Lake Mead National Recreation Area
Draft Quagga Mussel Initial Response Plan

Executive Summary

Quagga mussels, closely related to zebra mussels, were first discovered at Lake Mead National Recreation Area (Lake Mead NRA) on January 6, 2007, the first detection of this species in the western United States. These invasive freshwater mussels are expected to cause major impacts to biological resources, submerged cultural resources, marinas, water intakes, boats and recreational use in the Lower Colorado River System and, if spread, pose similar threats to other western waters. The National Park Service led a three month interagency initial response effort focused on assessment, containment, treatment, and long-term management of the quagga mussel infestation in Lakes Mead and Mohave. This effort culminated in an Initial Response Plan. When no treatment or eradication methods were found to be feasible at this time, the efforts focused on containment of spread to other watersheds. The highlights of the initial response effort include:

- Interagency planning at the local level with close coordination with concurrent upstream and downstream planning efforts as well as significant input from the scientific community
- Increased emphasis on the pre-existing invasive aquatic species prevention and early detection program
- Assessment and monitoring of adult and juvenile quagga mussel populations in Lakes Mead and Mohave
- Containment strategy focused on mandatory cleaning upon entry and exit for all slipped and moored boats
- New special use permit conditions for all water based activities to require cleaning of all participant watercraft upon entry and exit
- Increased boat wash capacity at almost all concessioner-operated marinas, including the planned installation in 2007 of five boat wash stations to be operated by concessioners
- Public messaging campaign - including signage, rack cards, displays, ramp staffing, and outreach to boat based businesses - to encourage come and go boaters to leave the lake with their watercraft clean, drained, and dry
- Sharing of lessons learned with others via the NPS Western Waters Quagga Mussel Contingency Plan

Introduction

Invasive mussels, similar in appearance and closely related to the zebra mussel, were detected on January 6, 2007 in Lake Mead and the species was positively identified as quagga mussel (*Dreissena bugensis*) by experts from the U.S. Fish and Wildlife Service. By January 20, the same species was confirmed in downstream waters at Lake Mohave and Lake Havasu, thus demonstrating a systemic infestation of the Lower Colorado River system.

An interagency meeting on January 17 resulted in the creation of a Lake Mead Interagency Core Team with representatives from each of the five agencies with direct management responsibilities in the Boulder Basin of Lake Mead, including National Park Service (NPS), Bureau of Reclamation (BOR), Southern Nevada Water Authority (SNWA), Nevada Department of Wildlife (NDOW), and Arizona Game and Fish Department (AGFD). After the mussels were found in the U.S. Fish and Wildlife (USFWS) Willow Beach Fish Hatchery on Lake Mohave in March, the team was expanded to include a representative from the USFWS. The Core Team also established coordination and communication with the Upper Colorado Prevention Response Effort and the California Quagga Mussel Incident Management Team, as well as established a science advisory team.

The geographic scope of the efforts undertaken directly by the Lake Mead Interagency Core Team is limited to Lakes Mead and Mohave and the surrounding shorelines and facilities administered by the partner agencies. The surface area of Lake Mead is 156,800 acres with a water volume of 8.4 trillion gallons. The surface area of Lake Mohave is 30,800 acres with a water volume of 592 billion gallons. The two lakes form the state boundary between Nevada and Arizona. The northern boundary (upstream) is bordered by Grand Canyon National Park and adjacent to the Hualapai Reservation and the southern boundary (downstream) is multi-jurisdictional, urban waters of the Colorado River. Over 8 million visitors recreate at Lake Mead National Recreation Area every year, with a majority of these visitors using the lakes. In the summer there are on average over 3,000 vessels on the water at any one time; on holiday weekends, this number rises to 5,000 vessels.

The Lake Mead Interagency Core Team began work on this Initial Response Plan on January 17 to address immediate needs (Goals 1-3) and to begin to address longer term needs (Goal 4):

1. Complete the initial assessment to determine the extent of infestation;
2. Take immediate steps to contain the infestation through management of boat movement, boater education, and voluntary inspection;
3. Investigate treatment options and implement those, if any, that are feasible; and
4. Identify actions needed to fulfill each agency's management responsibilities taking into consideration the long-term implications of quagga mussel invasion.

