

Chapter 6

Projections of Population, Water Demand and Wastewater Flow

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Purpose and Scope

In developing this Regional Water Plan, it has been necessary to assemble projections of future population, municipal and environmental water demands and wastewater flows. These projections are used to assess the adequacy of available water resources to meet projected demands and understand future wastewater treatment and disposal needs in the complex regulatory environment of the Truckee River basin and adjoining areas under the jurisdiction of the Regional Water Planning Commission (RWPC). Information provided by Reno, Sparks, Washoe County, TMWA, and Utilities Inc. established the data needed for the planning period (through 2025).

The projection of municipal and industrial (M&I) water demands and wastewater flows are estimated for the period based on population growth, per capita water demand, and wastewater flow factors.

A longer range projection of municipal demand was developed based on the potential water demands that could be realized at build-out of all approved vacant land uses within the planning area. For the land use based projection, demands are estimated with factors for general categories of land use, net acreage of developable land, and development limits imposed by local governments for master-planned developments.

Non-potable water demands for turf irrigation and industrial uses that could be satisfied with treated wastewater effluent have been developed as part of the master-planning efforts for the various water reclamation facilities. These are discussed in Chapter 3 and summarized in Table 6-3. Future agricultural demands are not estimated in this Plan. The assumption is made that agricultural demands will decline as irrigated lands are developed and water rights are purchased and dedicated for municipal or environmental uses.

Summary of Findings

Following are the findings developed as a result of the analysis of population, water demand, and wastewater flows for the planning period:

- **While forecasting population for the planning area as a whole can provide fairly close agreement with actual trends, it is difficult to forecast with certainty how this growth will be split between hydrographic basins.** Population forecasts for southern Washoe County have been estimated by hydrographic basin as shown in Table 6-1 on the following page. Population growth for the entirety of Washoe County is expected to be about 1.8 percent per year during the planning period. A comparison was made between the 2000 Census population and the forecast made in the 1995–2015 Regional Water Plan, with the finding that the overall forecast for the planning area deviated by 8%, while there were large variations in forecast versus actual population for the individual hydrographic basins. The forecast for the current planning period utilizes historical land utilization rates in each hydrographic basin to proportionally allocate population increases to specific areas. Continued evaluation of the accuracy of the forecasting methodology will enable the refinement of water demand and wastewater flow projections.
- **Annual M&I water demand for the planning area is projected to increase from 115,600 af/yr of existing commitments and domestic well demands to 147,800 af/yr in 2025.**

- **With careful management of both water rights and water quantity, there are adequate water resources available to accommodate estimated increases in population through the planning period.**
- **There are additional water resources available within the planning area that can be studied for the provision of additional supply in the future.**
- **An evaluation of the total potential demand that might be realized at the build-out of all currently approved land uses indicates a potential water supply surplus of 400 af/yr for the region.**
- **Individual hydrographic basins such as Lemmon Valley and Spanish Springs will need additional water resources beyond that currently planned by TMWA to satisfy the build-out of all approved land uses.**
- **Existing non-potable water demands total an estimated 13,500 af/yr, of which approximately 7,200 af/yr is supplied by effluent.**
- **A total potential for additional effluent demand of 15,200 af/yr has been identified at sites within the Spanish Springs, Truckee Meadows, and Pleasant Valley hydrographic basins. If all sites were developed, the total potential effluent demand for all facilities within the planning area would be approximately 22,400 af/yr.**
- **Total annual wastewater production to wastewater treatment facilities in the planning area is projected to be 46.57 to 62.84 MGD (52,200 to 70,400 af/yr) in 2025.**
- **As there are limited surface water rights available to the region, multiple uses for the same water rights needs to be pursued to the extent possible within the existing legal framework.**
- **Effluent management programs need to consider what is the most efficient use of water rights for the region that will extend the availability of all water resources to the maximum extent possible.**

6.1 Population Projections

The 2003-2025 Washoe County Consensus Forecast of population, adopted by the three local governments has been used to project future growth for Washoe County as a whole (Washoe County, 2003). This forecast was then broken out into forecasts for each hydrographic basin based on historical growth rates (land utilization rates) and available developable land. TMWA performed this analysis to assist the RWPC in development of its Market Forces Water Resource Baseline, the tool used to project M&I water demands for the planning period. More information is provided on the population forecast methodology in Section 6.2.1 under the heading "TMWA Retail/Wholesale Demands".

Table 6-1 depicts the year 2000 Census Population and the 2025 population forecast by hydrographic basin. Also shown is the year that the population is expected to reach the forecast level, and the average annual rate of growth that would occur during the growth period. The hydrographic basins that define the planning area covered by the Regional Water Plan are shown on Figure 6-1.

**Table 6-1
2025 Population Forecast by Hydrographic Basin**

Hydrographic Basin	2000 Census Population	2025 Population Forecast	Year Population Reached	Avg Annual Increase During Growth Period
Truckee Meadows / Pleasant Valley	248,900	322,700	2021	1.4%
Spanish Springs	20,100	45,600	2017	7.5%
Lemmon Valley	23,100	40,500	2025	3.0%
Cold Springs	4,200	9,600	2009	14.3%
Warm Springs	1,400	2,800	2018	5.6%
Washoe Valley	4,200	8,200	2025	3.8%
Truckee Canyon (Verdi)	3,700	15,600	2025	12.9%
Tracy Segment (Wadsworth)	600	8,400	2025	52%
Red Rock Valley	500	700	2025	1.6%
Sun Valley	21,000	30,900	2025	1.9%
Antelope Valley	300	300	2025	0%
Bedell Flat	100	200	2025	4%
Remainder County (Tahoe, High Desert areas)	12,300	12,300	2025	0%
Total	340,400	497,800	2025	1.8%

Source: 2000 Population based on 2000 Census, 2025 Estimate based on TMWA population split by hydrographic basin, conformed to Consensus Forecast (Washoe County, 2003)

The historical trends in some of the outlying basins (e.g. Spanish Springs) have shown periods of rapid growth that should stabilize when the large tracts of developable land are fully utilized. Other basins have resource or infrastructure limitations that have caused slower growth trends even though there may be large parcels of land available for development (Lemmon Valley, Cold Springs and Warm Springs). If the resource or infrastructure limitations in these areas are resolved, there may be a shift in the location of future growth from one basin to another.

Based on the above forecast methodology, Cold Springs is expected to build-out first, followed by Spanish Springs, Warm Springs, and the Truckee Meadows/Pleasant Valley hydrographic basins. The average annual growth rate for the county as a whole is estimated to be 1.8%.

The forecast methodology assumes that land use changes will occur to accommodate the continued consumption of vacant developable land in accordance with market demand, consistent with past practice in the region. The next update to the Regional Water Plan should review whether a modification to the forecast methodology is warranted to reflect possible future changes in development patterns based on policies in the 2002 Regional Plan.

