaged in research to find more sustainable, species-specific control mechanisms for non-native *Phragmites* and other invasive species. Scientists are currently testing (1) alterations the rhizosphere microbiota communities that occur around plant roots, (2) targeted control of endophytic fungal communities with fungicide; and (3) genetic-based approaches (e.g., RNA-based gene silencing) to control the most aggressive traits of *Phragmites*.

#### **Objectives:**

The successful candidate will assist with on-going projects advancing new control strategies for non-native *Phragmites*. Specifically:

- Continue research on the impact of organic acids on soil microbes and *Phragmites* growth and performance
- Manage greenhouse operations to support the needs of on-going *Phragmites* control studies
- Continue to identify important genetic pathways that could be manipulated to decrease *Phragmites* invasion success

#### **Intern Tasks:**

- Microbial manipulation experiment:
  - Work closely with USGS scientists and partners to plan and deploy field experiments exploring the

effects of organic acid application on soil microbes and Phragmites performance.

- Collaborate with team members to develop standardized field methods
  - Assist with preparation and application of chemical treatments
  - Monitor health and growth of Phragmites and competing plant species over the duration of the experiment
  - Harvest and process plants at conclusion of field studies
  - Prepare plant matter for final analyses (clean, dry, weigh, etc.)
  - Analyze field data as part of a collaborative team
  - Prepare findings for poster and/or internal presentation for GLSC and partners
- General greenhouse operations / maintenance
- Grow Phragmites plants from seeds and rhizomes to supply current control experiments
  - Maintain basic greenhouse operation including overall plant care, watering, pruning, basic greenhouse maintenance
- Exploring genetic pathways:
- Work with USGS and U.S. Army Corps of Engineer scientists to develop new treatments targeting the molecular processes that drive Phragmites performance

### ***Expected Outcomes:***

This collaborative project will yield important insights into alternative, innovative invasive species management strategies of great importance to the 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 setting. The intern will work closely with mentors to craft an experimental design and research plan that aligns with 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). This is a wonderful opportunity to gain research experience, gain exposure to high-priority federal science, and build a professional network in the research and management communities.

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### **Details for Matching:**

**Type of Project:** Field Work, Lab Work

**Project Discipline:** Ecology, Invasive Species

**Project Start Date:** Mon Apr 15 2019 00:00:00 GMT-0400 (EDT)

**Project Duration:** 4 years, depending on student and funding available

**Level of Physical Demand:** 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.

**GIS Training:** ESA

**Special 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 restoration. A basic understanding of botany, plant physiology, microbiology, or genetics is desirable.