Concurrent with the initial response planning effort, the Lake Mead Interagency Core Team began implementation of actions consistent with the four goals. The focus of the implementation effort was on containment of spread to uninfested waters based on the knowledge that trailered boats were the most likely vectors and the rapid approach of the busy boating season. As a first step, a strategic response plan was drafted to identify Phase I actions targeted for completion by February 1, 2007, Phase II with actions targeted for completion by April 1, 2007, and Phase III with actions targeted for completion by February 2009. As a result of concurrent implementation and planning, some initial response actions are more detailed than others, but all are contained within the Initial Response Plan which will serve to guide the park's response for the next three years. In the following pages, each chapter of the Initial Response Plan is briefly summarized, a summarized budget is presented, and implementation schedule is provided.

Natural History

Quagga mussels are known to breed prolifically year around, thus the population expands exponentially and can quickly colonize new areas. This species has external fertilization and the free floating larvae exist anywhere in the water column, but tend to be most abundant in the planktonic zone. The sub-adults can settle on almost any natural or man-made substrate (except soft mud) in depths ranging from surface to greater than 500 feet. Once settled, the mussels begin filter feeding and quickly reach reproductive maturity, thus starting the whole cycle over. Individual mussels can live up to five years and during its lifetime a mussel can produce millions of offspring. Quagga mussels are efficient filter feeders and are known in the Great Lakes to dramatically alter the ecology of infested waters by removing large quantities of plankton while producing large quantities of waste materials. The decomposition of waste material, coupled with the periodic mass die-off of the mussel colonies, can result in bacterial outbreaks that wreak havoc on the food chain and can create anoxic conditions, thus killing other aquatic species. Thus, the invasion of Lake Mead NRA by quagga mussels is expected to have wide-ranging and long-term ecological, recreational, and economic impacts. The specific NPS values at risk include:

- Biological resources, including the razorback sucker (an endangered fish)
- Submerged cultural resources
- Infrastructure, including water intakes, marina facilities, and aids to navigation
- Park operations, including significant workload increases for every division

Discovery in the Colorado River System

A prevention program for aquatic nuisance species, specifically targeting zebra mussel, has been in place at Lake Mead NRA since 2002. Utilizing the expertise of volunteer Wen Baldwin and Lake Mead personnel, early detection samplers were deployed at all nine marinas on both Lakes Mead and Mohave; periodic training was offered to park staff, concessioners, and boating organizations; and high risk vessels from eastern waters were targeted for inspection and decontamination. Prior to January 2007, a total of 54 high risk vessels had been intercepted entering Lake Mead NRA and, of those inspected, 6 were found to be infested with invasive mussels and required to decontaminate prior to launch. The detection and reporting of mussels by contract concession employees at Lake Mead can be directly attributed to both the education efforts and the early detection sampling system deployed in the marinas.

Nonetheless, these efforts failed to prevent the eventual invasion of the quagga mussel. Detection of their presence was delayed because the samplers were designed to identify the more common zebra mussel which prefers shallower water than the deeper water quagga mussels. Once initial discovery was made, the park took immediate action to:

- Alert interagency partners with infrastructure or management responsibility in the Boulder Basin and throughout the entire Park
- Alert the public via news releases, signage, handouts, and outreach to boat based businesses and events in the local communities

- Assess the extent of infestation and develop an initial response strategy focused on containment of spread to uninfested waters

Planning

Initial response planning represented both challenges and opportunities as a coordinated response on this scale had never been successfully undertaken in the U.S. for invasive mussels. The initial response planning period was from January 8 – April 13, 2007. Superintendent Bill Dickinson and Chief of Resource Management Kent Turner provided the leadership for the planning effort, while the implementation was guided by the Park's interdivisional Management Team. Additional personnel were assigned to the project from within the park, from other parks, and additional staff members were brought on under the "2006 Administratively Determined Pay Plan for Emergency Workers (Casuals)." Existing project funds for aquatic nuisance species education and water quality monitoring were redirected to cover the costs of this initial response planning effort as well as some of the implementation costs for high priority tasks.

