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# Glen Canyon Frequently Asked Questions: Mussel Monitoring Update for Lake Powell 1/14/2014

## 1. What is the current status of quagga mussels in Lake Powell?

Mussel larvae (veligers) were first confirmed in October 2012. Adult quagga mussels were first reported in March 2013 when a local marine services business discovered 4 adult mussels on a boat that had been pulled for service. As of January 2014, approximately 1,300 adult mussels have been found and removed from Lake Powell. To date, no mussels or veligers have been found uplake of Navajo Canyon. Recent water sampling results have detected additional veligers in the lake and indicate mussel reproduction.

## 2. How many adult mussels have been found?

As of January 2014, approximately 1,300 adult mussels have been found and removed from Lake Powell. Approximately 300 mussels have been removed from Wahweap Marina, 200 from Antelope Point Marina, and 800 from the Anchovy Point area.

## 3. Where have adult mussels been found?

Adult mussels have been found on moored boats and marina structures at Wahweap and Antelope Point Marinas. In addition, adult mussels have been found near the mouth of Wahweap Bay and on a fixed wheel gate on Glen Canyon Dam. All mussels found have been removed.

## 4. Where has the highest concentration of mussels been found?

NPS divers found and removed approximately 800 mussels on the canyon walls near Anchovy Point, with the highest concentration located between 40 and 60 feet down from the current lake elevation of 3587 feet.

## 5. How far uplake have mussels been found?

As of January 2014 no mussels have been found uplake of Navajo Canyon.

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**6. What other indications of mussels have been found?**

Mussel larvae (veligers) have been identified in recent water samples. The highest concentration of veligers in Lake Powell is about 0.02 veligers per liter of water taken near Glen Canyon dam. In comparison, water samples from Lake Mead never get below 30 veligers per liter of water and are usually much higher. The numbers of veligers in Lake Powell water samples represent an early detection.

**7. How could mussels have gotten into the lake?**

Mussels and veligers were likely brought in on boats that had been used in infested waters.

**8. What are the next steps?**

NPS will continue to work with partners to investigate the extent of mussels in Lake Powell. We expect to find additional adult mussels. With an understanding of the location and densities of mussels, strategies for control can be investigated. Control efforts in 2013 included a four day multiagency quagga mussel blitz which involved 35 divers and 65 support staff and resulted in the removal of 235 mussels.

**9. What control strategies exist?**

Control strategies do exist for many aquatic invasive species. The Quagga-Zebra Mussel Management Plan (QZMP) will evaluate potential control actions for Lake Powell to determine what approaches for treating quagga mussels may be appropriate at Glen Canyon.

**10. Why are boat inspections and/or decontaminations still required prior to launching?**

Although quagga mussels have been found in Lake Powell, the low numbers suggest an early detection stage and control strategies may be successful in containing the population. Continuing mussel prevention activities, including boat inspections, will minimize the chances that mussels will colonize other areas of the lake. It may also prevent the introduction of other aquatic invasive species.

**11. What happens to boats found to be contaminated when entering Lake Powell?**

The same prevention efforts will remain in place as they have in previous years. All incoming vessels are screened to determine their risk to Lake Powell and are inspected, decontaminated, or quarantined if necessary.

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**12. What are the requirements for decontamination when leaving Lake Powell?**

Arizona and Utah state law require you to clean, drain, and dry your boat when leaving Lake Powell using self-decontamination procedures. Additional steps are required if you will be launching on other waters without a significant drying period or if you are on Lake Powell for more than 5 days. The regulations vary depending on the state. All boaters should review the regulations of Utah and/or Arizona as well as the regulations of any other states they will enter with their watercraft after being at Lake Powell.

At this time, Glen Canyon National Recreation Area does not have the resources to offer professional decontamination services for boats leaving Lake Powell. If you are exiting the park into Utah and plan to visit another water body immediately, you may contact the Utah Division of Wildlife to find a decontamination unit: <http://wildlife.utah.gov/decontaminate/63-invasive-species/mussels/455-decon-units.html>.

**13. What effect will mussels in Lake Powell have on the Colorado River below the dam?**

These detections are so low that no effect is expected at this time. If a large infestation of quagga mussels developed in Lake Powell, large numbers of mussel larvae might travel through the dam. The larvae that survived would seek to attach in low flow areas. It is not known if they could reach high numbers. The canals of the Central Arizona Project has not yet developed large populations of mussels despite larvae being delivered from the Lower Colorado River.

**14. What has the NPS done to stop mussels at Lake Powell?**

The NPS has operated a mussel prevention program at Lake Powell since 2000. Over a decade ago, scientists predicted that Lake Powell would be the first lake in the western U.S. to get mussels. The number of high-risk boats coming to the park has increased exponentially in that time. Prior to 2007 and the discovery of mussels in the west, Lake Powell was threatened by about 50 high-risk boats per year from eastern states. In 2011 alone, that number was 17,000. 38 boats with mussels were stopped from launching in 2012, over twice the number in 2011. The increased pressure has required the park to screen boats to determine the highest risks and focus our limited capability where it was needed most.

**15. How is the NPS monitoring for mussels at Lake Powell?**

Lake Powell is intensively monitored for mussels with hundreds of samples each year. The NPS uses 4 early detection methods, including microscopic analysis, automated particle analysis (FlowCAM), Polymerase Chain Reaction (the DNA test), and deployment of artificial substrates to detect early colonization. Sampling occurs lake-wide at routine sites like marinas and the dam; computers are also used to determine random sampling locations throughout the lake. More samples collected are from areas where there are the most boats.

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Using both routine and random sampling as well as multiple early detection methodologies is expected to increase the chances of very early detection.

## **16. What are the next steps for the Aquatic Invasive Species (AIS) program at Glen Canyon National Recreation Area?**

The park is entering into a public planning process to guide actions regarding the management of invasive mussels for the next 20 years. While the public planning process is ongoing, the AIS interdiction program will continue to operate as it has in the past. The public planning process is anticipated to continue into 2015. Glen Canyon will hold a series of open houses in February 2014 to provide opportunities for the public to find out more about the Quagga/Zebra Mussel Management Plan (QZMP). Open houses will be held in Page, AZ and Blanding, Escalante, Kanab, and Salt Lake City, UT. For more information, or to provide comments on the QZMP visit <http://parkplanning.nps.gov/qzmp>.

## **17. What can the public do to help?**

Clean, drain, and dry! The spread of mussels and other aquatic invasive species is preventable. Cooperate with prevention and containment program efforts at Lake Powell and other places where people are trying to protect their waters. Always make sure your vessels and equipment are not causing the problem. Spread the message, not the mussels. Your input is also requested to help develop the Quagga-Zebra Mussel Management Plan (QZMP). For more information, or to provide comments on the QZMP visit <http://parkplanning.nps.gov/qzmp>.