



Eradication of Invasive Mussels in Open Water – Stage 1

When: Planned Launch December 2017

Problem Statement: Two species of dreissenid mussels, *Dreissena polymorpha* (zebra mussel) and *Dreissena rostriformis bugensis* (quagga mussel), have become established in freshwater lakes, reservoirs, and rivers in the United States. Both species were first detected in the late 1980's and they have subsequently spread throughout much of the eastern United States. More recently, quagga mussels have become established in various Reclamation managed waters following their discovery in Lake Mead in 2007. Zebra mussels remain largely confined to eastern states, but several populations have been documented in the West, including San Justo Reservoir in California.

Invasive dreissenid mussels pose significant challenges for Reclamation and all agencies and industries that have a stake in keeping water bodies free of infestations. Invasive mussels are prolific breeders and settle on or within water facility infrastructure such as water intakes, gates, diversion screens, hydropower equipment, pumps, pipelines, and boats. Infested water and hydropower infrastructure can fail or choke off water transmissions. Maintaining and operating water supply and delivery facilities, water recreation, and other water dependent industries and economies in mussel infested water bodies are dramatically more expensive and complex.

An invasive dreissenid mussel infestation can also be costly to local communities and water managers. Invasive mussels negatively impact the natural ecology which can be detrimental to native and endangered species, including native fisheries. This can lead to increased need for intervention by local agencies. Water managers are often required to dedicate greater time to recreation management and in some cases must completely restrict recreation, which can dramatically impact the local economy.

Currently, no practical methods exist for large-scale open-water control of invasive dreissenid mussel populations once they become established. In the absence of an economically viable open-water treatment, the majority of existing control efforts focus on containment and prevention.

The Solution We Seek: Reclamation and our collaborators seek novel methods to eradicate or prevent invasive dreissenid mussel infestations throughout large reservoirs and lakes. Proposed treatments must be specific to invasive mussels, without significant harm to non-target organisms, such as native mussels or threatened and endangered species. Treatments must comply with federal and state discharge permits and regulations concerning water quality, native organisms, and recreational fisheries.

Prize Competition Scope: This prize competition is envisioned to have 3 stages. The decision to proceed to each subsequent stage will depend on the results of the previous stage.

- **Stage 1** is a theoretical challenge requiring the submission of a white paper that describes novel methods for open water mussel eradication. Stage 1 will have a total prize purse of \$100,000.
- **Stage 2** is planned as a lab-scale demonstration and proof-of concept of selected treatment(s) from Stage 1. The efficacy of a treatment to produce adult and larval dreissenid mussel mortality will be confirmed in a controlled laboratory setting.
- **Stage 3** is planned as a field-scale demonstration where the selected treatment(s) will be deployed in a small-scale, closed-system open water environment to determine if the deployment and monitoring methodology is sufficient to produce and demonstrate large-scale dreissenid mussel mortality.

Collaborators:

RECLAMATION
Managing Water in the West



US Army Corps of Engineers



MOLLOY & ASSOCIATES, LLC

Expertise in Aquatic Invasive Species Biology, Ecology & Control

<https://www.usbr.gov/research/challenges/mussels.html>