



Invasive Mussel Collaborative

Connecting People, Science and Management

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¹Great Lakes Commission

²U.S. Geological Survey

International Conference on Aquatic Invasive Species

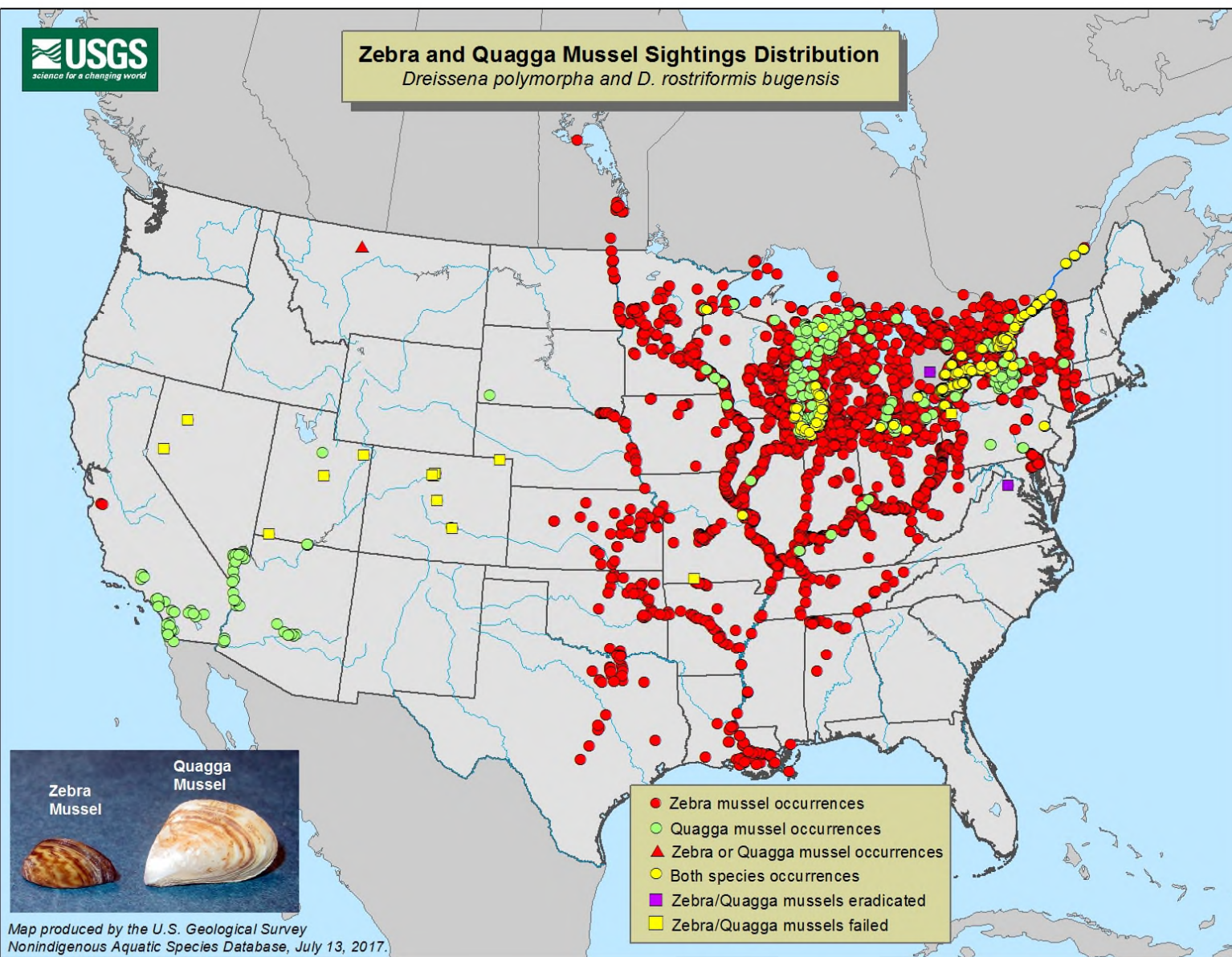
October 23, 2017 | Ft. Lauderdale, Florida





