

LAS VEGAS VALLEY WATERSHED ADVISORY COMMITTEE REGIONAL WATER QUALITY PLAN



Lake Mead, Nevada

2012

- THIS PAGE INTENTIONALLY LEFT BLANK -

LAS VEGAS VALLEY WATERSHED ADVISORY COMMITTEE REGIONAL WATER QUALITY PLAN

2012

Acknowledgements.....	5
Acronyms.....	7
Executive Summary.....	9

CHAPTER 1

Introduction.....	15
Mission and Goals.....	23
Regional Water Quality Plan	
Goal 1.....	24
Goal 2.....	25
Goal 3.....	26
Goal 4.....	27
Goal 5.....	28
Goal 6.....	29

CHAPTER 2

Economic and Social Impacts.....	30
----------------------------------	----

APPENDICES

References.....	38
Glossary.....	40

- THIS PAGE INTENTIONALLY LEFT BLANK -

**LAS VEGAS VALLEY WATERSHED ADVISORY COMMITTEE
MEMBER AGENCIES**

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



- THIS PAGE INTENTIONALLY LEFT BLANK -

ACRONYMS

AFY	Acre-feet per year	MS4	Municipal Separate Storm Sewer Systems
BMP	Best Management Practices	MAFY	Million Acre-Feet per Year
CAMP	Las Vegas Wash Comprehensive Adaptive Management Plan	NAC	Nevada Administrative Code
CCL	Contaminant Candidate List	NDEP	Nevada Division of Environmental Protection
CCRFCDD	Clark County Regional Flood Control District	NHPA	National Historic Preservation Act
CCWRD	Clark County Water Reclamation District	NPDES	National Pollutant Discharge Elimination System
CWA	Clean Water Act	NPS	National Park Service
EPA	Environmental Protection Agency	NRS	Nevada Revised Statutes
FEMA	Federal Emergency Management Agency	RMHQ	Requirement to Maintain Existing Higher Water Quality
GMP	Las Vegas Valley Groundwater Management Program	SDWA	Safe Drinking Water Act
LVVWAC	Las Vegas Valley Watershed Advisory Committee	SNWA	Southern Nevada Water Authority
LVVWD	Las Vegas Valley Water District	SNWS	Southern Nevada Water System
LWCC	Las Vegas Wash Coordination Committee	SQMC	Stormwater Quality Management Committee
MAC	Las Vegas Wash Management Advisory Committee	TDS	Total Dissolved Solids
MCL	Maximum Contaminant Level	TMDL	Total Maximum Daily Load

- THIS PAGE INTENTIONALLY LEFT BLANK -

EXECUTIVE SUMMARY



- THIS PAGE INTENTIONALLY LEFT BLANK -

EXECUTIVE SUMMARY

In 2007, Southern Nevada’s water, wastewater and stormwater agencies established the Las Vegas Valley Watershed Advisory Committee (LVVWAC). The committee was formed to enhance overall watershed management efforts and to develop a regional water quality plan for the Las Vegas Valley watershed.

Members include:

- 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

The 2012 Regional Water Quality Plan represents these efforts and recognizes the dynamic and interrelated nature of human and environmental influences on the valley’s watershed. The Regional Water Quality Plan also details the important role water, wastewater and stormwater agencies have in protecting critical watershed resources including municipal drinking water supplies, wildlife habitat and recreation.

There are a number of state and federal laws that govern water management practices and safeguard important natural resources in Southern Nevada. Some of these include the Clean Water Act, Safe Drinking Water Act, Nevada Administrative Code, Endangered Species Act, National Historical Preservation Act and Migratory Bird Treaty Act.

Meeting these laws requires that water, wastewater and stormwater agencies coordinate efforts closely for the benefit of the community. This Regional Water Quality Plan serves as a roadmap for continued collaboration among the agencies and establishes goals to help the LVVWAC 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.”

LVVWAC regional watershed goals include the following:

1. Manage the Las Vegas Valley Watershed to help protect Lake Mead as a source of water for Southern Nevada and downstream users.
2. Meet or surpass federal, state and local standards and regulations.
3. Preserve and enhance the natural, cultural, historic and recreational values of the watershed.
4. Sustain and coordinate water resources for future generations.
5. Manage flood risks.
6. Build community awareness and support for regional watershed management.

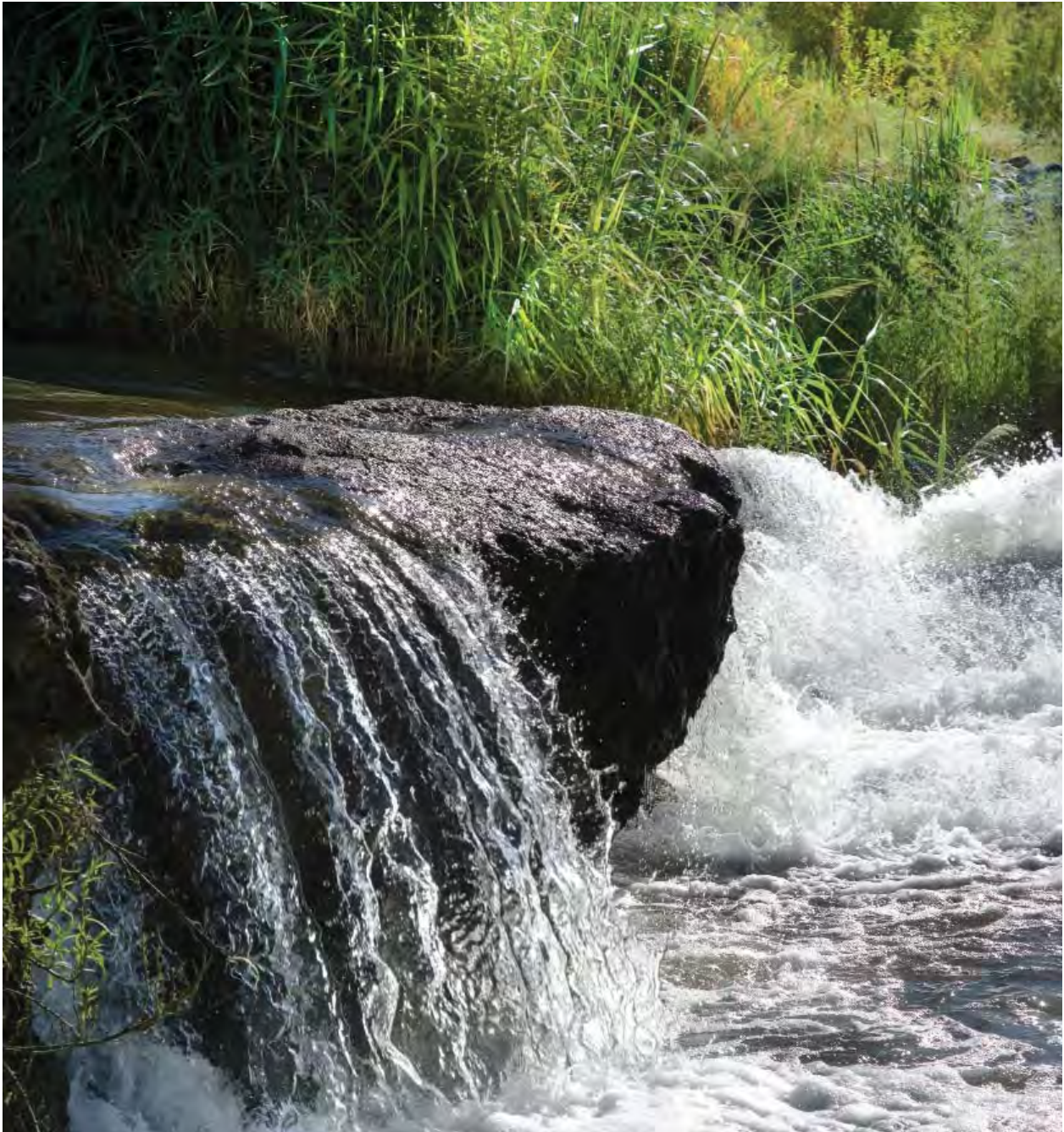
By working together, the LVVWAC can address watershed management efforts in a more coordinated manner. Doing so will help to protect vital public, environmental and recreational resources and help to ensure these resources are maintained for generations to come.

