Limnological Assistance for the Lake Mead National Recreation Area in Meeting the Challenge of the Water 2025 Initiative: Quarterly Report, Period Ending April 1, 2009

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Executive Summary

Project 1
• Technical input has been provided at two advisory team meetings attended this quarter.

Project 2
• Surface Water Monitoring for Indicator Bacteria in High-use Sites of the Lake Mead National Recreation Area (poster) was presented at the Lake Mead Science Symposium; a journal article is in preparation.

Project 3
• A draft document titled “Interagency Monitoring Action Plan (I-MAP): Quagga Mussels in Lakes Mead and Mohave” has been subdivided into four major sections and corresponding sub-groups have been formed to provide review and input. Six oral presentations related to quagga mussels were presented at the Lake Mead Science Symposium. Two journal articles are in preparation.

Project 4
• A poster presentation summarizing the data-mining and literature database was presented at the Lake Mead Science Symposium.

Project 5
• The Lake Mead Science Symposium was delivered at the UNLV Student Union 01/13-15/2009. The symposium included a plenary session with three keynote addresses and four special remarks by water-related agency leadership and six concurrent sessions with 44 talks and 13 posters. Approximately 150 individuals attended. Excellent feedback was received.

Project 6
• Interagency “Water 2025” Team meetings continue to be coordinated and built for eventual input into the ecological monitoring plan for Lakes Mead and Mohave. Day 3 of the symposium (project 5) launched work on the ecological monitoring plan.
C.2(a) Continue to attend and participate in technical advisory committees related to planning and implementation of monitoring programs on Lakes Mead and Mohave (SCOP, Lake Mead Water Quality Forum, Las Vegas Wash Coordination Committee). Provide a summary of each meeting attended noting important technical issues and challenges.

The two meetings listed below were attended during this quarter. Summaries were prepared and delivered to Kent Turner (Agreement Technical Representative; ATR) via e-mail by David Wong, Ph.D. (UNLV). These summaries may not be posted on the Internet (or otherwise distributed electronically) because they do not represent official minutes for these meetings. However, copies are maintained by and available from the Public Lands Institute.

02/18/2009 Lake Mead Water Quality Forum
02/23/2009 Boulder Basin Adaptive Management Program

Official summaries of the Las Vegas Valley Watershed Advisory Committee Meeting are available as follows:


The Regional Water Quality Plan presented at the 2/10 meeting is available at: http://www.lvwash.org/cfml/calendar/index.cfm/6750D89A-9B78-1E44-1BA5AF3CE3A317BD.pdf?calendarparam=file&doc_id=6750D89A-9B78-1E44-1BA5AF3CE3A317BD

3/10/2009 The summary for this meeting has not yet been posted. It was attended by Jennell Miller on behalf of this group.

C.2(b) Continue to provide technical input into the development of these monitoring programs. Submit technical reports to LAME staff for review and input prior to submission to committees.

Technical input is on-going through meeting attendance and participation [see C.2(a) above] and as described throughout project 1 activities, below. No formal technical reports have been required or delivered to date.

C.2(c) Review updated modeling data from ELCOM/CAEDYM/PLUMES. Provide management and monitoring recommendations to NPS in an annual report.

UNLV project staff will continue to participate and assist, but their specific role has not yet been defined.
C.2(d) **Provide technical assistance in the review of suggested monitoring programs under the SCOP BBAMP, particularly Issues of Concern and Management Indices.**

Dr. Wong continues to participate in the SCOP BBAMP meetings. At the 2/23/2009 meeting, the 2009 agenda and outlines for Items of Concern (IOCs) were discussed. There will be six meetings this year, which will cover the Management Action Plan, IOCs, including their status under baseline conditions, and anticipated changes to the management plan after SCOP completion.

C.2(e) **Participate in the completion and review of the Selenium Management Plan. Provide recommendations.**

As reported previously, the document, *Basis of Plan Report for Selenium Management in Las Vegas Wash*, which was prepared by Brown and Caldwell for the Clean Water Coalition is under review by Drs. Wong and Gerstenberger. At the 2/23/2009 Selenium Management technical advisory team meeting portion of the SCOP BBAMP meeting, Brown and Caldwell provided an additional update on the Selenium Management Plan, which has not yet been reviewed.

