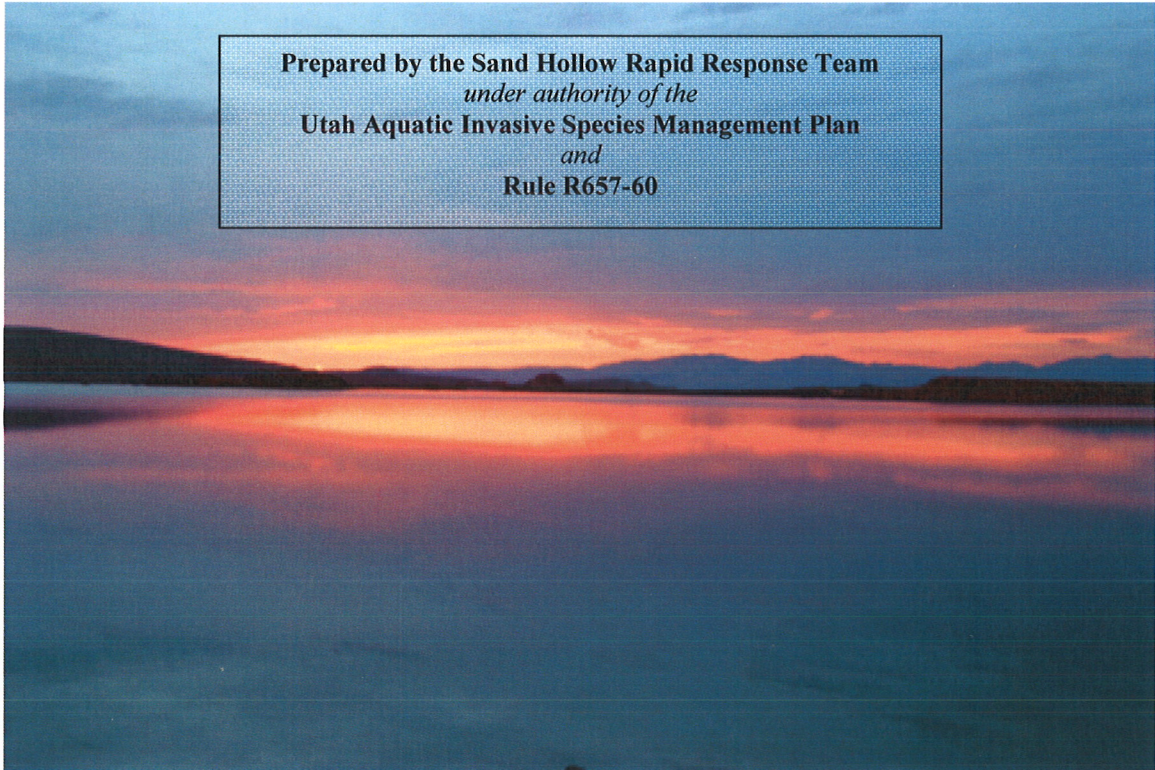



Control Plan

Sand Hollow Reservoir

Guidance for Management of an Infestation of *Dreissena* Mussels




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Date

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Background: A single live adult quagga mussel (*Dreissena bugensis*) was discovered in Sand Hollow Reservoir on May 21, 2010. Routine monitoring for *Dreissena* mussel veligers by Utah Division of Wildlife Resources (UDWR) and the Washington County Water Conservancy District (WCWCD) via cross-polarized and light lab microscopy of plankton samples during 2008 and 2009 showed no previous evidence for the mussels. *Dreissena* mussels are an aquatic invasive species that due to their explosive, uncontrollable populations have elicited national, regional, State of Utah, and local concerns relative to likely significant environmental and economical impacts.

Sand Hollow Reservoir is a 1,000 surface-acre reservoir located southwest of the City of Hurricane in Washington County, Utah. It is an off-stream impoundment with a maximum capacity of 50,000 acre-ft and receives water via a diversion from the Virgin River, which also fills Quail Creek Reservoir. Quail Creek Reservoir (590 surface acres, maximum capacity of 40,325 acre-ft) is located approximately 3 miles north of Sand Hollow Reservoir, and impounds water from Quail Creek and Leeds Creek as well as from Virgin River. The two reservoirs are connected by a pipeline which allows water to be transferred back and forth. Both reservoirs are owned and operated by the WCWCD, which provides municipal, industrial and agricultural water within Washington County. Utah Division of State Parks and Recreation (USP) operates a state park, encompassing Sand Hollow Reservoir and surrounding lands under agreement with the water conservancy district. And, UDWR is the state's wildlife authority, who manages the outstanding bass/blue gill fishery resource within the reservoir.

