CAMP action items

1. Ensure interagency coordination
2. Gather topographical and geological data
3. Conduct sediment transport modeling
4. Evaluate the impact of stream widening with alternate discharge considerations
5. Evaluate stormwater detention/erosion basins

ALTERNATE DISCHARGE, administered by the Chase Water Construction
6. Implement the discharge type to be used, alternate discharge study
7. Incorporate options and select criteria developed by the Alternate Discharge Study Team
8. Utilize the Alternate Discharge Study Team throughout the process
9. Integrate work done by other study teams into process

10. Update public officials and interested parties throughout the process

LAND USE, administered by the Environmental Review and Planning Study Team
11. Focus land use on a corridor zone along the Las Vegas Wash
12. Support the development and implementation of a common environmental review process among planning entities
13. Develop land management practices
14. Develop educational materials for developers
15. Identify opportunities for interagency coordination efforts

GERONTIC & REGULATORY, administered by the Las Vegas Valley Watershed Advisory Committee
16. Further investigate and define structure for local oversight of the Las Vegas Wash
17. Conduct additional research
18. Ensure implementation of mitigation measures
19. Develop long-term operations and maintenance plan
20. Ensure there is a plan for future contaminant discovery
21. Identify issues of concern

PUBLIC OUTREACH, administered by the Administrative Study Team
22. Establish a method to continue implementation of the public outreach program
23. Continue implementation of feedback mechanism and measurements of progress and results
24. Provide updates to selected officials

FUNDING, administered by the Administrative Study Team
25. Further investigate potential funding sources identified by the team
26. Anticipate future funding needs
27. Work with the Las Vegas Wash management entity to review funding options
28. Develop methods to identify specific projects for grant funding
29. Utilize existing resources and staff, whenever possible

SHALLOW GROUNDWATER, administered by the Research and Environmental Monitoring Study Team
30. Develop a method to identify the potential for future contaminant discovery
31. Develop and implement a notification plan
32. Ensure interagency coordination
33. Develop a bibliography

NEUTRAL PARKS, administered by Clark County Parks and Recreation
34. Identify water resources needed to maintain the park
35. Develop long-term monitoring plans
36. Develop a long-term operations & maintenance plan
37. Ensure implementation of mitigation measures
38. Identify funding needs
39. Ensure interagency coordination

ENVIRONMENTAL RESOURCES, administered by the Research and Environmental Monitoring Study Team
40. Develop long-term management and monitoring plans
41. Conduct additional research
42. Preserve and address cultural resource issue
43. Identify funding needs
44. Facilitate interagency coordination to ensure projects are implemented
Dear Friends:

This past year has been quite successful for the Las Vegas Wash Coordination Committee. In our 11 years of protecting, managing and enhancing the Las Vegas Wash, it is important to remember that the continued success of this effort relies heavily on our ability to work cooperatively to meet our common goals and objectives.

As we continue to work on issues related to the Las Vegas Wash, as well as protect the quality of our community’s water resources and develop regional water quality goals for the Las Vegas Valley watershed, we have developed a cohesive and integrated watershed management approach to address issues relating to wastewater, drinking water and stormwater.

The ongoing engineering activities to stabilize the Las Vegas Wash’s banks and minimize erosion will continue to play an important role in protecting our community’s drinking water supply and increase the sustainability of this vital waterway.

As we look forward to another exciting year, the 2009 Year-End Report summarizes the numerous activities conducted by the Las Vegas Wash Coordination Committee. Guided by the Las Vegas Wash Comprehensive Adaptive Management Plan, the Las Vegas Wash Coordination Committee will continue to coordinate and implement action items necessary to protect and enhance the Las Vegas Wash. Although more than a decade of hard work and substantial progress is now complete, we must continue to focus on the path ahead. There remains much work to be done and the partnerships among our stakeholders and between public agencies and the community we serve will help to bring it to fruition.

Sincerely,

Dennis Porter
Chairperson, Las Vegas Valley Watershed Advisory Committee
Las Vegas Wash Coordination Committee

LAS VEGAS WASH COORDINATION COMMITTEE
Basic Management, Inc.
Bureau of Reclamation
Citizen Members
City of Henderson
City of Las Vegas
City of North Las Vegas
Clark County Department of Air Quality and Environmental Management
Clark County Parks and Recreation
Clark County Regional Flood Control District
Clark County Water Reclamation District
Clark Valley Conservation
Colorado River Commission
Conservator District of Southern Nevada
Desert Wetlands Conservancy
Lake Las Vegas Resort
Las Vegas Boat Harbor
National Park Service
Natural Resources Conservation Service
Nevada Department of Wildlife
Nevada Division of Environmental Protection
Nevada State Health Division
Southern Nevada Health District
Southern Nevada Water Authority
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Geological Survey
University of Nevada, Las Vegas

LAS VEGAS VALLEY WATERSHED ADVISORY COMMITTEE
City of Henderson
City of Las Vegas
City of North Las Vegas
Clark County
Clark County Regional Flood Control District
Clark County Water Reclamation District
Clark Valley Conservation
Las Vegas Valley Water District
Southern Nevada Water Authority

mission

Working to stabilize and enhance the valuable environmental resources of the Las Vegas Wash

background

The Las Vegas Wash (Wash) carries more than 185 million gallons of water a day. It exists in its present capacity because of the metropolitan population in Southern Nevada. Decades ago, the flows of the Wash created more than 2,000 acres of wetlands. By the 1990s, only about 200 acres of wetlands remained. The dramatic loss of vegetation reduced both the Wash’s ability to support wildlife and serve as a natural filter for water that flows to Lake Mead, the source of our community’s water supply.

In 1997, a citizens advisory committee made recommendations to manage and protect the Wash. While many area organizations were concerned with the Wash’s deteriorating state, no single agency was responsible for managing it. To bring these interests together, the Las Vegas Wash Coordination Committee (LVWCC) was formed and includes representatives from more than two dozen local, state and federal agencies, environmental groups, business owners and concerned citizens. The committee’s goal was two-fold: develop a long-term management plan for the Wash, and oversee implementation of the plan.

Within two years, the committee completed the Las Vegas Wash Comprehensive Adaptive Management Plan (CAMP)—a several hundred page roadmap that included 44 specific action items related to water quality, habitat management, erosion control and other key Wash issues. The LVWCC also created internal sub-committees and an advisory committee, the Las Vegas Valley Watershed Advisory Committee (LVWAC). The LVWAC derives its management authority through its members’ boards and councils.

The remainder of this document, provided by the LVWAC, offers a closer look at the progress of the CAMP action items, focusing on the accomplishments of 2009. Additionally, this report highlights the effort and work of the LVWAC and the resulting activities along the Wash.
The LVWCC uses an adaptive process to meet its mission. As part of that process, the action items of the CAMP document are evaluated in this section.

