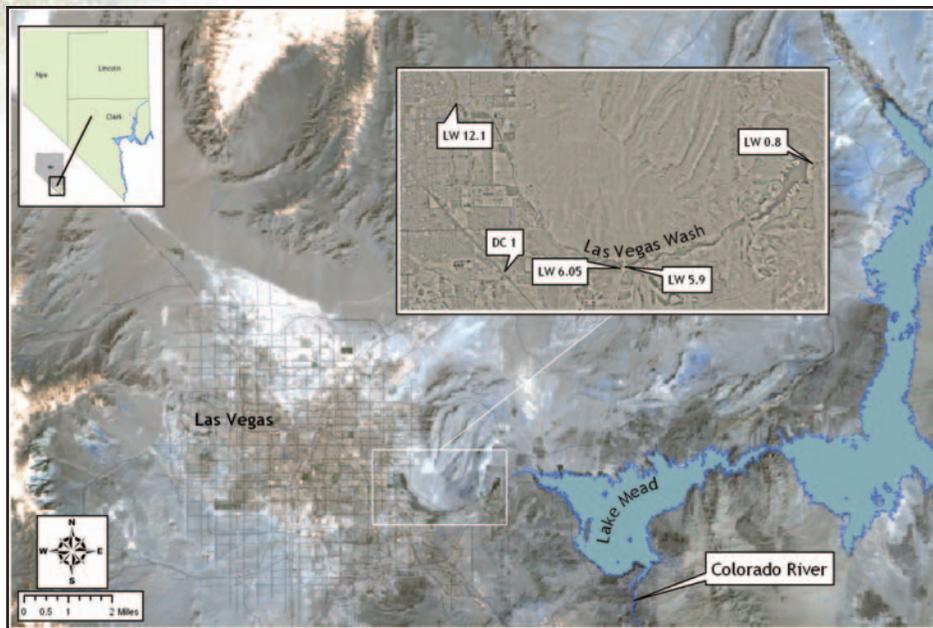


Water Quality Monitoring in the Las Vegas Wash

Xiaoping Zhou, Debbie VanDooremolen, Robert Huening, Keiba Crear, Peggy Roefler, Kimberly S. Zikmund – Southern Nevada Water Authority

The Las Vegas Wash is the sole drainage from the Las Vegas Valley watershed to Lake Mead. The flow to the wash includes highly treated wastewater from three treatment facilities in the valley, urban runoff, shallow groundwater, and storm water. Rapid growth and urbanization in the Las Vegas Valley over the past two decades have resulted in increased flows to the wash. These flows have not only caused significant erosion and wetland loss, but have the potential to affect water quality in the wash and in Lake Mead, which provides 88 percent of the drinking water for the entire region.

Since 1998, the Las Vegas Wash Coordination Committee, a group of 28 local, state, and federal stakeholders, has worked to implement long-term management strategies for the Las Vegas Wash. A Comprehensive Adaptive Management Plan (CAMP) was developed in 2000, and a series of projects, such as erosion-control structures, revegetation along the wash's banks, and wetland enhancement in the wash, have been implemented to



Sites selected for near-real-time water quality monitoring in the Las Vegas Wash.

control erosion, improve water quality, and enhance the ecosystem in the wash. In order to continue making decisions that meet the goals of the CAMP, water quality in the wash has been intensively monitored through several programs. One of these programs is the near real-time water quality monitoring of the wash and its tributaries using Hydrolab® multiprobe data loggers.

Data collected from this program give valuable information on general water quality in the areas monitored and support both the mainstream wash and tributary sampling programs. Specifically, scientists anticipate that results from this investigation will help to:

- obtain baseline data of water quality in the wash and selected tributaries
- monitor near real-time changes and unusual water quality conditions in the wash and its tributaries

- compare differences in water quality both over time and among different sites
- provide near-real-time water quality data to professionals and the public through a Web site.

These results, along with those from other water quality investigations in the area, will also help scientists to design and manage the Las Vegas Wash as a whole to maximize its environmental health.

Monitoring Sites

Five sites in the wash and its tributaries (see map), including Las Vegas Creek (LW12.1), Duck Creek (DC_1), upstream of Pabco Erosion Control Structure (LW6.05), downstream of Pabco Erosion Control Structure (LW5.9), and below Lake Las Vegas (LW0.8), have been selected for near-real-time water quality monitoring. Las Vegas Creek and Duck Creek are two of six major tributaries to the wash. They capture urban runoff from northwest and southwest parts of the Las Vegas Valley watershed. Sites LW6.05, LW5.9, and LW0.8 are located in the mainstream of the wash; LW5.9



Water quality monitoring and data transmission in the Las Vegas Wash area.