Authority: During 2008 UDWR impaneled the Utah Aquatic Invasive Species Task Force for the purpose of developing and implementing a Utah Aquatic Invasive Species Management Plan. The plan was ultimately approved in 2009 by the national Aquatic Nuisance Species Task Force under authority of the 1996 National Invasive Species Act. Additionally, the Utah Legislature in 2008 passed the Utah Aquatic Invasive Species Act (codified as Chapter 27 of Section 23 in the Utah Code) and the Utah Wildlife Board passed Rule R657-60, Aquatic Invasive Species Interdiction, to facilitate implementation of the Utah act.

The aforementioned federal and Utah acts, rule and plan all specify key considerations for a rapid response strategy to develop a control plan. The control plan is needed in the event of *Dreissena* mussels impacting a Utah water as follows:

1. To close or other wise regulate ingress and/or egress at a water body, facility or water supply system to terrestrial or aquatic vehicles and equipment capable of moving *Dreissena* species for protection of Utah from their spread; and
2. To maintain the closure and regulations until an acceptable control plan for containment and/or control of the *Dreissena* species is developed and implemented.

Immediately following discovery of the quagga mussel, a rapid response team for Sand Hollow was formed and met the next day and several other times to prepare this control plan. Walt Donaldson, Clay Perschon, Wayne Gustaveson, Richard Fridell, Larry Dalton, Scott Dalebout and Mark Ekins, all UDWR employees, served as consultants to the team.

Additionally, Fred Hayes, USP, and Mark Fuller, U.S. Fish and Wildlife Service, served as consultants. A “Closure Order” for the reservoir was immediately issued on May 22, 2010 by the Director of UDWR under authority of Rule R657-60 to control circumstances of continued boating. Then, the Utah Wildlife Board on June 10, 2010 listed Sand Hollow Reservoir as a *Dreissena* mussel “infested water” in Rule R657-60.

Control Plan Strategy: The following objectives outline a reasonable rapid response process for development of an aquatic invasive species (AIS) control plan for Sand Hollow Reservoir.

Control Plan Objective 1: Immediately verify a reported AIS detection.

Laura Melling, USP’s Sand Hollow Complex manager, was the first State of Utah point of contact when the suspect quagga mussel was discovered. Two scuba divers, working for WCWCD at the request of UDWR on an underwater mussel inspection due to a recent scare involving a quagga mussel on a State Park boat, discovered what was believed to be a live adult quagga mussel. It was reported to have been on the bottom side of one of two Sand Hollow Reservoir boat docks. The divers presented the suspect mussel to Michelle Deras, WCWCD biologist, and she presented it to Laura Melling, who then contacted Crystal Stock, UDWR aquatic invasive species biologist, to make an onsite visit to identify the mussel. Crystal Stock and her immediate supervisor, Richard Hepworth, responded and each agreed that the specimen was a quagga mussel based upon their visual observation. Crystal Stock preserved it in 70% ethanol, and immediately transported the mussel to UDWR’s Salt Lake City office, where Walt Donaldson, Aquatic Section Chief, concurred with the earlier visual identification. All of this occurred on May 21, 2010—the day of the discovery.

Digital photos of the mussel were circulated to other experts (David Britton, U.S. Fish and Wildlife Service at the University of Texas (Arlington); and Larry Dalton, UDWR, Salt Lake City, Utah), who also concurred that it was a quagga mussel.

The mussel was shipped to Pisces Molecular, Inc. in Boulder Colorado for molecular assessments, which verified on May 27, 2010 that the specimen was a quagga mussel. The molecular assessments used deoxyribonucleic acid (DNA) polymerase chain reaction (PCR) tests to assess nuclear ribosomal DNA (ITS1 zone) and mitochondrial DNA (COX1 zone) along with DNA sequences, comparing to the international genetic database—three independent tests, all of which were positive for quagga mussel.

