Building Strong Collaborative Relationships for a Sustainable Water Resources Future:

STATE OF NEVADA

SUMMARY OF STATE WATER PLANNING

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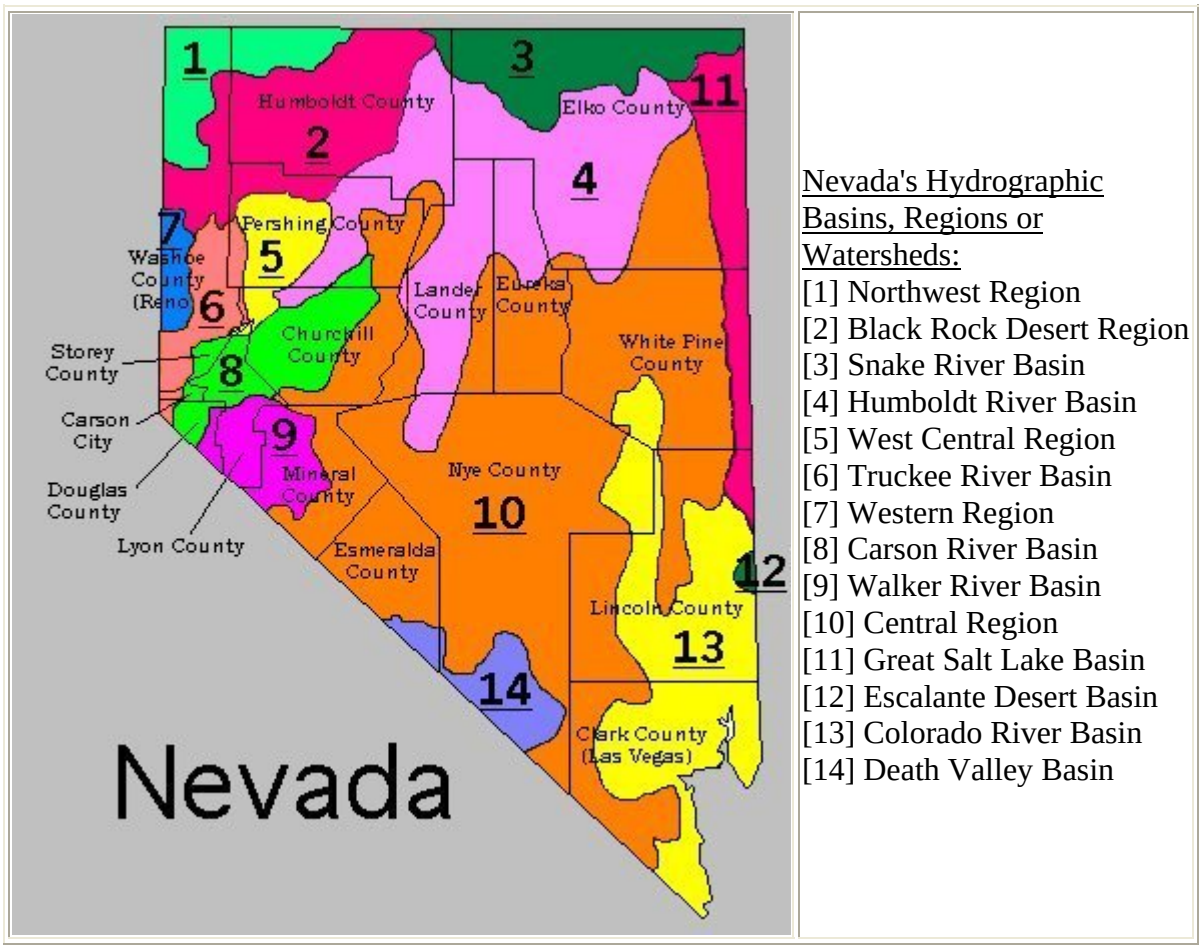
The findings contained in this report are based on the information collected from the literature search and interviews for this initiative and should not be construed as an official Department of the Army position, policy or decision unless so designated by other official documentation.

STATE OF NEVADA



Nevada's Hydrographic Basins, Regions or Watersheds:
[1] Northwest Region
[2] Black Rock Desert Region
[3] Snake River Basin
[4] Humboldt River Basin
[5] West Central Region
[6] Truckee River Basin
[7] Western Region
[8] Carson River Basin
[9] Walker River Basin
[10] Central Region
[11] Great Salt Lake Basin
[12] Escalante Desert Basin
[13] Colorado River Basin
[14] Death Valley Basin

Figure 1. Nevada's Hydrographic Basins or Regions

1. RESPONSIBLE STATE AGENCIES/REGIONAL ENTITIES

The Nevada Division of Water Resources (NDWR) (http://water.nv.gov/), located within the Department of Conservation and Natural Resources is the water policy agency for the State of Nevada. NDWR consists of seven sections: (1) Engineering; (2) Water Rights; (3) Titles Section; (4) Hearings; (5) Surface Water and Adjudications; (6) Water Planning and Floodplain Management; (7) and Information Technology.

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The State Engineer is required to *conduct necessary studies and inventories* including the 1999 Nevada State Water Plan (the Plan) (Source [1]). Under the Department of Conservation and Natural Resources, the following state agencies were closely involved in the plan preparation and review: Division of Environmental Protection, Division of Wildlife, Division of State Lands, Division of State Parks, Division of Water Resources, and the Natural Heritage Program.

Additional participants actively involved in creating the Plan include a Water Plan Steering Committee made up of: individuals from the Department of Conservation and Natural Resources, the state engineer, the attorney general, and the governor. An Advisory Board tasked with water resource planning and development was also created to help with the Plan. The Advisory Board consisted of representatives of local governing bodies; interest groups such as mining, agriculture, land development; and the public. A list of individuals involved can be found at: http://water.nv.gov/WaterPlanning/wat-plan/PDFs/name-lst.pdf.

2. STATE WATER PLANNING STATUS

The 1999 Nevada State Water Plan, lead by the Nevada Division of Water Planning (NDWP) under the Nevada Department of Water Resources, was completed as required by Nevada Revised Statute (NRS) 540.101 (Source [2]). The legislative basis for developing the plan dates back to 1969 when the State Water Planning Program was legislated authorizing the completion of water inventories and other necessary studies, which lead to *Water for Nevada*, 1974 – the first comprehensive water resources plan (Source [3]).