C.2(f) **Conduct a review and provide recommendations for the BBAMP Annual Operating Plan**

As reported previously, Dr. Gerstenberger has received an abridged version of the BBAMP Annual Operating Plan. He has reviewed this document and provided some informal recommendations on this document. He will provide a more detailed review of the full version of the document when he receives it.

C.2(g) **Participate in the development of the biannual data and trend review of BBAMP data as required by BBAMP. Provide recommendations.**

Drs. Gerstenberger and Wong will participate as needed/required when data is made available.

Project 2 Science Support for Water 2025 Interagency Monitoring & Research Initiatives

D.2(a) **Continue to conduct scientific reviews of data and reports resulting from Water 2025 CI projects as requested by ATR.**

No additional work has been required for this task during this quarter.

D.2(b) **Provide an annual synthesis of the above reviews, addressing technical soundness of the projects, identify management implications, provide recommendations.**

Patricia Cruz, Ph.D., under the direction of Craig Palmer, Ph.D. (Project PI) is in the process of developing *Surface Water Monitoring for Fecal Indicator Bacteria in High-use Sites of the Lake Mead National Recreation Area* for submission to *Lake and Reservoir Management*, a manuscript based on the formal report submitted last quarter. This submission was invited by the technical committee of the Lake Mead Science Symposium, based upon a poster presentation of the same name given at the symposium.

D.2(c) **Develop the annual synthesis into an annual summary for SNAP Board. Prepare a presentation and present to SNAP Board.**

To date, the annual synthesis has not been completed nor developed into a summary and presentation for the SNAP Board. This will be accomplished at the request of the ATR.
Project 3 Technical Assistance related to Quagga Mussel and other nuisance species

We continue to track Project 3’s Year 1 activities as they are completed. Also please note that typographic errors are present in the numbering scheme pertaining to this project within the original task agreement. To avoid confusion, we maintain the same coding used within the task agreement and match like activities from both years as you will see below.

E.1(a) and E.2(a)

Provide assistance for the development of a monitoring program to evaluate the emerging ecological effects of the quagga mussel infestation (Year 1). Provide assistance in planning, implementation, data review, and reporting related to the monitoring program evaluating the emerging ecological effects of the quagga mussel infestation (Year 2).

The portion of the task related to implementation will follow after development of the quagga mussel population-monitoring plan described below, which is the foundation for monitoring ecosystem response and trophic level analyses.

E.1(b) Complete a review of the natural history of quagga mussels (Year 1).

As previously reported, a draft section titled “Life History of Quagga Mussels” has been completed and presented within the draft document, Interagency Monitoring Action Plan (I-MAP): Quagga Mussels in Lakes Mead and Mohave (described below). As with other sections of the I-MAP, the Life History section is under review by a sub-group (see below).

E.1 (e) Provide assistance in the development of a quagga mussel population monitoring and assessment program (Year 1) and
E.2(b) Provide assistance in planning, implementation, data review, and reporting to the quagga mussel population monitoring and assessment program (Year 2).

This task has continued to be the major focus of Shawn Gerstenberger (UNLV, Project PI) and Dr. Wong. The draft Interagency Monitoring Action Plan (I-MAP): Quagga Mussels in Lakes Mead and Mohave was previously distributed to members of the Interagency Quagga Mussel Group. Unfortunately, no comments were received. This lack of response is thought to result from the size of the document, and the fact that many of the individuals who could provide helpful input do not necessarily need to review the entire document. Therefore, this quarter, Drs. Gerstenberger and Wong split the document into its major sections: “Life History,” “Artificial Substrates,” “Veliger Monitoring,” and “Adult Monitoring.” Specific sections were then e-mailed on 02/17/2009 to individuals who volunteered to serve on sub-groups pertaining to each section. Sub-group membership is listed below. Note that each sub-group includes staff members from agencies with management oversight as shown below. Drs. Wong and Gerstenberger, and Mr. Turner are members of every sub-group and so are not listed below.