Underwater searches by divers and plankton tows analyzed by cross-polarized and light microscopy on subsequent days to the initial discovery have shown no evidence of additional adult, juvenile or veligers (microscopic larval stage) *Dreissena* mussels.

Control Plan Objective 2: Upon verification for the presence of an AIS, and with concurrence of UDWR Director, immediately notify relevant natural resource managers (local natural resource managers, Utah’s AIS Task Force, and AIS

Coordinators in adjoining states), pulling appropriate technical personnel together as a “response team.”

Appropriate leadership employees within UDWR, USP, and WCWCD were all informed of the situation on the date of the discovery. Additionally, local elected officials were notified on May 22, 2010 about the Sand Hollow Reservoir situation. And, the Utah Aquatic Invasive Species Task Force and the Western Regional Panel for Aquatic Nuisance Species was informed of the situation on subsequent days, allowing them to prepare to protect their waters from boats that had used Sand Hollow Reservoir.

The Sand Hollow Reservoir Rapid Response Team met on May 22, 2010 to launch preparations for the rapid response effort to immediately take remedial action and begin to prepare a control plan. Additionally a “Closure Order” was issued that same day (May 22) by UDWR, facilitating appropriate management of departing boats, ensuring they were properly decontaminated in order to contain the infestation. Updates regarding the closure order are posted to UDWR’s web site every 10 days since the order was issued. Subsequent meeting of the Sand Hollow Rapid Response Team have occurred on May 25 and June 8, 2010; more meetings will occur into the future to steer management adjustments at Sand Hollow Reservoir and facilitate “best management practices” regarding *Dreissena* mussels.

Local, statewide and national media were advised about Sand Hollow Reservoir and invited to participate in news briefings, so the public would also become informed about the situation. Numerous media releases on television, radio and in newspapers resulted. Public response has been supportive and boaters are complying with requests to decontaminate their boats and other equipment.

Daily reports of boat interdiction and decontamination activity at Sand Hollow Reservoir are now a routine practice, and are being shared amongst the rapid response team.

The Utah Wildlife Board was apprised of the Sand Hollow issue and responded by listing it as an “infested water” in Rule R657-60 as an emergency action during their June 10, 2010 meeting. UDWR’s web site has been modified to show the closure order, Sand Hollow Reservoir’s infested status and the new rule.

Control Plan Objective 3: The response team immediately began surveys to define the extent of the *Dreissena* mussel infestation

Monitoring/survey efforts were already underway at Sand Hollow Reservoir and Quail Creek Reservoir by the WCWCD (Michelle Deras) and the UDWR (Crystal Stock) prior to the May 21 discovery. No upstream waters evidence *Dreissena* mussels. Historic surveys (2008 and 2009) have been negative for *Dreissena* mussels, and surveys will continue.

Following the finding, boat docks were pulled from the water at Sand Hollow Reservoir, inspected and cleaned on May 23 and 24, 2010. Artificial substrates at the main dam and

intake structure at Sand Hollow were inspected on May 24, 2010. Divers inspected all docks at Quail Creek Reservoir on May 25, 2010. A substrate monitoring line at Quail Creek Reservoir was also inspected on that date. Divers inspected the south dam intake and west wall at Quail Creek Reservoir on May 27, 2010. All sampling and inspections following the original discovery have been negative.

Starting in June 2010, the Sand Hollow rapid response team will begin surveys to determine the geographic extent and population demographics of juvenile/adult quagga mussels in Sand Hollow and possible populations at Quail Creek Reservoir. The initial surveys will serve to document the extent of the current infestation. Zooplankton surveys for veligers will continue following the initial sampling as part of the monitoring program identified in Objective 3 as follows:

UDWR

Virgin River

UDWR will evaluate potential monitoring activities that may be appropriate in conjunction with aquatic programs already underway for the native aquatic species under the Virgin River Program

Plankton Sampling

UDWR has provided WCWCD with the current plankton tow/veliger sampling protocol. Sand Hollow and Quail Creek reservoirs will be sampled monthly during the period when temperatures are suitable for mussel reproduction. Peak spawn occurs between 15-17 degrees Celsius and waters will not generally be sampled until temperatures reach 15 degrees. UDWR and WCWCD will share sampling responsibilities and coordinate to sample on alternating sampling dates. Samples will be split and shared between the two agencies.