The major state statutory policies that affect the water planning process of NRS include (Source [2]):

- Water Supply and Allocation: 533.024, 533.025, 534.020 (1), 540.011 (1), 541.030 (2)(a)
- Water Quality: 445A.300
- Environmental and Recreational Uses: 501.100, 527.260 (1)(b)
- Water Use Efficiency: 534.020 (2), 540.011 (1)
- Water Planning and Management: 540.011, 541.030 (2)(b), 543.020, 548.095, 548.100, 548.110
- Plan components and duties of the Water Resources Division: 540.051, 540.101

Water is the most precious resource determining the future of Nevada (Source [4]). Historic and current water use is reviewed in the plan with projected demands extending out to 2020. The plan states:

> *The key to development of the state water plan has been the establishment of a dynamic, flexible water planning process. Ongoing review and update of the plan is essential to ensure*

that we, as a state, successfully evaluate emerging issues and prepare ourselves to meet future challenges (Source [5]).
Subsequent updates of the Plan will include an evaluation of the state's progress in implementing the Plan's recommendations (Source [6]).

At this time, no future plans are mandated by legislation; however, the Plan includes issues to be addressed or further addressed in plan updates such as:

- Mine dewatering
- Integrated management of surface and ground water
- Conflict resolution
- Better identification of environmental water needs
- More thorough discussion of various types of water storage
- Dam safety
- Better assessment of perennial yield and restoration of over utilized aquifers (Source [7])

3. WATER MANAGEMENT VISION AND GOALS

Nevada Division of Water Resources Mission Statement:

The mission of the Nevada Division of Water Resources (NDWR) *is to conserve, protect, manage and enhance the State's water resources for Nevada's citizens through the appropriation and reallocation of the public waters. In addition, the Division is responsible for quantifying existing water rights; monitoring water use; distributing water in accordance with court decrees; reviewing water availability for new subdivisions and condominiums; reviewing the construction and operation of dams; appropriating geothermal water; licensing and regulating well drillers and water rights surveyors; reviewing flood control projects; monitoring water resource data and records; and providing technical assistance to the public and governmental agencies* (Source [8]).

The three ongoing NDWR *goal or objective* includes:

- *To conserve protect, manage and enhance the State's water resources for Nevada's citizens through the appropriation and reallocation of the public waters.*
- *To ensure that dams in the State will be built safe and remain safe for the design life of the dam.*
- *To enforce well drilling regulations.*

The seven *Key Long Term Goals and Objectives* provided on the NDWR website include:

1. *The Division will continue to manage the State's water resources through monitoring existing uses, reallocating water to new uses and ensuring that Nevada's growth can be based on a sustainable yield. This includes monitoring and studying the effects of pumping the carbonate aquifer on existing rights. The Division will also reduce the backlog of appropriation applications and change applications while expeditiously acting on applications as they are received.*

2. *Through the adjudication process set out in NRS 533, the Division will continue to attempt to quantify and determine water rights put to beneficial use prior to enactment of various statutes ("vested rights"), thereby ensuring that those water rights are recognized.*
3. *The Division will continue to protect the safety and health of Nevada citizens through the applicable statutes and regulations for dam safety, inspections and strict enforcement of channel clearance and flood control.*
4. *The Division will work to carry out the higher priority recommendations outlined in the State Water Plan and review the balance of the recommendations to see how they can best be implemented/accomplished in a timely manner. The Division will continue to provide flood plain management assistance to the communities throughout Nevada and the State itself.*
5. *The Division will continue to protect the health and safety of Nevada's citizens through the implementation of its well drilling laws, rules and regulations to ensure that the water resources of the State will be available for future generations.*
6. *The Division will reduce the backlog of requests for changes of ownership of existing water rights filed before October 1995 and continue to process newly filed reports of conveyances in a timely manner.*
7. *The Division will continue to maintain, update and improve the water rights database with the eventual goal being internet access to the general public* (Source [9]).

Guiding Principles for the State Water Plan

1. *All water within the state, whether above or below ground, belongs to the public and its use is subject to a system of water rights administered by the State Engineer, and by state and federal court decrees and regulations.*
2. *Public education and public input is vital to statewide water resources planning.*
3. *The State Water Plan should integrate water supply, water quality, water use, and environmental issues, and should be used to guide decisions which affect water resources in the state.*
4. *The State Water Plan by design should be "growth neutral." It should neither encourage nor restrict growth, and present no positions regarding the type, location or rate of growth.*
5. *Water right owners are entitled to buy, sell or trade their water rights to others under free market conditions. However, changes in the point of diversion, or place or manner of use must be approved prior to the change in accordance with the state water law, and state and federal court decrees and regulations.*
6. *The water resource needs of future generations of Nevadans should be protected by balancing economic goals with social, aesthetic, cultural and ecological values.*
7. *All water resource projects should be technically, environmentally and economically sound, and consistent with state law.*
8. *The State Water Plan should help integrate and coordinate the water planning and management activities of local, state and federal agencies.*
9. *The relationship between groundwater and surface water must be recognized in the State Water Plan.*

10. *Water conservation is an important component in the planning and management of the State's Water Resources.*
11. *Watershed planning efforts should be encouraged and should include representatives of all agencies, municipalities, political subdivisions, water users and any others with an interest in the planning and management of a watershed.*

Specific Planning Goals of the State Plan (Source [10])

1. ***Water Supply:*** *Enough water of sufficient quality for future generations*
2. ***Water Rights:*** *Protection of existing water rights*
3. ***Economic Efficiency:*** *The preferential use of water for greatest economic gain to the state*
4. ***Conservation:*** *More conservation and less waste of water*
5. ***Water Quality:*** *Protection and enhancement of water quality*
6. ***Rural Water Supplies:*** *Protection of water supplies for current and future development in rural areas*
7. ***Environmental Quality :*** *Protection and enhancement of the environment*
8. ***Efficiency:*** *Agency actions which are coordinated and integrated to save money and time, reduce duplication in projects or services, address gaps in resource protection, and result in better decisions*
9. ***Decision making:*** *Less litigation and more cooperative decision making to resolve water resource issues*
10. ***Effectiveness:*** *More informed water resource decision making, with a greater awareness of aesthetic, cultural and ecological values*
11. ***Sound Science:*** *Water resource projects which are technically, environmentally and economically sound*
12. ***Public Involvement:*** *A better educated citizenry and more public participation in water resource decision making*
13. ***Quality of Life:*** *A higher quality of life for all Nevadans*

The Plan focuses on a wide range of water planning issues affecting water planning, management, and allocation of water resources statewide while summarizing local and regional water planning efforts (Source [11]). The Plan does not focus on specific watersheds as unique systems; however the Plan appendix breaks out each county in Nevada by demographics and water use.