In fulfillment of the goals above, a strategic response plan was drafted that outlined objectives under each of the four goals, targeted for completion during three sequential phases:

- Phase I: Immediate needs; target completion date of February 1, 2007
- Phase II: Preparation for upcoming boater season; target completion date of April 1, 2007
- Phase III: Incorporation of quagga mussel response into day to day management actions and facility designs; target completion date of February 1, 2009.

The Initial Response Plan was drafted to provide details of all aspects of initial response. It is expected that the Initial Response Plan will continue to evolve and will be updated as needed.

Assessment

Assessment during Phase I and Phase II focused on characterizing the extent and nature of the population to guide immediate response. Phase I accomplishments included presence/ absence surveys by divers at all marinas and major boat launch facilities in January. Phase II accomplishments included presence/absence surveys by divers in undeveloped areas, systematic sampling for adults and/or veligers, and distribution and abundance measurements for adults. To date quantitative monitoring dive transects have been installed at nine sites, passive surface samplers have been installed at five marinas plus two undeveloped sites, and five large samples have been analyzed by the University of Texas at Arlington for population structure. The Virgin Basin, Temple Basin, and Boulder Basin of Lake Mead as well as the entire length of Lake Mohave are infested. Population analysis indicates that mussel invasion occurred in 2004 or perhaps 2003 and that the population is expanding.

A multi-phase assessment and monitoring strategy was developed by a small working group of NPS and USFWS scientists. Additionally, research questions were identified to invite outside

research interest that would most benefit the park and interagency partners. These are summarized below:

- Assessment
  - Presence / absence surveys
  - Quantitative surveys of the existing population using underwater transects
  - Age / growth analysis for established colonies
  - Assessment at depths > 60 feet
- Monitoring
  - Status and trends for established colonies
  - Adult detection
  - Larval monitoring
  - Previously collected larval samples
- Research Opportunities
  - Deep water sampling and monitoring techniques
  - Spatial and temporal distribution in the Colorado River System
  - Genotypes and phenotypes
  - Thermal tolerances and habitat preferences
  - Phylogenetic determination of source population, number of introductions, and time of introduction
  - Ecological and economic impacts

Containment

Aquatic nuisance species law enforcement is aimed at preventing the further spread or introduction of destructive organisms into previously un-infested waterways. Law enforcement is a critical piece of an agency's containment and preventative strategy. However, law enforcement efforts cannot violate an individual's constitutional rights under the Fourth Amendment to the U.S. Constitution; specifically law enforcement officers cannot conduct unreasonable searches and seizures. Any enforcement measures undertaken must ensure that officers do not exert physical control of private property or persons until after they establish a minimum of either reasonable suspicion that a watercraft is infected, or establish probable cause that mussels are present on the watercraft.

Zebra and Quagga Mussels are considered to by Aquatic nuisance species; the state of Arizona considers then restricted wildlife and the Sate of Nevada has deemed them to be detrimental (quagga listing will go into effect no latter than May14, 2007) The National Park Service Areas within the Special Maritime and Territorial Jurisdiction of the United States may adopt the States respective laws.

Officers have the authority to conduct warrantless searches of watercraft if any invasive mussel species are detected. If invasive mussel species are not physically visible, officers have the authority to temporarily detain watercraft for additional investigation provided reasonable suspicion exists that invasive mussel species may be present on the watercraft and further investigation is warranted to determine the presence or absence of invasive mussel species.

The park's containment strategy is three-tiered: mandatory compliance for slipped and moored boats that is implemented primarily through marina concessions, mandatory compliance for boat operations managed under a special use permit that is implemented through permit conditions, and voluntary compliance for "come and go" boaters that is implemented primarily through boater education.

