

## Research Update

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### Bottom Line

This research study determined the lethal dosage of muriate of potash for *dreissenid* mussel eradication in San Justo Reservoir water in California. The dosage trials accounted for the final treatment conditions, including water delivery needs and seasonal water quality. The data obtained will facilitate planning for the full reservoir treatment.

### Better, Faster, Cheaper

*Dreissenid* mussels in the Western United States are highly invasive. The shell debris causes clogging in water delivery facilities, disrupts the ecosystem, and causes an increase in aquatic weeds captured on trashracks. Successful mussel eradication will reduce the increased operation and maintenance in systems where mussels have colonized.

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## Eradicating Mussels at San Justo Reservoir

*Muriate of potash proof-of-concept testing and evaluating 100 percent mortality dosages, incorporating water quality and temperature variables*

### Problem

Invasive quagga and zebra (*dreissenid*) mussels pose a significant threat to the costs of operation and maintenance of Reclamation dams, powerplants, pumping plants, and other water infrastructure. Starting in January 2007, adult quagga mussels appeared in Lake Mead (Arizona/Nevada) and have since fully infested the lower Colorado River as well as Reclamation's Hoover, Parker, and Davis Dams and associated powerplants. This has necessitated significant protective technology installation and increased the maintenance activities needed to keep mussels from clogging critical piped systems, including the systems that cool generator bearings for hydroelectric turbines.

In early 2008, adult zebra mussels were discovered in San Justo Reservoir (California), which has now become heavily infested. The zebra mussels pose a significant threat to the reservoir's ecology and the ability to effectively operate the reservoir. Thus, collaborating personnel from Reclamation's Mid-Pacific Region, the California Department of Fish and Game, San Benito County, and San Benito County Water District are proposing an attempt to eradicate the zebra mussels by treating the reservoir with potassium provided in the form of muriate of potash. This may be an effective control measure for other Reclamation locations and, thereby, significantly reduce the operation and maintenance costs incurred due to invasive mussels.



*Treating mussels in a Mason jar with muriate of potash.*

## Solution

Reclamation continues to research effective control methods for invasive quagga and zebra mussels. Previous work, such as the successful mussel eradication at Millbrook Quarry (Virginia), established that water treated with muriate of potash at 100 parts per million potassium can be lethal to mussels.

This Reclamation Science and Technology Program research study determined the lethal dosage of muriate of potash for *dreissenid* mussel eradication in San Justo Reservoir. This research study also conducted proof-of-concept testing for a muriate of potash treatment to kill zebra mussels at San Justo Reservoir, and to provide data to help refine the final eradication plan.

## Application and Results

Muriate of potash is not a labeled treatment for the control of invasive mussels, yet it has been demonstrated to be an effective control for mussels. The efficacy is dependent upon the temperature and water quality in which the invasive mussels reside. This “proof-of-concept” study and testing allows management to plan for the future San Justo Reservoir treatment for the eradication of zebra mussels.

The research and testing was conducted in a small building onsite at San Justo Reservoir, using both mussels and water found at the site. The testing produced good data, demonstrating clear dose response curves. The results of this research study will be published in a peer reviewed journal.

## Future Plans

A full reservoir treatment, in an attempt to eradicate the zebra mussels from San Justo Reservoir, will be implemented when funding for the effort is obtained.

***“This research study demonstrated that treatment with muriate of potash in proper doses for [final treatment] conditions should be effective at San Justo Reservoir.”***

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## Collaborators

- Reclamation’s Mid-Pacific Region
- California Department of Fish and Game
- San Benito County, California
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## More Information

[www.usbr.gov/research/projects/detail.cfm?id=1610](http://www.usbr.gov/research/projects/detail.cfm?id=1610)

[www.usbr.gov/research/projects/researcher.cfm?id=1256](http://www.usbr.gov/research/projects/researcher.cfm?id=1256)