**EROSION AND STORMWATER** administered by the Desert Research Institute

- Install erosion control structures
  - Twelve of the 22 planned erosion control structures (i.e., weirs) have been installed along an approximately 6-mile section of the Wash.
- Obtain topography and geophysical data
  - Semi-permanent ground control points were established and topography and geophysical data are collected as needed to facilitate weir design and construction.
- Conduct sediment transport modeling
  - Sediment transport models have been developed using standard computer programs. Model runs are conducted as needed to understand system function and to inform weir design.
- Establish off-stream wetlands with alternate discharge considerations
  - An off-stream wetland feasibility study was prepared and concluded that wetlands should be established within the active floodplain and not in surrounding upland areas.
- Evaluate stormwater detention/retention basins
  - Clark County Regional Flood Control District regularly develops a flood control master plan, which includes an evaluation of stormwater detention/retention basins throughout the valley. Facilities built in the Wash and elsewhere in the valley consider stormwater plans.

**ALTERNATE DISCHARGE** administered by the Clean Water Coalition (CWC), handled by CWC, action items 10-13

- Considering the economic downturn and several other changed conditions, the CWC is re-evaluating for the Systems Components and Operations Program (SCOP). In December 2009, the CWC Management Board voted to suspend SCOP until January 2012.

**LAND USE** administered by the Environmental Review and Planning Study Team, handled by individual assigned agencies, action items 10-13

- Develop long-term management and monitoring plans
  - Long-term management and monitoring plans have been completed and updated and other activities are ongoing to achieve plan goals.
- Conduct additional research
  - Research activities are ongoing and are vetted by the study teams and the Wash Team.
- Pressure and address cultural resource issues
  - SNWA works with state, federal and tribal stakeholders to preserve cultural resources where feasible and mitigate when infeasible. A programmatic agreement is in development to facilitate the preservation of cultural resources.
- Identify funding needs
  - Funding needs are set by the study teams and Wash Team. Assessment and prioritization criteria include, but are not limited to, feasibility, cost, need for and importance of information and program benefit.
- Facilitate interagency coordination to ensure projects are implemented
  - A process was completed so that regular meetings are convened by managerial, technical, and administrative staff to ensure that interagency coordination is achieved.
- Develop a bibliography
  - A bibliography was completed and is accessible on the members' section of lvwash.org.

**FUNDING** administered by the Administrative Study Team

- Further investigate potential funding sources
  - Funding sources were identified and include local, state, federal and private contributions. Local contributions come from a portion of a quarterly sales tax and direct payments. State, federal and private contributions come from grants.
- Anticipate future funding needs
  - Annual budget draft funding needs for anticipated operating and capital expenditures.
- Work with the Las Vegas Wash Management entity to review funding options
  - Budgets are reviewed and approved annually by the LVWCC. Operating expenditures not reimbursed by state, federal or private grants are paid for by the City of Henderson (4%), City of Las Vegas (15.4%), Clark County (10%), Clark County Regional Flood Control District (10%), Clark County Water Reclamation District (20.6%) and SNWA (40%). Capital expenditures not paid for by grants are paid for by a portion of the quarter cent sales tax and account loans.
- Develop a method to identify the potential for future containment discovery
  - Regular data assessments are completed to evaluate potential concerns and analytic lists are regularly revised.

**SHALLOW GROUNDWATER** administered by the Research and Environmental Monitoring Study Team

- Develop a central database
  - Completed password-protected Web site for database, accessible through lvwash.org.
- Locate and inventory existing shallow monitoring wells
  - Existing data and geospatial technologies were used to locate and inventory existing shallow monitoring wells in the valley. Data are available on lvwash.org and http://ndep.neptunelinc.org/ndep_gisdt/home/index.xml.
- Identify issues of concern
  - Ongoing water quality monitoring programs and stakeholder data sharing provide the foundation for the early detection of issues of concern.
- Develop a long-term monitoring program
  - A monitoring program is being reviewed to address long-term shallow groundwater needs.
- Use groundwater models
  - Groundwater models are used to locate and inventory existing shallow monitoring wells in the valley. Data are available on lvwash.org and http://ndep.neptunelinc.org/ndep_gisdt/home/index.xml.

**JURISDICTIONAL AND REGULATORY** administered by the LVVWAC and the LVWCC

- Further investigate and define criteria for local oversight of the Las Vegas Wash Comprehensive Adaptive Management Plan
  - Local oversight was formally established by an interlocal agreement that created the nine-member LVVWAC. Members act on behalf of their governing boards and councils. Southern Nevada Water Authority (SNWA) was appointed the implementing agency for implementing CAMP action items.
- Ensure interagency coordination
  - A process was completed so that regular meetings are convened by managerial, technical and administrative staff to ensure that interagency coordination is achieved.

**PUBLIC OUTREACH** administered by the Administrative Study Team

- Establish a method to continue implementation of the public outreach program
  - Annual funding allocations are provided so that the public outreach program continues to be implemented.
- Continue implementation of feedback mechanism and measurement of progress and results
  - Solicited and unsolicited feedback is obtained at various public outreach events and on lvwash.org. Progress measurements (e.g., Web site visitors, event attenders, number of events, etc.) are recorded and reported quarterly to the LVWCC and in annual reports.
- Provide updates to elected officials
  - Public outreach events are logged into Speakers Bureau reports, which are then used to update elected officials.

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- Provide updates to elected officials
  - Public outreach events are logged into Speakers Bureau reports, which are then used to update elected officials.

**ENVIRONMENTAL RESOURCES** administered by the Research and Environmental Monitoring Study Team

- Develop long-term management and monitoring plans
  - Long-term management and monitoring plans have been completed and updated and other activities are ongoing to achieve plan goals.
- Conduct additional research
  - Research activities are ongoing and are vetted by the study teams and the Wash Team.
- Pressure and address cultural resource issues
  - SNWA works with state, federal and tribal stakeholders to preserve cultural resources where feasible and mitigate when infeasible. A programmatic agreement is in development to facilitate the preservation of cultural resources.
- Identify funding needs
  - Funding needs are set by the study teams and Wash Team. Assessment and prioritization criteria include, but are not limited to, feasibility, cost, need for and importance of information and program benefit.
- Facilitate interagency coordination to ensure projects are implemented
  - A process was completed so that regular meetings are convened by managerial, technical, and administrative staff to ensure that interagency coordination is achieved.
- Develop a bibliography
  - A bibliography was completed and is accessible on the members' section of lvwash.org.
Las Vegas Wash 2009 Activities Maps

Bird and Bat Study Sites
- Aquatic Bird Count Sites
- Bat Live Capture Locations
- Acoustic Bat Monitoring Stations
- Avian Point Count Survey Locations
- Marsh Bird Monitoring Locations
- Southwestern Willow Flycatcher Survey Route

Invertebrate and Mammal Study Sites
- Large Mammal Camera Points
- Small Mammal Capture Locations
- Terrestrial Invertebrate Sample Locations

Water Quality Monitoring Sites
- Real-Time Water Quality Stations
- Mainstream Monitoring Sites
- Total Suspended Solids Sampling Sites
- Tributary Sampling
- Tributary to Las Vegas Wash

Stabilization & Revegetation Activities
- Revegetation Sites
- DU Wetlands No. 2 Weir

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Maps illustrate activities completed during 2009.

