



2016 – 2035 WATER RESOURCE PLAN

VOLUME I

ABSTRACT

ABBREVIATIONS

2025WRP	2005-2025 Truckee Meadows Water Resource Plan, Truckee Meadows Water Authority, March 2003
2030WRP	2010-2030 Truckee Meadows Water Resource Plan, Truckee Meadows Water Authority, December 2003
2035WRP	2016-2035 Truckee Meadows Water Resource Plan
AF	Acre-Feet, an acre-foot is equal to 325,851 gallons
AF/yr	Acre-Feet/Year
CTMRD	Central Truckee Meadows Remediation District
DMPs	Demand-side management programs
DRI	Desert Research Institute
eDMPs	Enhanced demand-side management programs
JPA	Joint Powers Authority
M&I	Municipal and Industrial
NDEP	Nevada Division of Environmental Protection
NNWPC	Northern Nevada Water Planning Commission
non-TRA	non-Truckee Resource Area
NRS	Nevada Revised Statute
NVIP	North Valley Importation Project
PCE	tetrachloroethylene, a volatile organic compound
PLPT	Pyramid Lake Paiute Tribe
POSW	Privately-Owned Stored Water, as defined in the 1935 Truckee River Agreement
RWPC	Regional Water Planning Commission
SMPs	Supply-side management programs
STMGID	South Truckee Meadows General Improvement District
SVGID	Sun Valley General Improvement District
TCID	Truckee-Carson Irrigation District
TMWA	Truckee Meadows Water Authority
TMSA	Truckee Meadows Service Area
TRA	Truckee Resource Area
TROA	Truckee River Operating Agreement
UNR	University of Nevada, Reno

USEPA	U.S. Environmental Protection Agency
WCHD	Washoe County Health District
WDWR	Washoe County Department of Water Resources
WHPP	Wellhead Protection Plan

PREFACE

The Truckee Meadows Water Authority (“TMWA”) was created in 2000 through execution of the “Cooperative Agreement” among the City of Reno, City of Sparks, and Washoe County (“JPA”). One of the main purposes in creating TMWA was to meet the “common interest in assuring that water resources be developed and managed to fulfill the present and future water needs of the greater Truckee Meadows community” and “to assure sufficient water supply to meet the needs of existing and future development.” [JPA Recitals “A” and “D”]. Given its JPA directive authorizing TMWA to provide retail water service to customers within its retail service area, TMWA is required to ensure its customers’ water demands can be met in the most efficient, cost-effective manner in both dry and non-dry years.

The JPA also requires that TMWA establish a water resource plan which identifies, among other things, “(i) water supplies available to TMWA from all sources and (ii) demand within the Authority’s retail service area...and the means by which such requirements will be met.” The focus of TMWA’s water resource planning is meeting TMWA’s primary mission to deliver potable drinking water to the residents and businesses of the greater Truckee Meadows area, in perpetuity. It is important to note the scope of TMWA’s water planning process, as defined by its JPA directive, does not provide for municipal sewer, reclaim, flood control, storm drainage or groundwater remediation. Those functions are planned for by Reno, Sparks or Washoe County. All water-related utility planning efforts, including TMWA’s water plan and facility plan, are incorporated into the Western Regional Water Commission’s (“WRWC”) *Regional Water Management Plan* (under revision at the time of this writing).

The purpose of recurring water resource planning efforts is to examine changes in conditions, circumstances, or risks that may influence TMWA’s ability to: (1) meet the demands of its current customers and (2) determine the extent of TMWA’s ability to service the future water needs of the greater Truckee Meadows area with current and/or future acquired water resources. TMWA’s water resource plans analyze trends in climatic, demographic, economic, regulatory and legal influences that may pose a risk or impair TWMA’s right to divert surface or groundwater and deliver potable water. A water resource plan also investigates TMWA’s ability to acquire new sources of supply.

This *2016-2035 Water Resource Plan* (“2035WRP”) is the third such plan produced by TMWA pursuant to the JPA since the utility’s inception in 2001. The 2035WRP builds upon and incorporates themes and findings of prior TMWA and various regional water resource plans. TMWA’s Board of Directors adopted its first plan, the *2005-2025 Water Resource Plan* (“2025WRP”), in March 2003 and adopted its second plan, the *2010-2030 Water Resource Plan* (“2030WRP”), in December 2009. The prior water resource plans provide the historical context of how events over the years have shaped the management of water resources available to the community. The use and distribution of the waters of Lake Tahoe and the Truckee and Carson Rivers have been a flashpoint of controversy for more than a century, with issues including how the waters should be divided between California and Nevada, how much water should go to agriculture, how much water should go to Pyramid Lake and its native fish, how to create opportunity for enhancing recreation and wildlife uses, and how water supplies should be allocated to meet the water demands of urbanization in the greater Truckee Meadows region. Comprehending these water resource plans is difficult without an exposure to the tumultuous history of complex legal and operational issues of the Truckee River system. To gain a fuller

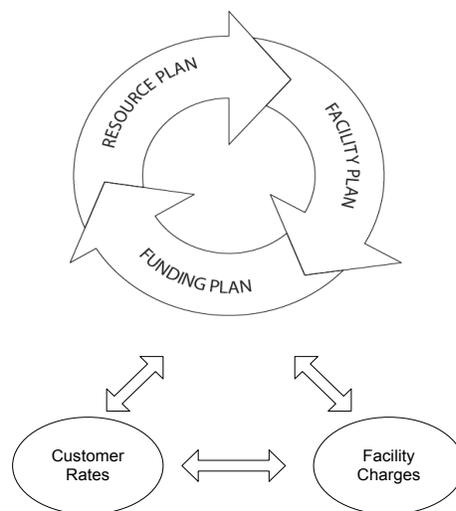
understanding of the contextual history of TMWA and water resource management for the greater Truckee Meadows region which began in the late 1800's the reader is encouraged to review the 2025WRP and the 2030WRP.

As a municipal provider of water service the water utility must take a very long-term planning perspective to ensure its available water resources are renewable, reliable and sustainable, in essence, in perpetuity. Ramifications from events that affect and shape the delivery of potable water take years to unfold. For example, fluctuations in population and economic conditions, such as dramatic growth during the 1980's through the early 2000's, or stagnation resulting from the 2007-2009 Recession, can positively or negatively impact water demand. Since future economic and population growth remain speculative, reliance on careful analysis of changes in economic trends is paramount to confident projections of future water demand. Moreover, the goals and objectives set by the community and its elected officials also evolve over time. In order to accommodate the land use entitlement and planning functions of the cities, counties and regional planning agencies, TMWA's water resource planning is designed to allow TMWA to meet the needs of anticipated future growth (if and when local land use planners and their governing bodies determine that such growth is appropriate). Should conditions warrant, with sufficient long-term view, the utility can anticipate and prepare for the construction of new water supply projects which can take decades to permit and complete. In order to develop adaptive strategies to meet both current and potential future water needs of the community, TMWA crafts its water resource plans to span a 20-year period. A 20-year plan provides a reasonable timeframe in which to assess potential changes and implement tractable and sustainable solutions. Planning for *the ability* of future municipal water supplies also furthers State policy to provide water which is safe for drinking and other domestic purposes, protects existing water rights and encourage efficient and non-wasteful use of limited water resources.