- THIS PAGE INTENTIONALLY LEFT BLANK -

CHAPTER ONE

Introduction

Mission and Goals



- THIS PAGE INTENTIONALLY LEFT BLANK -

INTRODUCTION

The Las Vegas Valley Watershed Advisory Committee (LVVWAC) was formed in 2007 among Southern Nevada's water, wastewater and stormwater agencies to develop a regional water quality plan, establish regional water quality goals and coordinate planning efforts among participating agencies. Members include:

- 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

The LVVWAC serves as a forum for partnering agencies to define and present a unified direction for addressing water quality issues and its impact within the Las Vegas Valley and Lake Mead. In addition, the LVVWAC is tasked with integrating individual water management approaches into a single comprehensive regional plan.

In accordance with the 2007 enabling agreement among participating entities, the LVVWAC assumed all functions of the Las Vegas Wash Management Advisory Committee (MAC), a former stakeholder committee that provided direction on water quality and resource issues associated with the Las Vegas Wash. The LVVWAC has taken on this role with an expanded scope, considering the regional watershed as a whole.

The LVVWAC has developed this 2012 Regional Water Quality Plan in an effort to coordinate all existing plans, policies, documents and efforts related to water quality in the Las Vegas Valley watershed. The Regional Water Quality Plan integrates regional water quality goals that were developed by the

LVVWAC during the year following its formation. These goals set a roadmap for future efforts and guide its members toward appropriate actions necessary to better manage community water resources. While the economy in Southern Nevada has suffered, the members understand the importance of water resources to the public and commit to maintain the current level of service and will strive to further the goals contained in the Regional Water Quality Plan as resources allow.

LVVWAC MEMBERS

Each of the eight LVVWAC members has a responsibility for protecting and preserving regional watershed resources for the community.

City of Henderson

The City of Henderson was incorporated in 1953 and is governed by a Mayor and a four-member City Council. The City is responsible for providing water, wastewater and reclaimed water service to its residents, and building infrastructure projects to collect and manage flooding and stormwater quality.

City of Las Vegas

The City of Las Vegas was founded in 1905 and is governed by a Mayor and a six-member City Council. It is responsible for managing wastewater treatment for its residents and building infrastructure projects to collect and manage flooding and stormwater quality. Domestic water service and reclaimed water distribution are provided by the Las Vegas Valley Water District.

City of North Las Vegas

The City of North Las Vegas was incorporated in 1946 and is governed by a Mayor and a four-member City Council. The City is responsible for providing water and wastewater service to its residents and building infrastructure projects to collect and manage flooding and stormwater quality. It also provides water service to portions of Las Vegas and

unincorporated Clark County.

Clark County

Clark County was formed in 1909 and is governed by a seven-member Board of County Commissioners. Clark County provides local and regional services to more than two million residents and approximately 40 million visitors annually. In compliance with Clean Water Act planning requirements, Clark County was appointed by the State to prepare the Clark County Area-Wide Water Quality Management Plan (208 Plan).

The 2,900 acre Clark County Wetlands Park, administered by the Parks and Recreation Department, is designed to protect and enhance the cultural and ecological resources of the Las Vegas Wash while providing environmental education, recreational, stewardship, and volunteer opportunities.

Clark County Regional Flood Control District

The Clark County Regional Flood Control District (CCRFCDD) was created in 1985 to develop a coordinated and comprehensive master plan to solve flooding problems, regulate land use in flood hazard areas, fund and coordinate the construction of flood control facilities, and develop a maintenance program for master plan flood control facilities. The CCRFCDD is the lead agency for the Las Vegas Valley National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit. The agency is governed by an eight-member Board of Directors that is comprised of two representatives each from Clark County and the City of Las Vegas, and one representative each from the cities of Boulder City, Henderson, Mesquite and North Las Vegas.

Clark County Water Reclamation District

The Clark County Water Reclamation District (CCWRD) was formed in 1954 and is governed by a seven-member Board of Trustees whose members also serve as the elected Clark County Board of Commissioners. It is responsible for wastewater treatment and reclamation in all of the unincorporated areas of Clark County, including the outlying areas of Blue Diamond, Indian Springs, Laughlin, Searchlight and Moapa Valley.

Las Vegas Valley Water District

The Las Vegas Valley Water District (LVVWD) was formed in 1954 and is governed by a seven-member Board of Directors whose members also serve as the elected Clark County Commission. The LVVWD provides water service to the City of Las Vegas and portions of unincorporated Clark County. The agency also serves as the managing entity for the Southern Nevada Water Authority.

Southern Nevada Water Authority

The Southern Nevada Water Authority (SNWA) was formed in 1991 among seven water and wastewater agencies in Southern Nevada to serve as the region's wholesale water provider. Specific functions of the SNWA are to acquire and manage long-term water resources for Southern Nevada, manage existing and future water resources, construct and manage regional facilities and promote water conservation. The agency is governed by a seven-member Board of Directors, comprised of one member from each partnering agency. SNWA members include Big Bend Water District, City of Boulder City, City of Henderson, City of Las Vegas, City of North Las Vegas, Clark County Water Reclamation District and Las Vegas Valley Water District.

LAS VEGAS VALLEY WATERSHED

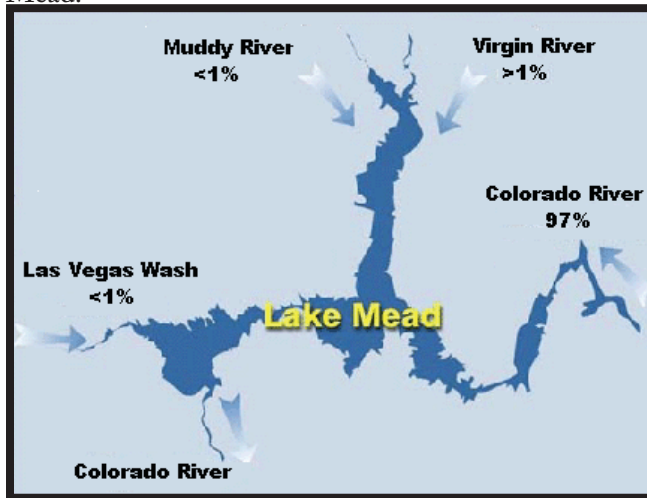
The Las Vegas Valley watershed includes the entire Las Vegas Valley Hydrographic Basin and Lake Mead (see page 22).

The Las Vegas Valley Hydrographic Basin measures approximately 2,200 square miles. It is bordered by Spring Mountains (West), Frenchman Mountains (East), McCullough Range (South) and the Sheep Range (North) and is drained by the Las Vegas Wash.

In addition to local groundwater, other watershed sources include the Colorado River, which is primarily fed by precipitation and snowmelt in the Rocky Mountains. The Colorado River drainage system runs through seven western states including Wyoming, Colorado, Utah, New Mexico, Nevada, Arizona and California. Nevada's Colorado River allocation is stored in Lake Mead.

For planning purposes, the LVVWAC considers all water sources within the Las Vegas Valley Hydrographic Basin (including groundwater, shallow groundwater, urban runoff, stormwater and treated

wastewater flows) as components of the Las Vegas Valley watershed. The Colorado River is included for planning purposes, as well as its tributaries including the Muddy and Virgin Rivers. The Virgin River originates in southwestern Utah, flows through Arizona and into Nevada where it joins the Colorado River at Lake Mead. The Muddy River is a perennial river fed by a series of springs in Southern Nevada. The river originates in Nevada and flows into Lake Mead.



Lake Mead inflows.

The Las Vegas Wash is another tributary to Lake Mead, and primarily serves as an “urban river.” Its flows are comprised of urban runoff, shallow groundwater, highly treated wastewater and stormwater. These flows are discharged into Lake Mead where they help to extend Southern Nevada’s Colorado River allocation. In Southern Nevada, water that is withdrawn from the system but later returned as treated wastewater flows, is effectively refunded. These “return-flows” allow Southern Nevada to extend the use of its Colorado River apportionment by approximately 70 percent.

WATER SOURCES

There are three distinct water type sources in the Las Vegas Valley watershed. These include potable water (Colorado River and local groundwater), highly treated wastewater and non-point sources (including urban runoff, shallow groundwater and stormwater).

Potable Water

Under the 1922 Colorado River Compact and associated agreements, Nevada has the right to the

consumptive use of 300,000 acre-feet per year (AFY). Agreements among the seven basin states that share the Colorado River have afforded Southern Nevada additional flexibility. For example, Southern Nevada has the ability to develop specific water resources and convey them to the Colorado River in exchange for credits. In addition, Southern Nevada has received credits in exchange for funding a water system efficiency project on the Colorado River. Southern Nevada also has water banking agreements with California and Arizona to bank Colorado River water in exchange for storage credits for SNWA to withdraw in the future.