Life History
- Wen Baldwin, NPS Lake Mead NRA Volunteer / Lake Mead Boater Owners’ Association
- Peggy Roefer, Southern Nevada Water Authority
- Tod Tietjen, Southern Nevada Water Authority

Artificial Substrates
- Wen Baldwin, NPS Lake Mead NRA Volunteer / Lake Mead Boater Owners’ Association
- Lynn Orphan, Clean Water Coalition
- Peggy Roefer, Southern Nevada Water Authority
- Jon Sjöberg, Nevada Department of Wildlife
- Tod Tietjen, Southern Nevada Water Authority

**Veliger Monitoring**
- Mark Buttner, UNLV Harry Reid Center for Environmental Studies
- Patricia Cruz, UNLV Harry Reid Center for Environmental Studies
- Peggy Roefer, Southern Nevada Water Authority
- Tod Tietjen, Southern Nevada Water Authority

**Adult Monitoring**
- Gerald Hickman, U.S. Bureau of Reclamation
- Bryan Moore, NPS Lake Mead NRA
- Peggy Roefer, Southern Nevada Water Authority
- Tod Tietjen, Southern Nevada Water Authority
- Leonard Willet, U.S. Bureau of Reclamation

In addition to the above sub-group members, Dr. Marion Wittmann (University of California, Davis – Tahoe Research Center) volunteered to review and provide comments on I-MAP sections pertaining to life history and monitoring.

Comments were due via e-mail to Drs. Wong and Gerstenberger on 3/13/2009. Dr. Wong is currently addressing and incorporating the comments provided for each of the sections. Additional sub-group meetings are planned for the upcoming quarter, and Drs. Wong and Gerstenberger anticipate distributing a revised (and compiled) version of the I-MAP next quarter at the upcoming Interagency Quagga Mussel meeting on 5/19/2009.

**E.1(f) Prepare a report: Long-term Quagga Mussel monitoring and research needs for Lakes Mead and Mohave (Year 1).**

This is a component of *Suggested Standard Methods for Interagency Long-Term Quagga Mussel Monitoring in Lake Mead* discussed in part E.1 (e) and E.2 (b) above.

**E.2(d) Prepare a report: Emerging Quagga Mussel Monitoring and Research Needs for Lakes Mead and Mohave not previously identified.**

As reported in Year 1, The Agency Core Management Team for Quagga Mussels decided to develop three projects that are to be funded outside of this task agreement. They are (1) quagga mussel monitoring and (2) impacts to fisheries and (3) a benthic survey.

Dr. Wong continues to work with project primary investigators and other staff and students to complete task E.2(d) to describe quagga mussel monitoring and research needs not previously identified in consultation with Dr. Gerstenberger.

**E.2(e) Organize and conduct the second annual meeting of the Quagga Mussel science advisory committee. Prepare a report: Recommendations from the committee.**
Dr. Gerstenberger continues to assist Mr. Turner in the facilitation of the multi-agency, interdisciplinary meetings listed below. Summaries of the Interagency Quagga Mussel meetings are documented by Jennell Miller (UNLV), e-mailed to meeting participants, supplied at subsequent meetings, and posted to GroveSite. PowerPoint presentations delivered at each of the Interagency Quagga Mussel Meetings have been archived at the Public Lands Institute and provided on CD to meeting participants and others upon request.

This quarter’s meeting occurred as follows:

- 02/25/2009 – Interagency Quagga Mussel Meeting

Attendees of these meetings have represented the Arizona Game and Fish Department; City of Henderson; City of Havasu City; Clark County Water Reclamation District; Clean Water Coalition; Imperial Irrigation District; Coachella Valley Water District; Lake Las Vegas Resort; Las Vegas Valley Water District; Los Angeles Metropolitan Water District; National Park Service; Nevada Division of Environmental Protection; San Diego County Water Authority; Southern Nevada Water Authority; University of Nevada, Las Vegas; University of Nevada, Reno; U.S. Bureau of Reclamation; U.S. Fish and Wildlife Service; and U.S. Geological Survey.