As economic and political conditions affect demand for water, seasonal fluctuations in Truckee River flows impact water supplies. Due to variability in climate and weather conditions, the form of precipitation (i.e., rain versus snow) and the timing of this precipitation affect Truckee River flows, TMWA's primary source of water supply, and TMWA's ability to capture those river resources. The December 1, 2015 implementation of the Truckee River Operating Agreement ("TROA") is a prime example of long-term planning for, and successful adaptation to, emerging water issues—some of which were identified in the 1970's. TROA is the culmination of decades of deliberative and careful water resource planning designed to address concerns over future water supply. TROA replaces the rigid and inflexible water management system for the Truckee River. The prior management system was dictated by decades-old court decrees and was originally designed to serve agriculture, small hydroelectric plants, now defunct paper mills, and a small, rural community. TROA now provides flexible Truckee River operating criteria, allowing TMWA the ability to adapt to future variability of climatic, hydrologic and economic conditions, while taking advantage of unused storage space in federal reservoirs. This new system means the Truckee Meadows community has a sustainable water supply that can meet demand for the 2035 planning horizon and beyond. TROA does this by allowing TMWA to use water when it needs it, and store it when it is not needed, rather than being required to let water flow past the Truckee Meadows as under old operating criteria. TROA also grants TMWA new rights to credit store and exchange waters in numerous upstream reservoirs, providing critical expanded drought protection to meet current and future municipal needs.

While changes to the supply of, and demand for, water resources cannot be accurately predicted and since it often takes years for extended dry or non-dry periods to be identified, TMWA is continually adapting its supply strategies to ensure it can meet the needs of its customers through such variability. In order to account for supply variability and develop dynamic, adaptive plans so as not to extend beyond the sustainability of available water resources, every five years TMWA updates its water resource plan. If water supply or other conditions significantly change within the regular 5-year update cycle, TMWA may update its Water Resource Plan more frequently.

Based on supply and demand projections, TMWA’s water resource plan describes optimizing strategies to manage, develop and utilize available water resources, provides direction for facility planning to ensure a safe reliable supply of water, and identifies potential impediments to avoid or mitigate the legal use of TMWA’s water resources. By integrating the long-term resource supply and demand with facility assessment and planning, TMWA ensures funding mechanisms are in place to meet current and projected future demand conditions. In addition to TMWA’s water resource plan, TMWA prepares its 20-year water facility plan and regularly updated its funding plans to ensure the continued success of the utility in achieving its mission. The water resource and facility plans set forth how the utility will meet the policy directives outlined in the JPA and in other Board adopted documents, and by implication, regional objectives of the local governments as they comprise TMWA’s Board of Directors. Both plans are operational in nature, in that they identify assets available to TMWA to generate high-quality, potable water supplies for current and future customers in a cost-effective manner. The water resource and facility plans form the basis for TMWA’s funding plan which is the core of the utility’s financial success. TMWA’s 2035WRP is one component of the coordinated planning efforts addressing the water resource and facility challenges facing the utility and the region. The objective is to develop workable strategies that are cost effective and protect the financial integrity of TMWA—and by extension, shield customers from undue costs. A visual representation of the cyclical nature of TMWA’s dynamic, integrated planning approach is shown below in Figure 1-1.



The cycle of planning, monitoring, analyzing, and updating is a continuous, dynamic process necessary to respond to changing economic and environmental factors that affect the greater Truckee Meadows current and future water supply.

SYNOPSIS OF THE 2016-2035 WATER RESOURCE PLAN

TMWA's 2035WRP is presented in three volumes:

- *Volume I – Abstract Truckee Meadows Water Authority 2016-2035 Water Resource Plan*
- *Volume II – Truckee Meadows Water Authority 2016-2035 Water Resource Plan*
- *Volume III – Appendices to Truckee Meadows Water Authority 2016-2035 Water Resource Plan*

This section of the Abstract contains a brief synopsis of each of six distinct chapters contained in *Volume II* within the water plan which are presented in the following order:

- Chapter 1, “Introduction”, presents some of the key past and current trends and challenges that have shaped, or are projected to shape, the future of the greater Truckee Meadows region and the availability of water resources.
- Chapter 2, “Source Water Reliability”, presents discussion of quality of surface and ground water sources, climate change and climatic effects, source/loss risk analysis, and water quality protection/response plans.
- Chapter 3, “Integrated Management of Water Resources”, describes availability of water rights used by TMWA and how those resources are conjunctively managed to annually produce a sufficient amount of water to meet TMWA's water service demands in non-Drought and Drought-Situation years.
- Chapter 4, “Population and Water Demand Projections”, presents forecasts of population and water demands for the planning horizon.
- Chapter 5, “Water Conservation Plan”, describes the various conservation programs and measures that TMWA employs to reduce annual water use and minimize water waste in both non-drought and drought-situation years, including a comprehensive list of tools that the TMWA Board can employ to produce enhanced water savings based on water supply conditions at any given time.
- Chapter 6, “Future Water Resources”, identifies potential future water resources.

Chapter 1

Economic development of the communities in and surrounding the Truckee Meadows is the primary driver and impetus to expand the pool of available water resources to meet the needs of the greater Reno/Sparks region in southern Washoe County. Over the past several decades water resource planning in the region focused its efforts on comparing smaller, incremental supply projects to the long-term water supply of the larger river settlement project, i.e., TROA. After nearly 40 years, the final components of TROA, signed on September 6, 2008, were completed in 2015 so that TROA could finally be implemented. This past August 2015 major milestones related to the Reno, Sparks and Washoe County obligation to supply 6,700 acre feet (“AF”) of Truckee River water rights were completed. The final two lawsuits before TROA could be implemented were dismissed in September and November 2015. On December 1, 2015, TROA was implemented and TMWA began crediting storing water the same day -- the first time

in history the water utility has been able to store water during a winter month. With the implementation of TROA, and the underlying elements of the Negotiated River Settlement ratified in PL 101-618 activated, the communities' water demands of up to 119,000 AF/yr within the Truckee Resource Area ("TRA")¹ can be reliably met as long as acceptable Truckee River water rights are dedicated to TMWA by future development prior to issuing new will-serve commitments. TROA provides greater flexibility in river operations, particularly during drought conditions as TMWA's drought storage potential increases, river flows are enhanced for endangered and threatened fish species, and water rights of the signatories and non-signatories to the agreement are protected. That is not to say work on other supply projects is discontinued. On the contrary, TMWA continues to track progress on various projects as it looks beyond TROA and the projected water needs of the region well beyond the planning horizon of this plan. The need and timing of future water supply projects will be dictated by future economic conditions and employment opportunities constrained by the availability and costs of developable land, water rights, rights-of-way, sewer treatment, Truckee River water quality, and related public infrastructure.

