Silicone foul release coatings show promise to manage invasive mussels at water facilities

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The Bureau of Reclamation has found that silicone foul release coatings may be an important tool for mitigating invasive quagga and zebra mussels' impacts to water and hydropower infrastructure. Allen D. Skaja, Ph.D., PCS, of Reclamation's Technical Service Center tested more than 50 coatings and metal alloys over three years at Parker Dam on the Colorado River.

"The silicone foul release coatings were found to reduce the rate of mussel settlement, and any attached mussels were easy to remove," said Skaja. "In many cases, it was found water flowing at 0.1 feet per second provided sufficient force to remove mussel colonies."

Parker Dam provided an excellent field test site to evaluate coatings in still and flowing water because the quagga and zebra mussels infesting this location reproduce throughout the year and have a high growth rate.

The coatings and metal alloys tested can be divided into six broad categories: conventional epoxies (no fouling control), foul release coatings, antifouling coatings, fluorinated powdered coatings, metallic coatings and metal alloys.

The coatings were tested in still water and flowing water. For still water, three, 1-foot-square steel plates were tied on a nylon rope and lowered into water approximately 50 feet deep near the face of the dam. For the flowing conditions, one 18-inch by 24-inch coated floor grate with 1-inch spacing was suspended 40 feet below the water surface

downstream from the forebay trashrack structure.

One problem with silicone foul release coatings is they are not that durable. Initial research found the silicone foul release coatings were soft and were easily damaged by floating debris or mechanical abrasion, such as a trash rack being cleaned. Further research is already underway to find a silicone foul release technology that will meet the abuse coatings on facilities must take.

Provided by Bureau of Reclamation