The 1995–2015 Regional Water Plan discussed the difficulty in accurately forecasting where growth will occur. Table 6-2 provides a comparison of the growth forecast by area in the 1995–2015 Regional Water Plan with actual population counts from the 2000 Census. There was not a year 2000 forecast in the Plan. In order to arrive at a comparison, year 2000 population was interpolated between the 1990 Census population and the 2015 forecast. While the overall forecast for the county deviated by 8% from the forecast, there was quite a range of deviation from area to area. Growth has not occurred as rapidly in the Tracy Segment as predicted. In fact, assuming the 1990 and 2000 boundaries are consistent, there was a decrease in population for the Tracy Segment. Sun Valley and the remaining county areas have grown considerably more than anticipated.

Table 6-2
Comparison of 1995–2015 Regional Water Plan Population Forecast with 2000 Census

Hydrographic Basin	1990 Census Population	2000 Forecast Population from 1997 Plan ^[1]	2000 Census Population	Deviation from Forecast
Truckee Meadows / Pleasant Valley	201,000	236,700	248,900	5%
Spanish Springs	3,700	18,500	20,100	9%
Lemmon Valley / Cold Springs	21,800	24,800	27,300	9%
Warm Springs	600	1,500	1,400	-7%
Washoe Valley	3,600	4,200	4,200	0%
Truckee Canyon (Verdi)	2,300	3,500	3,700	6%
Tracy Segment (Wadsworth)	1,800	3,100	600	-81%
Sun Valley	11,300	14,000	21,000	50%
Remainder County (Tahoe, High Desert areas)	8,600	9,900	13,200	33%
Total	254,700	316,200	340,400	8%

Note: All figures are rounded to the nearest 100.

[1] 2000 forecast interpolated between 1990 and 2015 Forecast from 1995–2015 Regional Water Plan

6.2 Water Demand Projections

A forecast of M&I water demand in the planning area through 2025 based on the population forecast in Table 6-1 and using basin and purveyor specific water demands gives an indication of future water resource and facility needs in southern Washoe County. The growth in M&I water demand due to population is expected to be offset by declining demand for groundwater and surface water in the agriculture sector and potential new importation projects for the North Valleys. As the reclaimed water infrastructure is extended to new areas, this will provide additional opportunities to offset M&I water demands. Potential demands for effluent are discussed in Chapter 3 and summarized here to create a complete picture of the water

demands for the region. Water demands for environmental purposes are discussed in Chapter 5.

6.2.1 Methodology for M&I Water Demand Projections

For the purpose of the Regional Water Plan, M&I demand has been projected separately for each basin. M&I demand is intended to reflect all water supplied through a well or pipe that must meet drinking water standards, and includes the potential demand associated with domestic wells. The projections include commercial / industrial and residential demands for all available sources of water. Within the planning area, there are three major water purveyors: TMWA, WCDWR, and Utilities Inc., as well as a number of smaller purveyors serving individual subdivisions, mobile home parks and commercial properties.

The projections are based on the following:

Existing Water Commitments:

Existing water resource commitments were obtained from each of the major water purveyors identified above through mid to late 2002, depending on the purveyor. A water resource commitment is issued by a water purveyor prior to approval of a Final Map for new development. Existing commitments also include the potential demands associated with existing domestic wells, and the domestic wells that can be developed on vacant parcels larger than five acres in size without dedicating additional water rights.

Water commitments may differ from actual demand due to a number of factors, including water rights dedication requirements that are higher than actual demand, reductions in water demand over time as a result of new rate structures, and reductions in water demand as a result of upgraded water fixtures. In general, without a change approved by the State Engineer, the difference in water dedication and actual demand is not available for dedication to new development. For this reason the amount of water that is dedicated for development (commitments) is what is used for calculation of the allocation of existing water resources, rather than actual demand. In other words, under the existing legal structure, unused committed resources are not available resources for new growth.

Projection of Water Demand through 2025:

The majority of this work was accomplished by the RWPC as part of its Water Resource Baseline, of which there are two models. Projections of demand through 2025 are contained in the "Market Forces Model" (described below). Projections of demand beyond 2025 are contained in the "Approved Land Use Model" that is discussed in Section 6.3. The Market Forces Model contains three components of demand:

- **TMWA Retail / Wholesale Demands:** TMWA's 2005-2025 Water Resource Plan developed a water demand forecast based on a forecast of population and employment by major industrial sector and available developable land using GIS techniques. The population and employment forecast utilized was the "*Truckee Meadows Water Authority Population and Employment Econometric Model for Washoe County*" ("TPEM"). TPEM is a time-series model that simultaneously forecasts population and employment in Washoe County using historical employment and population data from 1969 through 2000. TMWA water demand comprises retail and wholesale demand, and losses /

unaccounted for water. There are three components of retail demand: (1) Residential, (2) Commercial, and (3) Irrigation. Wholesale demand and losses / unaccounted for water are added to the TMWA retail demand to project TMWA system demand.

Retail demand is calculated separately for each of the three above-mentioned components of water demand, and wholesale demand is per the County facility plans for each wholesale area. Total TMWA demand is forecast to increase from 82,200 af in 2000 to 110,300 af in 2025. Included in this forecast is a projection that approximately 8,356 af will be saved per year as a result of metering the remaining flat-rate services. The demand forecast assumes that the entire system is metered beginning January 2010, and allows a one-year lag to fully capture behavior changes. As a result of the conversions, total water demand is anticipated to increase by an average of 0.8% per year through 2011, and 1.15% per year from 2011 through 2025.

Previous water demand forecasts prepared by SPPCo and RWPC used the Consensus population and employment projections to estimate future water demand. The Consensus includes 4 independent population forecasts, one of which was provided by SPPCo. In lieu of an updated Consensus Forecast, and the need to complete TMWA's water demand projection through 2025 in 2002, the water demand estimated in the 2005-2025 TMWA Water Resources Plan is based on TPEM results. The TPEM forecast has since been incorporated into the 2003 Consensus Forecast.

TMWA's total demand forecast by each hydrographic basin within its service territory was estimated by using historical growth rates within each basin and allocating future water demand growth to each basin based on their historical growth rates and available developable land.

- **Municipal Demands for Other Water Purveyors (Washoe County, Utilities Inc.):** A "Market Forces" population model was developed by TMWA staff to provide the population projections for each hydrographic basin based on the principle that market forces will determine the next area of growth and assuming that land uses will be approved to accommodate the development trends. Using TMWA's econometric model results of Washoe County population through 2025, the Market Forces Model allocates the population for each projected year to the hydrographic basins depending on each hydrographic basin's share of the total projected land to be developed within that year.