The slipped and moored boat strategy is based on the fact that boats that reside in Lakes Mead or Mohave have a high probability of being infested with adult quagga mussels and are the most likely vectors to infest other western waters. The potential for slipped and moored boats to serve as a vector for invasion of new waters was prioritized as the number one threat by the science team. There are approximately 3700 slipped or moored boats in Lake Mead NRA, all of which reside at one of eight marina facilities operated by NPS concessioners. The following procedures for mandatory compliance have been implemented:

- All slip renters received notification in the mail and signs were posted on all slip gates and dry storage gates informing boaters that it is unlawful to transport mussels and that their vessels are required to be cleaned upon exit.
- As a condition of slip rental agreements, all slipped and moored boats must be washed prior to entry and upon exit for transport outside of Lake Mead NRA.
- All marina concessioners have been instructed to immediately offer boat cleaning services using portable hot water pressure sprayers and five large boat wash facilities are being installed at marinas to facilitate this service.
- Free boat cleaning training courses were offered by the Park and all marina workers offering this service in the Park were required to attend training and follow the established guidelines.

Conditions have been attached to all vessels that enter or exit the park under a special use permit, including but not limited to vessels entering for fishing tournaments or oversized vessels requiring haul permits. These conditions mandate that the vessels be decontaminated before launch and prior to exit from the park. Similar conditions have been attached to all CUA holders in the park who provide boating services and/or use equipment on the water.

The come and go boat strategy is based on the fact that these boats have a lower probability of transport of invasive mussels because they would not be colonized by adult mussels in the few hours or days that they are on the water; in addition, the extreme heat and dryness of the Mojave Desert would most likely be lethal to transported larvae, but there remains a remote possibility of live larvae transport to uninfested waters under the right conditions. Thus the come and go boat strategy is based on voluntary compliance and implemented through aggressive boater education. The following components of this strategy are in place or in process and targeted for completion by May 1:

- Messaging is based on the pre-existing interagency "Stop Aquatic Hitchhikers" campaign and a companion campaign focused on quagga mussels in the west called "Don't Move a Mussel."
    - Rack cards have been produced and distributed to over 100 boat based and tourism businesses in all surrounding communities.

- Launch ramp signs in both English and Spanish are being installed at all designated launch ramps.
- Access road signs are being developed.
- Designated launch ramps will be staffed by interpretive rangers during peak boating season from May through August.
- Additional messaging products are being developed.

Treatment/Eradication

Both the science team and resource managers looked at a variety of treatment and/or eradication options. The few treatments that were used successfully in eastern waters were carefully considered, but the sheer scale of water depths, volumes, and submerged surface areas in Lakes Mead and Mohave were vastly different. After careful consideration, no viable eradication options were found due to the immense scale of the infestation and the size and depth of the treatment area. Additionally, no localized treatment options (e.g. "spot" treatment in a marina) were found for immediate implementation due to concerns about efficacy, multi-jurisdictional issues, environmental impact requirements, public notification requirements, and funding availability. We continue to engage in dialogue with our interagency partners and the scientific community regarding future eradication and/or treatment options and there is some promising research on a biocontrol that may be available for use sometime in the future.

Long-term Implications

It is anticipated that quagga mussel populations in Lakes Mead and Mohave will continue to increase for years ahead and the only limiting factor will be food supply. While we do not yet know all of the ways in which quagga mussels will impact the ecology, infrastructure, or recreational use of Lakes Mead and Mohave, we do anticipate that some of the impacts will be significant. Park operations will be impacted in a variety of ways; most costly will likely be the increased maintenance and possibly retrofit costs for water-based infrastructure including water intakes, marinas, and aids to navigation.

Coordination and Consultation

Initial response planning work was coordinated between partner agencies and both the Upper Colorado River Basin Prevention Team and the California Quagga Mussel Incident Management Team.

To advise the planning effort, a Science Advisory Team was assembled under the leadership of Linda Drees, Branch Chief for Invasive Species in the NPS Biological Resources Division. The science team was composed of quagga/zebra mussel experts from academia and public agencies as well as limnologists, fisheries biologists, and hydrologists familiar with Lakes Mead and Mohave.