4. SCOPE OF WATER RESOURCES PLANNING AND MANAGEMENT

The Plan is designed to assist in guiding the development, management, and use of the state's water resources (Source [4]). Approximately 60 percent of the water used in Nevada comes from surface water and 40 percent comes from groundwater (Source [12]). Surface water has been fully appropriated and utilized for many years thus meeting future demands with surface water may require any and/or all combinations of water right acquisitions and transfers, storage, and improved management practices.

The Plan is divided into three main parts. A brief summary is outlined below:

- Part 1: Background and Resource Assessment
  - Introduction, Guidelines, and Water Plan Organization
  - Summary of the 1974 Water Plan
  - Institutional Framework for Water Planning and Management
  - Water Resources Background
  - Socioeconomic Background
- Part 2: Water Use and Forecast
  - Historic and Current Water Use
  - Socioeconomic Assessment and Forecasts
  - Nevada Water Withdrawal Forecasts
  - Meeting Our Future Water Supply Needs
  - Technical Supplement, Water Use Coefficient and Related Forecast Factor Development and Application
- Part 3: Water Planning and Management Issues
  - Water Supply and Allocation
  - Water Quality
  - Resource Conservation and Recreational Uses
  - Flood Management
  - Water Planning and Management
- Appendices – Appendix 1 to 6 is included for each of the 17 Nevada Counties (Figure 2)
  - Appendix 1 – Water Use Data and Analysis
  - Appendix 2 – State and County Population Estimates and Forecasts
  - Appendix 3 – Population, Employment and Related Water Use Forecasts
  - Appendix 4 – State and County Forecasts of Irrigated Acreage
  - Appendix 5 – State and County Water Use Forecast Summary
  - Appendix 6 – Nevada and County Socioeconomic Overview

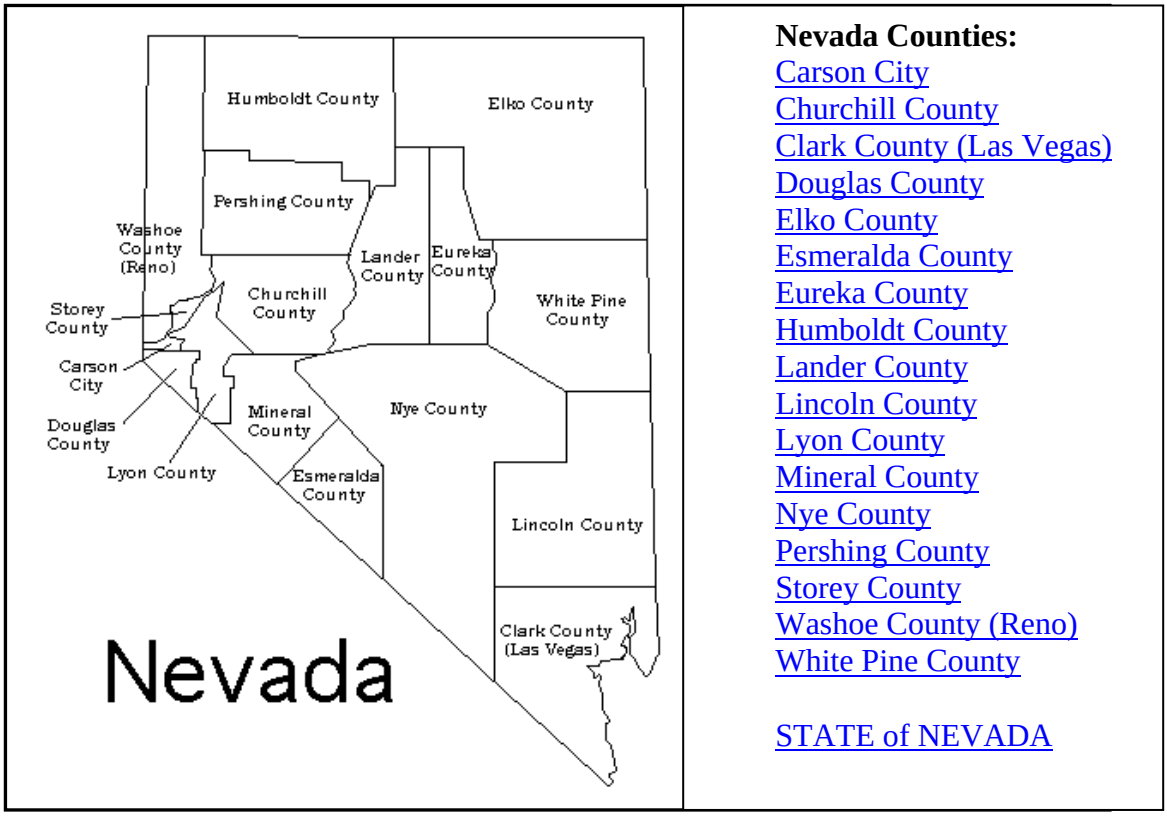

Figure 2. Water Resource Planning Appendices based on County Demographics and Trends

Trends Impacting Water Resources

Agriculture is the state's first and longest lasting industry (Source [13]). Shortly following statehood, the mining boom began to populate the state starting in the 1860's (Source [14]). Nevada's current economy has developed from an emphasis on gaming, tourism, warehousing, and manufacturing, which has resulted in over 80 percent of the state's population residing in the metropolitan areas of Las Vegas and Reno (Source [15]). Wildlife, recreation, and environmental water needs are recognized in the Plan as requiring additional planning and assessment. Overall, the increase in new water demand by 2020 is expected to be 9 percent or 350,000 acre-feet (Source [27]).

Population and the Water Supply

The USGS estimated that in 1995 over 94 percent of the state residents rely on nearly 300 public supply systems. The 1995 estimates also concluded that Nevada has the highest per capita water use at 315 gallons/person/day. The estimate includes all water used such as domestic, commercial, industrial, thermoelectric, public use, landscaping, and system losses (Source [16]).

According to the Nevada State Demographer, the population of Nevada is expected to reach 3.5 million by the year 2018 (Figure 3). According to U.S. Census Bureau, the population estimate for 2006 was just under 2.5 million people. A secondary estimate by the NDWP forecasts 3.05

million people by 2020 (Source [17]). With the population projection, the domestic water use is expected to jump from 8.9 percent of total water use in 1995 to 16 percent in 2020 (see Table 1).