Local Groundwater

The Las Vegas Valley Water District and the City of North Las Vegas have permanent groundwater rights totaling 40,629 AFY and 5,711 AFY, respectively. This groundwater is permitted by the Nevada State Engineer and is withdrawn from the principal aquifer in the Las Vegas Valley Hydrographic Basin.

Highly Treated Wastewater

Treated wastewater accounts for 90 percent of Las Vegas Wash flows at Lake Mead. Because Southern Nevada recycles 100 percent of its indoor water used for return-flow credits or reuse throughout the valley, meeting federal and state regulations for wastewater discharge not only protects Lake Mead water quality, it also extends the region’s water resources.

Non-Point Water Sources

There are three non-point source flow components of the Las Vegas Wash, the primary drainage source for all of Southern Nevada’s non-point sources:

- Urban runoff
- Shallow groundwater
- Stormwater

Urban Runoff. Urban runoff is typically associated with water runoff that begins in street gutters, and travels through the storm drain system and enters Lake Mead untreated. A number of water conservation programs, including water waste restrictions, adopted in the Las Vegas Valley have the added benefit of reducing urban runoff and the pollutants it transports.

Shallow Groundwater. Shallow groundwater is historically naturally occurring, but also is fed by excess irrigation. Shallow groundwater runoff is trapped near the land surface by an impermeable layer of clay and caliche, and typically lies within 50 feet of land surface. In some areas of the Las Vegas Valley, higher levels in the principal aquifer can contribute to the shallow groundwater system. In the southeast portion of the valley, the shallow aquifer is near the ground surface and discharges to stream channels.

Stormwater. Created by rain events, stormwater is conveyed untreated through the Las Vegas Valley to the Las Vegas Wash through an extensive network of flood control structures and natural washes. Southern Nevada does not receive return-flow credits for stormwater that enters Lake Mead.

WATER QUALITY REGULATIONS

All qualities of water in the Las Vegas Valley—including drinking water, wastewater and stormwater—are regulated by a series of federal and state regulations. These regulations serve to protect drinking water quality and source water, and ensure that the watershed’s environmental and recreational uses are preserved. Key water quality regulations in place to safeguard Southern Nevada’s water resources include:

- Clean Water Act
- Safe Drinking Water Act
- Nevada law

Clean Water Act

As amended, the 1972 federal Clean Water Act (CWA) regulates water pollution and ensures that surface waters meet certain standards necessary for appropriate beneficial uses, while restoring and maintaining the chemical, physical and biological integrity of the nation’s waters. Discharge of the point and non-point sources are covered under the act.

The CWA includes a number of regulatory and non-regulatory tools to manage water pollution. For example, the National Pollutant Discharge Elimination System (NPDES) is a permitting process to limit the discharges of pollutants to surface waters. The NPDES is managed by the United States Environmental Protection Agency (EPA) in partnership with state environmental agencies to

regulate point and non-point sources of pollution. In Nevada, the Nevada Division of Environmental Protection (NDEP) is responsible for implementation and enforcement efforts associated with the CWA. In addition to NPDES permitting activities, NDEP sets water quality standards, identifies impaired water bodies and establishes Total Maximum Daily Loads (TMDLs) for water bodies. NPDES permits must be reviewed and reissued every five years.

Safe Drinking Water Act

As amended, the 1974 federal Safe Drinking Water Act (SDWA) serves as the principal federal law that ensures safe drinking water for the public and applies to all public water systems. Pursuant to the SDWA, the EPA sets drinking water quality standards and oversees implementation. As part of this work, the EPA has established regulations for certain contaminants that may cause adverse public health effects. The EPA protects public health by establishing Maximum Contaminant Levels (MCLs) for enforceable contaminants.

The SDWA contains provisions that must be met for both regulated and unregulated organic, inorganic and microbial contaminants, which come from a variety of sources. In addition, there are a number of chemical compounds and organisms on the EPA’s Contaminant Candidate List (CCL) that may be regulated in the future, as well as pharmaceuticals and regulated compounds of concerns.

Nevada Law

The State of Nevada is responsible for coordinating and implementing federal water quality regulations throughout the state. In addition to federal regulations, Nevada Revised Statutes (NRS) and Nevada Administrative Code (NAC) include water quality standards to protect the beneficial uses of waters, including municipal water supply and warm water fisheries in Lake Mead.

The NAC includes anti-degradation standards based on the Requirement to Maintain Existing Higher Water Quality (RMHQ) where existing water quality is higher than the standards required for beneficial uses (such as in Lake Mead).

Other Regulations

Meeting anti-degradation standards also addresses

the National Park System's (NPS) non-impairment guidelines for water quality constituents, as well as recreation, fish and wildlife.

NDEP also regulates remediation programs which work to oversee cleanup activities and determine mitigation activities for contaminated water bodies throughout the state. Beyond NPDES permits, NDEP also may issue general wastewater or temporary dewatering discharge permits based on the type of discharge, duration and impacted waters.

The Colorado River serves seven western states and the country of Mexico. Water quality in and out of Nevada is regulated by the federal government (EPA). Nevada also works with the states of Arizona and California to set standards that work to protect interstate waters.

WATER QUALITY

This Regional Water Quality Plan addresses water quality management efforts of the source water for Southern Nevada, Colorado River water, local groundwater, highly treated wastewater and non-point water sources (stormwater, urban runoff and shallow groundwater). Below is a description of each, as well as a discussion of treatment issues and management strategies to ensure all water types meet or exceed established federal and state standards.

This section is intended to provide readers with a broad overview of regional water quality issues, as well as a context for enhanced communication and collaboration efforts occurring among partnering water, wastewater and stormwater agencies in Southern Nevada.



SNWS Water Quality Lab

Source Water

Source water is the term used to describe water that has not been treated for drinking and other domestic uses. In Southern Nevada, source water is comprised of Colorado River system inflows, local groundwater, highly treated wastewater returns, and non-point sources (urban runoff, shallow groundwater and stormwater).

Colorado River System Inflows. Ongoing drought conditions in the Colorado River Basin have affected raw water quality in Lake Mead. For example, concentrations of bromide and total organic carbon, two naturally occurring constituents, have increased primarily due to reduced inflows and concentration from evaporation. These constituents are relatively harmless by themselves. However, when they undergo mixing with water treatment processes (such as chlorine or ozone) or are influenced by factors such as temperature, undesirable water quality issues arise. Partnering LVVWAC agencies are working together to ensure that long-term drinking water quality is maintained. Some actions include modifying treatment techniques based on current and future conditions.

Water stored in Lake Mead is treated at the Southern Nevada Water System (SNWS), which has two advanced water treatment facilities designed to provide drinking water that meets all SDWA standards. Water undergoes ozone treatment and multi-stage filtration, and is further disinfected to protect drinking water in the distribution system.

Every month, scientists collect and analyze hundreds of water samples from throughout the Las Vegas Valley. The SNWS tests more frequently and extensively than the SDWA requires. Water delivered by the SNWS, as well as local groundwater supplies, meets or surpasses all state and federal drinking-water standards.

Local Groundwater. Because it is naturally filtered, water drawn from the groundwater basin is simply treated with chlorine as it enters the distribution system.

In 1997, the Nevada State Legislature directed the SNWA to develop the Las Vegas Valley Groundwater Management Program (GMP) to protect and manage

the Valley's groundwater resources. The program works to protect the groundwater supply from contamination, improve management of resources to prevent overdrafting and increase cooperation among groundwater users and agencies. In addition, the program works to recharge the aquifer by injecting treated surface water from the drinking water distribution system in the Las Vegas Valley into the groundwater aquifer. On behalf of the SNWA member agencies, this large-scale surface water recharge is used to "bank" water for future use and supplement the natural recharge of the aquifer. The surface water that is injected into the principal aquifer is subject to all drinking water standards.

Highly Treated Wastewater. The valley's four wastewater agencies (CCWRD and the cities of Henderson, Las Vegas and North Las Vegas) discharge highly-treated effluent into the Las Vegas Wash before it enters Lake Mead. Wastewater discharge is regulated by federal and state policies. The LVVWAC wastewater agencies are in full compliance with these established regulations for wastewater discharge.

The wastewater treatment process includes biological, physical and chemical treatment systems. Solids are removed from the wastewater stream and then dissolved biological matter is converted to sludge. After wastewater has undergone initial treatment activities, it undergoes tertiary treatment. Tertiary treatment raises the water quality of the effluent before it is discharged to the Las Vegas Wash. There are a number of tertiary treatment processes used in Southern Nevada, including the removal of nitrogen and phosphorus. The wastewater is then filtered and disinfected before being discharged.