Also, under the leadership of Public Affairs Officer Roxanne Dey at Lake Mead NRA, an Interagency Public Affairs Team was established. The team was composed of public affairs representatives of all agencies with a direct relationship to Lakes Mead and Mohave including Arizona Game and Fish, Nevada Department of Wildlife, Bureau of Reclamation, Southern Nevada Water Authority and U.S. Fish and Wildlife Service. This group coordinated public messaging and media days. The group was expanded as appropriate for information distribution to include public affairs personnel from Metropolitan Water District, Grand Canyon National Park, Glen Canyon National Recreation Area, Lake Havasu City, Bureau of Land Management, and Tribes.

Funding and Implementation Schedule

Actual expenditures for planning, monitoring and assessment and containment through the second quarter of FY2007 are shown, as well as projected expenses for the remainder of FY2007. The majority of the funding comes from Southern Nevada Public Lands Management Act (SNPLMA) for previously funded projects for education and monitoring for nuisance aquatic species. A proposed request for funding the ramp staffing plan from the SNPLMA Special Account Reserve was approved April 11 and is reflected in the table below.

	FY 07 Q2 (spent)	FY07 Q3 (in process)	FY07Q4 (projected)	Total FY07	Available FY07
Grand Total	**$161,614.84**	**$1,042,694.00**	**$659,600.00**	**$1,860,408.84**	**$1,815,668.00**
Planning	$37,039.65	$27,400.00	$15,900.00	$76,839.65	$50,000.00
Assessment	$54,452.85	$34,000.00	$33,500.00	$121,952.85	$100,000.00
Containment Total	$70,122.34	$981,294.00	$610,200.00	$1,661,616.34	$1,665,668.00
Containment subtotal a. Decontamination	*$28,056.96*	*$616,350.00*	*$603,850.00*	*$1,248,256.96*	*$998,358.00*
Containment subtotal b. Messaging	*$42,065.38*	*$364,944.00*	*$6,350.00*	*$413,359.38*	*$667,310.00*

Implementation status and future plans for tasks identified under planning, assessment, and containment are identified on the following three tables. These tables represent the most current and comprehensive listing to date, but are subject to change as the situation continues to evolve.

Lake Mead NRA Quagga Mussel Response PLANNING – page 1 of 2		
Task	**Status**	**Future Plans**
Issue news releases to inform public of quagga mussel presence and NPS actions	Five news releases have been issued to date and one media day event was hosted on January 26	Continue to issue news releases and work with the media as needed
Establish interagency coordination team for initial response	Established January 17, 2007	Maintain communication between interagency partners as needed
Draft initial response goals	Completed January 17, 2007	none
Draft strategic plan and complete interagency review	Completed February 9, 2007	none
Establish account and budget tracking procedures	Completed January 11, 2007	Maintain and closeout account
Prepare SAR funding request for PLMA	Submitted March 21, 2007	Awaiting decision
Establish a science advisory team for consultation on assessment, containment, and treatment strategies	Established January 22, 2007; met formally January 24, Feb 2, and March 14	Continue to consult with specific members or team as whole as needed
Establish interagency public affairs team for information distribution	Established January 17, 2007	Maintain communication between interagency partners as needed
Coordinate with Upper Basin Prevention Response	Established January 17, 2007	Maintain coordination as needed, especially as related to actions at South Cove
Coordinate with California Incident Management Team	Established January 17, 2007 and continued via weekly/biweekly conference calls; incident demobilized March 16	Maintain coordination with specific California agencies as needed
Bring on detailees and Emergency Workers (AD hires) to work on initial response	Emergency status expired April 8, 90 days from date of report to NPS	none
Prepare Initial Response Plan for Lake Mead NRA	Document drafted and released for internal review on March 11, 2007	Under review, will be released in April
Demobilize Initial Response	Demobilization is April 13	Transition to normal chain-of-command and park operations
Participate in NPS Western Waters Contingency Plan with Swed's ICS Team to share lessons learned from LAME with other parks	Scheduled for week of April 23	Continue support as necessary