General Legend
- Clark County Nature Preserve
- Clark County Wetlands Park
- Las Vegas Wash
- Lake Las Vegas
- Demonstration Wetland at the City of Henderson WRF
- Privately Owned (not a part of the Clark County Wetlands Park)

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PROJECT SUMMARY
Stabilization activities curtail the destructive power of erosion that washes away land, degrades water quality in the Wash and Lake Mead and minimizes the habitat of more than 260 wildlife species. Constructing erosion control weirs and fortifying banks to reduce the detrimental effects of erosion are major priorities of the LWCC. The Operations Study Team oversees the implementation of the stabilization project, from design and financing to construction and operation. Funding for these efforts is provided by a portion of the quarter-cent sales tax earmarked for water and wastewater projects in Clark County and is augmented by state and federal grants, when available.

Population growth in the Las Vegas Valley and increased water usage has considerably increased the speed and amount of water flowing through the Wash. Stormwater and other flows have eroded the Wash’s banks, causing wetlands to steadily disappear and millions of tons of sediment to be dumped into Lake Mead. In response to the alarming deterioration, the community created the LWCC and began the immense task of protecting the Wash from further erosion. Stabilization efforts include channel bed stabilization, bank protection and revegetation.

Stabilizing the channel bed, by installing dam-like structures called weirs that slow water flows, reduces the flow’s ability to cut deeper into the floodplain. Much of the bank protection construction has been accomplished through the efforts of the expert construction crews of the Bureau of Reclamation (Bureau, usbr.gov), working in partnership with the LWCC. The Wash control structures guard soil adjacent to erosion control structures against surface erosion. Weir construction activities also clear acres of invasive plants such as tamarisk from the banks of the Wash. These cleared areas are then revegetated with native wetland, riparian and upland species. In total, 22 erosion control structures are planned throughout the Wash to reduce channel bed erosion by slowing stream flow to less erosive conditions, while providing a stable platform for vegetation establishment. There are now 9 weirs, along an approximately 6 mile section of the Wash, with an additional three constructed by the National Park Service (nps.gov) downstream of Lakeshore Drive. The weirs have substantially strengthened the Wash’s ability to weather severe storm events without major damage or flooding. In addition, the Wash has benefited from an almost 80 percent total suspended solids reduction, improving water quality in both the Wash and Lake Mead.

2009 MAJOR ACCOMPLISHMENTS

Bureau crews were busy with stabilization activities in 2009. Crews installed several miles of bank protection along the Wash and cleared or knocked down more than 100 acres of invasive tamarisk in preparation of necessary construction clearings. The construction of DU Wetlands No. 2 Weir was completed, bringing the total number of weirs in the Wash to 12 (the three National Park Service weirs are not included in this total). Also during the year, design and contract documents were completed for the construction of the Lower Narrows Weir, the Homestead Weir, Fire Station Bank Protection, DU Wetlands No. 1 Weir and the Bureau 2010 Wash construction plans.

In the fall, construction bidding was completed and construction contracts were approved for the Lower Narrows and Homestead Weirs and the Fire Station Bank Protection projects.

Also in 2009, the Wash Facilities Team directed water quality experts to complete an extensive evaluation of the potential impacts of perchlorate contaminated groundwater discharges on Lake Mead and the Colorado River system during construction. The results show that it is safe to discharge up to 80 pounds per day of perchlorate into the Wash and there will be no more than a one part per billion rise in perchlorate concentrations in Lake Mead. The study did indicate that it is best to discharge groundwater only during times the lake is de-stratified (December-May).

2010 OPERATIONAL OBJECTIVES
Stabilization projects will steadily advance through the coming year. With several projects in design, bid or construction phase, the Wash Facilities Team will have a full schedule.

Significant progress in the construction of Lower Narrows and Homestead Weirs is expected, and construction crews anticipate conclusion of the Fire Station Bank Protection project by April. Also, DU Wetlands No. 1 and Demonstration Replacement Weirs are projected to go into construction bidding in the summer and fall, respectively.

Design efforts of the Wash Facilities Team will be focused on Archery and Silverbowl Weirs during 2010. Also, the Bureau will build bank protection along the south bank of the Wash at the Duck Creek confluence. All of the remaining bank protection work will be completed as a part of the weir construction projects. This includes approximately 6,000 linear feet of bank protection at the Lower Narrows and Homestead Weirs project.
2009 HIGHLIGHTS

• Compiled analytical data results from samples collected in 2003, 2005 and 2007.
• Drafted report summarizing 2007 data with comparisons to 2003 and 2005 data and submitted to SNWA for review.
• Prepared a draft manuscript by SNWA and the U.S. Fish and Wildlife Service regarding selenium in bird eggs.
• Obtained funding from the Bureau for bioassessment sample collections in late 2009 and 2010.

PROJECT SUMMARY

Erosion control structures along the Wash have led to some promising water quality improvements and ecosystem enhancements; however, these structures have the potential to change the flow regime. Wetland plants that are behind the weirs clean the water, but there is a potential for contaminants to accumulate and affect both the water and area wildlife. Thriving biota require regular monitoring and oversight to prevent potentially harmful contaminant accumulation in the waters and to provide background data for future water and wildlife management decisions.

Directed by the Research and Environmental Monitoring (REM) Study Team, the bioassessment monitoring program tracks the impacts of the weirs and monitors the potential for contaminants in the Wash. The objectives of bioassessment monitoring include determining the presence or absence of contaminants of concern in the Wash and select tributaries; comparing data results to established levels of concern; comparing data results to the same media among sample collection sites; and using the data for future bioassessment studies. The monitoring program is conducted to meet environmental compliance for constructing erosion control structures in the Wash.