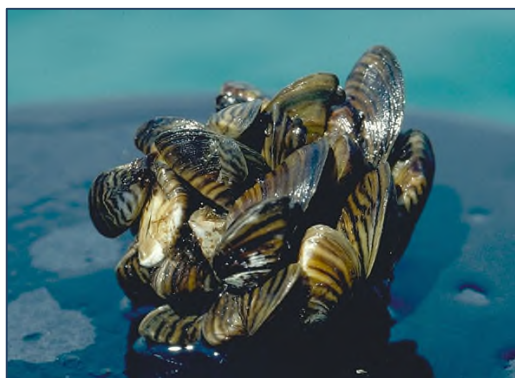
Zebra and Quagga Mussel Sightings Distribution

Dreissena polymorpha and *D. rostriformis bugensis*



Map produced by the U.S. Geological Survey
Nonindigenous Aquatic Species Database, July 13, 2017.

- Zebra mussel occurrences
- Quagga mussel occurrences
- ▲ Zebra or Quagga mussel occurrences
- Both species occurrences
- Zebra/Quagga mussels eradicated
- Zebra/Quagga mussels failed





- Limited options for response, containment or eradication in open waters
- New potential for management: Zequanox®¹
 - Trial applications
- Ongoing investments to develop other technologies
- Apply collective impact principles
 - Bring multiple interested parties into a **common understanding and agenda**
 - Use **management and science** to create potentially powerful management tools



Effects of biocontrol application

A colony of zebra mussels attached to a native mussel. The native mussel survives the application of biocontrol; the zebra mussels do not.

¹Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Mission

Advance scientifically sound technology for invasive dreissenid mussel control to produce measurable ecological and economic benefits.

Provide a framework for communication and coordination, identify the needs and objectives of resource managers, prioritize the supporting science, recommend communication strategies and **align science and management goals into a common agenda for invasive mussel control.**



Steering Committee

29 member orgs from U.S.
and Canada Federal, Tribal,
state, provincial and local
agencies; NGOs; industry,
academia



Core Team

Great Lakes
Commission, Great
Lakes Fishery
Commission,
National Oceanic &
Atmospheric
Administration &
U.S. Geological
Survey



Science Team

12 members representing
research agencies and
institutions

**Neutral backbone support and coordination
Great Lakes Commission**



Collaborative Communications

www.invasivemusselcollaborative.net

Email list-serv

invasivemussels@great-lakes.net

Webinar Series

- Approaches to Watercraft Inspection and Decontamination Programs
- Methods and Protocols for Decontaminating Field Gear and Equipment
- Management Options for Irrigation Systems
- Exploration of HABs and Invasive Mussel Interactions
- Case Studies in Integrated Pest Management
- Developing Innovative Control Technologies
- Zebra Mussel Control in Lake Winnipeg
- Case Studies in Zebra and Quagga Mussel Control for Inland Waterbodies
- Lessons learned from open-water applications and field trials of Zequanox®



Invasive Mussel Collaborative

ABOUT MUSSEL FACTS PREVENTION MANAGEMENT RESEARCH MORE CONTACT AN EXPERT

Research and Literature

The Invasive Mussel Collaborative works to collect publicly available scientific information about invasive zebra and quagga mussels. Available literature is organized by topic and can be accessed using the drop down menu from the Research tab above.

NEW! If you are someone that is or has been involved in research related to zebra and quagga mussels, the Invasive Mussel Collaborative would like to know about your research. The Collaborative is distributing a short (6 question) questionnaire to collect information about your dreissenid mussel research, past, present and future. **The Collaborative is asking for responses to the questionnaire by Friday, November 3. [Click here to access the questionnaire](#).**

The purpose of collecting this information is to facilitate collaboration and improved information-sharing and coordination of research efforts. Once compiled, the information will be made available on the Invasive Mussel Collaborative website, and used to inform future research and management priorities for dreissenid mussels.