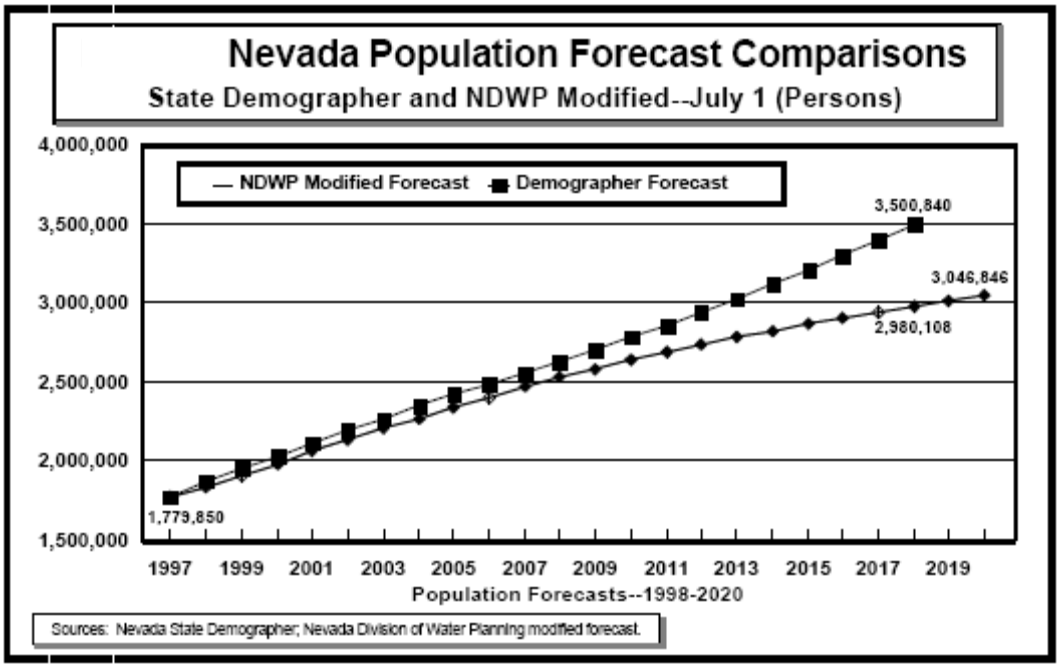

Figure 3. Population Forecast (Source [17])

Meeting Future Water Needs

The possible strategies for meeting future water needs are split into two categories according to the Plan:

1. Demand Management Strategies (i.e., conservation measures)
   a. Conservation – meter installation, xeriscaping, low-flow fixtures, audits, leak detection, etc.
   b. Alternative strategies to reduce potable water demand – utilizing non-potable water
      i. Effluent reuse – treated wastewater for landscaping (municipal)
      ii. Greywater use – bathing water used for landscaping requiring dual plumbing (residential)
      iii. Dual water systems – dual piping delivered with one pipe of lesser quality water for landscaping (municipal and/or residential)
2. Supply Development Strategies – increasing supply & reliability of supply
   a. Use of existing committed and uncommitted supplies – groundwater rights for uncommitted supplies as surface water rights are allocated
   b. Water transfer – groundwater from rural to urban
   c. Groundwater recharge and recovery – artificially recharging aquifers with available surface water for future use
   d. Conjunctive use – coordinated management of groundwater & surface water (e.g., use surface water when available, store excess surface water, and use groundwater storage when additional water is needed)

Table 1. Nevada Consumptive Use Forecast Summary

Estimated (1995) and Forecasted (2000–2020) Consumptive Use by Use Type (Acre-Feet/Year)

Total Nevada	1995	2000	2005	2010	2015	2020
Domestic (Residential) Withdrawals[1]	360,710	455,464	538,090	607,467	660,315	701,338
Total Consumptive Use	180,037	227,331	268,571	303,198	329,575	350,051
Percent Consumptive Use	49.9%	49.9%	49.9%	49.9%	49.9%	49.9%
Commercial & Industrial Withdrawals	172,407	220,355	261,880	296,905	323,811	344,919
Total Consumptive Use	31,950	40,836	48,531	55,022	60,008	63,920
Percent Consumptive Use	18.5%	18.5%	18.5%	18.5%	18.5%	18.5%
Thermoelectric Withdrawals[2]	65,449	67,085	68,427	69,522	70,412	71,223
Total Consumptive Use	41,053	42,079	42,921	43,608	44,166	44,675
Percent Consumptive Use	62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Total Mining Use[3]	274,434	278,996	282,708	284,965	283,764	277,566
Total Consumptive Use	89,164	90,947	92,402	93,289	93,469	92,751
Percent Consumptive Use	32.5%	32.6%	32.7%	32.7%	32.9%	33.4%
Total Agriculture Withdrawals[4]	3,119,914	3,167,378	3,115,872	3,052,038	2,976,780	2,901,522
Total Consumptive Use	1,614,398	1,638,928	1,612,275	1,579,244	1,540,300	1,501,356
Percent Consumptive Use	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%
Irrigation Water Withdrawals	3,113,585	3,160,754	3,109,348	3,045,636	2,970,521	2,895,406
Irrigation Consumptive Use	1,612,079	1,636,501	1,609,885	1,576,898	1,538,007	1,499,115
Percent Consumptive Use	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%
Livestock Water Withdrawals	6,329	6,624	6,524	6,402	6,259	6,116
Livestock Consumptive Use	2,319	2,427	2,390	2,346	2,293	2,241
Percent Consumptive Use	36.6%	36.6%	36.6%	36.6%	36.6%	36.6%
Total Water Withdrawals (Use)	**4,041,385**	**4,250,474**	**4,339,289**	**4,392,604**	**4,404,012**	**4,391,150**
Total Consumptive Use	1,956,602	2,040,121	2,064,701	2,074,361	2,067,518	2,052,752
Percent Consumptive Use	48.4%	48.0%	47.6%	47.2%	46.9%	46.7%

Notes: "Water Withdrawal" and "Water Use" are equivalent terms, but are not the same as consumptive use; do not account for return flows. Estimates of consumptive use are based on estimates provided by the U.S. Geological Survey (USGS). Figures for the total State of Nevada are based on an aggregation of individual county estimates and forecasts of water withdrawals and consumptive use. Water withdrawal forecasts are based on the existing levels of conservation.

[1] Total Domestic Use equals the total residential use, both indoors and outdoors (i.e., residential landscaping).

[2] Thermoelectric Use includes water used for geothermal power plants and cooling water for conventional plants.