Introduced in the 2007 Nevada Legislative Session, SB487 proposed to create a new regional water resources entity in Washoe County. Pursuant to SB487 the cities of Reno and Sparks, the South Truckee Meadows General Improvement District ("STMGID"), the Sun Valley General Improvement District ("SVGID"), TMWA, and Washoe County formed a JPA to operate the WRWC in 2008. The WRWC is charged with facilitating cooperative resource management efforts among the existing water purveyors in southern Washoe County and to provide for integration of regional water supply and storm water management, subject to TROA. SB487 included a change of oversight and restructuring of the Regional Water Planning Commission ("RWPC") into the Northern Nevada Water Planning Commission ("NNWPC"), in addition to an evaluation of the possibility of merging water purveyors in the Truckee Meadows. The outcome of the process led to the successful integration of STMGID and Washoe County's water systems into TMWA on December 31, 2014. From the aspect of treating and delivering potable water to customers, the consolidation enhanced efficiencies related to the operation of water production and distribution systems. The consolidation also allows for consistent water management strategies and the expanded use of surface water and reduced use of groundwater, thereby improving aquifer conditions in the various basins where TMWA operates. Although the merger expanded TMWA's planning and operational responsibilities, the addition of water systems did not burden TMWA since each system has its own resources and facilities for ongoing operations. However, it poses additional resource management challenges to ensure adequate supply within the expanded TRA. For those systems adjacent to TMWA's pre-merger service area, the enhancement in operations, allowing expansion of surface water use

¹ The introduction and use of the phrase "Truckee Resource Area" ("TRA") is used to designate TMWA's existing retail and wholesale service areas within which (1) TMWA will accept for dedication, subject to certain conditions, a Truckee River water source/right for the delivery of water to a service property that can be served with Truckee River resources and (2) facilities exist or can be constructed at a developer's expense that can transport potable Truckee River water that once it has been diverted and treated at TMWA's Chalk Bluff or Glendale Water Treatment Facilities. TMWA operates 5 separate systems in hydrographic basins that are not served from the treatment plants and are grouped under the "non-TRA" designation. These designations are needed to track the surface and groundwater rights to be assigned to various service areas and whether the rights and their use are part of resources for TROA.

in lieu of groundwater use, is a significant benefit to TMWA's new customers in those areas, particularly in the southwest portion of the Truckee Meadows hydrographic basin.

Also acquired in the merger were 5 smaller satellite-groundwater-dependent systems which are grouped under a "non-TRA" category for resource tracking purposes since each system has resources and facilities to meet the build-out conditions established when the system was initiated. For this plan, TMWA did not contemplate the acquisition of additional, out-of-service-area resources for these small systems due to: the remoteness of the systems; no indication of impending development adjacent to these systems; limited or fully committed groundwater resources in the hydrographic basins where these systems are located; and the costs to bring other resources to these systems presently outweighs the benefits.

Chapter 2

Meteorologic conditions and resulting droughts are the most significant weather variables and source supply contamination are of greatest concern in assessing the quantity and quality of water supplies available for continued municipal uses. Studies completed by Desert Research Institute ("DRI") indicate that while the potential for climate change to alter the timing, type of, and quantity of precipitation is possible, continued monitoring of meteorologic trends is required; therefore, specific recommendations in management of the region's water supplies, or any restriction to implementation of water resources due to climate change, have not been produced by the various researchers investigation of this phenomenon. Low precipitation years that lead to low snowpack accumulations can affect the amount of water available to the Truckee River system; Lake Tahoe elevations provide an indication of the severity and duration of historic drought periods.

TMWA's source water, both surface and ground, is of very high quality, meeting, and in many cases, significantly exceeding all required drinking water standards. A Water Quality Assurance Program is implemented to ensure this high standard continues to be met for current and future customers. While there is a risk to surface water reliability from turbidity and toxic spill events, TMWA has sufficient well capacity and distribution storage to meet reduced customer demands during a water quality emergency until repairs are completed or the threat to supplies has passed; additional actions are available to TMWA in the event of extended off-river emergencies. TMWA's Wellhead Protection Plan ("WHPP") provides information by which TMWA can develop and implement groundwater protection strategies to mitigate potential threats to groundwater sources, including educational outreach. The WHPP is operated voluntarily, under local jurisdiction and control, and utilizes both U.S. Environmental Protection Agency ("USEPA") and Nevada Division of Environmental Protection ("NDEP") guidance and criteria to provide for State endorsement. Successful examples of the WHPP working include TMWA's cooperation with NDEP and Washoe County Health District ("WCHD") to mitigate the Sparks Solvent/Fuel Site Remediation, the Stead Solvent Site Remediation, and over the years mitigation of several leaking, underground storage tanks in and around the Truckee Meadows along with the Central Truckee Remediation District for the clean-up of tetrachloroethylene ("PCE") in the Reno/Sparks area. TMWA's Source Water Protection Program is designed to preserve and enhance available surface water and groundwater supplies and to address known and potential threats to water quality, and remains adaptive to changes in USEPA, NDEP or WCHD drinking water standards and regulations.

Results from the analyses about *Source Water Reliability* described in Chapter 2 identified major factors affecting TMWA’s primary water supplies and TMWA’s responsive mitigation measures as summarized here:

- Weather and source supply contamination are of greatest concern in assessing the quantity and quality of water supplies available for continued municipal uses.
- Changes in management of or any restriction to implementation of water resources due to climate change are not warranted at this time.
- Low precipitation years that lead to low snowpack accumulations affect the amount of water available to the Truckee River system; Lake Tahoe elevations provide an indication of the severity and duration of historic drought periods.
- Drought periods have established patterns, typically taking three years of consecutive dry winters to cause Lake Tahoe to fall to or below its rim; however, all the reservoirs may be replenished quickly with one or two wet winters.
- Hydrologic droughts (periods when TMWA availability to use physical supplies of water diminishes) occur after 3 or 4 years of meteorologic droughts conditions.
- Drought periods occur in the Truckee Meadows and have ranged in duration from a few years to 8 years with intervening “wet” and “dry” years within the drought period.
- TMWA’s source water is of very high quality, meeting, and in many cases, significantly exceeding all required standards. A Water Quality Assurance program has been implemented to ensure this high standard continues to be met in the future.
- While there is a risk to source water reliability from turbidity and toxic spill events, TMWA has sufficient well capacity and distribution storage to meet reduced customer demands during a water quality emergency; additional actions are available to TMWA in the event of extended off-river emergencies. An earthquake event in 2008 tested TMWA’s emergency response plan with a loss in water supply and demonstrated TMWA’s ability to respond by having trained staff and available alternate water supplies.
- TMWA has a robust Source Water Protection Program in place designed to preserve and enhance available surface water and groundwater supplies and to address known and potential threats to water quality.

Chapter 3

At this time, Truckee River irrigation rights continue to be the major source of water supplies for the TRA. Through continued conversion and commitment to Municipal & Industrial (“M&I”) use, the number of available Truckee River water rights available will meet the projected growth through the planning horizon. Noted is the fact that the water rights market is becoming more competitive as there are other demands for these rights, such as M&I use in the Fernley area or use as dilution flows for water quality enhancement in the Lower Truckee River. Other factors discussed that are affecting the future acquisition of water rights in an open market environment include issues of ownership and finding willing sellers of the water rights which will ultimately affect the price and availability of water rights. TMWA has over 7,000 AF of

resources in its Rule 7 inventory, implying a 7 to 10 year supply depending on market demands. Significant price variation for water rights between 2005 and 2010 portends the future water rights market beyond the planning horizon. Including 8,000 AF of the North Valleys Importation Project (“NVIP”), TMWA’s combined pool of resources for all its service areas over 188,000 AF of decreed, converted irrigation, groundwater, and storage rights.