Is your research effort missing from our website? Submit your research project or paper using our simple online form! Publications and research projects will be used by the IMC science team to advance the goals of the collaborative and be posted on our website as a resource for the invasive mussel community.


[SUBMIT A RESEARCH PROJECT](#) [SUBMIT A PUBLICATION](#)


Share your research!

Respond to our research coordination questionnaire (Deadline is Nov. 3)

Add information about your project or a publication to our library (ongoing)






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Researchers and Managers

Prevention and Response Planning

- [Quagga/Zebra Mussel Infestation Prevention and Response Planning Guide](#) (National Park Service)
- [Zebra and Quagga Mussel Early Detection and Rapid Response Plan for British Columbia](#)
- [California Quagga and Zebra Mussel Infestation Prevention Program](#)
- [Upper Colorado Region Prevention and Rapid Response Plan for Dreissenid Mussels](#)
- [Columbia River Basin Interagency Invasive Species Response Plan: Zebra Mussels and Other Dreissenid Species](#) (Columbia River Basin Team, 100th Meridian Initiative)
- [Oregon Dreissenid Mussel Rapid Response Plan](#)
- [Washington Dreissenid Mussel Rapid Response Plan](#)
- [Invasive Mussel Prevention Framework for Western Canada](#)

Decontamination Methods for Sampling Activities and Fieldwork

Scientific researchers and resource managers undertake a variety of activities targeting invasive mussels in the field. While work in the field is integral to containing the spread of mussels and informing future management decisions and activities, prevention is equally as necessary for researchers and managers as it is for any other water body user. Fieldwork and prevention activities must always be compliant with relevant state, provincial, and federal protocols and

Events

Webinar: Approaches to Watercraft Inspection and Decontamination Programs (no. 2)

Recorded October 12, 2017
2:00-3:30pm ET
[Read More](#)

Webinar: Approaches to Watercraft Inspection and Decontamination Programs (no. 1)

Recorded July 24, 2017
11:00am-12:30pm EDT
[Read More](#)

[VIEW ALL](#)

Decontamination Methods for Sampling Activities and Fieldwork



Invasive Mussel Collaborative

Preventing the Spread of Invasive Zebra and Quagga Mussels:
A Reference Guide for Methods of Decontaminating Gear and Equipment

Remember to Clean, Drain and Dry!

When working on the water, take the following preventative measures before moving to a new water body:

- Inspect and clean off any visible aquatic plants, animals, and mud from all equipment before leaving water access.
- Drain motor, bilge, livewell, and other water containing devices before leaving water access.
- Dry everything for five days or more or wipe with a towel before reuse.

In situations where it is possible and/or necessary to disinfect watercraft and gear, the table below summarizes available options for the treatment of zebra and quagga mussels. Undertake decontamination efforts only after surfaces are visibly clean, drained, and dry.

- Not all methods are appropriate or feasible for all gear types and/or all situations.
- State and local agencies may recommend, require, or permit specific methods of decontamination for specific gear types or locations.
- Some decontamination methods can be scaled to meet specific needs.
- States may regulate decontamination runoff as wastewater and additional action may be needed to properly dispose of runoff water.
- Surrounding plants and soils could be harmed if decontamination is done improperly.
- Know your local, state, and federal regulations before use of any of the methods.

This table is intended for reference use only. For more information, contact your state invasive species program (<https://invasivemusselcollaborative.net/contact-an-expert/>) or visit <http://invasivemusselcollaborative.net/prevention/>.

This table is intended for reference use only. The Invasive Mussel Collaborative does not endorse use of or recommend any specific product, method, or application. Always ensure that you are complying with local, state, and federal regulations before, after, and during decontamination.