Other accomplishments related to Project 3

The following professional presentations co-authored by Drs. Gerstenberger and Wong were presented at the Lake Mead Science Symposium on 01/13-14/2009 in Las Vegas, NV:

- Baldwin, W.; Mueting, S.; Gerstenberger, S; and Wong, D. Growth and Recruitment of Quagga Mussels (Dreissena bugensis) in Lake Mead
- Gerstenberger, S.; Turner, K.; and Wong, D. Interagency Response to Quagga Mussel Invasion at Lake Mead: Detection, Prevention, Control, and Monitoring.*
- Loomis, E.; Wong, D.; Gerstenberger, S. Threadfin Shad and Invasive Quagga Mussels in Lake Mead, Nevada.
- Moore, B.; Gerstenberger, S.; and Wong, D. Quagga Mussel Invasion into Lakes Mead and Mohave in 2007: Abundance, Distribution, and Size Frequency
- Wong, D.; Tietjen, T.; Gerstenberger, S.; Mueting, S.; and Loomis, E. Potential Ecological Consequences of Invasion of the Quagga Mussel (Dreissena bugensis Andrusov 1897) into Lake Mead.

*The Lake Mead Science Symposium invited the submission of a manuscript based on this presentation to the journal Lake and Reservoir Management.

The following presentation was prepared for the Colorado River Basin Science and Resource Management Symposium (Scottsdale, AZ). During this quarter, authors have developed and
submitted a manuscript invited by symposium organizers. The manuscript is currently undergoing revisions.


### Project 4 Strategic Data Mining for Lake Mead

We continue to track Project 4’s Year 1 activities as they are completed.

**F.1(c) Create a prioritized list with the Water 2025 Science Team of significant projects whose data are not available electronically (Year 1).**

Projects beyond the benthos data (described last quarter) have not been identified to date. With the assistance of the interagency Water 2025 team, the goal will be to develop a prioritized list of significant projects for which data are not available electronically for future data-mining efforts.

**F.1(d) Prepare, quality assure, document and submit to NPS and other information portals electronic data sets for the above top priority projects (Year 1).**

On-going.

**F.2(a) Complete data mining projects from the prioritized list. Prepare, quality assure, document and submit to NPS and other information portals electronic data sets for the above top priority projects.**

On-going.

### Other accomplishments related to Project 4

The following poster presentation co-authored by Mr. Pollard and Ms. Andrew was prepared for the Lake Mead Science Symposium, January 13-14, 2009, Las Vegas, NV. This was an important means of informing the Lake Mead scientific community of this product.

- Pollard, J. and Andrew, G. Strategic Data Mining and Database Development for Research Projects at Lake Mead, Nevada-Arizona USA

Harry Reed (UNLV), at the request of Dr. Palmer, has designed a graphical front-end user for the Access database [prescribed by F.1 (b) in year 1]. The Access database with its new front end will be provided to Mr. Turner on CD in the upcoming quarter.

Data sheets provided by the Southern Nevada Water Authority (three bankers’ boxes full), will be placed in the Lake Mead Limnology Special Collection established as a part of this project.

### Project 5 Lake Mead Science Symposium
G.2(a)  Develop schedule of meeting sessions and speakers. Develop and print conference program and post to Web site.

Dr. Miller in consultation with Mr. Turner created the printed conference program (Appendix A) to include a schedule of meeting sessions and speakers, keynote speaker biographies, at-a-glance program tables, presentation abstracts, informational logistics, customized maps, and an author directory. Also included within the program was an In Memoriam section highlighting the achievements of Dr. James LaBounty, a renowned limnologist much of whose life’s work focused on Lake Mead. Program printing was done by UNLV’s Reprographics unit. Review comments were provided by Dr. Palmer and Margaret Rees (Project Administrator/UNLV PLI Executive Director). A PDF of the program was posted to the symposium Web site.

In addition to the printed program, attendees received a notebook with the symposium logo on the cover and a pen. The notebook and pen were made from recycled materials.

G.2(b)  Conduct symposium, facilitated by university personnel in collaboration with agency.

During this quarter, Dr. Miller and Rochelle Boyd (UNLV PLI) completed symposium planning and delivery. The open symposium sessions took place January 13-14, 2009 and a closed meeting of the technical committee occurred on January 15.