Wastewater agencies perform more than 250,000 process control and laboratory tests each year to meet strict NDEP regulations and ensure that water quality standards are met or surpassed at all times.

Non-Point Sources. Non-Point sources account for approximately 10 percent of Las Vegas Wash flows at Lake Mead on an annual basis. Non-point sources include urban runoff, shallow groundwater and stormwater.

Agencies in Southern Nevada work together to monitor these flows and ensure that they do not

adversely impact the environment. The NDEP and EPA, as authorized by the CWA, regulate non-point source discharges. To support these efforts, the NDEP manages the NPDES and requires a permit for all entities that discharge water to the Las Vegas Wash. NPDES is a permitting mechanism that requires the implementation of controls designed to prevent harmful pollutants from being washed by urban and stormwater runoff into local water bodies.

The CCRFCD is the lead entity for a multi-jurisdictional stormwater permit issued to the cities of North Las Vegas, Las Vegas, Henderson and Clark County. The CCRFCD coordinates permit compliance activities among these stormwater system operators. In addition, the Stormwater Quality Management Committee (SQMC) was formed among Las Vegas Valley stormwater permittees to help manage program development and compliance activities. The permit authorizes stormwater discharge to the Las Vegas Wash from storm sewer systems owned and operated by the cities of Las Vegas, North Las Vegas, Henderson and Clark County in return for implementation of certain storm water pollution reducing activities by the permittees.



The following provides an overview of non-point sources and respective water-quality challenges.

Urban runoff. Urban runoff can pose a risk to water quality because of its potential to carry various pollutants (including bacteria, oil, grease, pesticides, herbicides and nutrients) from the urban landscape into Lake Mead through the storm drain system. In addition, urbanization can increase the quantity and pollutant load of dry weather flows in the drainable

system as a result of landscape watering, vehicle washing and other miscellaneous activities.

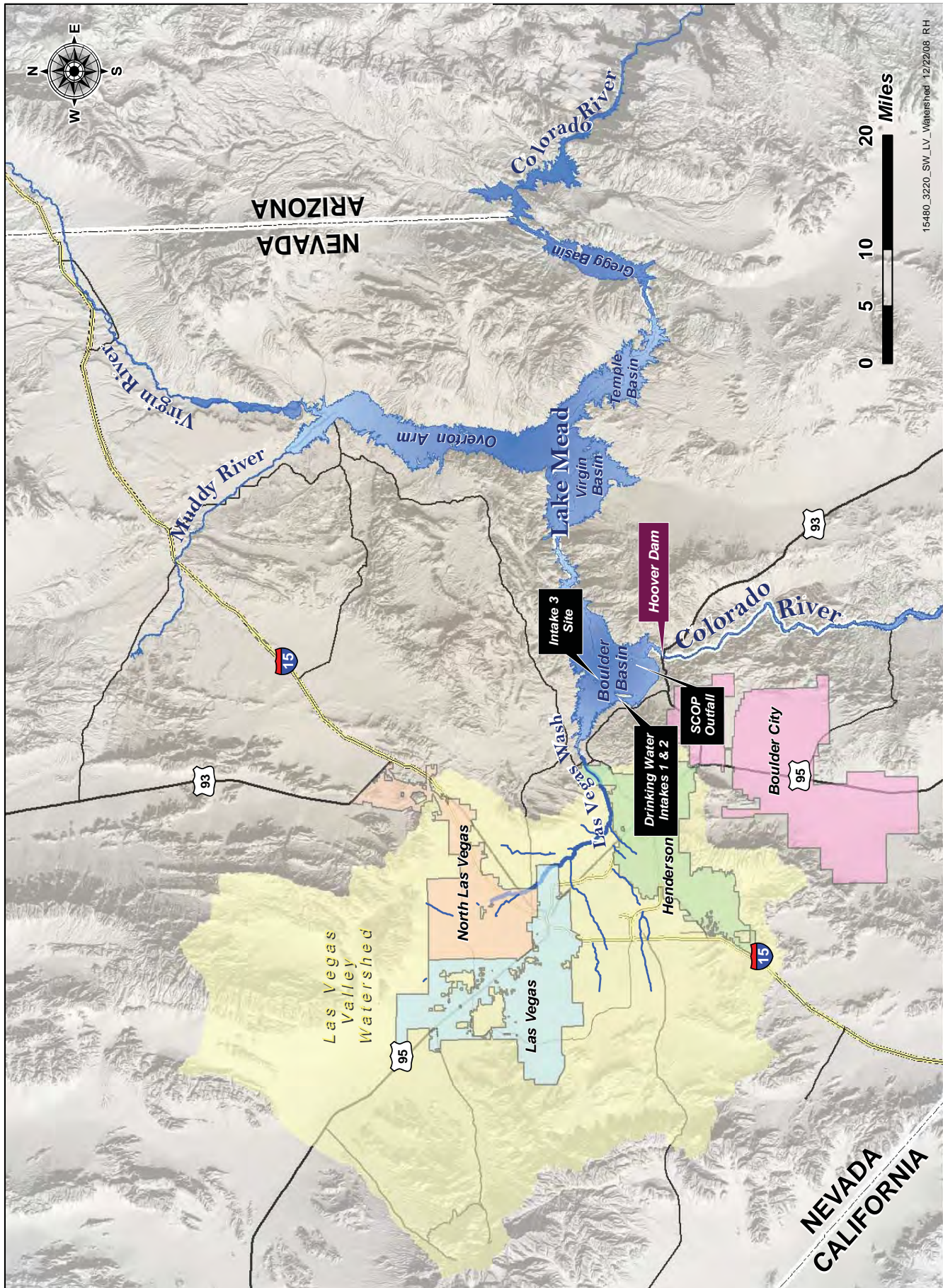
Shallow Groundwater. Local groundwater sources are known to contain elevated selenium and total dissolved solids (TDS), two watershed contaminants of concern that occur naturally in groundwater sources. Other shallow groundwater flow inputs are affected by sub-surface flows from industrial activities and dewatering discharges.

Stormwater. Sediment, debris and bacteria are the most common contaminants found in stormwater. These contaminants are washed into storm drains, which ultimately lead to Lake Mead via the Las Vegas Wash. During rain events, runoff may contain pollutants in quantities that could adversely affect water quality.

CONCLUSION

Numerous federal and state regulations exist to protect local source water and drinking water quality for the public. Drought impacts on major water supplies will require even more significant efforts, both in terms of treatment and facilities management, to protect public resources.

Proactive management of the Las Vegas Valley watershed is necessary to ensure the quality of Southern Nevada's drinking water supply is maintained and to protect regional water resources for environmental, human and recreational uses. To that end, the LVVWAC has adopted six regional watershed goals, as described in the following section.



15480_3220_SW_LV_Watershed_12/22/08_RH

Las Vegas Valley Watershed

MISSION:

PROTECT, PRESERVE AND ENHANCE THE QUALITY AND QUANTITY OF WATER RESOURCES IN THE LAS VEGAS VALLEY WATERSHED TO SUSTAIN ECONOMIC WELLBEING AND PROTECT THE ENVIRONMENT FOR PRESENT AND FUTURE GENERATIONS.

GOALS

1. Manage the Las Vegas Valley Watershed to help protect Lake Mead as a source of water for Southern Nevada and downstream users.
2. Meet or surpass federal, state and local standards and regulations.
3. Preserve and enhance the natural, cultural, historic and recreational values of the watershed and Lake Mead.
4. Sustain and coordinate water resource for future generations.
5. Manage flood risks.
6. Build community awareness and support for regional watershed management.

GOAL ONE: MANAGE THE LAS VEGAS VALLEY WATERSHED TO HELP PROTECT LAKE MEAD AS A SOURCE OF WATER FOR SOUTHERN NEVADA AND DOWNSTREAM USERS.

The Colorado River is the primary source for Southern Nevada's overall water resource needs. Nevada receives 0.30 MAFY for consumptive use from the Colorado River.

Other downstream users include Arizona which receives 2.85 MAFY, California, which receives 4.4 MAFY, and the country of Mexico which receives 1.5 MAFY.

The Las Vegas Valley accesses Nevada's Colorado River allocation through existing facilities at Lake Mead. Other Lake Mead inflows come from the Muddy River, the Virgin River and the Las Vegas Wash. Las Vegas Wash flows are comprised of highly treated wastewater discharge, stormwater runoff, shallow groundwater and urban runoff. The latter three are referred to as non-point sources.

