

RECLAMATION

Managing Water in the West

Patterns of genetic structure among southwestern populations of the invasive quagga mussel (*Dreissena bugensis*) in the United States

Research and Development Office
Science and Technology Program
Final Report ST-2016-6712-1



U.S. Department of the Interior
Bureau of Reclamation
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Mission Statements

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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14. ABSTRACT Large populations of invasive quagga mussels (<i>Dreissena rostriformis bugensis</i> , Andrusov, 1897) are present in reservoirs along the lower Colorado River. These reservoirs have unique water quality characteristics which raised questions about the extent of gene flow and genetic divergence among those populations. In this study, we examined the neutral genetic structure among six populations from different reservoirs along the Colorado River in the southwestern United States. Individual quagga mussels were genotyped at 10 microsatellite DNA loci to analyze patterns of genetic diversity and population structure. Overall genetic divergence among the populations was negligible and populations at a single reservoir were not significantly genetically differentiated from the group. Some population pairings did exhibit significant, if slight, genetic differentiation, and there was a moderate pattern of isolation-by-distance.		

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Executive Summary

Large populations of invasive quagga mussels (*Dreissena rostriformis bugensis*, Andrusov, 1897) are present in reservoirs along the lower Colorado River. These reservoirs have unique water quality characteristics which raised questions about the extent of gene flow and genetic divergence among those populations. In this study, we examined the neutral genetic structure among six populations from different reservoirs along the Colorado River in the southwestern United States. Individual quagga mussels were genotyped at 10 microsatellite DNA loci to analyze patterns of genetic diversity and population structure. Overall genetic divergence among the populations was negligible and populations at a single reservoir were not significantly genetically differentiated from the group. Some population pairings did exhibit significant, if slight, genetic differentiation, and there was a moderate pattern of isolation-by-distance. Observed morphological differences at some reservoirs are likely an environmental effect separate from heritable genetics. If significant environmental selective pressures are present they do not appear to have been strong enough to result in observable genetic bottlenecks over the relatively short time scale of the quagga mussel invasion of Colorado River

Main Report

A manuscript containing pertinent data and results pertaining to patterns of genetic structure among southwestern populations of the invasive quagga mussel (*Dreissena bugensis*) in the United States has been finalized through Reclamation peer review and submitted to a refereed journal. The principal investigator of this work will update this section to include the submitted manuscript once the journal peer review process has been resolved and information is ready for public dissemination.

Appendix

A manuscript containing pertinent data and results pertaining to patterns of genetic structure among southwestern populations of the invasive quagga mussel (*Dreissena bugensis*) in the United States has been finalized through Reclamation peer review and submitted to a refereed journal. The principal investigator of this work will update this section to include the submitted manuscript once the journal peer review process has been resolved and information is ready for public dissemination.

Data Sets that support the final report

If there are any data sets with your research, please note:

- Share Drive folder name and path where data are stored: Team (//bor/do) (T:), ENGR LAB, HYDLAB, RDLES, MUSSEL SAMPLES, 2015, 2015 Prop C, Microsatellite project
- Point of Contact name, email and phone: Sherri Pucherelli, spucherelli@usbr.gov, 303-445-2015
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