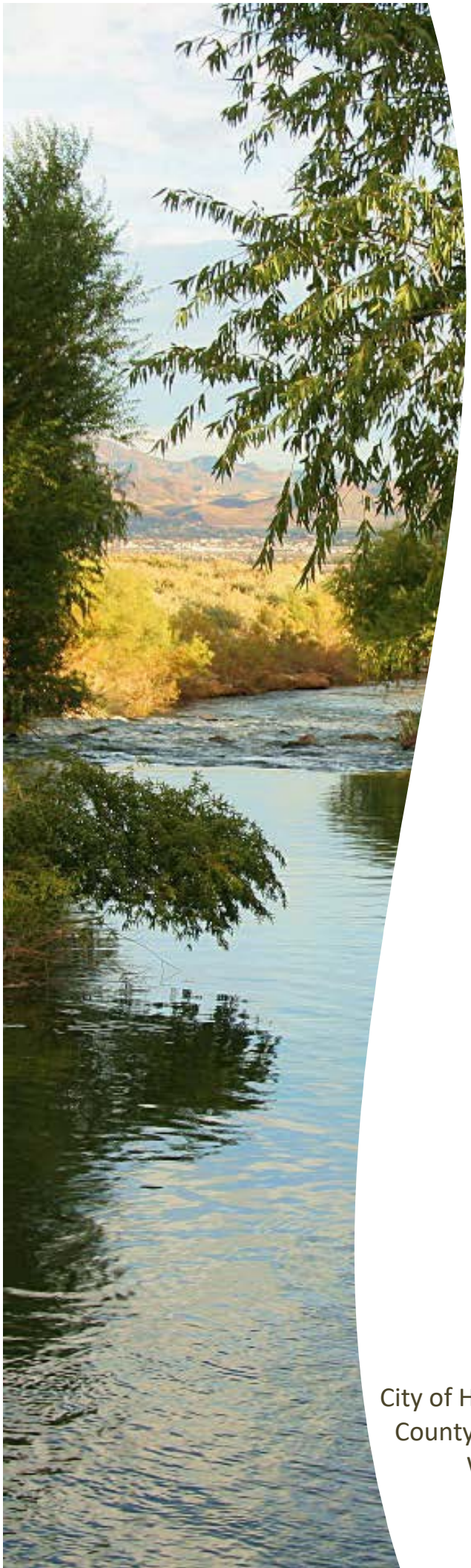


Regional Water Quality Plan

2020 & 2021 ACCOMPLISHMENTS

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 | Las Vegas Valley Water District | Southern Nevada Water Authority

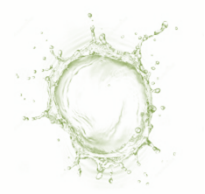
Regional Water Quality Plan | 2020 & 2021 Accomplishments

In January 2009, the Las Vegas Valley Watershed Advisory Committee (LVVWAC) adopted a Regional Water Quality Plan to help meet its mission to:

> *Protect, preserve and enhance the quality and quantity of water resources in the Las Vegas Valley watershed and to sustain economic well-being and protect the environment for present and future generations.*

In December 2012, the LVVWAC approved a Strategy Document that further defines its goals and summarizes actions needed to fulfill the Regional Water Quality Plan.

Each LVVWAC member agency has individual responsibilities that contribute to the management of the Las Vegas Valley watershed. The LVVWAC and its member agencies were impacted by challenges as a result of the COVID-19 pandemic, with programs, events and initiatives being cancelled or postponed. Staff continued to work together, whether from home or the office, and found solutions to maintain stable facility operations. The LVVWAC continued to meet virtually to adhere to safety measures and lessen the spread of the virus. The following is a summary of the LVVWAC's collaborative accomplishments for 2020 and 2021.