Residential land, commercial, and other uses of land are not differentiated as it is assumed the increase in population will occur in those hydrographic basins that have remaining land to develop. Once the population projection was developed for each basin, a per capita demand factor was applied to develop the water demand projection. Demand factors are based on historical consumption and water dedication requirements data provided by individual water purveyors.

- **Domestic Wells:** The potential demand associated with domestic wells is captured in the information on existing commitments discussed above. The water demand associated with domestic wells is 1,000 gallons/well/day (1.12 af/yr). Domestic wells are exempt from receiving a permit from the State Engineer as long as the consumption does not exceed 1,800 gallons per day (gpd) (NAC 534.180). While 1,800 gpd is the allowable pumping rate for a domestic well, estimating all domestic wells at this rate

year-round (2.02 af/yr) would far over-estimate the potential demand. The use of 1,000 gallons/well/day is used as a forecasting tool only and is not intended to limit the water pumped from individual domestic wells.

Impact of Water Conservation Potential on Projection of Future Demand:

As mentioned previously, the TMWA forecast of demand includes an anticipated reduction in future demand associated with metering of un-metered accounts. There will likely be additional conservation observed in the period leading to the next update to the Regional Water Plan based on new inverted block rate structures within both TMWA and Washoe County systems that escalate water rates based on monthly volume consumed.

Chapter 8: "Conservation", discusses the extensive conservation planning that builds on the program contained in the 1995–2015 Regional Water Plan . As reductions in per unit consumption are documented, the State Engineer may allow reduced water dedication requirements for future development. Water demand projections in future Plan updates will need to take into consideration whether reduced per capita demands have been realized.

6.2.2 Available Water Resources and 2025 M&I Demand

Table 6-3 depicts the water resources that the RWPC has determined may be available in each hydrographic basin and compares it to the potential M&I water demand in 2025 in order to calculate what the potential surplus or deficit in water resources might be at that point in time. More detailed information to back up this table is contained in several tables included in Appendix D, "Water Resource Baseline".

The available water resources identified below differ from the total water resources identified for the major basins in Tables 2-1 and 2-2 for the following reasons:

- Three of the tributary creeks (Galena, Thomas and Whites) in the South Truckee Meadows portion of the planning area have been studied and approved by the RWPC for M&I use. TMWA has rights to over 9,800 af/yr of Hunter Creek water resources. The remainder of the tributary creeks in the planning area has yet to be studied for M&I supply.

Since most of the tributary creeks are not backed up by storage for drought protection, consideration needs to be given to the resources that are actually available during an extended drought period. The RWPC uses historical records to simulate what resources are available during a 10-year drought period on the tributary creeks. Additionally, of the water flowing in any particular drought period, the amount that can be diverted for M&I supply is limited by the availability of water rights and limited to the consumptive use portion of those available rights.

The fulfillment of water duties on the tributaries differs from the management of Truckee River rights that are dedicated for service from TMWA in that they have different yields of water, based on the priority of the water rights being considered for use.

- The RWPC has adopted a Facility Plan for the South Truckee Meadows that relies on long-term groundwater withdrawals that are less than the perennial yield of the combined Pleasant Valley / Truckee Meadows hydrographic basins. The South Truckee Meadows Facility Plan (ECO:LOGIC, 2002) constrained the use of groundwater in order to manage

water levels on the Mt. Rose fan area within certain ranges that would minimize the potential impacts to domestic wells. For this reason, the groundwater available for these basins is less than that shown to be available in Chapter 2.

**Table 6-3
2025 Estimated M&I Water Resource /
Demand Comparison by Hydrographic Basin**

Hydrographic Basin	Total Potentially Available Water Resources (af/yr)^{[1][2]}	2002 Estimated M&I Commitments (af/yr)^[3]	2025 Potential M&I Demand (af/yr)	2025 Potential Resource Surplus / Deficit (af/yr)
Truckee Meadows / Pleasant Valley ^[5]	109,800 (TMWA,Trib,GW)	88,600	101,600	8,200
Spanish Springs	13,000 (TMWA,GW)	7,300	13,000	0
Lemmon Valley	8,400 (TMWA,GW)	7,400	11,000	-2,600
Cold Springs	n/a (GW)	1,900	3,000	n/a
Warm Springs	3,000 (GW)	1,300	1,300	1,700
Washoe Valley	9,300 (GW)	2,300	3,800	5,500
Truckee Canyon	5,100 (TMWA)	1,500	3,800	1,300
Tracy Segment ^[4]	5,000 (GW)	100	3,700	1,300
Red Rock Valley	n/a (GW)	800	800	n/a
Sun Valley	5,300 (TMWA,GW)	3,900	5,300	0
Antelope Valley	200 (GW)	300	300	-100
Bedell Flat	300 (GW)	200	200	100
Totals	159,400	115,600	147,800	15,400

Please Note: The projections contained in this table serve only to reflect historical rates of growth, and are not presumptive of future land use change approvals.

- Notes:
- [1] Available Water Resources includes TMWA surface/groundwater, non-TMWA groundwater, and some Truckee River tributaries (Galena, Whites, Thomas). "n/a" means there is not an RWPC approved estimate of available water resources for this hydrographic basin.
 - [2] "TMWA" means TMWA, Truckee and groundwater resource, "Trib" means Thomas, Whites, Galena resources, "GW" means non-TMWA groundwater within the basin.
 - [3] Includes potential demands associated with domestic wells.
 - [4] Tracy Segment existing commitments and potential demands do not include demands for development within Storey County.
 - [5] TMWA resource availability based on 119,425 af/yr, unallocated resource shown in TM/PV hydrobasin.

Source: Market Forces Water Resource Baseline, RWPC

The TMWA resources used in the calculation of available resources is based on the 119,000 af/yr of combined Truckee River and groundwater resources that TMWA would have available with the implementation of the Truckee River Operating Agreement (TROA). The projections of the TMWA 2005-2025 Water Resource Plan were used to allocate this resource to various hydrographic basins. The 11,100 af/yr surplus shown in the Truckee Meadows / Pleasant Valley hydrographic basins is the remainder of the TMWA resource that has not been allocated to a specific area in the TMWA Water Resource Plan. Under current practices, this resource would be utilized on a first come, first served basis as long as the use is in conformance with Policy 1.1.a – “Geographic Use of Truckee River Water” (see discussion in Chapter 2).

The largest deficit shown in Table 6-3 is in Lemmon Valley. In the case of Spanish Springs where the perennial yield of the groundwater resource is only 800 af/yr, a zero deficit is shown. Each of these basins has received extensive study and planning. The long-term management strategy for Spanish Springs will involve reducing the reliance on the groundwater resource, satisfying existing and future non-potable demands with effluent to the extent possible, and importing new sources of water.