TMWA conjunctively manages its water supplies during drought periods by utilizing a combination of natural river flows, groundwater pumping including extraction of accumulated volumes of injected surface water, releases of its upstream drought reserves, i.e., privately owned stored water (“POSW”). TMWA manages for uncertainty of its water supply, in terms of the overall quantity and the timing of its delivery, through storage of water in upstream reservoirs and injection of treated surface water through its network of wells into aquifers in Lemmon Valley, Spanish Springs and Truckee Meadows. When river flows are available, TMWA maximizes the use of surface water resources while minimizing the use of groundwater supplies. This approach allows TMWA to meet demands with surface water, and to rest and recharge specific wells when enough surface water is available. TMWA continually assesses the potential reduction to source water supplies due to variability of weather conditions. This continual reassessment of source water supplies and management tactics is the best defense against reservoir depletion as well as unnecessary economic stress to both the utility and customer base.

Significant to water resource planning is the selection of a drought period to estimate the yield of TMWA’s resources during Drought Situations. In years when sufficient precipitation occurs, there is no need for TMWA to pump significant amounts from its wells or release any of its POSW in upstream reservoirs since the Truckee River can supply the majority of water to meet customer demands. TMWA manages its resources to take maximum advantage of Truckee River flows while minimizing use of its groundwater and upstream reserve supplies during non-Drought Situation years. Planning for water supplies during a critical-year in a drought period determines the maximum amount of water demand TMWA will be able to provide. As a result of implementing TROA and the continued dedication of river rights, TMWA is able to fully utilize TROA’s demand limit of 119,000 AF. In addition, there are existing groundwater or creek resources that may be acquired or developed in the TRA over the planning horizon which provide over 140,000 AF of resources when added to TROA. During the negotiation and environmental process for TROA, its supply was designed to meet demands through the historic drought from 1987 to 1994. Scenarios developed for the 2035WRP tested TMWA’s water supplies under TROA operations using hypothetical droughts with (1) back-to-back 1987-1994 plus 1987 hydrology and (2) repeating 2015 hydrology for 5-years over using projected demands over the 20-year planning horizon; results demonstrate an accumulation of upstream reserves in throughout the planning horizon.

The processes associated with the concepts of *Integrated Resource Management* described Chapter 3 derived from conjunctively managing surface rights, groundwater rights, and water production facilities include the following:

- TMWA has sufficient water resources to meet the demands of current customers.
- Within the TROA/TRA and subject to future water-rights-market conditions, Truckee River water rights are available to take advantage of 119,000 AF of demand TROA provides.

- There are sufficient groundwater resources to meet current demands through the planning horizon within the non-TROA/TRA.
- Including 8,000 AF of NVIP groundwater resource, TMWA’s combined pool of resources in the TRA is over 188,000 AF of decreed, converted irrigation, groundwater, and storage rights.
- Current production capacities are:

	TRA	non-TRA
Chalk Bluff	90.0 MGD	na
Glendale	33.0 MGD	na
Subtotal Surface	123.0 MGD	na
Groundwater	100.0 MGD	17.0 MGD
Total	223.0 MGD	17.0 MGD

- Aquifer recharge has improved or stabilized groundwater levels in and around the injection wells thereby preserving TMWA’s ability to utilize its groundwater resources to meet summer peaking and/or drought situation pumping requirements without degrading groundwater quality.
- Drought year cycles are rare events, similar to flood events. The estimated drought frequencies are:

8-year	1 in 230 years
9-year	1 in 375 years
10-year	1 in 650 years

- Published tree-ring studies have shown a dry winter like 2015 occurs with a frequency of 1 in 3,100 years.
- Drought yield of TMWA’s TRA existing resources is a function of available resources and drought-year design. Based on available data, the 1987 to 1994 Drought remains the worse drought of record for the Truckee River and is the design criteria for TROA.
- Under TROA, hypothetical droughts were analyzed: (1) 9-year simulation of 2012 to 2015 actual hydrology plus 5 year repeating 2015 annual hydrology; (2) 20-year simulation of 2012 to 2015 actual hydrology plus 1987 to 1994+1987 hydrology repeated twice; and (3) 20-year simulation of 2012 to 2015 actual hydrology plus 2015 hydrology repeated 20 years indicate TMWA has sufficient dry-year reserves to meet demands, and in many years during the drought period accumulates drought reserves under TROA operations.
- The 2015/2016 winter and subsequent 2016 run-off projections indicate a moderate recovery-year but not necessarily an end to the drought period begun in 2012.

Chapter 4

The population model used for this plan, which implicitly accounts for environmental and economic conditions, forecasts population increasing at a decreasing rate of growth between

2016 and 2060. Projected Washoe County population for the year 2035 is 545,000 persons of which TMWA serves approximately 90 percent. The estimated water demand to support the projected population can be served and managed with TROA and existing groundwater resources through the planning horizon. In 2035, TMWA will have over 150,000 active water services and water will be delivered by TMWA to an estimated 475,000 persons living in the combined TRA and non-TRA service areas. The 2035 water demand projections for this plan indicate water demands will grow approximately 18,000 AF over the planning horizon, from approximately 83,000 AF forecasted for 2016 to 101,000 AF forecasted in 2035. TMWA has sufficient water production facilities to meet current and near-term demand; the timing of construction for new water production facilities to meet future demands will be developed in TMWA's upcoming *2016-2035 Water Facility Plan*.

The *Water Demand Forecast* projection process outlined in Chapter 4 presented TMWA's forecast of population, water demand, and numerous factors impacting the demand forecast are summarized as follows:

- A long term population projection through 2060 is developed using historic county population estimates from 1950 to 2014.
- TMWA's population forecast was found to be statistically similar to the 2014 State Demographer projections for Washoe County.
- Washoe County population is expected to see an average annual growth of 1.17 percent and a total population increase of over 101,000 persons from approximately 443,700 persons in 2015 to 551,300 by 2035.
- Based on expected growth, over 150,000 active water services are projected for the year 2035.
- Average water use, per service, is calculated based on usage data between 2009 to 2014. This approach captures recent changes in response to: (1) TMWA's billing structure; (2) average physical attributes of services; and (3) climate.
- Interacting average water usage with active service projections yields water demand projections through 2035.
- Total demand for water within is projected to increase approximately 83,000 in 2016 to 101,000 by 2035.
- Analysis of population and building trends show water demand increasing at a decreasing rate between 2015 and 2035 (i.e., while new growth will increase total production, per-service usage is expected to decline through time).

Chapter 5

Water conservation is achieved through efficient storage and delivery of the water supply and effective management of demand for that supply. Water supply management has been defined as the control of the water supply by the water purveyor or authority (Stephenson, 2012). Water demand management has been defined as “the development and implementation of strategies, policies, measures, or other initiatives aimed at influencing demand, so as to achieve

efficient and sustainable use of this scarce resource” (Savenije and van der Zaag, 2002). TMWA’s conservation plan contains the necessary elements to manage both the supply of its water resources as well as demand for those resources, and for meeting the requirements of the JPA, Nevada Revised Statute (“NRS”) 540.313 through 540.151, and TROA. To address the state’s water resource challenges, Nevada’s Governor Sandovol released in December 2015 the *Nevada Drought Forum: Recommendations Report* which outlines, among other things, recommendations on the best water conservation practices. In addition to the legal mandates, TMWA’s conservation plan is consistent with the recommendations identified in this report.