More than 100 samples of fish, bird eggs, water and sediment are typically collected biannually and then analyzed the following year for more than 50 contaminants of concern, such as selenium and mercury. The Pahranagat National Wildlife Refuge (Pahranagat) serves as a reference site where fish and bird egg samples are collected. Pahranagat has minimal urban influence found in its watershed, and samples from this area serve as a regional reference for baseline comparison.

In 2003, the Wash Team, aided by the U.S. Fish and Wildlife Service (fws.gov), began gathering fish tissue and bird egg samples from areas in the Wash. Since then, three rounds of sample collections for bioassessment monitoring have occurred. Water, sediment, fish and bird egg samples were collected from sites along the Wash, select tributaries and the Nature Preserve. All samples were analyzed by U.S. Environmental Protection Agency (epa.gov) certified laboratories for a selected suite of contaminants of potential concern.

The studies provided researchers with a snapshot of environmental conditions in the Wash and its tributaries, helping them to isolate issues of concern. Data were collected in 2003, 2005 and 2007, and show that, among other analytes, selenium is a concern in Las Vegas Valley.

2009 MAJOR ACCOMPLISHMENTS

While no field data were collected in 2009, the analytical data results from samples collected in 2003, 2005 and 2007 were compiled into a master database and quality control measures were implemented to ensure the database does not contain mistakes. A draft report summarizing 2007 data with comparisons to the 2003 and 2005 data was compiled and submitted to SNWA for review.

A draft manuscript was prepared by SNWA (snwa.com) and the U.S. Fish and Wildlife Service regarding selenium in bird eggs. Preliminary estimates show that selenium is found in most of the bird eggs collected in the Las Vegas Valley; however, the average concentration of selenium in eggs from Las Vegas Valley is only slightly higher than in Pahranagat Valley. No physical signs of toxicity have been observed in any sample collected. By 2007, risk of bird malformations, calculated from models developed by the U.S. Fish and Wildlife Service, was less than one percent.

The Wash Team also obtained funding from the Bureau for bioassessment sample collections in late 2009 and 2010. Activities were expanded to include a study evaluating selenium concentrations in zooplankton in Lake Mead. Zooplankton are to be collected from known razorback sucker spawning sites to determine potential selenium burden in the razorback sucker’s diet. Collections will be jointly conducted during other on-going studies.

2010 OPERATIONAL OBJECTIVES

The coming year’s activities will include submitting the 2009 report to LWVC stakeholders for review and comment and providing presentations to the LVWAC and others regarding the 2009 report and its findings.

The Wash Team also will submit the selenium bird egg manuscript to the LVWAC and collect bird eggs from the lower Wash and analyze the samples for selenium. Other sampling areas and sampling media also may be evaluated. Finally, zooplankton will be collected from Lake Mead and the samples will be analyzed for selenium.
PROJECT SUMMARY

Water quality sampling provides an unbiased glimpse into the daily conditions of the Wash waters. Collected data allows hydrologists to keep an eye on water quality as they work to evaluate the watershed and its role in our community’s water supply. Five permanent, real-time water quality stations were built along the Wash and its tributaries to continuously monitor water quality data, including temperature, pH, electrical conductivity, and dissolved oxygen every 20 minutes. Two stations are located in the mainstream of the Wash and the others are located in Duck Creek, Flamingo Wash and Las Vegas Creek. These first-hand water quality data, along with those from other water quality investigations, inform design and management decisions on the Wash, maximizing its environmental benefits.

The water quality monitoring efforts conducted on the mainstream Wash are used to evaluate the baseline conditions of the Wash, to demonstrate water quality variations over time, to quantify the effects of increased water usage on water quality and to provide a long-term history of data that can be used to make watershed-based decisions. The tributary sampling program, conducted to meet the Las Vegas Valley’s stormwater discharge permit requirements, was designed to monitor the effects of urban runoff on the Wash. Water quality samples obtained from the tributaries provide important information on nonpoint sources of contamination to the Wash and Las Vegas Bay in Lake Mead. Data is also used in other applications of water quality monitoring, such as determining mass concentrations of contaminants and analyzing seasonal changes in water quality. Routine water quality monitoring continues to assist in providing a comprehensive understanding of the Wash. Data collected since 2000 shows that the overall quality of the Wash improves with each year. The positive effects of basin stabilization and revegetation efforts are reflected in the water quality data. Total suspended solids (TSS) in the Wash have been reduced 77 percent at site LW0.8 (below Lake Las Vegas), from an average of 34.5 mg/L in 2001 to an average of 8 mg/L in 2008. TSS averaged 10.6 mg/L for 2009. This small increase was due to increased construction activities in and upstream of the Wash, which stirred up and released sediment downstream. The Wash Team has continually worked to expand and shape the water quality monitoring efforts to meet the evolving needs of the Wash.

Twelve erosion control structures have been constructed in the Wash. Wetland systems formed behind these structures are very efficient in removing TSS from the Wash water. The TSS monitoring program was designed to determine the efficiency of these structures on the removal of suspended solids.

2009 HIGHLIGHTS

• Adjusted sampling frequency for the mainstream program to every other month and the shallow groundwater sampling to quarterly based on evaluation data and consideration of sampling by permits.
• Continued the implementation of the extended selenium monitoring project that began in June 2008.
• Implemented a new software program for the management and quality assurance of the real-time water quality program.
• Uploaded water quality data into a central database accessible via the Wash Team’s web site.
• Determined ongoing efforts to control nutrient loading to the lake have been successful.
• Evaluated stalled progression of quagga mussels in Lake Mead.

PROGRAM RANGE FREQUENCY

Mainstream sampling 8 locations Bi-monthly

Tributary sampling 8 locations Quarterly

Real-time monitoring 5 locations Continuously

Shallow groundwater monitoring wells 5 locations Quarterly

TSS and percentile monitoring 10 locations Monthly

Extensive selenium sampling 3 tributaries Quarterly

Tributary stream gauging

Water quality monitoring programs

2009 MAJOR ACCOMPLISHMENTS

The Wash Team continued to assess and enhance water quality programs in 2009. Changes were made to the sampling frequencies of both the mainstream sampling program and the shallow groundwater monitoring, wells program. Sampling frequency for the mainstream program was moved to every other month and the shallow groundwater sampling was moved to quarterly based on evaluation of the data and consideration of sampling conducted by cooperating agencies. Agencies are working together to reduce duplicate sampling, while ensuring that data needed for projects are still collected.

The extended selenium monitoring project, which was implemented on June 1, 2008, continued through 2009. This project is conducted on a quarterly basis and is an expansion of the selenium monitoring that is part of the bioassessment monitoring program. Under this sampling project, three tributaries (Duck Creek, Pittman Wash and Whitney Drainage) are sampled for selenium at half-mile increments along each channel and at all downstream and upstream pipes that discharge into the channel. These three tributaries are the largest contributors of selenium to the Wash. This quarterly selenium sampling was useful in developing a selenium management plan for the Wash.