In Lemmon Valley, the options that have been investigated include additional importation of water either from TMWA or a new importation project from the north.

In both Spanish Springs and Lemmon Valley there is the need to import additional water resources to satisfy the potential demands associated with approved land uses and to balance the water budget for these hydrographic basins. The RWPC has developed a policy that provides guidance on the issues that need to be considered when a water importation project is proposed. The policy statement is as follows:

Policy 1.3.c: New Water Resources / Importation

New water resources, including imported water, may be developed provided they further the goals of the Regional Plan and the Regional Water Plan.

Criteria to implement policy:

Development of new water resources, including an importation water supply, may be pursued if the following criteria are met:

- The water is to be used within the Truckee Meadows Service Areas boundary, as may be amended from time to time.
- There is a need for additional water resources to help meet the demands associated with fulfilling the reasonable development potential of properties identified under Regional Plan Policies 1.2.1 and 1.2.2, as calculated in the Water Resource Baseline or the subsequent Water Resource Budgets.
- Local governments or water purveyors have determined that the new water resource or importation of water is economically feasible and consistent with water quality, wastewater disposal, environmental and flood control policies or regulations.

There are additional water resources available within the planning area that can be studied for development as M&I water supplies in the future. The RWPC has established a policy that provides guidance on when a water resource investigation should be initiated to satisfy anticipated future demands. The policy statement is as follows:

Policy 1.2.b: Water Resource Investigations

Where a water supply deficiency exists or a potential water supply deficiency may occur as a result of master plan, zoning or land use changes or changes to the Truckee Meadows Service Areas boundary, or there is a need for additional water resources to meet other regional objectives, the RWPC may investigate alternatives to meet the potential water requirement.

Criteria to implement policy:

The RWPC may initiate water resource investigations when any of the following criteria are met:

- The investigation has been identified as a required element of the RWPC's regular updates to the Regional Water Plan, per NRS 540A.130.3(d).
- When the projection of potential demand indicates that less than 10 years of remaining water resources are available, based on the Water Resource Baseline.
- When there is an identified need for additional water resources not associated with land use changes (examples: water for return flow requirements, Water Quality Settlement Agreement requirements, effluent reuse, domestic well conversion or augmentation, etc.).

It is also important to remember that, as mentioned in Chapter 2, it is very difficult to capture 100 percent of the yield of groundwater resources and it is sometimes necessary to balance the pumping of groundwater for M&I supplies with the need to maintain water levels in order to lessen the impacts to domestic wells.

In general, with careful management and monitoring, there are sufficient water resources to satisfy identified M&I demands up to and beyond the planning period.

6.2.3 Projections of Non-Potable Water Use (excluding agricultural demands)

Existing non-potable water demands and the source of water supplying these demands are depicted in Table 6-4. This information was derived from a number of sources and, due to the difficulty in obtaining data, is not absolutely comprehensive. It represents all of the existing parks owned by the three local governments and most of the golf courses in the region. It also includes some industrial sites and landscape areas that are maintained by homeowners associations if these sites have been studied for the future provision of effluent.

Table 6-4
Estimate of Existing Non-Potable Water Demands
(Excluding agricultural demands)

Hydrographic Basin	Acres Irrigated	M&I Supply (af/yr)	Untreated Groundwater (af/yr)	Effluent (af/yr)	Ditch / Tributary Water (af/yr)
Cold Springs	10	30	0	0	0
Lemmon Valley	220	70	10	720	0
Pleasant Valley	200	320	0	0	180
Spanish Springs	280	460	600	0	0
Sun Valley	10	40	10	0	0
Truckee Canyon	10	20	20	0	0
Truckee Meadows	2,710	2,550	530	6,450	1,490
Washoe Valley	10	0	10	0	40
Total All Areas	3,450	3,490	1,180	7,170	1,710
Total Existing Non-Potable Demand for All Resources: 13,550 af/yr					

The projection of future non-potable water demand depicted in Table 6-5 includes parks, golf courses, and some industrial uses that have been identified as potential effluent sites in the Truckee Meadows, Spanish Springs, and Pleasant Valley hydrographic basins.

In the remainder of the hydrographic basins, future non-potable demands are based on applying a factor of 237 persons/acre of new park to the future increase in population that is forecast for the planning period. Bedell Flat, Dry Valley, Red Rock and Antelope Valley are not listed in Table 6-5 because the population increase is so small for these hydrographic basins that projections of park demands are insignificant.

The factor for projecting future acreages of parks was developed for the 1995–2015 Regional Water Plan as follows; a determination was made of the number of acres of developed parks that were mowed or drip-irrigated in the Central Truckee Meadows. This acreage was divided by the population, resulting in a factor of 237 persons/existing acre of park.

Table 6-5
2025 Projection of Potential Future Increment of Non-Potable Demand and Possible Source of Water

Hydrographic Basin	Future Acres Irrigated	Future Demand Increment – Effluent (af/yr)^[2]	Future Demand Increment – Unspecified Source (af/yr)
Cold Springs	20	0	70
Lemmon Valley	60	0	220
Pleasant Valley	580	1,720	0
Spanish Springs	1,510	5,650	0
Sun Valley	40	0	150
Tracy Segment	30	0	110
Truckee Canyon	50	0	190
Truckee Meadows ^[1]	1,700	7,830	0
Warm Springs	10	0	40
Washoe Valley	20	0	70
Total All Areas	4,020	15,200	850

Notes:

[1] Includes 1,000 af/yr for SB Geothermal

[2] High-end estimate based on all potential sites, actual effluent demands will be developed in consideration of overall regional water resource and water rights issues.

Agricultural demands are not shown in Table 6-5. It is assumed that as development continues, water rights currently being put to agricultural use will be purchased and dedicated for M&I supplies. The outlook is for a broad decline in freshwater use due to reduction of surface-irrigated agricultural land and substitution of effluent for freshwater use to irrigate large public areas (e.g. parks, golf courses) and remaining agricultural lands. Costs, Truckee River water quality issues, water rights constraints and public acceptance will dictate the transition from freshwater use in these areas to effluent.

6.3 Future Needs Beyond 20-Year Plan Horizon

Quantitative integrated planning among water, wastewater, flood control, and drainage has been conducted in this document for the 20-year planning horizon. There is a consensus among water planning experts that it is important to look beyond 20 years into the future to assess future water supply adequacy, even though the projected data for this longer timeframe may be quite subjective.

