

Management Strategies for Dreissenid Mussels

Results of a comprehensive scoping review and call for participation in understanding management challenges

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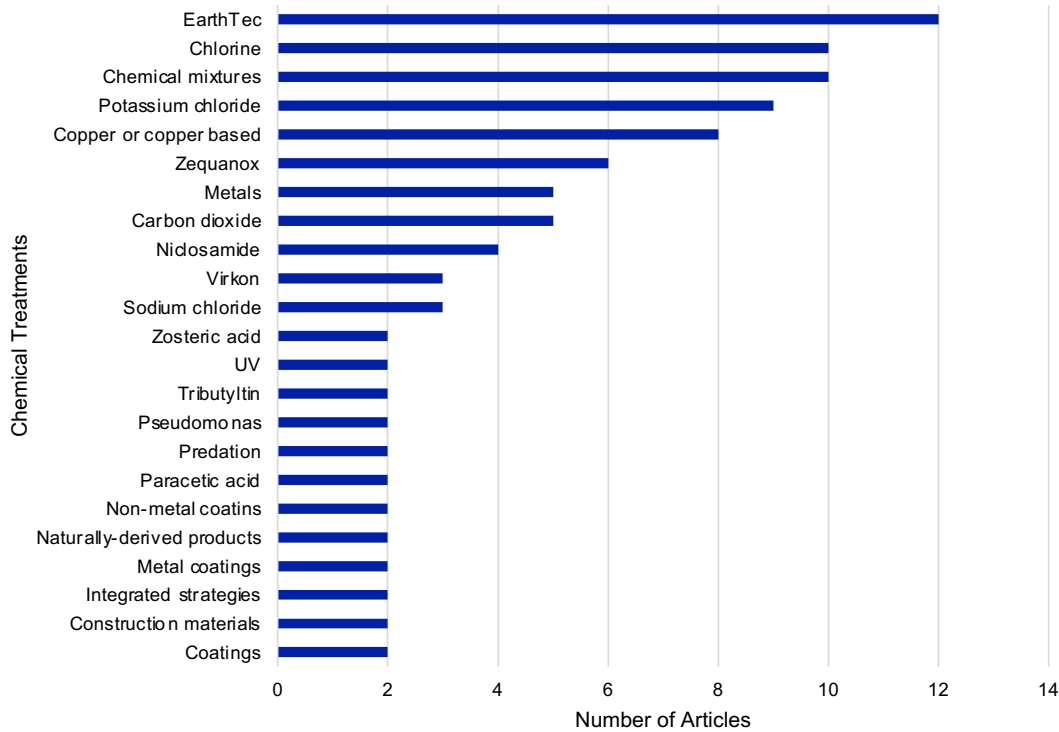
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Key points from scoping review

- Chemical control dominates the literature (81% of studies), while physical and biological strategies remain underdeveloped
- Efficacy varies with species (zebra vs. quagga), life stage, temperature, water chemistry, and exposure duration
- Temperature strongly modulates efficacy ($\uparrow T^\circ$ more effective)
- Field performance often underperforms lab success, and reinvasion is common
- Non-target risks remain a major constraint
- Integrated management approaches (chemical + physical + prevention) are essential for long-term success
- Integrated, life-stage-specific, temperature-aware strategies are promising
- Quagga mussels and ecosystem-scale impacts remain the biggest blind spots

Most studied strategies



Mixture	Outcome
EarthTec + Niclosamide / Clam-Trol	Additive or synergistic
KCl + Formalin	Reduced formalin dose needed but high non-target risk
Copper + Metals (Ag, Zn, Hg)	Antagonistic
Niclosamide + KCl / polyDADMAC	Antagonistic
Heat + Chemicals	Strong enhancement of efficacy
CO ₂ + physical treatments	Promising but underexplored

Physical	Biological
Thermal (hot water, steam, flame)	Bacterial – <i>P. fluorescens</i>
Antifouling coatings	Predation (redeer sunfish, crabs)
Benthic barriers	
Filtration	

Knowledge gaps

Additional Mixture Studies

- Integration of bioavailability modeling

Episodic Exposure Scenarios

- Varying exposure duration and frequency with periods of recovery

Non-target and ecosystem-level impacts

- Very few long-term or community-scale studies

Field-scale and long-term efficacy

- Most work remains lab-based
- Reinvasion and recolonization poorly quantified
- Limited data on durability of coatings and barriers beyond 1 year

Quagga mussel-specific responses

- Zebra mussels still dominate the literature

Life-stage optimized management

Integrated treatment frameworks

- Almost no formal testing of multi-tool adaptive management strategies (chemical + physical + seasonal timing + monitoring)

Water chemistry interactions

Social, regulatory, and economic feasibility

- Cost-benefit analyses, adoption, or stakeholder evaluations

Biological control expansion

- Predators, pathogens, parasites, and genetic/behavioral interventions

Next step

**Stakeholder Practices,
Perceptions, and
Adoption**

Voluntary Participation

Your participation in this study is entirely voluntary. You may choose not to participate or withdraw at any time.

Purpose of the Study

This study is conducted through the University of Florida in collaboration with the U.S. Army Corps of Engineers. This study aims to assess current practices, impacts, and challenges in the control and management of invasive dreissenid mussels. The findings will help inform future research to optimize and improve control strategies.

What You Will Do

If you choose to participate, you will complete an online survey (via Qualtrics). Topics include current dreissenid mussel impacts in your area, current management strategies, monitoring practices, and perceived effectiveness of control strategies. We are also interested in challenges to management within your area (e.g. environmental compliance issues)

Risks

There are no anticipated risks associated with participating in this study. Your responses will remain confidential. No personal identifying information will be collected or linked to your survey responses. Data will be securely stored and deleted after study completion. You may optionally provide your email address if you are interested in future collaboration (e.g., field trials, supplying organisms); however, this information will be stored separately and will not be connected to your survey responses.

Benefits and Compensation

While there is no financial compensation for participation, your responses will be extremely valuable for directing future research to help improve ZQ mussel management

Sign Up

<https://forms.osi.apps.mil/r/9PfY5K6pC2>



THANK YOU!
Questions?