

Glen Canyon Rainbow Bridge

National Park Service
U.S. Department of the Interior

Glen Canyon National Recreation Area
Rainbow Bridge National Monument



PREVENTING INVASIVE MUSSELS at Glen Canyon National Recreation Area

Interdiction

Screening is required for every vessel that arrives at Lake Powell to ensure that high-risk vessels are identified and do not launch without inspection.

Vessels that are determined to be high risk are inspected and, if necessary, decontaminated before being allowed to launch.



All vehicles with watercraft trailers must display a "MUSSEL FREE" certificate on the dashboard. Certificates are issued once the vessel has been confirmed a non-threat.

- Strong enforcement
- Thousands of decontaminations
- Dozens of vessels with mussels stopped
- Hundreds of samples show no mussels in most of lake

Number of Vessel Inspections

2005 – 45	2009 – 8700
2006 – 45	2010 – 15000
2007 – 500	2011 – 17000
2008 – 1200	2012 – 20000+

Education

An educated boating community is the best defense against spreading Zebra and Quagga mussels.

Signs are used at entrance booths, inspection stations, and launch ramps to inform visitors of new requirements.

Glen Canyon uses a variety of media and interpretive outlets in educational and outreach efforts

Glen Canyon participates in boat shows, public awareness days, service learning projects, and promotes partnerships with the Stop Aquatic Hitchhikers campaign.



Monitoring

Lake Powell is extensively monitored using plankton samples and artificial substrates for early detection of larvae and settling mussels.



Plankton samples are processed by NPS staff in the Glen Canyon Lake Powell Water Laboratory.

Monitoring Results

Year	Samples	Larvae	DNA
2008	48	0	0
2009	91	0	0
2010	127	0	0
2011	213	0	0
2012	220	4	2

Updated 20 Oct 2012

Management

Glen Canyon organized the Lake Powell Invasive Mussel Prevention Coordination Group, which includes approximately 20 local, state, and federal organizations.

Glen Canyon provides training opportunities for NPS, state, and concessioner staff to ensure quality inspection and decontamination services and general public information.

Glen Canyon provides support to concessioner services and other commercial outlets, which has resulted in external ownership of the overall prevention program.



Prevention of Zebra and Quagga Mussels at Glen Canyon National Recreation Area

Mussel Impacts Can Be Severe - Zebra and Quagga mussel infestations could severely impact everything that visitors value about Lake Powell including facilities, fishing, boating, and beaches.

Monitoring and Prevention Works!

- Less than 1% of inland lakes in the state of Minnesota have become infested, despite being on the front line at the Great Lakes for decades.
- St. Croix National Scenic Riverway is infested but has taken successful steps to limit the extent of the infestation and protect native mussels.
- No signs of mussels can be found in most of the lake; results near the dam are being investigated.

Timeline

- 1998:** Scientists predict Lake Powell will be the first western body of water infested with zebra or Quagga mussels.
- 2000:** Glen Canyon National Recreation Area (NRA) begins screening visitor boats .
- 2002:** The first documented boat with adult zebra mussels attached is found and decontaminated at Lake Powell.
- 2003:** Glen Canyon NRA requires any vessels coming from Quagga or Zebra mussel infested waters within 30 days to be decontaminated before launching in Lake Powell. (Decontaminations become mandatory).
- 2005:** *Lake Mead becomes infested with Quagga mussels that will not be discovered until 2007.*
- 2008:** High-risk vessels are required to report directly to the decontamination facility.
- 2009:** Launch hour restrictions. No self-certification at major marinas. Full quarantines of contaminated vessels when warranted. All vessels screened. Eleven watercraft with mussels attached were stopped from entering Lake Powell.
- 2010:** 15,000 vessel inspections - 5,000 decontaminations - 14 vessels with mussels attached stopped from launching.
- 2011:** 17,000 vessel inspections - 4,000 decontaminations - 16 vessels with adult mussels stopped.
- 2012:** 20,000+ inspections, over 20,000 decontaminations - 38 vessels with mussels stopped. Monitoring results indicate potential mussels near the dam and Antelope Point.

Future Prevention Program

Aquatic Invasive Species (AIS) are any form of life that traditionally has not been native to particular waterways; it is an old problem that is much bigger than Zebra and Quagga mussels. Many AIS have already been introduced to Glen Canyon NRA, but even more threaten. Prevention efforts developed against mussels is effective for most AIS, including a large bucket of living Eurasian water milfoil in 2009. Glen Canyon is working to carry this successful program into the future, continuing to protect the park from Zebra and Quagga mussels and all AIS threats, indefinitely.

A NOTE ON INEVITABILITY AT LAKE POWELL

Mussel prevention efforts are commonly hampered by apathy, borne out of sense of inevitability. Numerous examples show that AIS spread is not inevitable. Downstream transport of zebra mussel veligers (larvae) in highly sediment laden rivers like the Colorado and San Juan has never been demonstrated. Inflow areas of Lake Powell are not well-suited habitat for mussels. It only takes one infested boat, but not every infested boat will successfully spread mussels. Veligers transported in boats or downstream (in small numbers) to uninfested waters must get a little lucky to start a new population because reproduction is only successful for adult male and female mussels within inches of each other. Every year that even just a part of a water body goes without mussels is valuable. Every year is closer to having better tools available to deal with (or even eradicate) infestations.

Every year and every place mussel free is NPS Mission accomplished!