In order to address the long-term, an “end point” should be examined to see whether water resources would be sufficient in the region to meet all water supply, wastewater disposal, and environmental needs. In the 1995–2015 Regional Water Plan, the end-point that was discussed was the full implementation of the Negotiated Settlement. The question being whether there are sufficient water rights to implement the terms of the settlement, and whether there are other water resource issues that might constrain growth prior to realization of a TMWA demand of 119,000 af/yr. This is still a consideration, one that has received much study by the RWPC, TMWA, and TMWRF since publication of the 1995–2015 Regional Water Plan. The constraints associated with implementation of the various Truckee River related agreements are discussed in Chapter 7.

Another question is “What are the potential water demands beyond the planning period, and are there water resources available to supply them?” This is a question that was addressed by the RWPC during its Interim Water Policy work in 2002/2003, and is responded to by the Approved Land Use version of the Water Resource Baseline. The best indicator we have as a community of what the current end-point of water demand might be is the additional increment of demand represented by vacant approved land uses in each of the hydrographic basins in the planning area. Additionally, there is a potential additional increment of water demand that might be realized in the cities of Reno and Sparks if the region is successful in implementing the Regional Plan vision of redevelopment, infill and intensification of land uses within the McCarran Ring and Transit Oriented Development Corridors.

Table 6-6 represents the best available estimate of what that future end-point of demand might be based on approved land uses. As new land uses are approved, this end-point of potential demand will shift. Another factor that will affect the end-point of water demand is the amount of effluent reuse that is implemented.

Of the thirteen basins listed, three (Sun Valley, Washoe Valley and Tracy Segment) have a higher demand projection based on the population forecast than there are land uses approved to fulfill that demand. This can be seen by comparing the results for these basins between Tables 6-3 and 6-6. The population forecast assumes that land uses will be approved to satisfy market demands for developable land.

The potential future water demand for the Truckee Meadows / Pleasant Valley hydrographic basins also includes 4,400 af/yr of water demand for redevelopment / infill within the McCarran Ring. This number was derived by taking 35% of the projected increase in population from 2000 to 2025 (55,000 persons at assumed demand of 0.08 af/person/year) and assuming that it would be directed within the McCarran Ring per goals contained in the 2002 Regional Plan.

As with any long-range projection, there are many factors that can influence what the endpoint water demand might actually be. Some of the major variables are:

- Ongoing changes in land use to reflect market demands create a moving target until all vacant, developable land is consumed.
- Changes to the Truckee Meadows Service Areas boundary would change the amount of available land for development.
- Reductions in future per unit water demand as water resources costs go up. Verification of these decreases could lead the State Engineer and water purveyors to reduce water resource dedication requirements for future development.
- The high cost to retrofit water delivery infrastructure in the core areas of the cities will provide a very strong incentive to keep water demands for redevelopment and infill projects as low as possible in order to fit within existing infrastructure capacities.
- The amount of effluent reuse that is implemented for the region.

Table 6-6
Estimated Long-Range Projection of M&I Supply / Demand Comparison by
Hydrographic Basin (beyond 2025)

Hydrographic Basin	Total Potentially Available Water Resources (af/yr) ^{[1][2][6]}	Anticipated Demand by Hydrographic Basin (af/yr) ^[5]	Potential Resource Surplus / Deficit for Long-Range Analysis (af/yr)
Truckee Meadows / Pleasant Valley	107,500 (TMWA,Trib,GW)	107,200	300
Spanish Springs	16,500 (TMWA,GW)	16,500	0
Lemmon Valley	8,400 (TMWA,GW)	17,300	-8,900
Cold Springs ^[7]	n/a (GW)	3,000	n/a
Warm Springs	3,000 (GW)	3,200	-200
Washoe Valley ^[5]	9,300 (GW)	3,400	5,900
Truckee Canyon	5,100 (TMWA)	5,000	100
Tracy Segment ^{[4][5]}	5,000 (GW)	1,700	3,300
Red Rock Valley ^[7]	n/a (GW)	800	n/a
Sun Valley ^[5]	4,100 (TMWA,GW)	4,100	0
Antelope Valley	200 (GW)	400	-200
Bedell Flat	300 (GW)	200	100
Totals	159,400	162,800	400

- Notes:
- [1] Available Water Resources includes TMWA surface/groundwater, non-TMWA groundwater, and some Truckee River tributaries (Galena, Whites, Thomas). "n/a" means there is not an RWPC approved estimate of available water resources for this hydrographic basin.
 - [2] "TMWA" means TMWA, Truckee and groundwater resource, "Trib" means Thomas, Whites, Galena resources, "GW" means non-TMWA groundwater within the basin.
 - [3] Includes potential demands associated with domestic wells.
 - [4] Tracy Segment existing commitments and potential demands do not include demands for development within Storey County.
 - [5] Long-range demand is based on build-out of approved land uses. In some hydrographic basins the projection of demand based on population forecast is more than that associated with build-out of approved land uses (Sun Valley, Tracy Segment, Washoe Valley).
 - [6] TMWA Resource availability based on 119,425 af/year, unallocated resource shown in TM/PV hydrographic basin.
 - [7] There is no RWPC adopted estimate of perennial yield for the Cold Springs or Red Rock hydrographic basins.

Source: Approved Land Use and Market Forces Water Resource Baselines, RWPC

For both the 2025 and end-point projections of water demand, there are individual hydrographic basins that indicate a potential water supply deficit. This is important to note from the perspective of planning for additional water resources to satisfy the potential demand. The RWPC has two policies that will work together to ensure that: 1) there is not an over-allocation of a particular water resource when actual development is to be served, and 2) local government land use planners have the flexibility to provide for inventories of vacant and re-developable land uses in an environment of full disclosure of the available water resources.

The policy addressing the first item above is stated as follows:

Policy 1.3.e: Water Resource Commitments

Issuance of new commitments against a water resource or combination of resources shall be made in conformance with existing State Engineer permits, certificates or orders; water purveyor rules or policies; and/or local government policies. The local governments, water purveyors, and State Engineer will seek to achieve a balance between commitments and the sustainable yield of the resources in the region.

Criteria to implement policy: Local governments and water purveyors shall apply the following criteria to identify approved areas for the use of Truckee River resources:

- The primary locations where Truckee River water may be used include the hydrographic basins where Truckee River water has historically been diverted for agriculture pursuant to the Orr Ditch Decree: Truckee Meadows Hydrographic basin 87, Spanish Springs basin 85, Truckee Canyon segment basin 91, and Tracy segment basin 83, plus areas where Truckee River water has been delivered for municipal and industrial use in Sun Valley basin 86 and Lemmon Valley basin 92.
- In reviewing requests for use of Truckee River Water, water purveyors and local government agencies shall determine that export of the Truckee River water resource to additional areas does not impair the ability to meet the demands associated with fulfilling the reasonable development potential of properties identified under Regional Plan Policies 1.2.1 and 1.2.2, as calculated in the 2003 Water Resource Baseline (see Appendix D) and subsequent Water Resource Budgets.
- The proposed area of Truckee River water use is within the Truckee Meadows Service Area boundary, as it may be amended.
- Local governments and water purveyors have determined that the resource costs are found to be economically acceptable.
- Expanded use is consistent with water quality, wastewater disposal, environmental and flood control policies or regulations.