ATTENDANCE
Approximately 150 individuals attended the symposium, including staff members from the entities listed below:

Federal
• National Park Service
• U.S. Bureau of Reclamation
• U.S. Coast Guard Auxiliary
• U.S. Environmental Protection Agency
• U.S. Fish and Wildlife Service
• U.S. Geological Survey
• The Office of U.S. Senator Harry Reid (D-NV)
• The Office of U.S. Senator John Ensign (R-NV)

State
• Arizona Game and Fish Department
• Nevada Department of Wildlife
• Nevada Division of Environmental Protection

Regional
• Colorado River Commission of Nevada
• Imperial Irrigation District
• Metropolitan Water District of Southern California
• Southern Nevada Water Authority

City
• City of Glendale
• City of Lake Havasu City
• City of Las Vegas
Non-Profit
- Outside Las Vegas Foundation

University
- Louisiana State University
- New Mexico State University
- University at Buffalo
- University of Arizona
- University of California, Davis
- University of Colorado
- University of Nevada, Las Vegas
- University of Nevada, Reno
- University of New Mexico

Consulting Firms
- BIO-WEST, Inc.
- BSA Environmental Services, Inc.
- EarthSoft
- FlowScience, Inc.
- MWH Global
- PhycoTech, Inc.
- Precision Measurement Engineering
- SWCA Environmental Consultants
- Zeus Environmental, LLC

Registration was conducted by UNLV Educational Outreach with monitoring and follow-up by Ms. Boyd.

SYMPOSIUM PROGRAM (AGENDA)
The symposium agenda and event timing was created in consultation with Mr. Turner and the technical committee. Described within the printed program (Appendix A) is the final configuration of opening and special remarks, keynote addresses, 44 presentations within six concurrent sessions, 13 poster presentations, breakfasts, breaks, lunches, and an evening reception. Dr. Miller served as the liaison between the technical committee and all presenters for invitations, confirmations, and other communications.

Wilisha Daniels (UNLV PLI) served as VIP liaison. Ms. Daniels welcomed, set the tone for, and seated VIP guests and keynote speakers. In addition, she managed timing, cuing, and stage exiting for the keynote session, which was crucial due to the large number of presenters and presentations -- and the nature of presentations -- included (see list below).

- Session opening by Dr. Palmer and reading of a letter from U.S. Senator Harry Reid (Appendix B)
- Welcome address by Ronald Smith
- Symposium introduction, dedication, and acknowledgement of sponsors and exhibitors by Mr. Turner
- three sets of special remarks
• three keynote addresses (and introductions to each of the speakers)
• a multi-media memorial celebrating the life and work of Dr. James F. LaBounty

In regard to the concurrent sessions, Dr. Miller provided the technical committee of each session with a packet that included the following:

• session titles and authors
• facilitation protocol including details about session chair tasks, remote control use, time keeping, materials and people available, breaks, and scribe assignments.
• timing cue cards
• special announcement details customized to each session
• contact cell phone numbers

To facilitate smooth transitions and punctual timing between presentations, session slides were created listing each title. These titles were hyperlinked to PowerPoint presentation files such that the technical chairs needed only to click on titles to advance through the program for their assigned session. Break slides featuring sponsor logos and announcement slides were customized for each session.

Dr. Miller designed an exhibitor application and sent out requests for exhibitors. Peggy Roefer (Southern Nevada Water Authority) and Dr. Gerstenberger also identified and invited specific potential exhibitors, which were listed on the symposium web site and within the printed program. Ms. Boyd confirmed and organized exhibitors and their exhibits, assigned space, and provided detailed set-up and tear-down instructions, maps, and parking information.

**FOOD AND BEVERAGE**

Dr. Miller and Ms. Boyd worked with UNLV’s Special Events Planner Tori Klein and the UNLV’s Sodhexo catering staff to hand select breakfast, break, and reception foods and beverages to accommodate a variety of participant dietary needs including vegetarian, vegan, and gluten free. A new vegan menu item was created in process. Ms. Boyd coordinated multiple meetings with the Events Planner, and monitored and confirmed every detail of the food and beverage order. Buffet lunches were provided at the UNLV Dining Commons. Dr. Miller met with the Dining Commons day manager prior to the event to ensure that the volume of symposium attendees would be adequately handled. Consideration was given to environmentally friendly service, and thus pitchers of beverages were provided in place of individual bottles and china and silverware were used in place of plastic ware.