[3] Total Mining Use includes both consumptive and non consumptive uses (i.e., mining dewatering).

[4] Total Agriculture Withdrawals includes both irrigation and livestock water use.

Source Data: Nevada State Demographer; Nevada Department of Employment, Training and Rehabilitation (DETR); U.S. Geological Survey (USGS); and Nevada Division of Water Planning (NDWP).

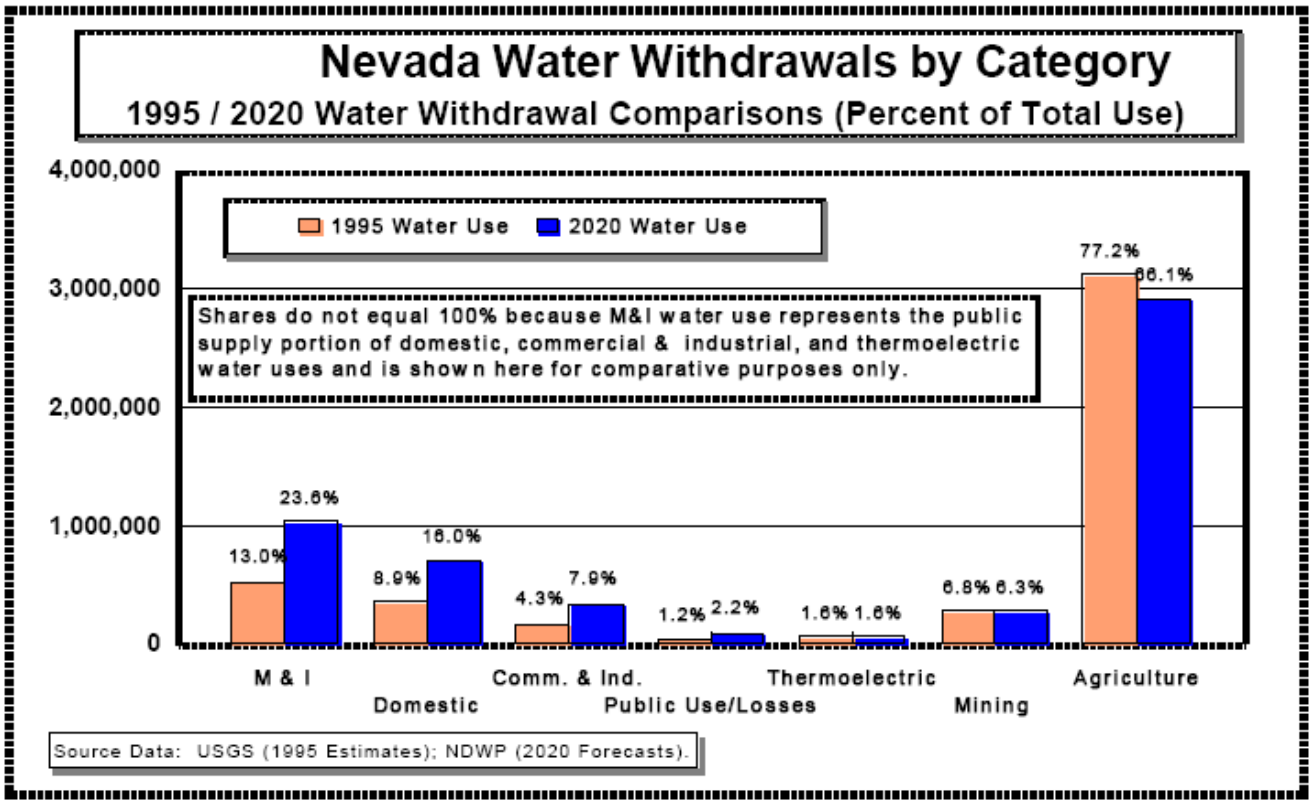

Figure 4. Nevada Withdrawals – 1995 and 2010

e. Desalination – energy intensive process of removing salts from water
f. Cloud Seeding – adding particles to the atmosphere to promote precipitation (Source [18]).

Commercial/Industrial

Commercial water use accounted for 3.8 percent of the state's water use in 1995. Commercial use includes casinos, motels, restaurants, offices, campgrounds, commercial facilities, and civilian/military institutions (Source [19]). Industrial water use is lumped in with commercial use in Table 1. Industrial water use (manufacturing and construction) accounted for 0.5 percent of the state's total in 1995 (Source [20). Based on county forecasts of employment-to-population ratios, commercial/industrial use is expected to nearly double to 7.9 percent by 2020 with public systems supplying the majority of commercial water needs and self-supplied systems supplying industrial needs (Figure 4).

Thermoelectric

Thermoelectric use includes the water used in seven fossil fuel and 15 geothermal electric power plants. The water used in these power plants accounted for 1.6 percent of the state's total in 1995. Over 97 percent of the water used for thermoelectric operations in 1995 was from self-supplied systems (Source [21]). Forecasts of thermoelectric water withdrawals were based on

county estimates and on historical trends. The total water use is expected to remain at about 1.6 percent from self-supplied systems.

Mining

Once mine milling technology was established and gold prices increased, low-grade ore along the "Carlin Trend" began being mined in the 1980's. These mines came in the form of open pit mining which dewaters groundwater basins while leaving behind cyanide heap leaches and tailing ponds. In 1995, mining accounted for 7 percent of the total state water use. The Plan's mining projections forecast gold prices stabilizing around $280–$350 per ounce (Source [17]), thus water withdrawals were anticipated to remain relatively constant. In current mining operations, mining withdrawals are associated with groundwater dewatering, which exceeds the typical consumptive use. The excess water is released back into the environment through surface water discharge, aquifer reinjection, or irrigation by other sectors.

Agriculture

Crop and pasture irrigation not from public water supplies, is the state's largest water user at 77 percent in 1995 (Source [22]); livestock watering accounted for 0.2 percent of water use (Source [23]). From the 1995 data, approximately 63 percent of the water used to meet agricultural needs was diverted from surface water sources; the remainder was supplemented with groundwater. The forecast predicts a 7 percent quantity decrease by 2020 in agriculture water use due to encroaching urbanization and the transfer of agriculture water rights to municipal and natural resource needs (Source [24]). By 2020, the agriculture water use in the state is estimated to be 66 percent of the state's total water use.