Collection and analysis of plankton samples via microscopy will follow the U.S. Bureau of Reclamation's protocols. Positive finds will be submitted to Pisces Molecular for DNA assessment using PCR assessment of nuclear ribosomal DNA (ITS1 zone) and mitochondrial DNA (COX1 zone) and DNA sequencing to compare against the international genetic database.

WCWCD

Plankton Sampling

Sand Hollow Reservoir and Quail Creek Reservoir will be sampled monthly during the period when temperatures are suitable for mussel reproduction. UDWR and WCWCD will share sampling responsibilities and will coordinate to sample on alternating sampling dates. Samples will be split and shared between the two agencies. WCWCD will conduct its own microscopy. Suspected finds of *Dreissena* mussels will follow the aforementioned DNA protocols.

Artificial substrates

Artificial substrates at both Sand Hollow Reservoir and Quail Creek Reservoir intake areas and near boat docks will be inspected quarterly by WCWCD. Suspected finds of *Dreissena* mussels will follow the aforementioned DNA protocols.

Divers

WCWCD divers will inspect boat docks, dead-man lines, intake areas, quarterly at Sand Hollow Reservoir and Quail Creek Reservoir.

Other Infrastructure

Other infrastructure which may provide an opportunity for monitoring (Skyline Pond, water treatment plant, diversion points, valves, etc.) will be identified by WCWCD and an appropriate survey/monitoring regime will be implemented by the response team.

Control Plan Objective 4: As the extent of infestation is analyzed, set-up an appropriate command structure to guide response team activities for determining and implementing control methods for the AIS infestation.

On May 22, 2010 during the initial response team meeting, the Sand Hollow response team agreed that Douglas Messerly, UDWR, will act as incident commander, directing activities of the response team and coordinating assignment of resources.

Key incident command system concepts listed below will be applied to the command structure of the Sand Hollow Response Group.

- Each individual participating in the Sand Hollow response team will report to only one supervisor (incident commander). This eliminates the potential for individuals to receive conflicting orders from a variety of supervisors, increases accountability, improves information flow, and helps coordinate response efforts.
- The Sand Hollow response team will be based on a "first-on-scene" structure, where the first responder of a scene has charge of the scene until the incident has been declared resolved, or the incident commander arrives and assumes control.

Control Plan Objective 5: Establish internal and external communication systems.

Lynn Chamberlain, UDWR regional outreach manager, was assigned to coordinate internal and external communication, ensuring that proper media relations occur.

In the event of new AIS findings within the Sand Hollow drainage the Incident Commander and the response team will develop an information dissemination process to ensure consistent and effective communication to interested internal and external stakeholders, including agency and elected officials, the media and the public.

Outreach efforts associated with the rapid response strategy and control plan to date have included information in the print media, DWR website, television, and radio. Signs have been posted at the reservoir making the public aware that it is an infested water body and

their responsibilities as a boater to decontaminate. An electronic sign was used to inform boaters of mussel contamination and potential delays associated with decontamination procedures during the Memorial Day Weekend.

Control Plan Objective 6: Organize available resources (personnel, equipment, funds, etc.) to conduct a rapid response, and stand prepared to address issues associated with compliance for environment or other laws and permitting requirements.

The Incident Commander and the response team are collaborating to identify and secure sufficient resources to affect *Dreissena* mussel eradication, control and/or containment actions. The response team has recognized a need to comply with a broad array of local, state and federal laws and permitting processes.

At a minimum, a six-person team of seasonal Technician I positions and a Technician II supervisor may be assigned to Sand Hollow Reservoir (April thru October) as needed during the busy season. Specifics about staffing are still being worked out. Staff from response team agencies will coordinate to cover the slow season boaters. All will routinely provide a brief educational message about invasive mussels to individual boaters. Staff will intercept departing boats to encourage proper decontamination. Staff will also interdict arriving boats, conduct inspection and decontamination, as need. Due to Sand Hollow Reservoir's infested status, departing boats are the priority target in order to achieve containment. Volunteers have already been a valuable resource in the aforementioned processes and will continue to be used. Cost estimates for additional infrastructure support will be identified by the response team as alternatives are developed.