Lake Mead NRA Quagga Mussel Response PLANNING – page 2 of 2		
Task	**Status**	**Future Plans**
Information transfer to other resource managers via presentations at George Wright Society Meeting	Scheduled for week of April 16	none
Consult with DOI Solicitor via Conference Call regarding legal authority to manage recreational boating traffic exiting infested waters	Conference call conducted March 26, 2007	Coordinate with States of Arizona and Nevada to enforce state standards as applicable.
Confirm with State of Arizona the listing of quagga mussel as a prohibited species.	Confirmed February 20.	Enforce state law.
Work with the State of Nevada to list quagga mussel as a prohibited species to provide authority for law enforcement action on exiting boats	A Temporary Regulation Change, Commission General Regulation (CGR 347) was approved by the Board of Wildlife Commissioners on Saturday, March 31 and will become official when processed by the Secretary of State.	Once approved by the Secretary of State, NPS rangers will enforce the temporary law and await the enactment of a permanent regulation which is planned for in September 2007
Work with Pacific West Regional Office and NPS Legislative Affairs on possible legislation that would expand NPS authority to respond to the threat of aquatic nuisance species.	Legislative language drafted March 14	Continue working with agency partners and potentially the Congressional delegation to get law passed

Lake Mead NRA Quagga Mussel Response ASSESSMENT - page 1 of 1		
Task	**Status**	**Future Plans**
Conduct presence/absence dives at nine marinas/major launch sites.	Nine sites completed by January 21, 2007	Re-inspect as part of routine facility maintenance
Conduct presence/absence dives on natural substrates in both Lakes Mead and Mohave	Initiated January 26, 2007 and 19 sites completed by April 1	Conduct opportunistic surveys as part of other dive activities.
Quantitative surveys of existing populations	Completed quantitative assessments at 15 sites by April 1	Transition to transect monitoring.
Conduct age/growth analysis for established colonies.	Field samples sent to Univ of Texas Arlington for population structure analysis.	Need research partner to establish a full-scale study
Assessment of deep water habitats inaccessible to divers	The ROV used as pilot project on February 10 - had limited utility.	Need research partner to study other bottom sampling techniques.
Study status and trends for established colonies using dive transects.	Initiated February 25, 2007 and installed transects at 9 sites to date.	1 more transect to install in April 2007, all transects to be read quarterly
Adult detection using passive surface samplers	7 samplers installed to date, including 5 in marinas plus 2 in non-marina locations	Add one more at Cottonwood Cove, then monitor monthly and report to Portland State University
Larval monitoring using PCR	Initiated monthly sampling in April 2007 at 8 stations total, including 4 in each lake.	to be sampled monthly under agreement with US Bureau of Reclamation and Southern Nevada Water Authority

Lake Mead NRA Quagga Mussel Response CONTAINMENT – page 1 of 3		
Task	**Status**	**Future Plans**
Hazard Analysis and Critical Control Point Plans produced for NPS activities: SCUBA, trailered boats, slipped boats	Implemented as of January 23	Review and update as needed for new activities
Draft Standard Operating Procedure for Decontamination for NPS activities	Implemented as of January 23	Formally review and adopt as part of normal SOP procedures
Acquire portable hot water pressure sprayers for cleaning NPS boats and equipment.	Equipment rented locally starting February 8 and purchased 2 units from GSA vendor March 16.	One unit each staged at Lake Mohave and Lake Mead.
Notify all concessioners, Commercial Use Authorization permittees, Special Use Permittees, and Researchers	Notifications via meetings, phone calls, or emails were completed in January and February	none
Require all marina concessioners to offer boat cleaning services following NPS guidelines for mussel decontamination	All concessioners were notified in writing by the Superintendent on March 23. As of April 13, all marinas except Lake Mead Resort will have portable hot water pressure sprayers and offer boat cleaning services.	When new concessions contracts are let in FY08, NPS will require that all marinas offer boat cleaning services for aquatic nuisance species.
Add boat wash stations to some marinas to increase boat wash capacity	Two stations were ordered with expected delivery in June for installation at Callville Bay and Boulder Beach and will be assigned as facilities to concessioners in those areas.	Three more stations will be ordered in April for installation in late summer at Cottonwood Cove, Temple Bar, and Echo Bay.
Notify all slip renters of the need to clean boats upon exit	A billing statement enclosure was sent to all slip renters in February or March billing statements. Signs were posted at all marina slip gates in March.	none
Add condition to slip rental agreements to require boat cleaning upon entry and exit for overland transport	On March 20, a new permit condition was presented to all marina concessioners for inclusion in all existing and future slip rental agreements.	Monitor compliance and enforce new permit conditions