Meeting future water needs for agriculture include planning methods such as:

- Improving water supply reliability for users depending on fluctuating water sources – storage
- Implementing conservation measures
- Utilizing treated wastewater
- Developing available groundwater resources (Source [25])

Wildlife and Environmental Water Needs

The Plan states that "securing of water supplies for wildlife and environmental purposes is still a relatively new resource management concept" (Source [26]). Government agencies and conservation groups, in recent years, have obtained water for wildlife and the environment by:

- Purchasing and transferring water rights to a designated water body including instream flow
- Filing for new appropriative water rights
- Entering into agreements for reuse of water from agriculture irrigation systems, wastewater treatment plants, mine dewatering operations, and thermoelectric plants

The water obtained for wildlife and environmental needs is often used to supplement streams, lake/reservoir water levels, spring pools, and wetland/riparian areas mainly in ecosystems that

are deteriorating. The Plan recommendations include legislative support for a plan, storage rights, funding for water rights, incentive programs for wildlife and environmental conservation along with a statewide working group.

Recreation Needs

The Plan recognizes the growing popularity of water-based outdoor recreation as adding to state and local economies at the same time recognizing the difficulty in quantifying the need. Implementing a comprehensive and integrated assessment process for recreation, perhaps combined with natural resources, will be required to anticipate future water needs.

Flood Management

Despite Nevada being the driest state in the nation (Source [4]), floods are common. The Plan devotes an entire section of flood management mainly as the coordinator between federal and local agencies. The Nevada Floodplain Management Program currently under the Division of Water Resources was created in response to the New Years Flood on the Truckee River in 1997. Clark County has developed a Flood Control Master Plan: http://acequia.ccrfcd.org/FileLibrary/FileLibrary.aspx.

Drought Management

Drought is common in Nevada. Although recognized, the Plan does not extensively cover drought. Rather, drought information can be found in the 2003 State of Nevada Drought Plan. http://water.nv.gov/WaterPlanning/wat-plan/PDFs/July%202003%20Drought%20Plan.pdf

Regional components

Regional Plans

NRS 540A.130 mandates a comprehensive Regional Plan covering the *supply of municipal and industrial water, quality of water, sanitary sewerage, treatment of sewage, drainage of storm waters and control of floods.* Some of the water plans for public owned utilities or individual counties are listed below:

- Southern Nevada Water Authority Water Resource Plan, 2008 http://www.snwa.com/html/wr_resource_plan.html
- Washoe County Comprehensive Regional Water Management Plan, 2004 to 2025 http://www.co.washoe.nv.us/water/rwmp/index~color=grey&text_version and the Amendment to the Washoe County Comprehensive Regional Water Management Plan, 2008 https://www.washoecounty.us/repository/files/10/2008_amendment_cover_072908.pdf
- The Truckee Meadows Water Authority Water Resources Plan 2005 to 2025 http://www.tmh2o.com/water_system/resources/pdfs/WRP2005_compressed.pdf
- Churchill County Water Resource Plan Update, 2007
- http://www.churchillcounty.org/planning/waterresource/FinalWaterResourcePlan2007.pdf
- Elko County Water Resource Management Plan, 2007 Draft

http://www.elkocountynv.net/planningzoning.htm

Conservation Plans

Conservation is an economically efficient water resource strategy through outreach and education. The following list includes the conservation plans that have been completed as mandated by NRS 540.121 for all municipal "suppliers of water":

- Beatty Water and Sanitation District – Water Conservation Plan, November 2008 http://water.nv.gov/home/pdfs/BWSD%20water%20conservation%20plan%20dec%202008.pdf
- Canyon General Improvement District – Water Conservation Plan, July 2008 http://water.nv.gov/home/pdfs/Canyon%20GID%20WCP-July%202008.pdf
- Imlay Water System – Water Conservation Plan, October 2007 http://water.nv.gov/home/pdfs/Imlay%20WCP%2010-07.pdf
- Indian Hills General Improvement District – Water Conservation Plan, March 2008 http://water.nv.gov/home/pdfs/Indian%20Hills%20GID%20WCP%20March%202008.pdf
- Indian Springs Water Company, Inc. – Water Conservation Plan, October 2008 http://water.nv.gov/home/pdfs/Indian%20Springs%20WCP%20Nov%202008.pdf
- Kingsbury General Improvement District – Water Conservation Plan, January 2009 http://water.nv.gov/home/pdfs/Kingsbury%20GID.pdf
- Silver Springs Mutual Water Company – Water Conservation Plan, http://water.nv.gov/home/pdfs/Silver%20Springs%20MWC%20WCP.pdf
- Southern Nevada Water Authority Conservation Plan, August 2004 http://snwa.com/html/cons_plan.html
- Sun Valley General Improvement District – Water Conservation Plan, December 2008 http://water.nv.gov/home/pdfs/Sun%20Valley.pdf
- Topaz Lodge Water Company –Conservation Plan, February 2008 http://water.nv.gov/home/pdfs/Topaz%20Lodge%20WCP%20Feb-8-2008.pdf
- Truckee Meadows Water Authority – Water Conservation Plan, July 2007 http://www.tmwa.com/conservation/pdfs/WaterConservationPlanJuly2007.pdf

The Plan states the 100 of the 700 public water systems have approved Conservation Plans; however, the water systems with approved plans serve approximately 95 percent of the total population served by public water systems. Despite this list of conservation plans, there is no mandate to assure implementation, effectiveness, or updates. The state does not provide funding for conservation measures.

Future Scarcity/Water Conflicts

Until approximately 2007, the Plan states that water demands in Southern Nevada can be met by utilizing existing long-term water supplies such as unused Nevada Colorado River water, the Las Vegas Valley aquifer, and conservation efforts. To meet the increased demand from 2007 – 2025, the Plan intends to utilize Colorado River surpluses (if available), the Southern Nevada Groundwater Bank, the Arizona Banking Demonstration Project, the future Arizona groundwater bank (if necessary), and exercise the 1992 contractual rights the state has with the Secretary of

the Interior for an annual distribution of unused apportionments and surplus Colorado River flows (Source [28]).

Plan Issues and Recommendations

Conservation**:** Conservation is seen as a tool to reduce demand regardless of the water system. The recommendations of the Plan assume that conservation will remain a voluntary activity while focusing on resources and incentives provided by the state through planning assistance, funding, water use measurement/estimating, and improving state programs.

Integrated Water Management**:** Because the population growth of Nevada is putting increased pressure on existing water supplies, the need to integrate surface water and groundwater management is increasing. Recommendations of the Plan focuses on improving groundwater monitoring to better understand availability and/or connectivity to surface water and the utilization of alternative water such as grey and reclaimed.