Alternative management strategies and potential funding resources are being assessed. Currently, funding primarily originates from UDWR's statewide AIS program, although USP and WCWCD also provide resources. An agreement between USP and UDWR is currently in place to provide funding for AIS technicians under USP supervision at Sand Hollow, Quail Creek and Gunlock reservoirs. The agreement can be amended as needed for the long-term management.

Control Plan Objective 7: Prevent Further Spread Using Quarantine and Pathway Management.

Notwithstanding the direct pipeline connection to Quail Creek Reservoir from Sand Hollow Reservoir, recreational boats are the primary pathway for potential movement of the *Dreissena* mussels to other waters. Already since the discovery of the quagga mussel and as compared to 2009, increased personnel resources (9 technicians and additional volunteers) and boat decontamination units (6 trailer-mounted units) have been put in place at Sand Hollow to interdict arriving boats and to contact departing boats, ensuring appropriate decontamination. AIS "alert" signs have been placed, and electronic signs notifying boaters about possible delays have already been utilized during the 2010 Memorial Day holiday period and will likely be used again in periods of high boat use.

New data to be gathered since discovery of the quagga mussel will be further used to identify risks by Sand Hollow Reservoir's boaters to other waters. Count data obtained for trailered-boat traffic passing the I-15 Port-of-Entry will also be reviewed, as well as any data available from 2009 AIS surveys on other Utah waters. A web-based survey (Survey Monkey) is being assessed as an additional method for gathering data to facilitate risk assessment.

Historical effort and boater use data for Sand Hollow Reservoir that was gathered during 2009 are of use to evaluate risk as follows:

1. Budget, Personnel & Equipment

- a. UDWR \$16,490 for 1 technician assigned March thru October (8 months).
- b. One \$13,400 decontamination unit purchased with UDWR funds in FY08.

2. Outreach

- a. Several media releases occurred on the radio and television and in local area newspapers.
- b. "Zap the Zebra" brochures as reminders about "Clean, Drain & Dry" and "Decontamination Certification Forms" were given to boaters at gate entrances to water bodies and at boat launches.
 - i. UDWR volunteers assisted.
- c. 1,362 boats were interdicted, inspected and educated.
 - i. Most (95%) were from Utah, but 4% were from Nevada; the remainder were from California (1%), Arizona (1%), Colorado (1%) and Montana (1%).
 - ii. 50% of their boats had been used within the last 30 days.
- d. 99.9% of boaters were aware of invasive mussel issues.

3. Decontaminations & Encrusted Boats

- a. Two boats were decontaminated; both were from Lake Mead.
- b. No boats were discovered encrusted with quagga or zebra mussels.

4. Boater History of Last Water Visited and Next Destination (1,362 interviews)

- a. Last Water Visited & Presumably Where They Will Return to
 - 1. Sand Hollow = 913 (67%)
 - 2. Quail Creek = 150
 - 3. Lake Powell = 95
 - 4. Utah Lake = 54
 - 5. New Boat Owners = 27
 - 6. Lake Mead = 27

Note: 67% of Sand Hollow Reservoir's boaters seem to frequently re-use Sand Hollow. And, Rockport, Gunlock, Minersville and Jordanelle reservoirs each represent 1% or less of the "Last Water Visited" for boaters at Sand Hollow Reservoir.

5. Assessment for Presence/Absence of *Dreissena veligers* via Plankton Samples

- a. Plankton samples were all sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.

6. Law Enforcement Efforts

- a. Regional Conservation Officers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written

warnings were given to boaters that were non-compliant with the self-certification process. No “Notice to Appear” in court citations were issued.

The aforementioned efforts have been increased and will continue, along with a focused outreach campaign, both statewide and local, making the public aware of *Dreissena* mussel issue and how they can help. A primary focus of the outreach campaign is to market the “clean, drain and dry” message, causing boaters to routinely decontaminate at the conclusion of every boating excursion.

Under authority of Utah Code § 23-27-303 and Utah Administrative Code R657-60-8, all conveyances and equipment that have been in or on the water at Sand Hollow Reservoir, including those in the past 30 days, are subject to the provisions in Utah Code § 23-27-201. This means any boat, vessel, personal watercraft, motor vehicle, trailer, or other article capable of carrying or containing a *Dreissena* mussel or water that exits Sand Hollow Reservoir or has been in or on the reservoir in the past 30 days must comply with decontamination requirements before transporting the conveyance or equipment or entering any other water body in the State of Utah. Nevertheless, decontamination is not required when a conveyance or equipment is removed from Sand Hollow Reservoir and subsequently re-enters the reservoir, provided the conveyance or equipment is inspected, drained, and cleaned as required in Utah Admin. Code R657-60-5 and is not placed in or on any other water body in the interim without first being decontaminated. Boats that have advantaged this opportunity have been marked for easy identification.