A new software program was implemented in January for the management and quality assurance of the real-time water quality program. This software allows better data management and applies corrections for probe fouling and drift, therefore providing better quality data. Also during 2009, water quality data from all the projects were uploaded into a central database on the members’ password-protected Web site accessible through lvwash.org. This database allows all the members of the LWCC to readily access and download the data from any of the water quality monitoring programs.

Water quality in Boulder Basin and Las Vegas Bay of Lake Mead continued to improve during 2009 despite falling water levels. The continued decline in lake levels did have implications for water supplies, as the warm surface waters reached the drinking water intakes almost one month earlier in 2009 than during 2008. The lake did not completely destratify during the winter of 2008/2009, leaving slightly decreased oxygen concentrations in the bottom waters of Boulder Basin. The introduction of Colorado River waters through a subsurface underflow served to stabilize these concentrations, preventing them from falling to levels of concern. The continued improvements in broad measures of water quality, low chlorophyll concentrations, decreasing total phosphorus concentrations and low total organic carbon concentrations, suggests that ongoing efforts to control nutrient loading to the lake have been successful. The invasive quagga mussels that were first identified in Lake Mead in 2007 appear to have stalled in their progression in the lake. Data describing the juvenile veliger stage of the mussels in general shows that densities were similar to those measured in 2008. The Wash Team is hopeful that this indicates that the population has reached its carrying capacity given current conditions in the lake. This conclusion is supported by the resurgence of other zooplankton groups; the Copepods and Cladocerans. These groups compete with the mussels for food resources, and their resurgence might indicate reduced competition pressures.

2010 OPERATIONAL OBJECTIVES

All ongoing water quality monitoring programs in the mainstream Wash and its tributaries will continue in 2010. Sample locations, frequencies and analyses for these programs will remain similar to the previous year. The Wash Team also will implement a new program, involving increased water quality monitoring along the Wash and in the shallow groundwater system as a result of wet construction and permit compliance. As the Wash Facilities Team moves forward with the construction of additional erosion control structures, they will discharge water from their construction sites into the Wash. As required by the Nevada Division of Environmental Protection (NDEP, ndep.nv.gov) permits, these shallow groundwater wells will be sampled to monitor and track any effects of the discharging to the Wash and shallow groundwater system along the Wash.
2009 HIGHLIGHTS

- Concluded studies at both the Demonstration Wetland at the Henderson Water Reclamation Facility and the Pittman Wash Pilot Wetlands.
- Secured grant funding from the Bureau to begin water quality monitoring at the Clark County Nature Preserve and the in-lieu fee mitigation wetlands.
- Completed the Wetland Characterization Study with Desert Research Institute.
- Contracted the Microbial Uptake Study to the Desert Research Institute.
- Submitted final report of the Wetland Plant Decomposition Study for research conducted in 2008.

PROJECT SUMMARY

Offstream wetlands offer valuable benefits to the Wash by polishing tributary flows and providing precious habitat for local wildlife. Wetland areas are complex systems where biogeochemical processes play an important role in degradation of organic compounds and nutrient cycles. As a result, wetland systems can be beneficial in improving water quality by sequestering nutrients, contaminants and sediments. Two demonstration projects offer scientists the chance to study these areas and conduct water quality, avian and vegetation monitoring activities. Development and monitoring of these wetland systems is supported by grants, as well as staff support from the Bureau and the City of Henderson. (cityofhenderson.com)

The Demonstration Wetland at the City of Henderson’s Kurt R. Flagler Water Reclamation Facility (Henderson WRF) holds 11 submerged beds (hummocks) planted with bulrush, three floating islands and open water. Scientists began study of this constructed wetland in 2004 to obtain data on its effectiveness at improving water quality and helping to identify vegetation compatible with ecological conditions prevalent in Southern Nevada. Biologists conducted bird surveys at the wetland from 2004-2009 to quantify nutrient additions from birds to the wetlands and to assess general bird use.

The Pittman Wash Pilot Wetlands project was constructed in 2005 and primarily examines the impact of constructed wetlands may have on urban runoff. This system diverts the urban runoff in Pittman Wash into a channel and then into two adjacent cells: one cell supports subsurface flows, while the other has a surface flow regime. The two cells are vegetated with three species of bulrush and there are three open-water areas in the surface flow cell. Monthly water quality samples obtained at the inlet and the outflow of the two cells are analyzed for nutrients, cation/ions and metals. Additionally, total nitrogen and phosphorus, dissolved oxygen and electrical conductance are measured during sampling events. This project provides valuable data about the benefits of a smaller wetland system on improving urban runoff flows.

In the spring and fall of 2007 and 2008, vegetation monitoring occurred at both demonstration wetland projects for stem density, height and diameter and survival rate. Additionally, total cover was estimated for each hummock and cell. Plant tissue samples were also collected and analyzed for arsenic, selenium, mercury, total nitrogen and total phosphorus. In 2009, studies were concluded at both the Demonstration Wetland at the Henderson WRF and the Pittman Wash Pilot Wetlands.

2009 MAJOR ACCOMPLISHMENTS

Water quality investigations at the Demonstration Wetland at the Henderson WRF were completed in June. Nearly five years of water quality data were collected that provide insight into the reduction of nutrients, metals and other contaminants in a constructed wetland.

Bird surveys also concluded at the wetland in July, bringing an end to biological monitoring at the site. The surveys identified a total of 110 bird species. The seven most abundant species accounted for more than 70 percent of the birds detected during the 5-year period. In order of most to least abundant, these are northern shoveler, American coot, ruddy duck, great-tailed grackle, mallard, green-winged teal and common moorhen. The northern shoveler single-handedly accounted for more than 25 percent of the total birds detected, even though it was only present at the site during the winter months.

At the Pittman Wash Pilot Wetlands, water quality monitoring ended in January after a storm damaged the infrastructure of the system preventing proper flow. The two years of data have shown little change in water quality, most likely due to the project’s small size and low residence time. The footprint of data have shown little change in water quality, most likely due to the project’s small size and low residence time. The footprint of data have shown little change in water quality, most likely due to the project’s small size and low residence time.

A contract for the Microbial Uptake Study was issued to the DRI to evaluate the role that algae and other microorganisms play in improving water quality in the Las Vegas Valley watershed. Water samples were collected from several locations within the valley and were cultured to quantify the rate of microbial uptake of nitrate and phosphate. Also, microorganisms were inventoried for abundance on a quarterly basis. Using abundance and uptake data, potential nutrient removal by microorganisms was calculated.