TMWA’s conservation plan has two components: (1) supply-side management programs (“SMPs”) are designed to reduce production and distribution losses and (2) demand-side management programs (“DMPs”) are designed to conserve water supplies by limiting water waste, inefficient use, and overuse. TMWA’s SMPs are actions taken to maintain water resources and provide alternative sources to potable water in a cost-effective manner, as well as to ensure water is delivered to customers in an efficient manner. Once water is delivered to the customers, TMWA’s DMPs target customers’ watering practices in order to promote efficient use of its available water resources. The region experiences meteorologic droughts² brought on by climatic conditions which may or may not affect TMWA’s available water supplies in any given year. If meteorologic drought conditions persist, then hydrologic drought³ conditions can ensue which begin to affect both natural river flows and, at times, TWMA’s groundwater and upstream reservoir supplies (i.e., POSW). When a Drought Situation⁴ is identified, TMWA evaluates what actions from customers may be necessary to reduce demands. As mentioned above, under TROA operations, managing drought reserves are significantly enhanced (i.e., increased storage potential) thereby reducing much of the pressure on water supplies and customers during Drought Situations. TMWA’s four level Drought Situation classification system specifies the timing of enhanced DMP (“eDMPS”) activities. This classification is directly linked to TROA’s operation protocol and definitions regarding the need to reduce water use when water reserve supplies are impacted. This system is efficient in that it is tied to TROA operations and criteria, minimizes administrative burden and costs on TMWA, and improves TMWA’s ability to create more meaningful, easier to understand information campaigns that relate needed reductions in customer use to available water supplies. Based on targeted savings for the year during drought periods TMWA enhances its DMP to promote further reduction in water consumption by its customers in the event the drought situation extends for another year. Program success is evaluated differently depending on the type of program and TMWA strives to provide the most meaningful effectiveness metrics, whenever possible.

Specific findings about TMWA’s *Water Conservation Plan* presented in Chapter 5 include the following:

² Meteorologic drought is often defined by a period of well-below-normal precipitation. The commonly used definition of meteorologic drought is an interval of time, generally of the order of months or years, during which the actual moisture supply at a given place consistently falls short of climatically appropriate moisture supply.

³ Hydrologic drought refers to periods of below-normal streamflow and/or depleted reservoir storage.

⁴ Pursuant to TROA: “**Drought Situation** means a situation under which it is determined by April 15, based on procedures set forth in Section 3.D, either there will not be sufficient **Floriston Rate Water** to maintain **Floriston Rates** through October 31, or the projected amount of **Lake Tahoe Floriston Rate Water** in Lake Tahoe, and including **Lake Tahoe Floriston Rate Water** in other **Truckee River Reservoirs** as if it were in Lake Tahoe, on or before the following November 15 will be equivalent to an elevation less than 6,223.5 feet Lake Tahoe Datum.”

- TMWA’s Conservation Plan meets the requirements of the JPA, NRS 540.313 through 540.151, and TROA.
- TMWA’s conservation plan is consistent with the water conservation recommendations detailed in the 2015 Nevada Drought Forum: Recommendations Report.
- TMWA will continue to be fully engaged in the regional dialogue on responsible water use and will implement programs for its customers that benefit the region and support regional water use goals.
- TMWA’s water demand management programs pursue measures to efficiently use its available water resources by addressing water waste, system deficiencies (e.g., leaks, pressure changes, etc.), public education and outreach, watering schedules, drought situations, and emergency conditions.
- Demand management programs may be progressively enhanced during Drought Situations to address the need to reduce water use when water reserve supplies are impacted.
- Enhanced DMPs may be necessary in response to natural disasters and other events that have potential to interrupt TMWA’s available water supplies.
- TMWA will continue to be engaged in the regional dialogue on responsible water use and will implement programs for its customers that benefit the region and support regional water use goals.
- TMWA will continually assess the benefits of implemented programs and may modify programs to reflect new practices, technologies, and regional climate information.
- New and innovative ways to improve efficient water use will continue to be assessed, including expanded uses of non-potable supplies.

Chapter 6

Although TMWA can continue to convert Truckee River water rights, from irrigation to M&I, and provide for new development based on its current pool of resources in the growth prone areas of the Truckee Meadows and thus take full advantage of TROA, TMWA is active in evaluating aquifer storage and recovery and creek development projects, as well as monitoring various groundwater importation projects. The activities of the groundwater importation project sponsors are vital in order to have the next viable water resource available when demands dictate its need. In reviewing prior water plans, the number of water supply projects available for future development has decreased from a high of twenty to eight projects. The reduction in supply projects is a result of changes in conditions necessary to facilitate developing a project. For example, the loss in the number of potential reservoir sites is due to housing developments that have been built in the proposed reservoir site (e.g., Mogul Canyon west of Reno or Canoe Hill in the eastern foothills of Spanish Springs). The estimated supply from future water supply projects has also decreased over the past 20 years, from a high of 73,000 AF under the TROA supply scenario in the 1994/1995 planning period to the current estimate of 51,000 AF from all projects including TROA supplies. These changes are due to reductions in the number of potential supply projects as permitting processes are stalled or denied and/or as a result of changes in the scope of

the project. For example, the North Valleys Importation Project (“NVIP”) (subsequently purchased and implemented by Vidler Water Company) originally sought a permitted yield of 13,000 acre feet/year (“AF/yr”). The project is currently permitted for 8,000 AF/yr, and may be expanded to 13,000 AF/yr pending commitment of the 8,000 AF and demonstration of the sustainability of the resource. Also, plans are underway to construct a creek-treatment plant to help reverse declining groundwater supplies in the Mt. Rose area and support expanded use of creek water rights for future development. Although there has been a decline in the number of potential water supply projects and in the quantity available from these projects, the conclusion to draw is that future water supply development may reach beyond TMWA’s TRA and non-TRA service areas, and ultimately be costly to implement.

Specific findings about TMWA’s *Future Water Resources* presented in Chapter 6 include the following:

- In the TRA, TROA will provide 119,000 AF/yr, sufficient to meet the projected demands through the planning horizon.
- The NVIP place of use is in the North Valleys, the project is operational, and will yield 8,000 AF/yr.
- Plans are underway to construct creek-treatment plant(s) to help reverse declining groundwater supplies in the area and support expanded use of creek water rights for future development.
- There are several importation projects for the North Valleys area that are in various stages of permitting and/or design. Construction of these projects is subject to positive changes in economic conditions leading to increased demand for water supplies.
- TMWA will continue to closely monitor advancements in the potable reuse industry to determine its potential applicability to the Truckee Meadows.
- Over the years, numerous projects have been proposed but remain unbuilt due to lack of financing, permitting, conceptual design, institutional or regulatory constraints, etc.

KEY FINDINGS AND RECOMMENDED ACTIONS

This section of the Abstract contains the “Key Findings and Recommendation Actions” which (1) summarize the significant findings from each chapter of the 2035WRP and (2) provide specific recommendations for the Board to consider and act upon.