There are a number of factors that can and will likely continue to influence water quality in the future, these include:

- Drought conditions in the Colorado River Basin. Reduced inflows limit dilution and mixing of existing storage and contribute to lower surface elevations and associated temperature variations.
- Increased volumes of highly treated wastewater discharged to Lake Mead.
- New discharges of treated wastewater to the Virgin and Muddy rivers by upstream users such as Southern Utah and other growing Nevada cities.
- Potential plans by the U.S. Bureau of Reclamation to release warmer water from Lake Powell for endangered species recovery.
- Changes to upstream reservoir operations (Lake Powell).
- Imported groundwater from the SNWA's proposed Clark, Lincoln and White Pine Counties Groundwater Development Project.
- Increased non-point source inflows due to continued development in the watershed.

Climate change is one example of an emerging issue that will warrant monitoring to determine future impacts. Climate change and its resulting impacts will likely influence water resource availability and consequently influence water quality.



Lake Mead, Nevada

GOAL TWO: MEET OR SURPASS FEDERAL, STATE AND LOCAL STANDARDS AND REGULATIONS.

All qualities of water in the Las Vegas Valley are regulated by a series of federal, state and local regulations. Key water quality laws in place to safeguard local and regional water sources include the Clean Water Act, the Safe Drinking Water Act and Nevada Administrative Code.

The Nevada Division of Environmental Protection (NDEP) is responsible for implementation and enforcement efforts in Nevada associated with the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). The CWA generally applies to municipal sources, wastewater, industrial wastewater, urban storm drainage systems and construction site runoff management efforts. The SDWA applies to drinking water sources.

In Nevada, water quality control standards are regulated by Nevada Administrative Code (NAC). Specific constituents regulated in the Colorado River below Hoover Dam, Lake Mead, inner Las Vegas Bay and the Las Vegas Wash include toxic materials, phosphates, and dissolved oxygen, as well as temperature and pH levels. The NAC has anti-degradation standards to ensure existing water quality is higher than the standards required for beneficial use.

NDEP established the Lake Mead Water Quality Forum to protect public health and preserve water quality in the Las Vegas Wash and Las Vegas Bay, as well as Lake Mead. A number of federal, state and local stakeholders are involved in this process and work together to identify issues regarding water quality and impacts on the water supply, coordinate study efforts, disseminate information, serve as a clearinghouse on water quality issues and formulate further study on water quality issues.

In 1999, the Colorado River Basin began to experience drought conditions that, during the next few years, became the worst drought in the recorded history of the basin. As a result, water levels in the two primary storage reservoirs on the lower Colorado

River (Lake Mead and Lake Powell) dramatically declined.

One outcome of low or declining water levels is reduced water quality. Low water levels affect water temperature, a key variable in water quality management, as well as the concentration of other constituents such as Total Organic Carbon and Bromide.

While Southern Nevada's water treatment facilities are capable of addressing many source water quality challenges, proactive management of the Las Vegas Valley watershed remains key to protecting the region's overall supply. To this end, research and monitoring efforts are underway by LVVWAC member agencies to remain current on emerging issues including endocrine disrupting compounds, pharmaceuticals, household cleaning products and personal care products such as fragrances, lotions, sunscreens. Improved technologies have allowed researchers to detect constituents at levels that could not previously be detected using older technology in surface water, drinking water and wastewater effluent samples. Although impacts on human health have not been demonstrated, water treatment operators are evaluating the effectiveness of current treatment techniques on their removal.

Moving forward, water managers must be aware of sensitivities towards the existence of emerging chemicals and compounds found in drinking water supplies. Furthermore, these compounds may be regulated in the future, which will impact current treatment techniques and operating costs.

GOAL THREE: PRESERVE AND ENHANCE THE NATURAL, CULTURAL, HISTORIC AND RECREATIONAL VALUES OF THE WATERSHED.

The Las Vegas Valley watershed includes the Lake Mead National Recreation Area and the Las Vegas Wash. These water sources and open lands present opportunities for both active and passive recreation, and support important environmental resources such as wildlife and wildlife habitat.

The Lake Mead National Recreational Area is managed and operated by the National Park Service (NPS). The 1.5 million-acre area was once occupied by early Native American cultures, pioneers and explorers. The area now serves more than seven million annual visitors and supports a variety of recreational activities such as boating, swimming, hiking, fishing and motorized water sports. The area also serves as habitat for a variety of land and aquatic species.

The Las Vegas Wash, as it travels through the Clark County Wetlands Park, offers a number of recreational opportunities for its visitors including hiking, biking, nature walking, bird viewing and equestrian uses. The habitat surrounding the Las Vegas Wash also supports a large variety of birds, including federally listed bird species such as the southwestern willow flycatcher and the Yuma clapper rail.

In 1998, the Las Vegas Wash Coordination Committee (LVWCC) was formed to address water quality and environmental degradation concerns related to the channel. The 29-member stakeholder group developed its guiding document, the Las Vegas Wash Comprehensive Adaptive Management Plan (CAMP), over the next year. The plan sets forth 44 action items to help the group achieve its mission of stabilizing and enhancing the Las Vegas Wash.

In addition to the CAMP, federal, state and local laws and plans are in place to protect the valley's watershed for the benefit of all users. Federal regulations include:

- Endangered Species Act
- National Historic Preservation Act
- Migratory Bird Treaty Act

Endangered Species Act. Species that are endangered or are likely to be endangered are “listed” by the federal Endangered Species Act (ESA). The act protects listed species and conserves the ecosystems that they depend on for survival. Currently, there are a number of listed species found in Southern Nevada such as the desert tortoise and southwestern willow flycatcher.

National Historic Preservation Act. The federal National Historic Preservation Act (NHPA) and other state and local laws prescribe certain mandates to preserve cultural and historic sites so that they are not needlessly lost. Among other things, the NHPA created the National Register of Historic Places. There are more than 45 sites near the Las Vegas Wash eligible for listing on the National Register of Historic Places.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act codifies various treaties and conventions between the United States, Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Nearly every bird species found in Nevada is listed as a migratory bird. Among other things, the act protects migratory birds by prohibiting hunting, capturing, possessing, selling or affecting birds, nests and eggs.



GOAL FOUR: SUSTAIN AND COORDINATE WATER RESOURCES FOR FUTURE GENERATIONS.

Each LVVWAC member agency has individual responsibilities that contribute to management of the Las Vegas Valley watershed. For nearly two decades, the agencies have worked closely together to address a number of specific issues (for example, coordinating the location of future intake and discharge facilities and management of the Las Vegas Wash). The LVVWAC addresses the need for coordination of water, wastewater and non-point source water management efforts on a larger, more comprehensive scale to:

- Reduce duplication efforts.
- Ensure that individual projects and activities do not cause unintended consequences for other projects and management efforts.
- Ensure that necessary plans and activities are taking place to protect and enhance the Las Vegas Valley watershed.

By working together, LVVWAC member agencies can address watershed management efforts in a more coordinated manner and ensure that all factors and consequences of individual agency actions are fully understood and addressed. The LVVWAC member agencies have committed to working together to achieve the overall goals established through the LVVWAC interagency process, including coordinated resource management.

To support this work, the LVVWAC has developed this Regional Water Quality Plan to help coordinate all existing plans, policies, documents and efforts related to water quality in the Las Vegas Valley watershed.



Las Vegas Wash restoration efforts.

GOAL FIVE: MANAGE FLOOD RISKS.

While the Las Vegas Valley receives an average rainfall of approximately four inches per year, the area often experiences intense rainfall and subsequent flash floods.

Recorded reports of flooding in Clark County date back nearly 100 years. Between 1905 and 1975, 184 different flood events occurred in Clark County, resulting in damage to private property and public facilities. Since 1960, the area has experienced at least 11 floods costing more than a million dollars each in damages to public and private property.

While floods can and have occurred in almost every month of the year, the most damaging storms typically occur between July and September. During warm summer months, moist unstable air from the Gulf of Mexico is rapidly forced upward by hot air currents. These weather patterns often cause severe thunderstorms with intense rainfall on steep mountain slopes and armored desert surfaces. The rainwater runs off rapidly and concentrates in the urbanized areas at lower elevations in the valley. Among other things, flood events can adversely impact public safety, the local economy and water quality.