GOAL ONE

Protect Lake Mead as a source of water for Southern Nevada and downstream users

The Las Vegas Valley accesses Nevada's Colorado River allocation through existing facilities at Lake Mead. The Muddy River, Virgin River and the Las Vegas Wash also contribute inflows to Lake Mead. In 2020 and 2021, LVVWAC member agencies monitored and responded to upstream inflows to Lake Mead as they:

- Utilized the 2020-21 Lake Mead Monitoring Plan and optimized resources by sharing staff and equipment to accomplish the goals of the plan;
- Continued to implement the Las Vegas Wash Surface Water Quality Monitoring and Assessment Plan;
- Conducted water quality sampling and analysis in Lake Mead, Las Vegas Wash, Muddy River, Virgin River and Colorado River above Lake Mead and below Hoover Dam;
- Leveraged the Lower Colorado River Water Quality Database — a database utilized by agencies in the lower Colorado River region to facilitate data sharing;
- Expanded the capabilities of the Lake Mead Model to forecast potential water quality conditions under future water surface elevation scenarios; and
- Continued to operate and maintain water quality monitoring platforms on Lake Mead to collect high frequency data.

LVVWAC member agencies also managed non-point sources from the Las Vegas Valley:

- Revegetating 46 acres along the Las Vegas Wash to protect against erosion and limit sediment and contaminant movement to Lake Mead;
- Supporting ongoing conservation initiatives that seek to limit outdoor water use, reducing urban runoff from the Las Vegas Valley;
- Continuing implementation of and compliance with the Las Vegas Valley's National Pollutant Discharge Elimination System (NPDES) Stormwater Permit;
- Completing all monitoring required for the Municipal Separate Storm Sewer System (MS4) and NPDES Wastewater Discharge permits, and reporting results to the state of Nevada;
- Continuing participation in the Las Vegas Wash Coordination Committee (LVWCC) and its sub-committees (Operations Study Team, Administrative Study Team and Research and Environmental Monitoring Study Team); and
- Continuing wastewater pre-treatment programs to monitor and prevent contaminants and industrial wastes from entering the wastewater collection system.

The Clark County Water Reclamation District (CCWRD) and the cities of Henderson, Las Vegas and North Las Vegas operate and maintain the community's wastewater treatment facilities. These facilities discharge highly treated wastewater to Lake Mead via the Las Vegas Wash. Additionally, many of these facilities provide reclaimed water for direct non-potable reuse at area parks, golf courses and industries.

In their management, coordination and optimization of the water reclamation facilities in 2020 and 2021, LVVWAC member agencies:

- Reduced the number of sanitary sewer overflows to below the U.S. Environmental Protection Agency benchmark for well operated sanitary sewer systems by two overflows per year per 100 miles of sanitary sewer;
- Continued operation of state-of-the-art membrane bio-reactor treatment plants by the City of North Las Vegas and City of Henderson;
- Completed various rehabilitation and optimization efforts at numerous biological nutrient removal plants, which resulted in increased energy

efficiency, improved biological phosphorus removal, reduced chemical utilization and decreased sludge hauling costs;

- Completed the rehabilitation of the dissolved air floatation tanks at the Flamingo Water Resource Center to stabilize the concentration of waste-activated sludge before dewatering and construction of a new reuse water pump station to supply reclaimed water for internal use and to external customers;
- Completed the 60 percent design of an expansion of the preliminary, primary and secondary treatment facilities at the Flamingo Water Resource Center and began planning for construction;
- Completed $10 million in design and construction of wastewater and reclaimed water facilities at the City of Henderson, including electrical power reliability improvements, with a total capital improvement program budget of $556 million for the Utility Services Department with $169 million in sewer-funded projects ($100 million active and $69 million planned) over the next 10 years; and
- Participated in water and wastewater treatment optimization studies.

GOAL TWO

Meet or surpass federal, state and local standards and regulations

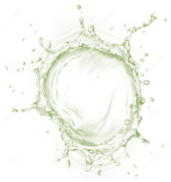
Key water quality laws and regulations, such as the Clean Water Act, Safe Drinking Water Act and the Nevada Administrative Code are in place to safeguard local and regional water sources. While Southern Nevada's water treatment facilities address many source water quality challenges, proactive management of the Las Vegas Valley watershed remains key to protecting the region's overall water resources.