Policy 1.3.e provides direction to water purveyors and/or local governments on the sustainable management of the region's water resources, seeking to ensure that actual commitments against a particular water resource do not exceed the long-term sustainable yield of the resource. Some resources have been extensively studied, leading to a great deal of confidence in the estimates of sustainable yield. Other resources, particularly groundwater resources, have had less investigation and therefore there is a lower level of confidence in some estimates of sustainable yield.

The RWPC policy that addresses the balance of water resources and approval of land use in the future is stated below:

Policy 1.3.d: Water Resources and Land Use

Land use designations or zoning designations do not guarantee an allocation of future water resources. This applies to both surface water and groundwater, including groundwater for domestic wells. While a potential water supply deficiency may exist based on approved land uses, water supply commitments may only be approved pursuant to Policy 1.3.e.

Criteria to implement policy: Local governments shall consider the following criteria in reviewing proposed projects or in reviewing changes to land use or proposing changes to the Truckee Meadows Service Area:

- The potential resource requirement;
- The availability of uncommitted water resources in the hydrographic basin, as identified in the Water Resource Baseline¹;
- Whether or not a potential water supply deficiency is created and its timing, magnitude and regional water resource impacts;
- Existing water resource investigations that have been performed in accordance with Policy 1.2.b; or
- Timing and availability of potential new water resources developed in accordance with Policy 1.3.c and/or potential mitigation measures.

The RWPC, through this policy and the tools that are developed to support it, seeks to provide information to local governments on the availability of water resources and what the future potential demand against those resources might be if all approved land uses are fully developed. The Water Resource Baseline was developed by the RWPC as a tool to assist local governments when they consider making future land use changes and the long-term potential implications of those decisions.

6.4 Wastewater Generation Projections

An estimate of wastewater flows that are anticipated at 2025 based on a range of per capita flow factors is depicted in Table 6-7. These are the estimated sewer flows only. The estimated effluent discharge from septic tanks is contained in Table 6-8.

¹ The RWPC 2003 Water Resource Baseline and subsequent Water Resource Budget are subject to continuing review and update by the RWPC.

**Table 6-7
2025 Estimated Wastewater Flow
by Ultimate Treatment Plant Service Area**

Ultimate Treatment Plant Service Area	2025 Estimated Sewered Population	Low Range Flow Factor GPCD	High Range Flow Factor GPCD	Annual Average	
				Low Range Flow Estimate MGD	Hi Range Flow Estimate MGD
Truckee Meadows Water Reclamation Facility [1]					
Hydrographic basins:					
Truckee Meadows (77% of basin area)	238,300	110	160	26.21	38.13
Truckee Canyon (Verdi)	13,900	110	160	1.53	2.23
Sun Valley	30,500	88	112	2.68	3.42
Spanish Springs	43,900	110	130	4.83	5.71
Total TMWRF:	326,600			35.26	49.48
South Truckee Meadows Water Reclamation Facility					
Hydrographic basins:					
Truckee Meadows (23% of basin area)	59,600	110	130	6.55	7.74
Pleasant Valley	1,900	110	130	.21	0.24
Total STMWRF:	61,500			6.76	7.99
Reno-Stead Water Reclamation Facility [2]					
Hydrographic basins:					
Lemmon Valley	32,800	110	130	3.61	4.27
Total RSWRF:	32,800			3.61	4.27
Warm Springs Water Reclamation Facility (proposed)					
Hydrographic basins:					
Warm Springs	1,400	110	130	0.16	0.18
Total WSWRF:	1,400			0.16	0.18
Cold Springs Wastewater Treatment Facility					
Hydrographic basins:					
Cold Springs	7,100	110	130	0.78	0.92
Total CSWTF:	7,100			0.78	0.92
Totals	429,400			46.57	62.84

- Notes:
- [1] Assumes Gold Ranch, Boomtown and Glen Meadows facilities will be decommissioned by 2025 with flows routed to TMWRF.
 - [2] Assumes Lemmon Valley Wastewater Treatment Plant will be decommissioned by 2025 with flows routed to RSWRF.

Each of the major wastewater treatment facilities has had facility plans updated within the past five years, with the exception of the Lemmon Valley Wastewater Treatment Plant, which is not expected to increase in size.

These individual facility plans should be referenced for detailed projections of wastewater flow and anticipated capital improvements. At the time the various facility plans were prepared, the Consensus Forecast of population used for this Regional Water Plan was not available. The data presented in Table 6-7 was developed in order to prepare a projection of wastewater flow that is consistent in methodology with projections of water demand for the planning period. A review of this data against existing facility plans indicates that the projection of wastewater flow for the planning period falls within the range of flows developed by the previous facility planning work.

The per capita flow rates in Table 6-7 are inclusive of wastewater flow generated from commercial / industrial sources. A range of potential flows is given because there is some uncertainty in how future development will proceed. Different non-residential uses can have large variations in the generation of wastewater flow.

Table 6-8 depicts the potential septic tank flows by hydrographic basin. The assumptions for this projection are that existing septic tanks will remain unless there is a directive from NDEP to undertake a sewer conversion project, such as was received for the central part of Spanish Springs. All future growth will be sewerered unless it is in an area where the approved land use is of five acres or greater lot size. For consistency, the number of new septic tanks is based on the number of new domestic wells that were determined to be possible in the Water Resource Baseline.

A factor of 85 gallons/capita/day (0.10 af/capita/year) was used for the purposes of estimating wastewater effluent discharge from septic tanks. At a region-wide average of 2.33 persons/dwelling unit, this would equate to a wastewater flow of approximately 200 gallons/septic tank/day.

Table 6-8

Estimate of Septic Tank Effluent Discharges at 2025

Hydrographic Basin	Estimate of 2000 Population Served by Septic Tanks	2025 Estimate of Population Served by Septic Tanks	2025 Estimate of Septic Tank Effluent Discharge (0.10 af/capita/yr)
Truckee Meadows / Pleasant Valley	21,550	22,950	2,300
Spanish Springs	4,370	1,680	170
Lemmon Valley	6,880	7,630	760
Cold Springs	2,500	2,500	250
Warm Springs	1,350	1,350	140
Washoe Valley	4,160	8,150	820
Truckee Canyon	1,710	1,710	170
Tracy Segment	570	8,360	840
Red Rock Valley	550	680	70
Sun Valley	350	350	40
Antelope Valley	270	340	30
Bedell Flat	120	150	20
Totals	44,380	55,850	5,610

6.5 Summary of 2025 Estimated M&I Water Demand and Wastewater Flows

Table 6-9 provides an overall summary of estimated M&I water demands and wastewater flows by hydrographic basin at 2025. M&I water demands are inclusive of domestic well demands and wastewater flows are inclusive of septic tank flows. Overall, wastewater flows generated are anticipated to represent approximately 45% of the total M&I water demand.

