

## **Invasive Quagga and Zebra Mussels**

Quagga mussels, an invasive aquatic species, were discovered in Nevada's Lake Mead in 2007, and later throughout its lower basin. This was the first discovery west of the Continental Divide. Subsequent surveys found populations in Southern California reservoirs that receive raw water from the Colorado River. Currently the Colorado River, Colorado River Aqueduct and 20 reservoirs in Southern California are infested with quagga mussels, and one reservoir in central California is infested by the similar zebra mussel. The source of this introduction remains unknown.

The environmental and economic impacts caused by zebra and quagga mussels are profound. When established, these mussels alter ecological processes, and negatively affect threatened and endangered species, recreational and commercial fisheries, and recreational activities. A recent study on zebra mussels in the eastern United States estimates \$268 million in zebra mussel-related impacts just to drinking water and power plant facilities from 1989 to 2004. An infestation into California's extensive waterways and water distribution system could have drastic results. If introduced into the State Water Project or Central Valley Project, the mussels could affect all submerged components and conduits of this water delivery system, including fish passage facilities, raw water distribution systems, irrigation, power plant cooling systems, hydroelectric facilities and agriculture operations. The loss of recreational activities and their accompanying contributions to local economies could be devastating.

As the state lead for this issue, the Department of Fish and Game (DFG) coordinates the activities of state, federal and local agencies. The first line of defense is prevention and control with an emphasis on public education and outreach. DFG works closely with the Department of Food and Agriculture to ensure boats entering California are inspected for mussels and cleaned if necessary, and assists local water agencies in developing containment plans for infested waters and prevention plans for uninfested waters. DFG game wardens inspect vessels for compliance and created a K-9 detection program for both types of mussels. The program, now 20 dog teams strong, was the first in the world use dogs for mussel detection. Throughout the state DFG monitors for new mussel populations and provides laboratory services to assist monitoring efforts by local water agencies.

DFG is maximizing all resources currently available, yet various stakeholder groups and local agencies consider funding for the program inadequate to fully address this issue. Additional monitoring is needed for comprehensive early detection of new populations, inspection/cleaning stations are needed at select infested reservoirs, and research is needed to determine vulnerability of sensitive habitat areas and identify potential control methods. DFG, in conjunction with local, state and federal agencies, environmental and recreational groups and water districts, continues its public awareness campaign, waterway monitoring and research, and is working to develop federal funding sources to enhance these current efforts.