

Zebra & Quagga Mussel Research Program

RESEARCH NOTE

Field Evaluation of Coatings to Deter Attachment of Quagga Mussels

Background

Several coatings have been identified that appear to help prevent attachment of mussels. The effectiveness of coating materials for preventing zebra and quagga mussel attachment is of interest for a wide range of applications across Reclamation. Infrastructure that is most vulnerable for reduction in flow capacities are trash racks, intake grates, and small diameter pipe.

The study began in May 2008 at Parker Dam and involved 20 different coatings to deter the attachment of mussels. After 7 months of exposure, 16 coatings were eliminated from the study due to moderate to heavy fouling. Four coatings have been identified that may prevent attachment of mussels. Figure 1 shows the effectiveness of some coatings to deter attachment. Further studies are needed to fully evaluate the coatings for durability and obtain projected service life information.



Figure 1. – Uncoated steel grate after 7 months (left). Non-toxic foul release coated steel grate (right).

Project Description

Parker Dam was chosen for the test site because it is heavily infested with quagga mussels exhibiting rapid

growth rates. Panels were suspended from the dam face at a depth of approximately 50 ft for a duration of 7 months (May – December, 2008). Grates were suspended from the trash rack structure in flowing conditions. Following this 7-month initial test period the panels and grates were retrieved for inspection.

Preliminary Findings

There was an array of different fouling rates, with some substrates showing complete coverage while other substrates had no mussel attachment. Test specimens were removed from the study if there was moderate or heavy fouling. The coatings remaining in the study had minimal or no fouling. Two of the remaining coating systems are antifouling and the other two are foul-release.

Figure 2 shows the contrast of fouling that was observed between the grates exposed to considerable flow and plates exposed to minimal flow.



Figure 2. Flame sprayed zinc metalizing contrast between plates (minimal flowing conditions) and grates (flowing conditions).

Future Work

Currently, we plan to continue the study evaluating the 4 coatings that remain. We also plan to evaluate these 4 products using the ASTM testing procedures to determine the durability and estimate the service life. Also, the program should be scaled up to apply products on actual trashracks under actual service conditions. In addition, other foul release technology, experimental coatings, and fluorinated polymers are being considered for evaluation.

Acknowledgements

Thanks to staff from Reclamation's Technical Service Center in Denver, CO including Principal Investigator Allen Skaja, PhD, Aaron Muehlberg, and Brandon Poos; LC Dams Office, Leonard Willett; and Parker Dam management & staff for providing access and support.

Further Program Information

Curt Brown, PhD
Director
Research & Development Office
cbrown@usbr.gov

Joe Kubitschek, PhD, PE
Program Manager
Technical Director - Engineering
jkubitschek@usbr.gov

Fred Nibling, MS
Program Coordinator
Technical Director – Biology
fnibling@usbr.gov