To protect Lake Mead, the Las Vegas Wash and associated tributaries, LVVWAC member agencies:

- Continued year-round phosphorus removal at wastewater treatment facilities to meet the 334 pounds-per-day waste load allocation for total phosphorus, surpassing permit requirements, which only require phosphorus removal between March 1 and October 31;
- Continued year-round ammonia removal;
- Developed and exceeded internal goals for minimizing sanitary sewer overflows;
- Continued implementation of and compliance with the Las Vegas Valley's NPDES MS4 Permit;
- Executed wet and dry weather monitoring programs;
- Performed treatment studies that examined the removal of unregulated contaminants, such as endocrine-disrupting compounds (EDCs), perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) in wastewater, which provided guidance on control strategies and the minimization of these contaminants in effluent discharges to the Las Vegas Wash and Lake Mead;
- Constructed the Effluent Chlorination/ Dechlorination Project at the City of Las Vegas, which provides multiple discharge points as well as newer and redundant sample pumping and analyzing equipment;
- Initiated the Filtration Building Rehabilitation Improvements Project at the City of Las Vegas that will rehabilitate filters, fix corrosion damage, construct a server room and provide HVAC improvements for the filtration building;
- Completed the Biological Nutrient Removal Facility Rehabilitation Project at the City of Las Vegas, replacing valves and actuators, electrical components and influent pumps, along with other miscellaneous improvements;
- Monitored Lake Mead weekly to determine the impacts of the inflows (Las Vegas Wash, Virgin River, Muddy River and Colorado River) on the Southern Nevada Water Authority (SNWA) intakes;
- Initiated development of site-specific criteria for selenium in the Las Vegas Wash in partnership with the Nevada Division of Environmental Protection (NDEP);
- Initiated a review of the tributaries in the Las Vegas Valley that are listed on the state 303(d) list to determine if the listing remains applicable in partnership with the NDEP;
- Monitored contaminants of emerging concern quarterly in the Las Vegas Wash, Lake Mead and below Hoover Dam;
- Completed installation of updated pumps for the low-level pumping station near Lake Mead that will work alongside Intake No. 3 to protect access to Nevada's Colorado River allocation; and
- Continued implementation of the Clark County 208 Area-Wide Water Quality Management Plan in collaboration with the Sewage and Wastewater Advisory Committee to address issues associated with water pollution, population growth and long-term planning as required under Nevada Revised Statutes and the Clean Water Act.

Ensuring that Southern Nevada's water meets or surpasses federal, state and local regulations is of key importance to LVVWAC member agencies. As such, the LVVWAC is proud to report that:

- Southern Nevada's water quality continues to meet or surpass state and federal drinking-water regulations;
- The cities of Henderson and Las Vegas and the CCWRD earned the National Association of Clean Water Agencies (NACWA) Platinum Peak Performance Award for at least five years of consecutive 100 percent NPDES permit compliance. The City of Las Vegas achieved 22 consecutive years of compliance, the City of Henderson reached 17 consecutive years of compliance and the CCWRD achieved nine consecutive years of compliance at the Flamingo Water Resource Center and eight consecutive years of compliance at the Laughlin Water Resource Center;
- City of Henderson and CCWRD coordinated and cooperated with SNWA, University of Nevada, Las Vegas (UNLV), City of North Las Vegas and other partners (Biobot) to sample, analyze and study wastewater epidemiology as a method of monitoring and predicting COVID-19 virus pervasiveness in the community;
- City of Henderson executed a professional services agreement with the design consultant for $9.6 million and the construction manager at risk (CMAR) for $2.1 million for the WRF Phase 4 Improvement Project. The total project budget is $67 million;
- City of North Las Vegas successfully completed Phase 1 of the Membrane Basin Re-coating Project at its water reclamation facility. This project addresses the failing membrane tank coatings, and once completed, will begin end of life cycle membrane replacements and ultimately expand current treatment capacity from 25 million gallons per day (MGD) to 35 MGD in preparation for the city's growth;
- City of North Las Vegas completed and accepted a reuse water line project between the water reclamation facility and Nellis Air Force Base. This installation provides treated effluent under an enhanced lease agreement and replaces groundwater supplies for irrigation use at Nellis Air Force Base;
- City of North Las Vegas entered the design phase of the Sloan Channel Effluent Conveyance Project to address the existing leaking culvert boxes conveying water reclamation effluent to the Las Vegas Wash;
- City of North Las Vegas began replacing the existing dewatered sludge pumps at its water reclamation facility to provide a more efficient method with increased reliability in the dewatering process;
- City of North Las Vegas has completed design and bid preparation for the water reclamation facility's flow equalization basin and anticipates to begin construction in 2022;
- CCWRD is in the design phase of additional headworks, primary clarifiers, biological nutrient removal trains, a dissolved air flotation tank and primary sludge thickeners at the Flamingo plant to ensure sufficient capacity is available for the future and the current treatment goals can continue to be met; and
- CCWRD is also rebuilding its two largest lift stations, Whitney and Lincoln, and installing new interceptors to ensure current and future flows are kept in the system and safely conveyed to the Flamingo plant.