Table 6-9
Summary of 2025
Estimated M&I Demands and Wastewater Flows

Hydrographic Basin	Estimated M&I and Domestic Well Water Demand (af/yr)	Estimated Wastewater and Septic Tank Flows (af/yr)
Truckee Meadows / Pleasant Valley	101,600	46,300
Spanish Springs	13,000	6,100
Lemmon Valley	11,000	5,200
Cold Springs	3,000	1,200
Warm Springs	1,300	300
Washoe Valley	3,800	800
Truckee Canyon	3,800	2,300
Tracy Segment	3,700	800
Red Rock Valley	800	100
Sun Valley	5,300	3,500
Antelope Valley	300	<100
Bedell Flat	200	<100
Totals	147,800	66,600

Within individual hydrographic basins, the ratio of wastewater flow to water demand varies significantly. The factors affecting this ratio are:

- Hydrographic basins with large numbers of domestic wells (Warm Springs, Tracy Segment, Red Rock Valley) will have a higher per unit water demand factor based on the 1,000 gallon/well/day estimate of demand for domestic wells, resulting in a low ratio of wastewater flow to overall water demand.
- Hydrographic basins with low commercial / industrial land use acreages will have a lower per capita water demand factor (Sun Valley, Cold Springs), resulting in a higher ratio of wastewater flow to overall water demand.
- The Washoe Valley hydrographic basin has both a large number of domestic wells and a high per capita demand for the Washoe County water systems, resulting in a low ratio of wastewater flow to water demand.

The non-potable water demands discussed in Section 6.2 are represented in the M&I demands for Table 6-9 if a water purveyor currently provides the supply or if it is an approved non-residential vacant land use with non-potable demands that has not been planned to receive effluent.

6.6 Efficient Use of Water Rights

The 1995–2015 Regional Water Plan indicates that all the surface water rights in the planning area would need to be utilized in order to reach an ultimate TMWA demand of 119,000 af/yr while also providing water rights to make up for effluent that would not be returned to the river. The water rights that are dedicated to replace effluent not returned to the river are referred to as “return flow credit water”. The requirements for dedication of return flow credit water are spelled out in settlement agreements related to maintaining water quality and in stream flows in the Truckee River. These agreements are discussed in the following sections and in more detail in Chapter 7.

There are many competing demands for water rights that must be considered from a broad planning perspective so that the limited availability will go the farthest in satisfying the water resource needs of the region.

Some of the primary uses for Truckee River and tributary water rights in the planning area are listed below:

- Dedication of water rights for maintenance of in-stream flows in the lower Truckee River as required by the Negotiated Settlement (PL 101-618, see Appendix F)
- Dedication of water rights for water quality enhancement in the lower Truckee River as required by the Water Quality Settlement Agreement, 1996
- Dedication of Truckee River water rights for M&I supplies from TMWA
- Dedication of water rights as return flow credit water to maintain in stream flows and satisfy downstream water rights
- Dedication of certain tributary creek water rights in the South Truckee Meadows for new surface water treatment plants

To satisfy each of these demands independently would eventually require more water than can be provided by the river and its tributaries. The many competing demands for water rights and resources from the Truckee River need to be coordinated and all non-consumptive uses must share water to the extent possible. This problem can be avoided by developing cooperative management of water to satisfy two or more of these competing demands with the same water.

The RWPC has adopted a policy that is intended to provide guidance to purveyors when developing long range plans for effluent management:

Policy 2.1.a: Effluent Reuse - Efficient Use of Water Resources and Water Rights

The use of reclaimed wastewater for irrigation, recharge or other permitted uses should be pursued where such use is an efficient use of water resources and water rights.

Criteria to implement policy: Local governments, effluent providers, or water purveyors shall apply the following criteria to identify approved uses or areas for reclaimed effluent:

- Where it is an efficient use of water resources and water rights, local governments, effluent providers, or water purveyors may require the use of reclaimed wastewater, including the necessary facility improvements.

- The use of reclaimed wastewater will be included in the Water Resource Budget as both a supply and as a satisfied demand. To the extent that there may be requirements for make-up water associated with certain uses of reclaimed wastewater, those shall be included in the Water Resource Budget.
- Where such effluent reuse is consistent with water quality, wastewater disposal, public health, vector, environmental and flood control permits, policies or regulations.

6.6.1 Demand for Water Rights – Truckee River and Tributaries

The water demands developed in this chapter provide an indication of what the water resource requirements will be during the planning period. As important as the actual water resource, is the availability of water rights to secure that water resource, particularly with respect to surface water resources where there is almost never a 1:1 yield of water with respect to water rights. Following is a brief discussion of the demands for water rights in the Truckee Meadows, and the constraints that affect how much water can be produced from different types of rights.

Municipal Supply and Drought Reserve – Truckee River

In the case of Truckee River water that will be supplied for M&I service by TMWA, there are existing agreements and facilities that provide storage capacity upstream of the Truckee Meadows. These facilities store water when it is available, and release it as needed to satisfy demands. The reservoirs provide a reserve for both seasonal fluctuations in demand and annual variations between wet and dry years. TMWA uses the reservoirs in conjunction with its groundwater resources to make up the entirety of its water supply.

In the future, TROA operation of Truckee River reservoirs will be expanded, thereby increasing dry year reserves. In exchange for greater flexibility in reservoir operation, TMWA is required to dedicate 0.11 af of water rights for each af of new demand. This dedication must be made from Truckee River water rights. (Refer to TMWA 2005 to 2025 Water Resource Plan for complete description of TMWA water resources, agreements, and drought planning).

Municipal Supply and Drought Reserve – Proposed South Truckee Meadows Treatment Plants

The water resources for the proposed South Truckee Meadows water treatment plants differ from TMWA surface water resources in that there is no upstream surface water storage planned to equalize the fluctuations in seasonal tributary flow and variations in annual flow that result from wet and dry years. This affects the amount of water that can be derived, the “yield”, from a particular water right. Another factor that affects the yield of a water right is its priority with respect to other water rights on the same system.