**FLOW**

Ms. Boyd, in consultation with Dr. Miller, facilitated the flow of over 150 conference attendees intermixed with students by:

• creating a corridor of strategically placed volunteers throughout the conference site
• posting ample directional signage on the campus and within the UNLV Student Union
• communicating with and providing detailed information to UNLV Student Union Events coordinating staff
• arranging for the donated use of university golf carts and volunteer drivers to shuttle attendees to and from the parking garage
• arranging VIP parking in a lot located near the UNLV Student Union
• communicating with UNLV Parking Services and Security the regarding event logistics
• providing detailed programmatic information to UNLV Student Union staff for electronic signage placed at key locations throughout the Student Union
• providing three registration tables operated throughout the conference by symposium volunteers and managed by Allison Brody (UNLV PLI) under the direction of Ms. Boyd

COMMUNICATIONS/SERVICES
For presenter convenience, Ms. Boyd, in consultation with Dr. Rees, organized a “green room” equipped with eight laptops, printer, telephone, an array of office supplies, and secure Internet access. This room was intended for speakers to use to practice their talks, share data, images, and information with other attendees, and check e-mail/use the telephone. The room was stocked with snacks and beverages and served as a “lost and found.” It was staffed throughout the conference by Cathy Willey (UNLV PLI), under the direction of Ms. Boyd. Ms. Boyd created an emergency cell phone list of event staff, pertinent UNLV departments, and emergency numbers so that Ms. Willey could serve as the symposium dispatcher. Ms. Willey was provided with a prepaid cell phone, the number of which was listed in the symposium program.

MEDIA
A media advisory (Appendix C) was prepared by LaNelda Rolley in consultation with Drs. Miller and Gerstenberger and Mr. Turner. Media personnel were coordinated prior to the event by Ms. Boyd and by Ms. Rolley during the symposium.

Dr. Gerstenberger served as point of contact for media staff. Media coverage of the event resulted in articles (listed below) published by Las Vegas Sun, Las Vegas Review-Journal, Silicon Valley Mercury News, and News 3 Las Vegas.


• Clark, Dave. “UNLV study: Lake Mead Fish safe to eat.” Las Vegas Sun 14 Jan. 2009


Attendee Survey
An attendee satisfaction survey was distributed with the printed program (Appendix D). Forty eight attendees responded. The results are shown below:

<table>
<thead>
<tr>
<th>Aspect Rated</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
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<td>Program</td>
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<td>18</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>48</td>
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<tr>
<td>Event Organization</td>
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<td>9</td>
<td>1</td>
<td>0</td>
<td>1</td>
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<td>23</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>48</td>
</tr>
</tbody>
</table>
Attendees were also surveyed (Appendix E) in regard to threats, stressors, and immediate needs that should be addressed within the Ecological Monitoring Plan for Lakes Mead and Mohave (Task 6 of this Project). Results of this survey will be provided within the annual report. A drawing was connected with submission of this questionnaire with prizes donated by REI (two backpacks) and Skydance Studios (art print and multi-media DVDs).

G.2(c) Prepare, publish, and distribute symposium proceedings to participants and agency and university libraries.

Arrangements have been made to publish selected papers within a special issue of *Lake and Reservoir Management*. Note that manuscripts must undergo the journal’s standard selection and peer review process.

During the closed session of the symposium, the technical committee carefully discussed and selected symposium presentations for potential development into manuscripts. During the first week in February, Dr. Miller e-mailed invitations to the selected individuals. Authors were asked to submit their manuscripts to Dr. Miller by June 1, 2009. Dr. Miller will distribute submitted manuscripts to the technical committee for review. Following member review, the manuscripts will be forwarded to Ken Wagner, editor of *Lake and Reservoir Management*, to be entered into the journal’s formal peer review process. G. Chris Holdren, Ph.D. (U.S. Bureau of Reclamation) is serving as liaison with Dr. Miller between the interagency team and the journal. This role was previously performed by Dr. LaBounty, who was an editor for the journal.

Of the 18 invitations sent, eight authors accepted. These authors are listed below with their symposium presentation titles:

- Cruz, P. et al. “Surface Water Monitoring for Fecal Indicator Bacteria in High-Use Sites of the Lake Mead National Recreation Area.”
- Holdren, G. C. “Nutrient Budgets for Lake Mead.”
- Kramer, J. et al. “Mercury Concentrations in Muscle Tissue from Sportfish in Lake Mead, NV.”
- Tietjen, T. “Long-term Patterns in the Diversity and Composition of Phytoplankton in Las Vegas Bay, Lake Mead.”
• Wong, D. et al. “Potential Ecological Consequences of Invasion of the Quagga Mussel into Lake Mead.”