GOAL THREE

Preserve and enhance the natural, cultural, historic and recreational values of the watershed and Lake Mead

The Las Vegas Valley watershed includes the Lake Mead National Recreation Area, Clark County Wetlands Park (Wetlands Park) and Las Vegas Wash, which present opportunities for recreation and support important environmental resources including wildlife and habitat. To provide for recreation and manage wildlife and habitats, LVVWAC member agencies:

- Surveyed for federally threatened and endangered bird species at the Las Vegas Wash. In 2020, biologists detected a Yuma Ridgway's rail (YRRA) and a possible yellow-billed cuckoo (YBCU) breeding territory. In 2021, biologists reported a record number of YRRA (5), the first resident southwestern willow flycatcher in eight years, a migrant willow flycatcher (subspecies unknown), a possible YBCU breeding territory and a likely migrant. Staff also continued construction monitoring for desert tortoise;
- Continued the general invertebrate inventory at the Las Vegas Wash, identifying 33 new species in 2020 and 17 in 2021 for a total of 582 species;
- Navigated COVID-19 limitations and engaged 9,316 youth and adults through environmental education, art, guided tours and events at the Wetlands Park over the course of 2020 and 2021, including 8,100 students through in-person and virtual field trips;
- Removed an estimated 4,400 pounds of trash and debris at the Wetlands Park with 503 volunteers contributing nearly 900 volunteer hours in 2020 and 2021 combined; and
- Managed recreational opportunities in the Henderson Bird Viewing Preserve, hosting over 21,000 visitors in calendar year 2021.

The LVVWAC supports the National Park Service's mission to provide for the enjoyment of scenery, natural and historic objects and wildlife in a manner that will leave such resources unimpaired for future generations.

LVVWAC member agencies made the following progress in minimizing impacts to cultural resources:

- Completed a resurvey of the Las Vegas Wash Archaeological District that documented the district's integrity despite heavy activity and generated new photos, GIS data, maps and a final report;
- Continued to implement the Programmatic Agreement between the Bureau of Reclamation (BOR), U.S. Army Corps of Engineers, SNWA, Clark County, the Nevada State Historic Preservation Office and the Advisory Council on Historic Preservation to expedite the construction of erosion control structures in the Las Vegas Wash until it concluded in 2021 and discussed a new agreement limited to maintenance activities on BOR lands;
- Supported the Cultural Resources Coordinating Committee until its work was completed in 2021 with the conclusion of the Programmatic Agreement; and
- Provided cultural resource reviews on the proposed bridge alignments for an extension of Hollywood Boulevard across the Las Vegas Wash and for weir maintenance activities, identifying no impacts.

LVVWAC member agencies also took the following measures to prevent and control invasive species:

- Removed 11.4 acres of tamarisk from the Las Vegas Wash through a grant from the Nevada Division of Forestry and monitored and removed weeds at recently planted sites; and
- Continued to monitor and evaluate quagga mussel populations in Lake Mead.