Decontamination must be completed in one of two ways:

Professional decontamination by using a professional decontamination service approved by the division to apply scalding water (140 degrees Fahrenheit) to completely wash the equipment or conveyance and flush any areas where water is held, including ballast tanks, bilges, live-wells, and motors (Note: a Decontamination Certification Form and a corresponding boat-to-trailer seal are oft times issued to a boater following a professional decontamination in order to identify they have been decontaminated and expedite their next launch.); or

Self-decontamination by: 1) removing all plants, fish, mussels and mud from the conveyance or equipment; 2) draining all water from the equipment or conveyance, including water held in ballast tanks, bilges, live-wells, and motors; and 3) drying the equipment or conveyance for no less than 7 days in June, July and August; 18 days in September, October, November, March, April and May; 30 days in December, January and February; or expose the equipment or conveyance to sub-freezing temperatures for 72 consecutive hours.

Restrictions on transporting or launching conveyances or equipment that have been in Sand Hollow Reservoir may also be imposed in other states. Boaters are advised to contact state authorities for further information before transporting a conveyance or equipment into that jurisdiction.

WCWCD provided maps and associated information to the response team regarding water management, distribution, and use within the Sand Hollow/Quail Creek Complex. Use of raw water within the system is being further assessed by WCWCD to reduce the probability of infesting Quail Creek Reservoir and other additional sites.

Several alternative management options continue to be reviewed by the response team regarding the restrictions on boating use at Sand Hollow Reservoir. At this point in time, a prohibition of water-based recreation (boating and angling) does not seem sound in light of likely local economic and bio-political impacts and other considerations. Some of the options being considered are as follows:

- Daily limits on the number of watercraft allowed on Sand Hollow;
- Educating/notifying boaters (ref: potential delays associated with required decontamination);
- Pre-scheduling of times for departure/decontamination;
- Closure of the south boat ramp;
- Risk assessment / triage by interviewers at launch ramp;
- Developing immediate onsite dry storage facilities for boats at the USP;
- Requiring boaters to be off the lake by 9 pm;
- Installing semi-permanent (\$65,000/unit) or permanent (\$250,000/unit) “recycling” wash facilities;
- Modify the Rule R657-60 and the Decontamination Certification Form to facilitate easier use by local repeat boaters;
- Adding a stipulation in Certificates of Registrations for bass tournaments at Sand Hollow that participants must be professionally decontaminated before leaving;
- Adjusting/developing washer locations to facilitate decontamination during low use times;
- Consider relevance and legality of site-specific professional decontamination protocols based on target species and life stages, that may be less intensive than generalized decontamination procedures; and
- Using private vendors to perform professional decontamination.
- Developing and implementing Hazard Analysis and Critical Control Point plans to ensure that private and local, state, tribal or federal government response personnel do not further spread the original infestation;

Many of these actions could also be used at Quail Creek Reservoir if quagga mussels are detected or infest that water.

Control Plan Objective 8: Apply available, relevant and legally defensible eradication, control and/or containment actions and implement mitigation.

Water management as a control--Potassium Chloride (KCl) is preferred for *Dreissena* mussel eradication to other chemical treatments because the other available chemicals can harm fish. Sand Hollow Reservoir is an outstanding bass/bluegill fishery, attracting attention by anglers across Utah and the nearby southwest region. KCl has been used in a zebra mussel (*Dreissena polymorpha*) eradication in the Millbrook Quarry, Virginia, where 100 ppm was maintained for 48 hours. This concentration and duration killed 100% of the zebra mussels in the quarry but did not harm the bass and bluegill which were present.