Lake Mead NRA Quagga Mussel Response CONTAINMENT – page 2 of 3		
Task	**Status**	**Future Plans**
Add condition to all oversize haul permits (used primarily for overland transport of houseboats) requiring that all boats and trailers be cleaned upon entry and exit from park waters	Provisional language in place on all permits as of March 4, final language still in draft	Monitor compliance and enforce new permit conditions
Add condition to all water-based special use permits (fishing tournaments, sailing regattas, waterski competitions, etc.) requiring that all vessels be inspected and cleaned upon entry and exit from park waters	Provisional language in place on all permits as of March 4, final language still in draft	Enforce new permit conditions
Add condition to all water-based research permits to require that all equipment and boats be cleaned prior to use in park waters and upon exit from park waters	New permit condition is under internal review and will be implemented within the month of April.	Enforce new permit conditions
Train NPS employees, concessioners, and other partners on quagga mussel identification and decontamination.	Between February 13 and April 3, six classes were held in and around Lake Mead NRA and were open to anyone who wanted to attend. A total of 80 people participated.	No additional classes are scheduled for this spring, more will be offered in future years.
Design and produce educational rack cards for distribution at all park entrances, visitor centers, and boat-based or tourism businesses.	1.3 million copies were produced and distributed at all entrance stations and visitor centers plus over 100 locations in surrounding communities.	A system has been established within the park for people to acquire additional copies as needed. It is anticipated that another GPO print run will be needed next fall.
Order and distribute new version of Zap the Zebra tri-fold, four color brochures at all visitor centers, boat events, and in surrounding communities.	Funding has been identified and camera ready artwork is available.	To be ordered by Interpretation Division from Government Printing Office in April.
Design, produce and distribute informational posters within the park and the surrounding communities.	Approximately 300 posters have been produced and distributed.	A system has been established within the park for people to acquire additional copies as needed.

Lake Mead NRA Quagga Mussel Response CONTAINMENT – page 3 of 3		
Task	**Status**	**Future Plans**
Design, produce, and post signs at all launch ramps based on the national Stop Aquatic Hitchhikers campaign and the companion Don't Move a Mussel campaign.	Layout and design is complete. 100 each in English and 50 each in Spanish will be ordered in early April.	Install signs at all designated launch locations.
Design, produce, and post notification signs on park roads that access water.	Layout and design in both English and Spanish is complete and signs will be ordered in late April.	Order and install signs at all access roads.
Design, produce, and post regulatory signs on the launch ramp sign posts.	Awaiting new Nevada state law for legal citation. Then will proceed with layout, design, and production.	Layout, design, order, and install legal citation signs on all boat ramp sign posts.
Staff boat exit ramps with visitor use assistants to contact exiting boaters with the "clean, drain, and dry" message; reinforced by the presence of additional law enforcement personnel.	A ramp staffing plan has been drafted and a funding request was submitted in March. The park is currently recruiting for 28 seasonal visitor use assistants and 14 seasonal law enforcement rangers as well as supervisory staff for this ramp operation.	Implement ramp staffing plan.
Establish procedure for mussel response team of NPS personnel to work directly with marina concessions to gain voluntary compliance from exiting slipped/moored boats to assure that they are cleaned prior to launch in other waters.	The standard operating procedure has been in place since February 20 and continues to evolve as additional boat washing capacity becomes available within the park and regulatory processes are put into place.	By May 1, transition from voluntary compliance to mandatory compliance under the direction of NPS law enforcement personnel.
Develop a comprehensive public outreach program targeted for the boating public.	NPS interpreters have staffed boat shows, fishing tournaments and other events since January. Props and educational materials have been acquired and additional programs are being developed for a variety of audiences and delivery methods.	Continue to work with interagency partners to assure that the Stop Aquatic Hitchhikers message is presented at major community events. Continue to develop and present various programs.