Method	Preparation//Contact Time	Applications	Other Considerations
Hot water	260°C (140°F) // 10 seconds ^{1,2}	<ul style="list-style-type: none"> Surfaces of watercraft and trailers Motor flushing Sampling nets and equipment Wet suits, masks, snorkels, and fins Waders/boots Clothing 	Most self-serve car washes do not meet the temperature requirement. To verify that the hot water spray is effectively heating the contact area, a non-contact infrared thermometer can be used. Water loses approximately 15-20 degrees F per foot of distance when sprayed from a power nozzle; an increase in initial temperature can be used to account for this heat loss to the point of contact. Personal protective equipment (PPE) is needed to avoid burns.
Steam cleaning ³	Live steam from a steamer	<ul style="list-style-type: none"> Surfaces of watercraft and trailers Motor flushing Sampling nets and equipment Clothing 	High steam temperatures can melt bonds and adhesives. Inflatable PFDs, technical fabrics, and wader/boot seams can also be melted by steam. Quick strokes instead of lingering in one place with a steam cleaner will decrease the likelihood of causing damage to equipment. Read all manufacturer's guidelines to determine if steam will harm equipment.

¹ Comeau, S., Rainville, S., Baldwin, W., Austin, E., Gerstenberger, S., Cross, C., and W. H. Wong. 2011. 'Susceptibility of quagga mussels (*Dreissena rostriformis bugensis*) to hot-water sprays as a means of watercraft decontamination. *Biofouling* 27(3): 267-274.

² Morse, J.T. Assessing the effects of application time and temperature on the efficacy of hot-water sprays to mitigate fouling by *Dreissena polymorpha* (zebra mussels Pallas). *Biofouling* 25(7): 605-610.

³ Wisconsin Department of Natural Resources. Best management practices for boat, gear and equipment decontamination. 23 pp.

Last Updated: 04/03/2017



Common Language Agreement

- Establishes mission, goals, objectives, terminology

Develop and guide the implementation of a long-term adaptive strategy that establishes and prioritizes an agenda for developing effective dreissenid mussel control methods that can be applied at a variety of spatial scales and environments to suppress or eradicate dreissenid mussels and support the restoration of biodiversity, and ecosystem functions and services.

Developing a strategy for the Great Lakes

- Convened a subgroup of Collaborative members to develop the components of a draft strategy
- Common Language Agreement as foundation
- Other management plans as examples
- Focus on advancing control and management in GLB waters



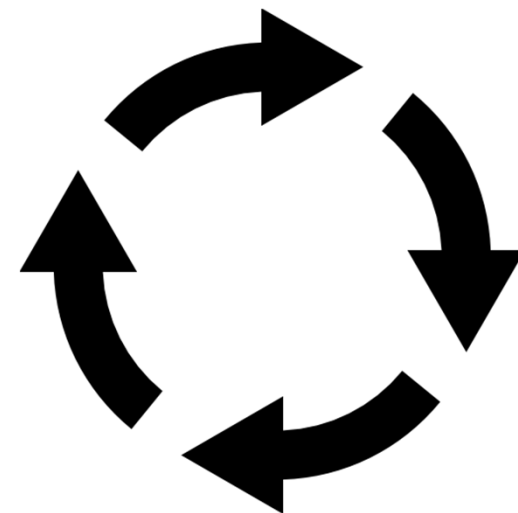
Terminology

<u>Control</u>	reduce an established population to a target level in order to minimize deleterious impacts and/or achieve a beneficial outcome
<u>Cost-benefit Analysis</u>	a systematic process for calculating and comparing benefits and costs of a project, decision, or policy
<u>Eradicate</u>	remove or eliminate all living organisms of an established population in a geographically defined area
<u>Establish(ed)</u>	a species with a self-sustaining population outside its native range
<u>Management</u>	any activity or suite of activities undertaken to achieve specified ecologic and/or economic outcomes
<u>Prevent(ion)</u>	preventing organisms from entering a pathway, and preventing organisms that are transported from being released or escaping alive
<u>Response</u>	any activity or suite of activities undertaken to stop establishment
<u>Suppress(ion)</u>	reduce an established population in order to minimize deleterious impacts and/or achieve a beneficial outcome



Next steps

- Review and revise!
- Finalize and share
- Implement and track progress
 - Inform, coordinate & prioritize ongoing research and management
 - Recognize that it may not be possible to fully realize the goals
 - Does not preclude ZQM prevention and management activities in other systems, but serves to complement those efforts





Invasive Mussel Collaborative

Connect With Us

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