The LVVWAC actively worked to support recreational uses and the health of fisheries and other water-dependent wildlife by:

- Managing and monitoring nutrient inputs from wastewater treatment plants to support a healthy fishery in Lake Mead;
- Monitoring selenium concentrations in the Las Vegas Wash and its tributaries to establish background concentrations and determine sources;
- Monitoring Lake Mead for the presence and concentrations of harmful algal blooms and associated toxins; and
- Ensuring that wastewater quality meets the water quality standards as determined by the NDEP for recreation.

GOAL FOUR

Sustain and coordinate water resources for future generations

LVVWAC member agencies address regional water resource planning and management by working collectively and through participation in various regional groups, such as the LVWCC and the Stormwater Quality Management Committee.

In 2020 and 2021, significant strides were made to improve the structural integrity of the Las Vegas Wash, provide for its long-term protection and maximize reclaimed water use and return flow credits:

- Contractor and BOR crews removed spoils and vegetation and re-established grades at four weirs in 2020 and seven weirs in 2021;
- Members approved the Las Vegas Wash Long-Term Operating Plan;
- The cities of Henderson, Las Vegas and North Las Vegas and the CCWRD reclaimed 100 percent of their wastewater effluent by treating it to very high standards and either returning it to Lake Mead or distributing it to golf courses, parks, industries and other customers throughout the valley;
- Reclaimed water was efficiently utilized at the Wetlands Park and Henderson Bird Viewing Preserve to support wildlife habitats;
- The Lake Mead Model was used to forecast changes with changing water levels in Lake Mead to better advising planning for water and wastewater treatment needs; and
- CCWRD and SNWA (and its member agencies) began a Septic Conversion Program to encourage septic users to connect to the sanitary sewer to reclaim the water and obtain return flow credits.

Members also worked to conserve water resources by:

- Enforcing policies aimed at reducing water use such as day of the week and time of day watering restrictions, turf limits, policies restricting water from flowing or spraying off the property, fountain and water feature restrictions, mist system restrictions, golf course water budgets, landscape codes, vehicle washing restrictions, building and equipment washing restrictions; and
- Approving revisions to Las Vegas Valley Water District service rules that increase water conservation by targeting non-essential use by prohibiting new golf courses from using Colorado River water to irrigate grass, and by implementing penalties for water theft, or when someone takes water without payment through an unauthorized connection.

In addition, water and wastewater treatment and delivery processes require significant energy resources, linking the need to conserve both water and energy and develop renewable energy resources. LVVWAC member agencies have undertaken several renewable energy projects that reduce dependence on non-renewable and less-efficient energy sources. The following are progress highlights:

- City of Las Vegas continued formal exploration to potentially sell biogas generated by its anaerobic digesters;
- City of Las Vegas explored opportunities for beneficial use of biosolids by diverting a portion of biosolids for further processing and use;
- City of Las Vegas completed full rehabilitation of its anerobic digesters. These digesters reduce sludge volume by roughly 30 percent resulting in less sludge dewatering and lower hauling costs;
- City of Las Vegas continued its Process Air Blower Replacement Project. Staff is exploring new technologies to provide oxygen to biological processes, which should be more energy efficient than the current blowers;
- Wastewater agencies leveraged opportunities to share treatment and transmission facilities to reduce energy expenditures; and
- SNWA continued to support the solar photovoltaic test center at the River Mountains Water Treatment Facility that is collecting data from new technology and exploring new technology annually in partnership with Sandia National Laboratories and UNLV.

GOAL FIVE

Manage flood risks

Despite an average rainfall of only four inches per year, the region often experiences periods of intense rainfall and subsequent flash flood events. To minimize the loss of life and property, LVVWAC member agency Clark County Regional Flood Control District:

- Continued implementation of the Master Plan for Flood Control Facilities. As of June 2021, there were 102 detention basins and approximately 667 miles of channels and underground storm drains (of which 140 miles are natural, or unlined, washes) throughout Clark County; total flood control funding to date for capital improvements is approximately $1.84 billion;
- Spent $9,882,528.52 in fiscal year 2019-2020 and $12,453,975.90 in fiscal year 2020-2021 on the Maintenance Work Program to ensure efficient operation of the flood control network;
- Completed an update to the Master Plan for the Muddy River and tributaries and initiated an update to the Master Plan for the City of Mesquite and the Town of Bunkerville;
- Continued to upgrade the Flood Threat Recognition System from the ALERT to ALERT2 protocol. The upgrade will result in faster, more reliable data transmission from more than 500 meteorological sensors located throughout Clark County;
- Produced an 18-minute interactive outreach video for virtual presentations in schools to limit face-to-face interactions in response to the COVID-19 pandemic. During calendar years 2020 and 2021, 2,594 and 405 students received curriculum materials, respectively, and teachers were provided with the *Desert Floods* school video in both English and Spanish;
- Conducted public outreach via media during annual "Flash Flood Awareness" press conferences on July 1, 2020 and July 1, 2021;
- Continued to provide public outreach on the National Flood Insurance Program and began providing outreach on the Federal Emergency Management Agency's new *Risk Rating 2.0* and the potential impacts to insurance rates. This outreach will continue in 2022;
- Received recognition for the Public Outreach Program from the National Association of Flood and Stormwater Management Agencies for the new "Drainger Danger" campaign; and
- Produced and aired two episodes of the Flood Channel, each one featuring a public service announcement related to stormwater quality.

GOAL SIX

Build community awareness and support for regional watershed management

Understanding that the public has a direct impact on the overall water quality of the Las Vegas Valley's watershed, the LVVWAC engaged the community to enhance awareness and support of regional watershed management. In 2020 and 2021, LVVWAC member agencies contributed to presenting a unified public education program, as they:

World Wetlands Day planting

- Continued to implement education and outreach grants from NDEP on non-point source pollution entering the Las Vegas Wash and Lake Mead including virtual and in-person events with 125 Mabel Hoggard fifth graders, a virtual stormwater pollution poster contest for nearly 960 students and two Wash Green-Ups that attracted more than 500 participants. With the cancellation of in-person events for several months due to the COVID-19 pandemic, NDEP also funded the filming of six Las Vegas Wash videos to use in virtual outreach;
- Conducted tours of the City of Henderson's Water Reclamation Facility and Southwest Water Reclamation Facility. These were greatly reduced in 2020 and 2021 due to COVID-19 restrictions, with a total of six tours conducted for private citizens and wastewater conference attendees;
- Engaged with 21,573 visitors in calendar year 2021 at the Henderson Bird Viewing Preserve. Visitors also enjoyed educational classes while at the preserve. While schools did not offer field trips due to the pandemic, there are four already scheduled for 2022;
- Received record numbers of more than one million total visitors (547,665 in 2020 and 536,790 in 2021) at the Wetlands Park and more than 25,000 people visiting the Exhibit Gallery and Nature Store; community members engaged in nearly 10,000 hours of active, hands-on stewardship, information services, field trips and program assistance; and 109 Wetlands Walker Program participants tracked their walking mileage;
- Facilitated outreach activities to educate the local community about the Las Vegas Wash and LVWCC, including a World Wetlands Day science symposium for 240 high school students, Girl Scout and Allegiant Stadium planting events, a field trip for Green Valley Christian School and virtual experiences with more than 60 classrooms reaching nearly 2,200 students;

World Wetlands Day presentation

- Launched the newly redesigned Las Vegas Wash public website, lvwash.org. The website is now mobile friendly and compliant with the Americans with Disabilities Act, offers an improved user experience and utilizes new technology to display information, photos and video; and
- Created and launched a new LVWCC logo with four versions to suit a variety of media. The new logo has a more modern look and is also mobile friendly.

New Las Vegas Wash Coordination Committee logo

The LVVWAC integrated existing stakeholder programs to specifically address watershed issues:

- All agencies promoted water conservation and water resource management through the "Be Water Smart" and "Pain in the Drain" programs; and
- A webpage on SNWA's website (snwa.com) provided enhanced accessibility to LVVWAC information, carrying all LVVWAC reports and presentations, as well as posted agendas and meeting minutes.