A final report of the Wetland Plant Decomposition Study was submitted for research conducted in 2008. Three species of common wetland plants (hardstem bulrush, cattail and common reed) were planted in the Wash and left to decompose over a year-long period. The intent of the study was to determine the rate of plant decomposition, the mechanisms of decomposition and the chemical makeup of the plant tissue that remained after decomposition started. Results found that bulrush decomposed most quickly and that arsenic and selenium were likely actively transported into decomposed material by microbes.

2010 OPERATIONAL OBJECTIVES

A final report detailing the results for both the Demonstration Wetland at the Henderson WRF and the Pittman Wash Pilot Wetlands will be completed in 2010. Also, the physical structures at the Pittman Wash Pilot Wetlands will be removed.

The Wash Team will begin to collect wetland data at the Nature Preserve and in-lieu fee mitigation wetlands beginning in February. Approximately nine sites will be selected in both locations. The team expects to analyze water samples for total dissolved solids, chlorides, fecal coliform, sulfates, metals, nitrogen and phosphorus. Results will be detailed in quarterly reports prepared for NDEP and annual reports.

The DRI study report will be finalized and submitted to the LWCC stakeholders for review and comment. Also, a draft report for the Microbial Uptake Study will be submitted for review and comment.

If funding is available, collected data from the Pittman Wash Pilot Wetlands, Demonstration Wetland at the Henderson WRF, Wetland Plant Decomposition Study, Wetland Characterization Study and Microbial Uptake Study will be used to measure wetland processes at the system level. From this assessment a wetland system mass balance can be calculated and a functional model can be developed.
PROJECT SUMMARY

The diverse and abundant wildlife at the Wash not only emphasizes the importance of the Wash area to Las Vegas residents, but also to the valley’s ecosystem. Working closely with the REM Study Team, the Wash Team evaluates and implements wildlife monitoring and management activities. The information collected from their studies was used to develop the Las Vegas Wash Wildlife Management Plan. The plan serves as a guiding document for effectively managing the Wash’s diverse wildlife population, and recommends actions to conserve wildlife abundance and diversity, protect and enhance native wildlife habitats and increase environmental awareness of these resources in the community. Since 1998, biologists have studied vertebrate and invertebrate wildlife inhabiting the Wash. They have identified more than 260 species through this research including: reptiles, large and small mammals (both terrestrial and bats), fish, amphibians and birds. Aquatic macroinvertebrates and terrestrial invertebrates including butterflies also have been studied. In addition, surveys for endangered species have been conducted as a mitigation measure that allows erosion control activities to continue. The Wash Team conducts long-term research and monitoring to expand the knowledge and understanding of all wildlife in the Wash and further the LWCC’s ability to protect and conserve these species, in addition to documenting the presence of species never before known to exist in the area.

The Wash hosts more than 200 species of birds, including some sensitive species. Several ongoing studies gather valuable information regarding the bird population. The Avian Point Count Survey, begun in 2005, monitors birds on a bi-weekly basis at more than 30 sites representing the diversity of habitats along the Wash’s banks. The Marsh Bird Monitoring Study was initiated in 2007 to target secretive, wetland-dependent species and has included the federally endangered Yuma clapper rail since 2008. In addition, breeding surveys for another federally endangered species, the southwestern willow flycatcher, are conducted annually. Finally, monthly aquatic bird counts and identified more than 260 species using Wash habitats.

The wildlife management plan recommended conducting a baseline small mammal survey in marsh habitats to determine the presence of the western harvest mouse in the Wash. The one-year study began in August. Two months of captures were completed at eight sites. There were eight species found (يار, deer mouse, house mouse, western harvest mouse, Merriam’s kangaroo rat, pocket mouse, desert woodrat, and white-footed myotis). There were almost double the number of captures in 2009 compared to 2008. Although previously recorded during acoustic monitoring, 2009 is the first year the Townsend’s big-eared bat was captured.

2009 MAJOR ACCOMPLISHMENTS

Implementation of the wildlife management plan continued in 2009. REM and Administrative Study Team members completed final rankings of the plan’s 31 recommended actions and of the sub-actions that were later developed by the Wash Team with study team approval. Actions that were already ongoing continued and new actions were initiated, including completing the baseline inventories on taxa species not identified during the surveys conducted between 1998 and 2007. Most of the projects described in this report were initiated or continued as a result of wildlife management plan actions and all were funded by grants from the Bureau.

2010 OPERATIONAL OBJECTIVES

The Great Basin Bird Observatory will complete the year five report for the Avian Point Count Survey in 2010. Also, the Wash Team will finalize the 2007-2009 marsh bird report, draft a report on the first year of aquatic bird count data and write a report for five years of the bat study, including both the acoustic and the capture surveys. In addition, the Wash Team will complete both the large and small mammal studies. The team will begin data analysis and draft reports of their findings. Wash Team staff also plans on taking over surveys for the southwestern willow flycatcher, once federal permits are obtained. This should represent a great cost savings to the project, as consultants previously conducted the surveys.
2009 HIGHLIGHTS

- Revegetated approximately 38 total acres, including 9.6 acres at Downstream Pabco North and 28 acres at the Clark County Water Reclamation District property.
- Harvested bulrush, sandbar willow and cottonwood trees and planted them at the Upper Diversion Weir.
- Salvaged emergents from Pittman Wash Pilot Wetlands and transplanted them to the DU Wetlands No. 2 site.
- Created more than 1 acre of wetlands along the Upper Diversion Weir.
- Cleared nearly 34 acres of tamarisk at the Clark County Water Reclamation District property.
- Knocked down an additional 80 acres of tamarisk for pre-construction for future weirs.

PROJECT SUMMARY

Stabilization activities limit erosion and reinforce the Wash’s banks, yet these efforts displace valuable vegetation in the process. When construction ends, the Wash Team and volunteers replant disturbed sites with suitable native vegetation. These actions comply with the 404 permits issued by the U.S. Army Corps of Engineers (Corps) and stormwater permits issued by NDEP. This work also allows for habitat enhancement, public outreach and bank stabilization benefits.

The health of the vegetation and variety of plant life dictate the animal species that will reside in an area. Plant life also helps control erosion by stabilizing soils, weirs and adjacent banks. In addition, vegetation filters urban water flows helping to improve the water quality in the Wash. The Wash Team diligently works to clear invasive vegetation such as rapid-spreading tamarisk, which degrades habitat quality and increases soil salinity, and replants these areas with diverse native vegetation. Learning from past successes and failures has made the processes involved in vegetation enhancement and management more efficient and sped up the time it takes from starting a project to its ultimate completion.