The CCRFCD is responsible for implementing a regional flood control program throughout Clark County to address flood risks, and has developed a master plan to identify infrastructure needed to manage flood risks in Clark County. The agency works together with local entities, including Clark County and the cities of Las Vegas, North Las Vegas, Henderson, Boulder City and Mesquite, to:

- Establish flood management policies
- Develop flood reduction plans and designs
- Construct and manage regional flood control facilities

Flood control infrastructure is owned and operated by the local entities with funding oversight provided by the CCRFCD. To date, significant progress has been made to reduce flood risks including the construction of hundreds of miles of conveyance facilities and several detention and debris basins.

The CCRFCD is required to follow all federal, state and local environmental compliance regulations related to construction and maintenance of flood control facilities in the Las Vegas Valley. To ensure compliance, the CCRFCD has developed regulations and design criteria that identify flooding risk management requirements that meet or surpass these standards.



Flood Event in downtown Las Vegas.

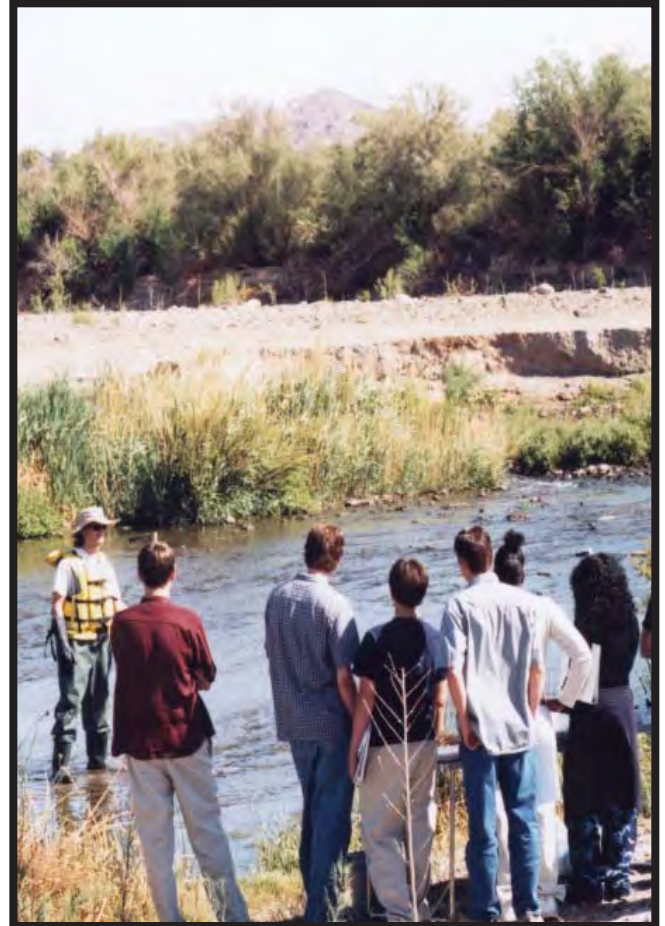
GOAL SIX: BUILD COMMUNITY AWARENESS AND SUPPORT FOR REGIONAL WATERSHED MANAGEMENT.

While a number of factors can exacerbate water quality challenges, in most cases, the public has a direct impact on the overall quality of its watershed resources. For example, salt loads from the use of water softeners, the quality of stormwater flows and even the introduction of the quagga mussel into Lake Mead are all effects that stem from public use.

Managing, maintaining and improving water quality in the Las Vegas Valley watershed requires the public to better understand their direct impacts on the water system and to participate in efforts to ensure a safe and reliable water supply for the future. Education and outreach are critical components of meeting water quality goals for these reasons.

The public's perception of the risk and aesthetics of drinking water are significant issues faced by most water suppliers. While there are a number of existing water quality controls in place (such as local, state and federal water quality regulations), these controls need to be closely coordinated among water managers and water users to ensure that water quality is maintained for the benefit of the public and the environment.

The Southern Nevada Water Authority and the Clark County Regional Flood Control District have each utilized citizen advisory committee processes to solicit public input on facilities, treatment and cost issues associated with water quality in Southern Nevada. The LVVWAC will continue to engage the community to enhance awareness and support for regional watershed management.

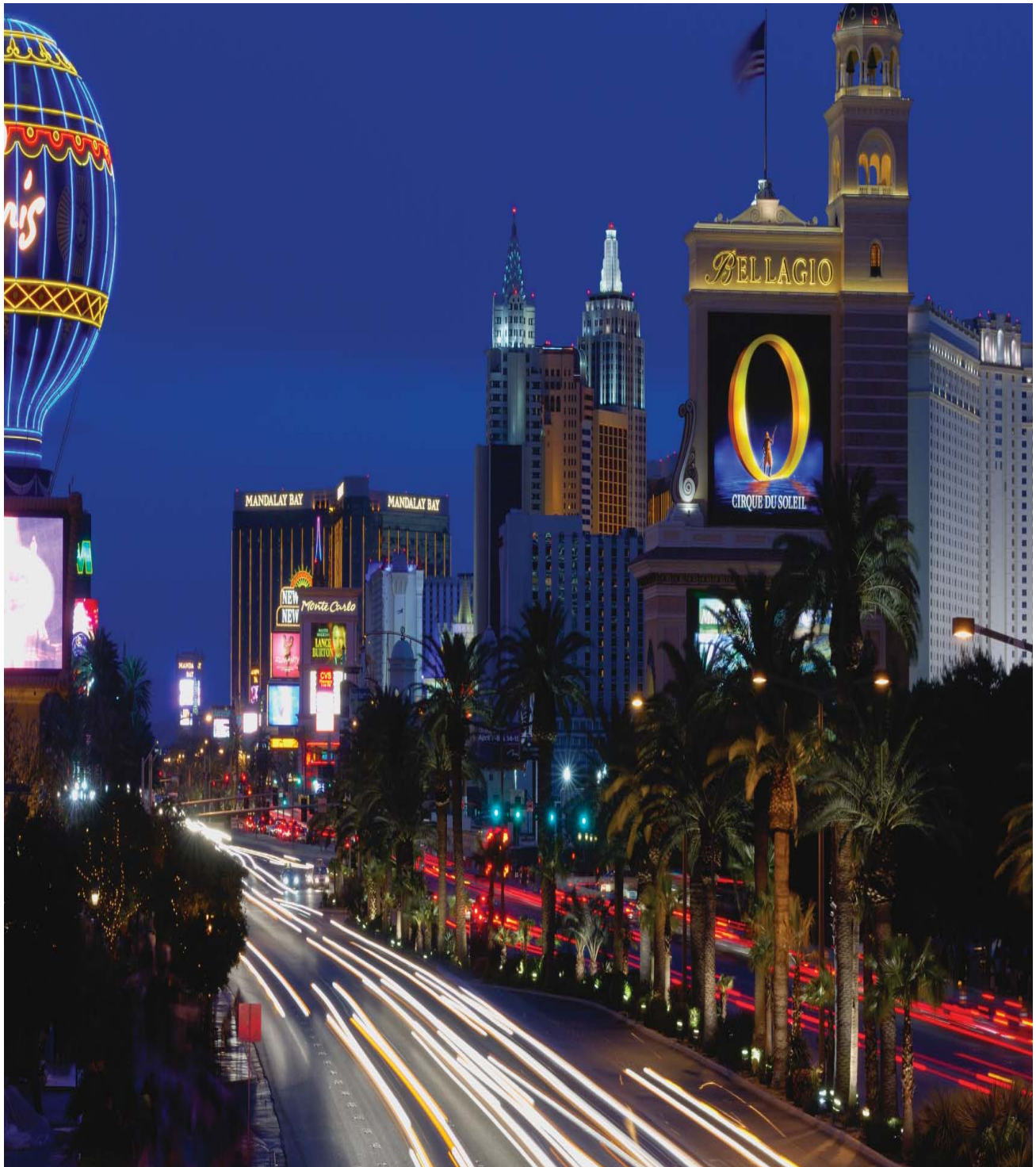


Students visit the Las Vegas Wash.

- THIS PAGE INTENTIONALLY LEFT BLANK -

CHAPTER TWO

Economic and Social Impacts



- THIS PAGE INTENTIONALLY LEFT BLANK -

ECONOMIC AND SOCIAL IMPACTS

The Colorado River serves as a lifeblood supply to the seven basin states it serves. Together the states rely on the river to meet a portion of their industrial, municipal and agricultural needs. Nevada diverts a majority of its Colorado River apportionment from Lake Mead. Protecting Lake Mead's water quality is essential to ensure a safe drinking water supply and other water supply needs for the reservoir's downstream users.

There are a number of emerging issues that will likely affect water quality and water resources in the future. These issues include the control and management of invasive species, increased water quality regulations, economic conditions and climate change. Moving forward, these issues will be closely monitored and any resulting economic and social impacts will be appropriately addressed.