1.1 2016-2035 Water Resource Plan (“2035WRP”)

Findings:

Truckee Meadows Water Authority’s (“TMWA’s”) prior water resource plans: (1) laid the foundation for an understanding of the region’s water supply system; (2) summarized the history of municipal water supply in the Truckee Meadows up to and including the formation of TMWA; (3) presented legislative directives that modified regional water resource planning for the Truckee Meadows and led to the creation of the Western Regional Water Commission (“WRWC”); (4) analyzed economic influences at the local level that affect the growth activity and patterns for the Truckee Meadows resulting in a need to examine current population trends and their potential impact on future water demands and resource requirements; (5) confirmed the use of Truckee River flows during the historical 1987-1994 drought period as the basis for prudent water supply planning for the Truckee Meadows; and (6) provided ongoing analysis of future water supply options to meet the region’s economic development needs. This 2035WRP continues the Board’s previous direction to review conditions and influences affecting water supplies and local growth trends and what those influences may have on Truckee Meadows water resources and TMWA’s plans and/or management strategies in the context of completion of the merger of the former Washoe County water utilities into TMWA in December 2014; completion of all conditions precedent to implement the Truckee River Operating Agreement (“TROA”); and current hydrologic conditions.

Recommendation:

Continue monitoring, reviewing and revising, where necessary, its water resource management strategies through its planning efforts, as presented in documents such as this 2035WRP, in response to current and future conditions including but not limited to changing conditions in meteorology, hydrology, community development, institutional/regulatory constraints, customer demands, or other factors affecting TMWA’s water resource availability and delivery systems.

1.2 Consolidation of TMWA and WDWR Water Operations

Findings:

In response to the WRWC legislative directive to evaluate the potential consolidation of water purveyors in the Truckee Meadows, staffs of TMWA and Washoe County Department of Water Resources (“WDWR”) successfully merged the former Washoe County water utilities and the South Truckee Meadows General Improvement District (“STMGID”) into TMWA on December 31, 2014.

Recommendation:

No further action required on this item.

1.3 TMWA Planning Area

Findings:

TMWA's retail service area grew by approximately 50 square miles in hydrographic basin where TMWA has facilities as the result of the consolidation of TMWA and WDWR Water Operations. In addition, the consolidation added facilities in hydrographic basins where TMWA did not have a presence (Basin 88-Pleasant Valley, Basin 89-Washoe Valley, and Basin 83-Truckee Canyon). Figure 1-1 shows TMWA's expanded retail area in relation to the Truckee Meadows Service Area ("TMSA") and the Western Regional Water Commission's planning area. Historically, TMWA's planning for the delivery of water has been focused on areas adjacent to its retail service area and within the TMSA.

Recommendation:

As a result of the merger and expansion of the area that TMWA now plans for, determine the role and extent of TMWA's water resource planning subject to the constraints of TMWA's Joint Powers Authority.

1.4 Truckee River Operating Agreement ("TROA")

Findings:

The five Mandatory Signatory Parties - TMWA, the Pyramid Lake Paiute Tribe ("PLPT"), the United States, California and Nevada - completed all conditions precedent to implement TROA in the fall of 2015; TROA was implemented on December 1, 2015. TROA's framework provides flexibility for river operations to allow parties to store water they previously could not store; significantly enhances TMWA's drought reserves; allows the exchange of water to optimize the use of Truckee River supplies without injuring the water rights on which the parties rely; and resolves future regulatory uncertainties surrounding the use of the Truckee River.

Recommendation:

Although implemented, continue to participate in any pending litigation or appeal that challenge the implementation of TROA.

1.5 Donner Lake Acquisition

Findings:

In fall 2015, the Truckee Carson Irrigation District ("TCID") began discussions with TMWA regarding the sale of TCID's interest in Donner Lake. After extensive negotiations, TCID and TMWA staff reached an agreement whereby TMWA would pay \$17.2 million for TCID's Donner Lake water rights in addition to eliminating all pending litigation on Donner Lake between TMWA and TCID, and the withdrawal by TCID of all its pending appeals regarding TROA implementation. The purchase agreement was presented to and approved by both the TMWA and TCID boards on December 16, 2015. On January 4, 2016 TCID held a special election of the members of the irrigation district on whether TCID should sell the Donner Lake assets pursuant to the agreement; the members voted overwhelming to sell the assets. Upon close of escrow scheduled for February 2016, TMWA will add TCID's share of 4,750 acre feet ("AF") of Donner Lake water rights to its share, thereby owning all of the 9,500 AF of Donner Lake

water rights. TMWA will manage the acquired portion of the Donner Lake water rights pursuant to TROA operations and Board direction; TROA allows using the rights for more credit storage and issuing new will-serve commitments within the 119,000 AF of demand TROA will supply.

Recommendation:

Continue to work to close escrow for the purchase of TCID’s interest in the Donner Lake water rights.

2.1 Sustainability of Source Water Supplies - Climate Variability

Findings:

Climate change and meteorological droughts are the most significant variables with potential to change the quantity and quality of raw water supplies, particularly surface water supplies. While the weather pattern consistently provides precipitation during the winter and spring months, the type of precipitation (snow versus rain), amount of precipitation, water content of snow, and speed of snowmelt are variable from year to year. TMWA manages the uncertainty of its raw water sources through storage in upstream reservoirs, conjunctive use of surface and groundwater supplies, and continual assessment of threats to water supply reliability from weather. Studies by Desert Research Institute (“DRI”) and University of Nevada, Reno (“UNR”) indicate the potential for climate change to alter the timing, type of, and quantity of precipitation needs continued monitoring and study, but findings are inconclusive at this time as to the magnitude of impact that climate change will have on the greater Truckee Meadows region and its water resources over a long-term planning horizon. Over the past several years the use of tree ring studies have been found useful in understanding the climate history of Lake Tahoe, Truckee River, and Carson River watersheds. Through such studies a better understanding of the cycles of dry and wet years has been developed along with analyses of frequencies of occurrence, durations and magnitudes. However, the current body of research on tree ring chronologies have not been specific in the Truckee and Carson River watersheds, thus there is limited direct data on historic flows that can be used in planning.

Recommendation:

Continue to consider, when available, new findings from climate change research for the greater Truckee Meadows region; continue working with UNR, DRI, and other researchers to test climate change effects on TMWA’s sources of supply; and engage UNR, DRI and/or other researchers to develop tree ring chronologies of the Truckee and Carson River watersheds for use in water resource planning and management during droughts and periods of drought recovery beyond historic, instrumental record.

2.2 Sustainability of Source Water Supplies - Surface Water Contamination

Findings:

While there is a risk to surface water reliability from turbidity and toxic spill events, research conducted in 1996 and again in 2007 by UNR on behalf of TMWA has shown no recorded river contamination event from rail or highway transportation. The 2007 study found that the area of highest risk is downstream of TMWA’s treatment facilities in

the City of Sparks where there is a rail yard and a large number of warehouses and shipping companies that load/unload trucks and rail cars. TMWA's Source Water Protection Program (including its Wellhead Protection Plan ("WHPP")) is designed to preserve and enhance available water supplies and to address known and potential threats to water quality. TMWA has sufficient well capacity and distribution system storage to meet reduced customer demands during a water quality emergency, and has emergency plans in place in the event of extended off-river emergencies. With the merger of WDWR and STMGID water systems into TMWA, system integration improvements will be implemented that are beneficial in terms of increasing the supply and/or quality of water supplies at minimum economic costs to ensure the delivery of water through the 20-year planning horizon and beyond.