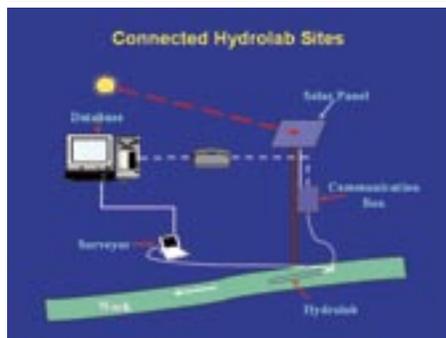
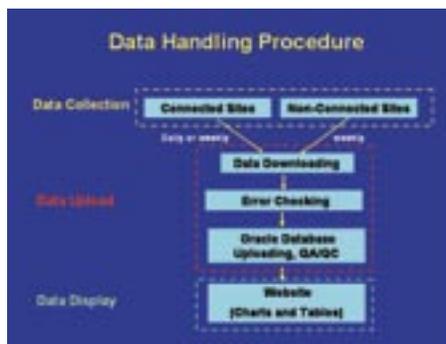
and LW0.8 are below the discharges from three wastewater treatment facilities; and LW0.8 is located near the end of the wash, representing the outlet of the Las Vegas Valley watershed.

Data Collection

This near-real-time water quality monitoring program began with three mainstream wash sites in December 2000 and was expanded in May 2001 to include two tributary sites. Hydrolab units, containing DataSonde® water quality multiprobes and a Surveyor® water quality data logger, have been used to measure water quality parameters, including water temperature (T), pH, dissolved oxygen (DO), and electrical conductivity (EC), from which total dissolved solids are calculated. Each multiprobe remains in the water 24 hours a day throughout the year, except when out for maintenance and calibration or during flood events in the valley. The multiprobes record the water quality parameters and the data loggers store the collected data every 20 minutes. With a memory of 512 kilobytes, the data loggers can store as many as 100 days' worth of water quality data collected at 20-minute intervals. The recorded data from each site are downloaded to the water quality database monthly. One tributary and two mainstream sites are also accessible via modem inside the communication box, which operates with solar power. The data from these remotely accessible sites are transmitted and downloaded hourly and displayed online. The probes are cleaned and calibrated at the sites weekly and in the laboratory monthly. The monitoring sites are also cleaned and maintained in good condition during the weekly site visit.

Data Upload

After automatically downloading the data to a personal computer in the office, errors in the data, such as data gaps due to cleaning and calibration, extreme or incorrect readings due to burying of probes by sediments, and recording failures due to low batteries, can be identified and eliminated. Oracle Database Upload automatically uploads the data to the database. During this process, the data are checked one more time by an Oracle trigger. A wide range for each parameter



(T, pH, DO, EC) was previously defined. When the entered data are out of range, they are flagged.

Data Display

All uploaded data are maintained in an Oracle database, which is accessible to the public through the Las Vegas Wash Coordination Committee Web site, www.lvwash.org/applications/iwq_chart/. Using the search features, one can obtain and display water quality data from a single site or multiple sites, for a single water quality parameter or multiple parameters. The data can be extracted from the database for different periods (daily, weekly, or monthly) and for different time intervals (every 20 minutes or a specified time). All extracted data can be displayed as a chart, table, or both. These charts and tables allow comparisons of water quality among different sites over days, weeks, or months.

In summary, water quality parameters are measured every 20 minutes at five sites in the Las Vegas Wash and selected tributaries. The data are stored in a water quality database and are accessible by water quality professionals and the public. Through the Las Vegas Wash Web site, one can view these water quality data online within an hour of the latest measurement from remote-access sites.

Contact Xiaoping Zhou at 702-822-3302 or Xiaoping.zhou@lvwd.com. Visit www.lvwash.org.

INNOVATIVE SOLUTIONS IN HYDROLOGY

Consulting Services

- Vadose Zone Characterization and Modeling
- Groundwater Recharge Investigations
- Groundwater Resource Studies
- Mine Reclamation
- Mine Leach Optimization
- Design and Development of Monitoring Systems

Hydrologic Testing Laboratory

- Saturated and Unsaturated Flow Properties Testing
- Calibration of Monitoring Instruments
- Large Core Testing
- Custom Testing and Research

GeoSystems Analysis Inc.

2015 N. Forbes Ave,
Suite 105
Tucson, AZ 85745
phone: 520.628.9330
fax: 520.628.1122

www.gsanalysis.com