The LVVWAC provides a forum for water managers to coordinate planning and funding efforts. This communication and coordination will likely yield significant economic opportunities in the future.

This section discusses current and future economic and social impacts associated with the implementation of this Regional Water Quality Plan.

ECONOMIC IMPACTS

Las Vegas Wash

- In response to public health concerns over downstream water quality in Lake Mead, there have been significant efforts in the Las Vegas Wash to reduce point and non-point source pollutants. Furthermore, improving the Las Vegas Wash provides critical habitats to a number of native species in Southern Nevada. To date, activities in the Las Vegas Wash include the construction of 14 erosion control structures, more than 10 miles of bank stabilization and 337 acres of native revegetation, including 77 acres of wetlands. To date, total expenditures associated with these capital activities are \$99,309,242.

Projected capital expenditures through 2017 are estimated to be \$167,102,801.

Invasive Species Control

- The SNWA will spend more than \$25 million in capital expenditures to control quagga mussel impacts on new water infrastructure at Lake Mead. Annual operating expenses are also expected to rise by \$150,000 to reduce impacts through chemical treatment.
- Downstream users also are affected. For example, the Metropolitan Water District of Southern California is currently investing several million dollars in infrastructure improvements for invasive species management.

Water Quality

- Salinity control has been an integral part of Colorado River management for more than 30 years. A minute to the bi-national treaty between the United States and Mexico was established in 1973 to limit Colorado River salinity levels for Mexico deliveries. One factor that contributes to higher salinity concentrations in Southern Nevada is the use of residential water softeners. These have gained popularity during the last decade as a method to reduce the naturally high mineral hardness in Colorado River supplies. Local municipalities are responsible for costs associated with salinity control.
- The production of total organic carbon from algae growth also can elevate treatment costs. For example, it would cost between \$200 million and \$400 million to treat an accelerated algae growth at Lake Mead to control total organic carbon concentrations. An estimated \$10 million would be required for annual operations.
- Recent technology improvements have allowed water managers to detect certain constituents at extremely low concentrations. For example, Southern Nevada has identified trace levels

of pharmaceuticals and endocrine disrupting compounds found within the water supply. To date, there has not been a demonstrated impact to human health at the levels detected. Although these constituents are not currently regulated by the EPA, they may be in the future. If these constituents are regulated and water treatment is required, water treatment operators will incur additional costs.

- A new intake is being constructed near Boulder Basin to protect municipal water customers from water quality issues and declining Lake Mead water levels. Intake No. 3 will maintain the SNWA's ability to draw upon Colorado River water at lake elevations below 1,000 feet above sea level. This will help ensure system capacity is maintained even if Intake No. 1 is not operational. This project is estimated to cost \$817 million.

Wetlands Park and Las Vegas Wash Stabilization

- The Southern Nevada Public Lands Management Act (SNPLMA) provides for the orderly disposal of federal lands in the Las Vegas Valley and uses proceeds from those sales to provide grants to qualified agencies and projects to perform conservation actions within the state.
- Clark County Wetlands Park has benefitted from approximately \$80 million of SNPLMA grants that has allowed the vision of the 1995 Master Plan to be completed ahead of schedule. SNPLMA dollars have funded trails and trailheads, ponds, native vegetation enhancements, the Nature Center with exhibits, and interpretive materials (brochures and audio-visual productions).
- In addition to the to the above, SNPLMA grants have, to date, contributed over \$22.5 million to the construction of six weirs as part of the Las Vegas Wash stabilization program. Nearly \$2 million more has been contributed to revegetation projects along the Las Vegas Wash.

Planning Efforts

- In compliance with Clean Water Act planning requirements, Clark County was appointed by the State to prepare the Clark County Area-Wide Water Quality Management Plan (208 Plan).

Costs associated with the planning efforts are between \$500,000 and \$550,000. In the future, these costs are proposed to be shared by local jurisdictions based on population.

Renewable Energy Efforts

- Wastewater agencies are building solar power plants and expanding the generation of methane through anaerobic digestion of food waste, grease and wastewater solids. SNWA and LVVWD have installed solar generating facilities, in-conduit hydroelectric generation, and have signed a power purchase agreement with a biomass power generating facility located in Lincoln County.

Flood Control

In March 1999, the CCRFCD performed its first region-wide cost analysis to determine the benefit of regional drainage facilities in Clark County. In 2005 the analysis was updated and it validated the benefits versus cost factor 2 to 1 for economic benefits of building flood control infrastructure in the Las Vegas Valley. Findings of this report include:

- For each public dollar expended to improve flood protection, a public benefit of \$2.00 has been realized.
- Historically, less than 10 percent of the CCRFCD's expenditures have been dedicated to administrative and operating costs.
- Public benefits associated with the CCRFCD's capital program include both quantifiable and non-quantifiable benefits. Quantifiable benefits include inundation reduction, savings in floodproofing costs, transportation cost savings, and flood insurance overhead savings. Benefits that are more difficult to quantify include reductions in flood-related injuries and deaths, protection of Southern Nevada's tourism industry, direct and indirect economic benefits arising from the CCRFCD's construction program, protection and enhancement of property value, and economic opportunities arising from alternative land planning and usage.
- Capital projects undertaken by the CCRFCD's have resulted in removing land from federally identified Federal Emergency Management

Agency (FEMA) flood zones (for example, residential dwellings and non-residential land such as commercial, manufacturing, gaming, schools and religious establishments, etc.). Removing property from the floodplain can provide for increased property value, savings in flood insurance premiums, the creation of enhanced land use planning opportunities and a broader tax base.

Stormwater Quality Management

- Most costs for stormwater quality management are borne by public agencies that are the permittees under the MS4 stormwater permit program. Costs include: stormwater monitoring, construction and industrial site inspections, staff training, street sweeping, drainage system maintenance, public outreach and program administration.
- The development community is responsible for funding Best Management Practices (BMP) installation at construction sites and contractor training.
- Proposed programs to mitigate impacts of new development rely heavily on incorporation of measures in existing and proposed regional detention basins. These costs will be borne by CCRFCD. The development community will be responsible for implementation of permanent measures to be required on new large parking lots.
- The industrial community is responsible for funding BMP installation on private industrial properties within certain business types identified by NDEP.
- The State of Nevada has permit programs for construction and industrial sites that parallel those of the local entities. State costs for these permit programs are covered primarily by permit fees paid by developers and industrial site owners.

SOCIAL IMPACTS

Pharmaceuticals

- Improved technologies have allowed researchers to detect constituents at levels that could not previously be detected using older technology. Despite the lack of known impacts, the presence

of pharmaceuticals and endocrine disrupting compounds in the drinking water supply has created national media coverage. To date, there has not been any demonstrated impact to human health at existing concentrations. Despite the lack of impacts, the general public remains wary of their presence in drinking water supplies. This demonstrated concern may pressure water quality regulators to require additional treatments by water and wastewater treatment operators. Research studies related to these impacts on human health, the environment and water quality are preliminary and ongoing.

Stormwater

- Social changes could occur as a result of public outreach activities that are designed to change behaviors that may adversely impact non-point source water quality. These include managing pet waste, pesticide/herbicide use, vehicle maintenance, household hazardous waste disposal, over-watering of landscaped areas, and proper pool maintenance.

Flood Control

- Implementation of floodplain management policies to reduce flood risks can affect land uses on public and private properties adjacent to the Las Vegas Wash and its major tributaries.

Recreation

- Parks and recreation have been shown to have positive impacts on the physical, mental and social health of individuals and their communities. Physical activity helps to control obesity, boost the immune system, diminish the risk of disease and increase life expectancy. There are also social benefits of recreation, such as strengthening communities, promoting social bonds and supporting youth. Proximity to parks and recreational facilities leads to safer, cleaner neighborhoods, volunteerism and creates a community atmosphere.