Interbasin and Intercounty Transfers**:** Water transfers are an integral part of Nevada's history and are likely to become a common strategy for meeting future water needs; however they are not without potential impacts, which typically includes heavy public involvement. The Plan states that transfers must be carefully balanced to meet:

- Water supply sufficiency
- Protection of existing water rights
- Preferential use of water for greatest economic gain to the state
- Greater conservation
- Protection of water quality
- Protection of water supplies for rural areas
- Environmental protection
- Sound processes for decision-making, including efficiency, cooperation, more information, sound science and public involvement (Source [27])

Water Use Measurement and Estimation: It is estimated that 65 to 75 percent of the groundwater and surface water withdrawn is measured or estimated in detail. The Plan recognized the importance of water use information for effective management and planning. Recommendation for improving water use measurements and estimates mainly involves creating a State program to better manage and collect data including meter installation funding.

Instream Flow and Environmental Purposes: The public has identified the need for environmental protection and natural resource conservation despite the growing need to divert water for human use. The recommendations for ensuring instream flow and adequate water supplies for environmental purposes includes legislative support and establishing a working group of experts tasked with obtaining water supplies from alternative mechanisms.

Water Resources Data Collection and Management: The Plan emphasizes the importance of accurate and comprehensive water resource data for planners and decisionmakers.

Recommendations are directed toward the State supporting, encouraging, and creating data management systems for partnering agencies and their own system.

Local Government Planning Assistance: The Plan acknowledged the need for the State to provide more assistance to local governments for planning. Local governments are learning that planning is crucial as competition for water grows. The Plan recommends that the State: (1) provide monetary along with technical support for planning; (2) improve water use estimates and measurements; (3) improve data management; and (4) improve watershed management.

Funding Opportunities

Several funding opportunities exist for the planning, management, protection and development of water resources. Various types of funding and the specific use from state and federal agencies are listed in Table 2 below.

Table 2. Available Water Resources Funding – State and Federal (Source [29])

Source	Distributor	Use
State Grant	Division of Water Planning	Capital Improvement to Community Water Systems
State Grant	Division of Env. Protection – Nonpoint Source Program	Nonpoint Source Pollution Implementation
State Grant	Commission on Economic Development	Community Infrastructure Studies and Construction, i.e., wells and distribution lines
State Loan	Department of Business and Industry	Management, Control, Delivery, Use or Distribution of Water
NV Petroleum Fund	Division of Env. Protection – UST/LUST/Claims Branch	Cleanup of Above or Below Ground Storage Tanks
State Loan	Division of Env. Protection – Bureau of Water Pollution	For Municipalities to Construct Waste Water Treatment Plants for Nonpoint Source Control
NV Revolving Fund	Division of Health – Bureau of Health Protection Service	Assist Public Water Systems to Comply with the Safe Drinking Water Act
State Grant	Division of Water Resources	Channel Clearance Maintenance, Restoration, Surveying and Monumenting
State Disaster Relief Fund	Legislative Counsel Bureau	Community Recovery from Event Disasters
Federal	U.S. Dept. Of Agriculture, Rural Development	Rural Utilities Development: Water, Wastewater, Stormwater Systems
Federal Grant	U.S. Environmental Protection Agency	Assist State, Tribal and Local Governments in Developing Wetlands Protection Programs
Federal	Natural Resource Conservation Service & U.S. Fish & Wildlife Service	Wetland Reserve Program for Wetland Restoration
Federal Grant	Federal Emergency Management Agency	Mitigation Projects Aimed at Reducing Repetitive Insurance Losses and Future Damage

5. PARTNERSHIPS, STAKEHOLDER, AND PUBLIC INVOLVEMENT

As mentioned previously, the DCNR steering committee, Advisory Board on Water Resources Planning and Development, interest groups, local governments, and the state legislature were involved in the State Plan planning process. A technical working group tasked with developing a draft *State Water Policy*, and the public were also involved in planning. Public involvement has been credited as the "key" to developing the Plan with the public's thoughts, opinions, and recommendations being included during all phases of planning (Source [6]).

Prior to the start of the Plan planning process, approximately 800 Nevadans participated in a series of Water Policy Forums in 1992 that resulted in a report: *Nevada's Water Future: Making Tough Choices.* The Report helped in the early stages of the planning process by representing a diversity of issues important to Nevadans.

The breadth and scope of the plan was developed from workshops sponsored by the Division of Water Planning (1994 and 1995) in which Nevadans were educated on state water law and water planning policy. The workshops were also useful in getting a sense of the public's perception on issues such as interbasin transfers. There were 20 workshops with over 600 participants.

The planning process leading to the Plan followed the steps below.

- Solicit public input to determine the scope of the plan and the issues to be addressed.
- Develop and update basic hydrologic and socioeconomic data sets.
- Analyze the water resources institutional framework.
- Forecast the state's population and anticipated economic trends over the next 20 years.
- Forecast future water needs over the next 20 years.
- Inventory water supplies presently available.
- Inventory resources already committed (permits, vested rights, etc.).
- Research additional possible sources of supply.
- Identify alternate scenarios to meet the water needs of the state.
- Identify issues that affect water use, allocation and management.
- Develop and evaluate policy and programmatic recommendations to address the issues.
- Solicit public input throughout plan development to gauge the relevancy of the issues and the appropriateness of recommendations.
- Present comprehensive plan with recommendations to the state legislature for review and approval.

Over 87 percent of the land in Nevada is controlled and managed by the federal government (Source [30]); as such, the federal government is highly involved with water resources. For instance, the USGS National Water Use Information Program is responsible for estimating statewide water use on a routine and comprehensive basis and has been doing so every 5 years since 1950. The USGS Water Resources Division collects and aids in evaluating quantity, quality, distribution, and use of water resource data including surface water gaging stations. Also, the USGS is jointly responsible along with the NDWR in collecting groundwater levels around the state.

Aside from the federal government, several other agencies are involved in water resources. Table 3 lists the organizations involved specifically in developing GIS data files for water resource planning and management.

Table 3. Agencies and Organizations involved in Water Resources GIS Data Files

Department of Conservation and Natural Resources	Natural Heritage Program	Desert Research Institute
Division of Water Resources	Division of Water Planning	U.S. Geological Survey
Division of Environmental Protection	Legislative Counsel Bureau	U.S. Forest Service
Division of Wildlife	Department of Transportation	U.S. Bureau of Land Management
Division of State Lands	University of Nevada System	U.S. Bureau of Reclamation
Division of State Parks	Tahoe Regional Planning Agency	U.S. Natural Resources Conservation Service
	Nevada Bureau of Mines and Geology	

6. PLAN IMPLEMENTATION STRATEGY

The *Nevada State Water Plan* was designed as a guide to help develop, manage, and use the state's water resources. The Plan quantifies historic use, current use, and forecasts future use out to 2020. Although the Plan identifies constraints and opportunities affecting water resource decision making, the Plan does not delineate specific future water supplies for corresponding regions within the state.