Recommendation:

Continue to: (1) implement its source water protection strategies in cooperation with local entities; (2) maintain, as a minimum, the ability to meet daily indoor water use with its wells; and (3), for river outages lasting up to 7 days during the summer, maintain the ability to meet average daily water demands using its wells, treated water storage, and enhanced conservation measures.

2.3 Sustainability of Source Water Supplies - Groundwater Contamination

Findings:

TMWA works closely with the Central Truckee Meadows Remediation District ("CTMRD") to characterize tetrachloroethylene ("PCE") contaminated groundwater and remove PCE contamination at affected wells. TMWA is also working with the CTMRD to remove PCE contamination at the source before groundwater can be impacted. A more ubiquitous contaminant, nitrate, has been impacting groundwater in several basins. A 2007 report by the WDWR funded by the Regional Water Planning Commission ("RWPC") titled *Septic Nitrate Baseline Data and Risk Assessment Study for Washoe County, Phase I: Prioritization of Study Areas and Assessment of Data Needs*, used available data to identify potential areas of septic nitrate contamination and identify data gaps. The report identified approximately 18,300 septic systems in Washoe County, and at least sixteen areas that have septic densities high enough to impact potable water supplies. Of these, it was determined that five study areas (Spanish Springs, Cold Springs, Washoe Valley, Heppner, and Golden Valley) had sufficient evidence linking water quality degradation to septic systems and required management action. Nine additional areas (Mt. Rose, Ambrose, Hidden Valley, Huffaker, Verdi, Geiger, Island 18, Mogul, and Pleasant Valley) are currently being studied. Two municipal wells in Spanish Springs Valley have already been shut down due to septic nitrate contamination. TMWA has sufficient well capacity and distribution storage to continue to provide safe drinking water in Spanish Springs, as well as remaining areas of concern. However, until areas of high septic density are converted to sewer, the flow of nitrate-contaminated effluent to drinking water aquifers will continue and concentrations may continue to increase.

Recommendation:

Continue to: (1) provide safe drinking water in all areas affected by PCE and septic effluent; (2) investigate the impact to groundwater from PCE and septic effluent; (3) work closely with local jurisdictions to find resources and strategies to convert residences

and businesses on septic to sewer; and (4) utilize aquifer recharge as a potential strategy to keep contaminated water away from production wells.

2.4 Sustainability of Source Water Supplies - Groundwater Management

Findings:

Long-term water level declines in East Lemmon Valley, west Pleasant Valley and southwest Truckee Meadows due to reduced natural recharge resulting from low-precipitation and increased pumping by all users have made groundwater production more expensive and impacts to domestic well owners more likely in these areas. TMWA's current strategy to reduce impacts to groundwater levels relies on: (1) strategic and coordinated timing of its pumping; (2) passive groundwater recharge by increasing the duration and location of deliveries of surface water as often as possible to allow wells to rest and water levels to recover; and (3) active groundwater recharge to enhance groundwater supplies and drive water level recovery. Active groundwater recharge relies on the diversion and treatment of Truckee River and, upon the completion of the Mt. Rose Water Treatment Plant, Whites and Thomas Creek water during the winter months.

Recommendation:

Continue to: (1) reduce impacts to groundwater by pumping municipal wells strategically; (2) allow water levels to recover through passive groundwater recharge; and (3) force water level recovery through active groundwater recharge. Increasing the breadth and scope of all three of these activities in areas formerly served by WDWR will help groundwater levels recover in areas most affected by groundwater level declines.

2.5 Sustainability of Source Water Supplies – Aquifer Storage & Recovery

Findings:

Since its inception, TMWA's aquifer storage and recovery ("ASR") program has improved or stabilized groundwater levels in and around the injection sites thereby preserving TMWA's ability to utilize its groundwater resources to meet summer peaking and/or drought situation pumping requirements without degrading groundwater quality in the process. ASR is one element of TMWA's integrated management strategy to augment drought reserve supplies for later use during a Drought Situation. ASR can increase the natural supply of groundwater by storing surface water underground when excess supply and treatment capacity exist, and by mitigating groundwater contamination. TMWA has equipped its production wells to allow for treated Truckee River water to flow back into the wells during winter time operations. Through 2015, TMWA has replenished groundwater reserves in the region (Truckee Meadows, Spanish Springs and Lemmon Valley) with over 30,000 AF of treated surface water since its inception.

Recommendation:

Continue and expand the injection of treated surface water into groundwater aquifers to: (1) augment groundwater supplies which provide additional drought and peak-demand capacity; (2) reduce or eliminate water quality concerns; and (3) stabilize and increase groundwater levels. Increasing the breadth and scope of all three of these activities throughout the service area will help groundwater levels recover and may help reduce the impact from septic, industrial, and naturally-occurring contaminants.

3.1 Water Rights Availability

Findings:

TMWA’s planning area grew as a result of the 2014 merger of the water systems formerly owned or operated by Washoe County. Because the majority of the water distribution system in the Truckee Meadows, Spanish Springs, Lemmon Valley and a portion of Pleasant Valley is integrated, this planning area can take advantage of Truckee River resources and the benefits of TROA. This planning area is referred to as the Truckee Resource Area (“TRA”) ⁵. The remote, satellite systems in Washoe Valley and east of the Truckee Meadows in the Truckee Canyon Segment must rely solely on groundwater for their water supply. These systems are referred to as the non-Truckee Resource Area (“non-TRA”). The non-TRA systems have sufficient resources to meet the need within the development (or subdivision) and TMWA does not anticipate significant expansion of the systems beyond those boundaries. Within the TRA, a review of available Truckee River water rights shows a sufficient number (potentially over 45,000 AF) of water rights exist to meet future-average-year-TMWA-water-service demands through the 2016 to 2035 planning horizon. However, acquiring and transferring many of these water rights, which are fractionated and have ownership problems, will require additional time and expense before the water right can be put to use. Over the past decades, demands for Truckee Meadows water rights have increased in response to a highly competitive development market, difficulties in finding willing sellers of significant quantities of water rights, and competing environmental and lower river uses of water rights for such things as Fernley’s water supply or enhancing water quality both in the Lower Truckee River and groundwater aquifers. Since the number of Truckee Meadows water rights is limited, close coordination of the various river interests must occur to avoid undue stress on the water rights market. Additionally, the North Valleys Importation Project’s (“NVIP”) 8,000 AF of Honey Lake groundwater resource is available to meet future demands in the North Valleys.

Recommendation:

Continue to accept the dedication of Truckee River water rights in the growth prone Truckee Meadows, Spanish Springs and upper, west Pleasant Valley, which water rights are sufficient to support both TROA implementation and increased future development needs within TRA; recognize NVIP is available to meet future demands in the North Valleys, and unless other resources are available in the non-TRA systems, these systems are limited to the resources dedicated for the development within the system’s service area.