Through research and testing, the Wash Team has created a growing list of native plants for the Wash. A wide variety of native plant material and planting techniques for revegetation projects have been utilized, including a seed collection program and hydroseeding techniques. In addition, ideal irrigation practices have been explored and developed to ensure that every area laboriously planted thrives and meets the performance criteria outlined in permits.

To date, the Wash Team has revegetated more than 260 acres of Wash land. Of the completed acres, 37.5 can be applied toward wetland mitigation goals for the erosion control program. The remaining 222.5 acres have been planted to satisfy requirements for other permits or various grants provided to the SNWA to fund the erosion control program.

Since 2001, vegetation management activities have consisted of finding innovative and economical ways of removing non-native species from the Wash and ensuring that these species do not return to revegetated sites. Effective invasive weed control helps improve wildlife habitat and allows native plants to thrive. To date, the LWCC has removed approximately 240 acres of tamarisk, which does not include the 80 acres knocked down by Bureau crews for future construction (knocked down vegetation is not permanently removed, therefore it is not included in the above total).

2009 MAJOR ACCOMPLISHMENTS

Volunteers revegetated approximately 38 total acres during 2009. Broadcast seeding took place for the first time at the Downstream Pabco North location, with volunteers seeding the site with three native plant species: sunflower, desert marigold and brittlebush. The 9.6 acres revegetated at Downstream Pabco North includes the transplant of almost 3 acres of native saltgrass from the Nature Preserve. The remaining 28 acres of revegetation took place at the Clark County Water Reclamation District (CCWRD) property.

The Wash Team harvested bulrush from the Pittman Wash Pilot Wetlands and transplanted them to the DU Wetlands No. 2 site. Additionally, more than 1 acre of wetlands were created along the Upper Diversion Weir with harvested hardstem bulrush and other emergents from the Demonstration Wetland at the Henderson WRG. Cottonwood poles from the cottonwood cell and sandbar willows from the Historic Lower Weir.

Tamarisk removal progressed in 2009 as well. The Bureau cleared nearly 34 acres of tamarisk at the CCWRD property. Also, an additional 80 acres of tamarisk was knocked down for pre-construction for future weirs. No herbicide treatment was applied.

2010 OPERATIONAL OBJECTIVES

The Wash Team expects to combine vegetation surveys with wildlife surveys to show whether or not the vegetation enhancement and management program is enhancing wildlife habitat along the Wash. Weeding and maintenance will continue with the Nevada Division of Forestry, with support from a Bureau grant. The team also will clear approximately 7 acres of invasive tamarisk near the Historic Lower Weir.

Also in the coming year, the Wash Team will continue harvesting hardstem bulrush and other emergents from established locations such as Bostick and Calico Ridge Weirs and transplanting them to other Wash sites. Possible volunteer planting locations include DU Wetlands No. 2 and Upstream Historic Lateral South 2 sites.
2009 HIGHLIGHTS

- Mapped, disassembled and relocated the Lower Narrows Milk House to the Clark County Museum.
- Determined parameters of cultural site tested near the expected location of the Sunrise Mountain Weir.
- Continued efforts to finalize the Programmatic Agreement to unify archaeological work.

PROJECT SUMMARY

The Wash's flourishing wetlands began attracting visitors to its banks as early as 300 B.C. Valuable information about the lifestyle of Las Vegas' earliest inhabitants lies buried beneath the soil, waiting to reveal the story of a people who long ago used the area’s water, plant and animal resources to sustain a life in the harsh Mojave Desert. The Wash Team and archaeologists work to identify potential cultural resource sites and excavate noteworthy areas to ensure that historically significant artifacts are appropriately collected and catalogued.

As one of the most significant concentrations of cultural resources in the area, the Wash contains a number of cultural resource sites that provide significant data about the historic and prehistoric desert culture in Southern Nevada. In 1977, the area was designated as the Las Vegas Wash Archaeological District in an effort to recognize and protect these resources. Also, any feature more than 50 years old discovered in the area may be eligible for listing on the National Register of Historic Places. To date, more than 40 eligible cultural sites have been identified at the Wash.

Almost 10 years ago, the Bureau partnered with the Wash Team to conduct archaeological surveys as a step toward preserving the historically significant area. This effort was necessary since early surveys had been greatly under-funded and the collected information was incomplete. In addition, the topography of the land had changed significantly due to erosion, road construction and impacts from off-road vehicles, further justifying the effort. Today, the Wash Team works with oversight from the REM Study Team to preserve this area and mitigate the impacts of construction-related disturbances.

Archaeological excavations of buried cultural deposits at the Wash have identified pit houses, hearths and food storage pits dating from 300 B.C. to A.D. 1600. These digs have allowed researchers to study artifacts corresponding to different periods of occupation. Archaeologists have uncovered the foundation of a house along with an irrigation ditch, a collapsed 4-foot timber wall and a stepping-stone pathway dating from the early 1900s. These discoveries and research suggest that the Wash was a central lifeline for early inhabitants and explorers of Southern Nevada.

2009 MAJOR ACCOMPLISHMENTS

The early 1900s Lower Narrows Milk House cultural site, also referred to as a root cellar, was mapped, disassembled and relocated to the Clark County Museum early in 2009. The structure is being stored on pallets at the museum until its reassembly and use for educational outreach. The Wash Team also received a grant from the Bureau to fund reassembly. Data collected from this site continue to be analyzed.

Archaeologists also tested another cultural site near the expected location of the Sunrise Mountain Weir. The testing revealed historic debris on the surface and likely one fire pit lens below the surface. The parameters of the site were determined to be fairly concentrated and outside the anticipated construction limits and therefore could be left alone.

The Wash Team continued efforts to finalize the Programmatic Agreement created by the Bureau over a multi-year period in order to meet its responsibilities under Section 106 of the National Historic Preservation Act. The agreement is now very near completion. Once executed, the agreement will serve to expedite the review process for upcoming projects and provide a clear strategy for projects that would require mitigation.

2010 OPERATIONAL OBJECTIVES

Most importantly, the Wash Team will finalize and sign the Programmatic Agreement among Clark County, the Bureau, the Corps, the SNWA, the Nevada State Historic Preservation Office and the Advisory Council on Historic Preservation. The agreement will provide a streamlined and more efficient process for meeting the requirements of the National Historic Preservation Act. Also, the agreement will serve as a directive outlining the regulatory process for any project within the Clark County Wetlands Park that may impact cultural resources.

Additionally, the Wash Team will concentrate on the reconstruction of the Lower Narrows Milk House. The structure will be reassembled at the Clark County Museum and once completed will be utilized for educational outreach opportunities.
2009 HIGHLIGHTS

- Hosted or participated in 46 outreach events.
- Distributed 4,512 E-mail Updates to valley residents.
- Interacted with a record-breaking 21,447 residents through various community outreach events.
- Developed a bilingual weed guide and updated wildlife education material.
- Adapted field trip for Mabel Hoggard Math and Science Magnet School.