Project 6 Ecological Monitoring Plan for Lakes Mead and Mohave

H.2(a) Assist other committees (SCOP BBAMP, Water 2025, Quagga Mussel) with the development of their monitoring plans.

This activity is ongoing as described throughout this report.

H.2(b) Synthesize background information, including information collected from this project (data mining and science symposium).

Members of the technical committee have agreed to serve as a sub-committee to work on the development of this project.

H.2(c) Complete chapters according to schedule.

A schedule for chapter development has not yet been set. During Day 3 of the Lake Mead Science Symposium, the technical committee and Mr. Turner identified major topic areas to be addressed in the Ecological Monitoring Plan for Lakes Mead and Mohave. In their broadest terms, they are: Limnology and Water Quality, Environmental Contaminants, Aquatic Biota and Fisheries, Emerging Issues/Non-native Species, Riparian and Shoreline Resources. Additionally, Mr. Turner established a framework for the monitoring plan, wherein, each topic area will be analyzed and information summarized about the water quality requirements related to fisheries, wildlife, recreation, and community needs. Topic areas will be “stepped down” into suggested monitoring activities needed to meet the related water quality goals. The specific organization of the material has not yet been determined. Other components of the framework include an introduction/preamble/broad goals for the monitoring and research plan; plan goals, which are a mutual set of goals of the participating agencies with monitoring responsibility; resource plan and related plan component categories, brief statements of knowledge; relationship to the existing water quality models and regional plans; data management and QA/QC; data analysis and summaries.

Establishing a role for and assignments to UNLV staff to facilitate the development of these chapters, participate in their creation, and setting a schedule for their completion remains to be done.

Other accomplishments related to Project 6

Interagency Water 2025 Meetings
Drs. Palmer, Miller, and Gerstenberger have assisted Mr. Turner in the facilitation of the meeting listed below.

• 02/11/2009 – Interagency Water 2025 Meeting
Attendees of this multi-agency meeting have represented the Clean Water Coalition; National Park Service; Southern Nevada Water Authority; University of Nevada, Las Vegas; University of Nevada, Reno; U.S. Bureau of Reclamation; U.S. Fish and Wildlife Service; and US Geological Survey.

Submitted by:

Margaret N. Rees, Project Administrator

04/28/2009
APPENDICES
Appendix B

Dr. Margaret Rees
University of Nevada Las Vegas
4505 Maryland Parkway
Las Vegas, Nevada 89154

Dear Dr. Rees:

Thank you for your invitation to the Lake Mead Science Symposium. I appreciate hearing from you and I regret that I will be unable to attend the Symposium.

As we begin the 111th session of Congress, there are a great number of environmental challenges facing our nation. Many of the most urgent issues will be discussed over the next few days at your gathering: climate change, water supply, water quality, invasive species, and how best to coordinate and track responses to these pressing issues.

Lake Mead is perhaps the single most important natural resource in southern Nevada. The water that comes from Lake Mead and the Colorado River makes our very way of life possible. In order to protect that water and the dynamic system in which it is found, I am pleased to be working with Senator Feinstein from California to secure funding for research on quagga mussels and other similar invasive species. I am also proud to be the sponsor of legislation known as the 100th Meridian Invasive Species State Revolving Loan Fund which, when passed, will provide funding to western states to help state, local, and non-governmental entities address and prevent disastrous invasive species outbreaks, like the quagga mussel in Lake Mead and invasive weeds throughout the Great Basin, that threaten the environment, ecosystems, and local economies. These efforts – in addition to providing much needed and long overdue resources to Lake Mead National Recreation Area and other units of the national park system – are a priority for me. It is time for us to give our natural resources the attention they deserve. We depend on their health for our own.

I appreciate your help in meeting these challenges. I hope that your time together is productive and I look forward to hearing the results of your conference. Again, thank you for your invitation to this event. I look forward to hearing from you in the near future.