⁵ The introduction and use of the phrase “Truckee Resource Area” (“TRA”) is used to designate TMWA’s existing retail and wholesale service areas within which (1) TMWA will accept for dedication, subject to certain conditions, a Truckee River water source/right for the delivery of water to a service property that can be served with Truckee River resources and (2) facilities exist or can be constructed at a developer’s expense that can transport potable Truckee River water that once it has been diverted and treated at TMWA’s Chalk Bluff or Glendale Water Treatment Facilities. TMWA operates 5 separate systems in hydrographic basins that are not served from the treatment plants and are grouped under the “non-TRA” designation. These designations are needed to track the surface and groundwater rights to be assigned to various service areas and whether the rights and their use are part of resources for TROA.

3.2 Current Water Resources

Findings:

TMWA's 2035 water use projection of 101,000 AF for the combined TRA and non-TRA can be satisfied with TMWA's current resources with continued dedication of river rights. Ultimately, within the TRA, TROA allows TMWA to meet a demand of 119,000 AF. Additionally, as a result of the merger, TMWA has added over 20,000 AF of groundwater rights committed to areas within the TRA and non-TRA which are not included in the TROA resource pool. Including NVIP, TMWA has over 188,000 AF of decreed, storage, and irrigation rights to generate water supplies for customer demands, sufficient to meet the projected demands over the planning horizon. Under TROA, TMWA uses its Privately Owned Stored Water ("POSW") and a portion of its unexercised water rights to generate sufficient upstream drought reserves to meet projected drought-year demands over the planning horizon. To ensure an adequate supply of water for all customers, TMWA's Rule 7 requires that applicants for any new water service dedicate sufficient water rights to meet the demand of their development. Applicants for new service are required to dedicate sufficient and acceptable water rights to TMWA which they may currently own or acquire on the open market or purchase a will-serve commitment from TMWA.

Recommendation:

Continue to acquire water rights to meet future water demands pursuant to its Rule 7.

3.3 Conjunctive Management of Water Resources

Findings:

The meteorologic drought, begun in 2012, created hydrologic drought⁶ impacts in 2014 and 2015 which required TMWA to release some of its upstream drought reserves for the first time since 1992. As defined in TROA, the region has been in a Drought Situation (i.e., the level of Lake Tahoe had been projected to be below elevation 6223.5 feet on November 15 of a given year) since 2014. Scenarios testing operation of water supplies and drought reserves under TROA indicate that TMWA accumulates drought reserves under the 1987 to 1994 drought hydrology; under hypothetical droughts which repeated the 1987 to 1994 plus 1987 and a repeat of 2015 hydrology over the planning horizon demonstrate TMWA has sufficient drought reserves in all scenarios tested. When this 2035WRP was published in January 2016, the 2015/2016 winter and subsequent 2016 run-off projections indicate a moderate recovery-year but not necessarily an end to the drought period begun in 2012. Unfortunately, it cannot be known with certainty the duration of the current drought. However, with the successful implementation of TROA no alteration to TMWA's planning criteria is warranted at this time.

Recommendation:

Continue to rely on TMWA's pool of resources to meet current demands and recognize TROA can provide drought-year operational benefits in excess of current drought-year reserves thereby supporting future demands and continue to monitor TMWA's ability to

⁶ The [State of Nevada Drought Plan](#), a report prepared in 2012 by the Drought Response Committee comprised of the State Climate Office, Division of Water Resources, and Division of Emergency Management under direction of the Governor defines hydrologic drought as periods of below-normal streamflow and/or depleted reservoir storage .

meet current and future demands through the 1987 to 1994 drought period, the worst drought period of record, and based on factors such as demand growth, conservation improvements, hydrologic cycles, climate changes, etc., update the Board when future conditions evolve that require changes to the planning criteria or supply operation.

4.1 Population Projection

Findings:

TMWA's population forecast estimates total Washoe County population to increase by 95,000 from 450,000 in 2016 to 545,000 in 2035, or 21 percent; the estimated population served by TMWA will increase by 83,000 people from 392,000 in 2016 to 475,000 by 2035, or 21 percent. The population estimates may change over time as the pace of development within the region or its sub-area varies, and as the region moves towards greater intensification of land use. TMWA's forecast results are statistically similar to the State Demographer's near-term projections.

Recommendation:

Accept TMWA's population forecast as a reasonable estimate of future population growth to be used by TMWA for planning purposes in its planning areas.

4.2 Water Demand Forecast

Findings:

Water demand-per-service within TMWA's service areas has been decreasing over time resulting in slower total demand growth in TMWA's extended forecast. Based on the review of current growth and economic trends in the region, future water demand is anticipated to grow in the central Truckee Meadows but at a slower pace than historically seen. The water production forecast for a typical year indicates that from 2016 to 2035, production will increase from current estimates for 2016 of approximately 83,000 AF to a projected 2035 demand of approximately 101,000 AF, or about 18,000 AF. The 2035 production is well within the maximum 119,000 acre feet per year ("AF/yr") under TROA operations.

Recommendation:

Accept for planning purposes that the water demand projections are reasonable estimates for use in TWMA's planning areas.

5.1 Water Demand Management

Findings:

TMWA's Water Demand Management Programs include measures to enhance efficient use of water, reduce or eliminate water waste, and save water. Some specifics include change-out of old meters, leak repair, water theft prevention, numerous education materials including landscape design/retrofit information, Assigned-Day Watering, watering prohibited during the heat of the day, water audits, and Drought Situation responses. Combined, these measures are designed to satisfy the conservation goal agreed to in the 1996 Water Conservation Agreement between Reno, Sparks and Washoe County ("RSW"), TMWA, PLPT and the United States. Continued levels of spending will be in accordance with that agreement. TMWA works with the WRWC in developing

conservation plans for the region, and cooperates with WRWC in implementing its conservation programs. The water conservation activities embodied in this 2035WRP satisfy Article 5(i) of the Joint Powers Authority (“JPA”) agreement that formed TMWA and the Nevada Division of Water Resources requirements that public water systems have a water conservation plan as set forth in NRS 540.131 through 540.151. TMWA’s Conservation Plan is also consistent with the water conservation recommendations detailed in the Nevada Drought Forum: Recommendations Report.

Recommendation:

Accept the Water Conservation Plan outlined in this 2035WRP.

6.1 Future Water Resources

Findings:

The selection of the next water supply project is strictly a function of a project’s yield, ease of implementation, sustainability, and financial feasibility accompanied with existing regional economic conditions and market forces that may or may not favor the development of a future water supply project. It may be that in the future, as new technology becomes available or the political, regulatory or public opinion changes, new projects may be developed or projects previously thought infeasible may become feasible. In addition to the implementation of TROA, the NVIP was completed in 2008 and is available to supply 8,000 AF annually to the North Valleys. The pending completion to purchase Donner Lake provides TMWA additional ability to issue will-serve commitment pursuant to TROA to take advantage of the full 119,000 AF of demand TROA provides. As future economic conditions warrant, TMWA can also pursue other resource development projects that do not conflict with TROA requirements and will be necessary in order to meet water demands beyond the 2035 planning horizon.

Recommendation:

Continue to investigate, evaluate, and negotiate, where appropriate, other potential water supply projects consistent with and/or in addition to TROA.