PROJECT SUMMARY

The Wash plays a critical role in our community’s overall ecosystem. As the public’s awareness grows, so does their involvement in events at the Wash. Activities offer the community a chance to participate in and understand the unique challenges facing the Wash and challenge citizens, from children to adults, to engage with Wash stakeholders, to become involved in preserving this vital waterway. Since the first volunteer event in 2001, more than 5,000 people have volunteered to lend a hand in planting more than 46,000 trees, shrubs and emergent grasses that now beautify and strengthen the Wash area. The 15 volunteer Green-Ups completed to date include the largest one-day volunteer planting event in Nevada history and have revegetated nearly 120 acres with native plants.

The Wash Team, with the guidance of the Administrative Study Team, invests considerable resources and staff time into providing learning opportunities and educating Southern Nevadans about the importance of the Wash and its water quality, plant and animal species, stabilization activities and archeological discoveries.

2009 MAJOR ACCOMPLISHMENTS

- In spring, 358 volunteers planted 2,160 plants and spread 43 pounds of seeds across 7.5 acres of Downstream Pabco North. In the fall, 1,000 volunteers planted 6,137 plants on 28 acres of the COWARD property. The fall event was the 15th and the largest Green-Up ever completed, as well as the first conducted outside the Clark County Wetlands Park boundary.
- Additional accomplishments included the development of a bilingual weed guide and increased wildlife education material, as well as participation in Connecting Hand’s Offering Lifelong Learning Adventures (CHOLLA).

2010 OPERATIONAL OBJECTIVES

Two Green-Ups will be conducted during 2010, one in spring and one in fall. The spring event is expected to be located on the south side of the Wash adjacent to the DU Wetlands No. 2 Wet. The fall Green-Up is expected to be on the south side of the Wash at the upstream Historic Lateral South 2 site if cleared by Bureau crews in the winter.

In spring, 358 volunteers planted 2,160 plants and spread 43 pounds of seeds across 7.5 acres of Downstream Pabco North. In the fall, 1,000 volunteers planted 6,137 plants on 28 acres of the COWARD property. The fall event was the 15th and the largest Green-Up ever completed, as well as the first conducted outside the Clark County Wetlands Park boundary.

Additional accomplishments included the development of a bilingual weed guide and increased wildlife education material, as well as participation in Connecting Hand’s Offering Lifelong Learning Adventures (CHOLLA).

The Wash Team reached 21,447 residents through community outreach events throughout 2009, a record number for the program.

The Wash Team plans to participate in or coordinate outreach events for the community including several Earth Day-type events and the Mabel Hoggard program. Also, wildlife educational materials will be offered at all events and involvement with CHOLLA will be expanded.
2009 HIGHLIGHTS
• Hosted more than 28,300 visits and 18,300 unique visitors to lvwash.org.
• Responded to 338 information requests.
• Reorganized the document library and volunteer signup sections of the Web site.
• Spatially referenced aerial photography collected of the Wash.
• Optimized application to enable water quality data downloads of any size.

PROJECT SUMMARY
The Wash Team diligently creates, monitors and maintains a variety of technology-driven projects to support the ongoing research and activity of the LVWCC. From water quality to bioassessment monitoring, the ability to store, access and share maintenance of a central data repository accessible to participating agencies. A vast amount of information is shared through the Web site, which provides an avenue for stakeholders and the public to access and request information from the LVWCC and the Wash Team. The tools developed by the Wash Team have been critical in answering water resource management questions. These innovative applications, databases and repositories have continued to help the Las Vegas Valley meet its watershed goals. Two Web sites were established to support the LVWCC’s efforts. The password-protected members’ site accessible via lvwash.org helps facilitate communication amongst the study teams, LVWCC members and the Wash Team. This site includes several applications such as: Project Tracking, the Image Repository, a Water Quality Database and the Contact Request System. The Wash’s public Web site, lvwash.org, provides instantaneous information to the community around the clock. Designed to inform and energize the public about the LVWCC’s efforts, the Web site features monthly articles and information about upcoming Wash events and provides a multi-faceted look at the Wash’s past, present and future. Users can volunteer and request tours or field trips through the site. Continued maintenance includes: monthly news updates, E-mail Updates and regular updates to both the public Web site and the members’ Web site. The Wash Team also provides the ever expanding storage, maintenance and processing of high-resolution aerial maps, which are flown a minimum of every six months. These photographs provide the baseline maps for researchers to use for vegetation analysis, planning, erosion control, water quality and overall documentation of historical changes.

2009 MAJOR ACCOMPLISHMENTS
An active year for the Wash Team resulted in more than 28,300 visits to lvwash.org by more than 18,300 unique visitors. This averaged more than 1,500 unique visitors per month. Twelve E-mail Updates were sent to LVWCC members and the nearly 380 subscribers. The Wash Team handles increasingly larger amounts of information each year, requiring enhanced efficiency on their part. In 2009, team members managed and supported:
• 335 contact requests
• 137 images added to ImageRepo, bringing the total to 11,556 images
• 335 documents added to document library, now holding 7,492 documents
• 693 user accounts
• 4,353 contacts
• 176,495 HydroLab readings, totaling more than 1.25 million records since 1998

Updates were made to the design of the E-mail Update and the Wash Team reorganized the document library and volunteer signup sections of the Web site. The content of the Web site is continually updated, including monthly news features. New digital aerial photography was flown and the imagery was processed for two flights that occurred in 2009. The flights take place as requested by researchers, or when needs arise. In 2009, there were 864,471 lines of water quality sample data. Since the inception of the program in 2008, a total of 2.4 million lines of water quality sample data have been drawn. The centralized database now includes 189 sites, 582 parameters and seven participating agencies. Also in the last year, the application was optimized to enable water quality data downloads of any size.

2010 OPERATIONAL OBJECTIVES
Upcoming projects for the year will include content maintenance of lvwash.org. The Wash Team will continue to look for opportunities to improve the Web site and keep up with industry standards, ensuring timely, concise and relevant applications, databases and repositories. The members’ Web site will be enhanced in 2010 to improve navigation and make it much more user-friendly. Ongoing research, continued regular updates, monthly E-mail Updates and re-construction of the image repository also will continue. Because interagency coordination is so critical to long-term management activities for the Wash, the Wash Team will continue to liaison with information technology professionals to facilitate the efficient and accurate transfer of information among participating agencies.
Mission: working to stabilize and enhance the valuable environmental resources of the Las Vegas Wash

April 2010