The cost of treating Sand Hollow Reservoir and Quail Creek Reservoir with KCl was estimated using information from small scale, precautionary KCl treatments in Utah during 2008. Estimates of the current price of KCl, and the average annual minimum pool at the two waters were based on a treatment concentration of 100mg KCl/liter of water and a KCl cost of .44/pound or \$119.60 per Acre Foot as follows:

<u>Water Body</u>	<u>Average annual minimum pool</u>	<u>KCL Cost</u>
Sand Hollow Res	28,000 acre ft	\$3,348,800
Quail Creek Res	14,000 acre ft	\$1,674,400

Treatment costs using KCL could be reduced by reducing water levels at the reservoirs. Estimated costs do not include the planning, environmental clearance, application and monitoring costs

Water management as a control--Quagga mussels can be eliminated from a reservoir by draining and drying for an extended period. This option was reviewed by the response team and determined to be unrealistic based upon cost, uncertainty of effectiveness, small water yield of the reservoir, associated long time to refill (6 years), and likelihood of re-infestation in the future.

Biological Controls—Managing Dreissena mussels with mussel-eating fish has not been shown to be effective. Several species, such as fresh water drum, sheep’s head, blue catfish and common carp, eat zebra mussels but don't significantly affect mussel populations. Due to the lack of evidence on the effectiveness of mussel-eating fish as biological controls they will not be considered as viable control options for this plan. The response team remains open-minded to new research that may address biological controls.

Research is currently underway on a common strain of bacteria (*Pseudomonas fluorescens*) that has shown promise when fed in its dead form as a biological control of zebra and quagga mussels. Marrone Bio Innovations in partnership with SePRO Corporation has developed a cultured strain with a trademark name of Zequanox, and in cooperation with the U.S. Bureau of Reclamation are currently seeking Environmental Protection Agency licensing for its emergency use. The response team will keep up to date on the ongoing research in order to decide if this product could one day be utilized as a biological control within the Sand Hollow/Quail Creek complex.

Use of chemical or biological controls will likely require significant planning, NEPA clearances and permits, along with resultant restoration or mitigation actions. The response team is cognizant of these facts, and will take action as appropriate.

Boat interdiction and decontamination—This method has been previously discussed in Objective 7.

Control Plan Objective 9: Institute Long-Term Monitoring.

Long-term monitoring will initially be a continuation of surveys and monitoring already underway by WCWCD and UDWR as described under Objective 3. The monitoring schedule may be reduced to a less intensive regime once the *Dreissena* population stabilizes, and population density, distribution, and age structure has been documented. Ongoing monitoring will be documented within this plan at the end of each boating season.

Control Plan Objective 10: Evaluate response effectiveness, modify the sand Hollow Control Plan as needed, and pursue long-term funding for *Dreissena* mussel management.

The response team can enhance long-term preparedness for responses to other AIS introductions through adaptive management by assuring feedback on the efficacy of response actions and the effectiveness of the Sand Hollow/Quail Creek Control Plan.

Summary and Future Management: The primary focus is control and containment of *Dreissena* mussels in the Sand Hollow/Quail Creek Reservoirs Complex under authority of this *Sand Hollow Control Plan* and Rule R657-60 as guided by the 2009 *Utah Aquatic Invasive Species Management Plan*. This plan, although developed for an infested water, continues a philosophy similar to that used in two prior control plans (*Red Fleet Reservoir Aquatic Invasive Species Control Plan* and *San Rafael Aquatic Invasive Species Control Plan*) for waters classified as “detected” in Utah. All of the control plans promote voluntary boater compliance to routinely decontaminate their boats as they disembark from a water body. Boaters are encouraged to use self-decontamination through “Clean, Drain & Dry.” This control plan facilitates return use by boaters to Sand Hollow Reservoir without them completing the full dry time. A “professional” decontamination option using scalding hot water (140⁰ F) to wash the boat inside and out, wash other wetted equipment, and flush the boat’s raw water circulation systems and is available for boaters who recreate too frequently to dry.

Questions about this plan or reports of *Dreissena* mussels or other AIS within the Sand Hollow/Quail Creek Reservoirs Complex should be directed to Crystal Stock (crystalstock@utah.gov).

The Sand Hollow Rapid Response Team continues to update this control plan as improved understanding of the situation is unveiled, and as scientists and others develop improved management methods. Thus, it is a “living document” intended to be regularly updated. The most current version of this approved control plan will be maintained on UDWR’s web site at http://wildlife.utah.gov/mussels/pdf/sand_hollow_control_plan.pdf.