- THIS PAGE INTENTIONALLY LEFT BLANK -

APPENDIX

References

Glossary



REFERENCES

Bureau of Reclamation, U.S. Department of the Interior (Lower Colorado River Operations Schedules and 2008 Annual Operating Plan for Colorado River Reservoirs).

www.usbr.gov

Clark County, Nevada (Area-Wide Water Quality Management Plan and Multiple Species Habitat Conservation Plan)

www.accessclarkcounty.com

Clark County Regional Flood Control District (Flood Control Master Plans)

www.ccrfcd.org

Las Vegas Wash Coordination Committee (Las Vegas Comprehensive Adaptive Management Plan and Las Vegas Wash Wildlife Management Plan)

www.lvwash.org

Nevada Division of Environmental Protection, State of Nevada (Source Water Assessment Plan)

ndep.nv.gov

Southern Nevada Water Authority 2009 Southern Nevada Water Authority Water Resource Plan)

www.snwa.com

Stormwater Quality Management Committee (NPDES Municipal Separate Storm Sewer System - MS4 permit)

www.lvstormwater.org

United States Geological Survey (Real Time Water Quality Monitoring and Water Quality Monitoring Quality Assurance Plan)

nevada.usgs.gov

LVVWAC MEMBER WEBSITES

City of Henderson

www.cityofhenderson.com

City of Las Vegas

www.lasvegasnevada.gov

City of North Las Vegas

www.cityofnorthlasvegas.com

Clark County

www.accessclarkcounty.com

Clark County Regional Flood Control District

www.regionalfood.org

Clark County Water Reclamation District

www.cleanwaterteam.com

Las Vegas Valley Water District

www.lvwd.com

Southern Nevada Water Authority

www.snwa.com

GLOSSARY

BOULDER CITY

Local governmental entity located southeast of the Las Vegas Valley.

BROMIDE

Any compound of bromine with another element or radical. Can form bromate, a SDWA-regulated contaminant in the presence of ozone.

BUREAU OF RECLAMATION (BOR)

A Department of the Interior bureau, which works to manage, develop and protect water and related resources.

CITY OF HENDERSON (COH)

Local government entity that provides water, wastewater and reclaimed water services to the Henderson community.

CITY OF LAS VEGAS

Local government entity that maintains city public use facilities, roadway and traffic network, wastewater and stormwater management systems and regulates private development.

CITY OF NORTH LAS VEGAS

Local government entity that provides water and sewer service to the City of North Las Vegas.

CLARK COUNTY

Regional government entity responsible for economic, recreational and social services for Southern Nevada residents.

CITY OF MESQUITE

Local government entity that provides water, wastewater and reclaimed water services to the City of Mesquite.

CLARK COUNTY PARKS AND RECREATION DEPARTMENT (CCPRD)

Local government entity responsible for the management of the Wetlands Park.

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT (CCRFCD)

Local government entity responsible for the regional management and comprehensive planning of flood activities.

CLARK COUNTY WATER RECLAMATION DISTRICT (CCWRD)

Regional government entity responsible for treating wastewater in areas of Clark County.

CLEAN WATER ACT (CWA)

The primary federal law in the United States governing water pollution.

CLEAN WATER COALITION (CWC)

A joint powers authority responsible for implementing the Systems Conveyance and Operations Program.

COLORADO RIVER

A 1,400 mile-long river, which supplies approximately 90 percent of Southern Nevada's drinking water.

CONSUMPTIVE USE

Water that is used and not available for return to the Colorado River.

CONTAMINANT CANDIDATE LIST (CCL)

List of water contaminants published by the Environmental Protection Agency.

EFFLUENT

Another term for treated wastewater.

ENDANGERED SPECIES ACT

Federal act which protects animal and plant species from extinction and identifies those species that are threatened or endangered.

ENVIRONMENTAL PROTECTION AGENCY

Leads the nation's environmental science, research, education and assessment efforts to protect the environment and human health.

HOOVER DAM

A concrete arch-gravity dam in the Black Canyon of the Colorado River. The construction of Hoover Dam created the Lake Mead reservoir.

INVASIVE SPECIES

A species not naturally occurring in a specific area and whose introduction does or is likely to cause economic or environmental harm.

LAKE MEAD

The largest man-made reservoir in the U.S. It stores Colorado River water and has a storing capacity of 26 million acre-feet.

LAKE MEAD NATIONAL RECREATION AREA

Recreational area containing Lake Mead and Lake Mojave. The area is managed under a cooperative agreement between the National Park Service and the Bureau of Land Management.

LAKE MEAD WATER QUALITY FORUM

Supports the protection of human health and the environment and preserves and improves water quality in the Las Vegas Wash, Las Vegas Bay and Lake Mead.

LAS VEGAS VALLEY GROUNDWATER MANAGEMENT PROGRAM

Works to protect the valley's groundwater supply from contamination, improve management of resources to prevent overdrafting and increase cooperation among groundwater users and agencies.

LAS VEGAS VALLEY WATER DISTRICT

Provides water to Las Vegas Valley residents and also services Big Bend Water District (Laughlin), Blue Diamond, Coyote Springs, Searchlight, Kyle Canyon and Jean.

LAS VEGAS VALLEY WATERSHED ADVISORY COMMITTEE (LVVWAC)

Forum for partnering water and wastewater agencies to address water quality and its impact on quantity issues in the Las Vegas Valley and Lake Mead.

LAS VEGAS WASH

The primary channel through which the Las Vegas Valley's excess water returns to Lake Mead.

LAS VEGAS WASH COMPREHENSIVE ADAPTIVE MANAGEMENT PLAN

A document produced by the Las Vegas Wash

Coordination Committee designed to outline long-term stabilization, enhancement and management of the Wash.

LAS VEGAS WASH COORDINATION COMMITTEE

A 29-member committee working to bring together all interested parties to address issues related to the Las Vegas Wash.

LAS VEGAS WASH MANAGEMENT ADVISORY COMMITTEE

A former collection of key stakeholders that provided direction on issues associated with the Las Vegas Wash (now known as "LVVWAC")

MAXIMUM CONTAMINANT LEVELS (MCL)

Highest allowable concentration of certain contaminants in water delivered to a user of public drinking water supply.

MIGRATORY BIRD TREATY ACT

Federal legislation that protects specific birds.

NATIONAL HISTORIC PRESERVATION ACT

Federal legislation intended to preserve historical and archaeological sites in the U.S. and created the National Register of Historic Places.

NATIONAL PARK SERVICE

Department of Interior bureau responsible for the care and management of national parks.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

Regulations that control water pollution by regulating point sources that discharge pollutants into U.S. waters.

NATIONAL REGISTER OF HISTORIC PLACES

A federal list of districts, sites, buildings, structures and objects deemed worthy of preservation.

NEVADA ADMINISTRATIVE CODE (NAC)

Administrative regulations of the Nevada State government, which regulates water pollution.

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP)

Division of the Nevada Department of Conservation and Natural Resources that maintains programs for water quality, water pollution and safe drinking water. Responsible for the implementation and enforcement efforts of the Clean Water Act. (www.ndep.nv.gov)

NEVADA REVISED STATUTES (NRS)

Nevada State laws, some which govern water pollution and water quality.

NON-POINT SOURCE FLOWS

A source of water pollution that cannot be traced to a specific source, such as stormwater or urban runoff.

PHOSPHORUS

An essential plant nutrient that is commonly found in wastewater treatment plant effluent and urban runoff. It can limit algal growth in Lake Mead.

POINT SOURCES

A source of water pollution that can be traced back to its source, such as a stream or pipe.

POTABLE WATER

Water that is free of pollution, harmful organisms and impurities and is therefore safe to drink.

QUAGGA MUSSELS

Invasive mussels that inhabit depths of Lake Mead. The species can quickly colonize, causing harm to water quality and infrastructure.

REQUIREMENT TO MAINTAIN EXISTING HIGHER WATER QUALITY (RMWQ)

Requirement established when monitoring data show that existing water quality for individual parameters is significantly better than the standard necessary to protect the beneficial uses.

RETURN-FLOW CREDITS

Colorado River water returned to the Colorado River, primarily consisting of highly-treated wastewater returns.

SAFE DRINKING WATER ACT (SDWA)

The main federal law that protects and mandates the quality of America's drinking water.

SELENIUM

A metal found in natural deposits and ores. It is toxic in large amounts, but trace amounts of the metal are necessary for cellular function in animals.

SOUTHERN NEVADA WATER SYSTEM (SNWS)

System of treatment and transmission facilities that divert Colorado River water from Lake Mead and delivers treated and raw water to municipal water purveyors.

SOUTHERN NEVADA WATER AUTHORITY (SNWA)

A cooperative agency formed to address Southern Nevada's water needs on a regional basis. (www.snwa.com)

TOTAL DISSOLVED SOLIDS (TDS)

A measure of inorganic and organic materials dissolved in water.

TOTAL MAXIMUM DAILY LOAD (TMDL)

A calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards.

TOTAL ORGANIC CARBON (TOC)

The entire quantity of carbon that exists in a measured sample, and is used as a measure of the amount of organic pollution in a water sample.

- THIS PAGE INTENTIONALLY LEFT BLANK -