My best wishes to you.

Sincerely,

[Signature]

HARRY REID
United States Senator
Appendix C

January 6, 2009

Contacts: Gian Galassi, UNLV Public Affairs Office: 702-895-3104
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UNLV TO HOST LAKE MEAD SCIENCE SYMPOSIUM JANUARY 13-14

State-of-the-science symposium will explore challenges and issues facing Lake Mead and Lake Mohave

WHAT: Local and regional researchers and environmental managers will convene at UNLV for the inaugural Lake Mead Science Symposium to share information, exchange ideas, and coordinate efforts to protect the ecological health of lakes Mead and Mohave. Participants will also initiate the development of a comprehensive ecological monitoring strategy for the lakes.

WHEN: Tuesday, January 13, from 9 a.m. to 5 p.m.
       Wednesday, January 14, from 8:30 a.m. to 5 p.m.

WHERE: UNLV Student Union, 4505 S. Maryland Parkway

DETAILS: There are 47 scheduled presentations, the details of which can be found at http://www.lakemeadsymposium.org/program.htm. Some topics of interest include:

- Fish and Wildlife
- Water Quality
- Environmental Contaminants
- Quagga Mussels

Participating agencies include the National Park Service, Bureau of Reclamation, Clean Water Coalition, Nevada Department of Wildlife, Southern Nevada Water Authority, U.S. Fish and Wildlife Service, U.S. Geological Survey, and the University of Nevada, Las Vegas. Planning for the Lake Mead Science Symposium is funded by the Southern Nevada Public Land Management Act as a component of a larger initiative led by the National Park Service, which is, in part, administered by the UNLV Public Lands Institute and the UNLV School of Community Health Sciences on behalf of the National Park Service.

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UNLV is a doctoral-degree granting institution with more than 28,000 students and approximately 3,300 faculty and staff. Founded in 1957, the university offers more than 220 undergraduate, master's and doctoral degrees. UNLV is located on a 350-acre campus in dynamic Southern Nevada and is classified in the category of Research Universities (high research activity) by the Carnegie Foundation for the Advancement of Teaching.
Appendix D

Symposium Survey

Please place your completed survey in the designated box at the symposium registration table.

1. Rate the following aspects of the symposium:
   a. Cost
   b. Registration Process
   c. Program
   d. Event Organization
   e. Customer Service
   f. Overall Quality of Presenters
   g. Audio-Visual and Technology
   h. Food and Beverage
   i. Food Service
   j. UNLV Student Union Facility

   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor
   ○ Excellent  ○ Good  ○ Fair  ○ Poor

Any comments or suggestions with regard to the above?

2. What overall rating would you give this conference?
   ○ Excellent  ○ Good  ○ Fair  ○ Poor

3. Did the symposium meet your professional goals?
   ○ Yes  ○ No

4. What best describes your involvement in Lake Mead Science? Check all that apply.
   ○ Resource Manager
   ○ Program Manager
   ○ Staff Scientist
   ○ Technical Specialist
   ○ Educator / interpreter
   ○ Planner
   ○ Administrator
   ○ Student
   ○ Volunteer
   ○ Other
Thank you for your participation in the Lake Mead Science Symposium. In development is an interagency ecological monitoring plan for Lakes Mead and Mohave, which will be focused on the topic areas corresponding with the session titles. We invite you to share your thoughts on what should be included in the future plan. Fill out one sheet per topic area you wish to address. If you would like to add input after the symposium, contact jennell.miller@unlv.edu. Please print!

My responses within this questionnaire refer to the following topic area (please select one):

- ☐ Aquatic Biota and Fisheries
- ☐ Lake Management
- ☐ Other
- ☐ Contaminants
- ☐ Limnology and Water Quality
- ☐ Other
- ☐ Emerging Issues
- ☐ Riparian and Shoreline Resources
- ☐ Other

1. What, in your opinion, is the most serious threat / stressor facing Lakes Mead and Mohave for this topic area?

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2. What are the major expected consequences of this threat / stressor?

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3. What are the most important monitoring needs for Lakes Mead and Mohave within this topic area?

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4. Additional input (e.g., recommended measurements, how monitoring needs should be prioritized, etc):

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Please continue your response on the back of this sheet if necessary.