> *The state water plan is designed to be a policy and planning guide, not a water supply plan. Many of the decisions regarding how to meet a particular water supply objective are best determined and implemented at the local level. And in fact, many local governments have taken a close look at their own water supply needs and are now charting a course to meet those needs. Thus, while the plan summarizes local and regional water planning efforts, it focuses on a broad array of water planning issues which affect water planning, management and allocation of water resources statewide* (Source [4], [5]).

To assist local governments in managing region specific water resource planning, the State provides water assistant in the form of:

- Information and data sharing
- Financial support of local water planning efforts (Table 2)
- Review of local water planning documents
- Technical assistance
- Participation in local water planning efforts (Source [31])

7. OUTCOMES AND ASSESSMENT PROCESS

Nevada does not have a specific process to monitor the implementation of the state water plan. The state is not currently focusing its resources on statewide planning. Rather the state's current focus is on supporting local planning needs and water rights administration to meet those needs.

8. NEEDS, CHALLENGES AND CRITICAL PRIORITIES - INTERVIEW INSIGHTS

Over the last two decades Nevada has been one of the fastest growing states in the nation. Much of this growth has been focused in the Las Vegas and Reno/Sparks metro area. Water, especially in the southern part of the state is less plentiful and fully appropriated. Some basins that are considerably over appropriated are now facing significant risk of administration including curtailment of use. To address these needs areas are looking beyond their immediate resources to meet future needs. The state has 256 hydrographic basins and the Division must make a determination of whether a transfer between basins, among other criteria, is environmentally sound and this has been a difficult challenge. One need that would aid the Division in making some of these decisions is more data collection

Overall Nevada has a strong focus on local decision making, local control, and protection of private property rights. While the state has done statewide and regional planning this has not always been embraced by local and state decision makers. The Water Plan was last published in 1999; in 2001 the water planning division was eliminated and the staff was dispersed. This is not the first time that the Division has been disassembled. The planning sections main responsibility today relates to the review of conservation elements of local government(s) water plan(s).

Beyond these planning challenges Nevada has also identified the following needs, challenges and priorities:

- There is a need more drought protection.
- Addressing endangered species issues in Death Valley National Park has created significant conflict over ground water use.
- The state has been identified as an area to explore "Green Energy"; solar energy requires significant water resources.
- Resources and time is needed to addressing Tribal water rights claims over groundwater.
- Speculation of water rights prevents acting on junior applications. Some individuals are filing applications even if they don't have a project.
- Funding and resources are needed to address the 100's of reserve right claims from the Federal Agencies that assert claims. An orderly and more thoughtful prioritization of these claims is needed.
- Resources, funding, and time to address water rights adjudications; it takes a long time and is complicated by the above factors.
- One example of a cooperative success story is the five-party Truckee River Operating Agreement that helps protect decreed rights in Nevada and gives operational flexibility in upstream reservoirs.

9. REFERENCES

Much of the language and information in this summary comes directly from reports published by the Nevada Division of Water Resources.

[1] Nevada Revised Statutes: Title 48 – Water, Chapter 532 – State Engineer
http://www.leg.state.nv.us/NRS/NRS-532.html

[2] Nevada State Water Plan: Part 1, Section 1, page 1-1, 1-5, 1-6, 1-7
http://water.nv.gov/WaterPlanning/wat-plan/PDFs/pt1-sec1.pdf

[3] Guidelines for Nevada Water Planning, Report No. 1, Letter to the Citizens of the State of Nevada from the State Engineer
http://water.nv.gov/scans/publications/water%20planning%20reports/wfn_rpt1.pdf

[4] Nevada State Water Plan: Part 1, Section 1, page 1-1
http://water.nv.gov/WaterPlanning/wat-plan/PDFs/pt1-sec1.pdf

[5] Nevada State Water Plan: Part 1, Section 1, page 1-2

[6] Nevada State Water Plan: Part 1, Section 1, page 1-9

[7] Nevada State Water Plan: Part 1, Section 1, page 1-15
http://water.nv.gov/WaterPlanning/wat-plan/PDFs/pt1-sec1.pdf

[8] Nevada Division of Water Resources website: mission statement
http://water.nv.gov/home/Mission.cfm

[9] Nevada Division of Water Resources website: goals & objectives
http://water.nv.gov/home/objectv.cfm

[10] Nevada State Water Plan: Part 1, Section 1, page 1-4 and 1-5
http://water.nv.gov/WaterPlanning/wat-plan/PDFs/pt1-sec1.pdf

[11] Nevada State Wataer Plan, Part 1, Section1, page 1-1 and 1-2
http://water.nv.gov/WaterPlanning/wat-plan/PDFs/pt1-sec1.pdf.

[12] Nevada State Water Plan: Part 2, Section 4, page 4-2

[13] Nevada State Water Plan: Part 1, Section 5, page 5-1

[14] Nevada State Water Plan: Part 1, page 5-1

[15] Nevada State Water Plan: Part 1, page 5-4, 5

[16] Nevada State Water Plan: Part 2, page 1-4

[17] Nevada State Water Plan: Part 2, page 2-6

[18] Nevada State Water Plan: Part 2, page 4-3 – 4-8

[19] Nevada State Water Plan: Part 2, page 1-8, 9

[20] Nevada State Water Plan: Part 2, page 1-10

[21] Nevada State Water Plan: Part 2, page 1-11, 12

[22] Nevada State Water Plan: Part 2, page 1-17

[23] Nevada State Water Plan: Part 2, page 1-19

[24] Nevada State Water Plan: Part 2, page 3-15

[25] Nevada State Water Plan: Part 2, page 4-15, 16

[26] Nevada State Water Plan: Part 2, page 4-17

[27] Nevada State Water Plan: Part 3, page 1C-1

[28] Nevada State Water Plan: Part 2, page 4-10

[29] Nevada State Water Plan: Part 1, page 3-22 – 3-24

[30] Nevada State Water Plan: Part 1, page 5-7

[31] Nevada State Water Plan: Part 3, page 5C-2, 3