Without storage, additional water rights must be dedicated for service above the normal amount that will actually be consumed to ensure that a minimum supply can be maintained under drought conditions. During drought conditions, the highest priority rights will receive water and lower priority rights may not be fulfilled. During non-drought conditions, however, the additional water that is available under these rights can be used to satisfy other needs such as aquifer recharge, enhancement of Truckee River water quality, satisfaction of effluent return flow requirements, etc. Because the use of tributary water rights for municipal water supply purposes in the Truckee Meadows is a new practice, the specifics of how these rights are to be administered are still under development.

Truckee River Water Quality

As a result of the Water Quality Settlement Agreement, the Cities of Reno and Sparks, Washoe County, and the U.S. Government have agreed to spend \$24 million on the purchase of Truckee River water rights to help improve water quality in the lower Truckee River. The US Bureau of Reclamation (BOR) estimates that 13,211 af of Truckee River water rights will be purchased under this program, of which 2,900 af are main stem Truckee River water rights in either the Truckee Meadows or the segment of the river between Vista and Wadsworth.

Replacement of Effluent Return Flow

Historically, water that was applied for irrigation was only partially consumed by the irrigated plant or infiltrated into the ground. The remaining run-off water would then be available to satisfy the water rights of downstream users. As agricultural uses of surface water have been replaced with municipal uses, water that is not consumed is sent to regional wastewater treatment facilities, where it is treated and either discharged to the Truckee River or applied to landscaping as an irrigation supply (effluent reuse). The component of water that is consumed is referred to as the “consumptive use” portion of the water right; the remainder of the water right is the “non-consumptive use” portion. If the non-consumptive use portion of a water right is diverted such that it no longer returns to the Truckee River, then a replacement amount of water rights must be acquired and remain in the river as in-stream flow to ensure that the rights of downstream users are not negatively impacted.

In the Truckee Meadows region, the need for return flow rights occurs when treated wastewater that originated from the Truckee River is used for irrigation purposes or is treated at a facility that does not discharge its effluent to the Truckee River, such as the STMWRF and RSWRF.

The amount of effluent reuse planned in the future is partially determined by the need to meet Truckee River TMDL limits. Based on current planning, effluent reuse demands could range from 10,880 af² to as high as 15,210 af³ per year. After considering the portion of this effluent that consists of groundwater, which does not require a return flow component, the return flow water right requirement for effluent could range from 3,220 af to 7,550 af. Dedications of water rights for effluent return flow can be either main stem Truckee River water rights or tributary water rights. In the case of Truckee River water rights the dedication is a 1:1 ratio of water rights to return flow requirement. In the case of tributary water rights, the yield of the particular water right needs to be determined in order to establish a dedication ratio.

As part of their ongoing planning to help provide for a sustainable river and maintain long-term Truckee River water quality objectives, TMWRF staff continually evaluates the need for less than full implementation of effluent reuse programs by implementation of other opportunities such as river restoration, seasonal modifications of TMDLs for the Truckee River, flow augmentation and water quality trading.

² TMWA 2005–2025 Water Resource Plan pgs. 106-107 describes water rights requirements for effluent reuse in the increment of wastewater flow between 44,800 af (40 MGD permitted TMWRF discharge) and 55,680 af (the point at which annual TMWA water demand will reach 119,000 af).

³ Carollo Engineers, April 15 2002, “Projected Wastewater Flow, Water Reuse Demand, and Total Nitrogen Loading”. (Table 2-6, pg 20) 15,210 af/yr represents projected 2020 maximum TMWRF effluent reuse demand.

Successful implementation of these “non-structural” programs has good potential to enhance the sustainability of the river and increase water resources. Scenarios 5 and 6 on Table 6-10 show the resource improvements, or lack of effluent reuse need, relative to the small changes in the TMWRF discharge permit. Another benefit to the non-structural component is that the program produces the least cost for TMWRF effluent disposal options.

6,700 Acre-foot Water Rights Dedication Requirement - TROA

As part of the TROA negotiations, local governments have agreed to dedicate 6,700 af of water rights for Truckee River in-stream flows. Dedications for the 6,700 af requirement can be either main stem Truckee River water rights or tributary water rights. In the case of Truckee River water rights the dedication is a 1:1 ratio. In the case of tributary water rights, the yield of the particular water right needs to be determined in order to establish a dedication ratio.

6.6.2 Water Rights Availability

The above discussion highlights the various demands for water rights that will lead to the conversion of most agricultural water rights in the Truckee Meadows to other uses. Table 6-10 below provides a summary water rights balance under six potential future water resource scenarios. The M&I water resources remain constant from one scenario to the next. The variations between scenarios are based on implementation of TROA, a nine-year drought and the amount of effluent reuse projected for TMWRF.

The “Summary Water Rights Requirement” column of Table 6-10 refers to the number of water rights that must be acquired to satisfy the increment of M&I demand between 2002 conditions and a total TMWA supply of 119,000 af/year; a South Truckee Meadows tributary plant supply of 6,700 af/year; long-range TMWRF effluent disposal needs; and satisfaction of existing agreements relating to Truckee River and tributary resources (See Chapter 7 for a discussion of agreements). The detailed calculations of summary water rights requirements and estimation of available water rights can be found in Appendix E.

Scenario 1:

- 119,000 af/yr TMWA supply with TROA implementation
- 7600 af/yr TMWRF effluent reuse requiring no additional surface water rights for Truckee River in-stream flows
- 6,700 af/yr tributary supply from South Truckee Meadows water treatment plants

In Scenario 1 a low amount of TMWRF effluent reuse is projected based on the potential benefits that might be realized from the implementation of non-structural Truckee River water quality improvement projects and/or discharge permit modifications.

Scenario 2:

- 119,000 af/yr TMWA supply without TROA implementation
- 9-year drought
- 7,600 af/yr TMWRF effluent reuse requiring no additional surface water rights for Truckee River in-stream flows
- 6,700 af/yr tributary supply from South Truckee Meadows water treatment plants

Scenario 2 differs from Scenario 5 in that it assumes that TROA is not implemented.

Scenario 3:

- 119,000 af/yr TMWA supply with TROA implementation
- 10,880 af/yr TMWRF effluent reuse requiring 3,220 af/yr surface water rights for Truckee River in-stream flows
- 6,700 af/yr tributary supply from South Truckee Meadows water treatment plants

This scenario is based on the assumption that TMWRF discharges to the Truckee River could be limited by water quality standards to a total of 40 MGD (44,800 af/yr). When TMWA M&I demands reach 119,000 af/yr, effluent is estimated to be 55,680 af/yr, with the result that, under this scenario, 10,880 af/yr of effluent would need to be applied as reuse⁴.

Scenario 4:

- 119,000 af/yr TMWA supply without TROA implementation
- 9-year drought
- 10,880 af/yr TMWRF effluent reuse requiring 3,220 af/yr surface water rights for Truckee River in-stream flows
- 6,700 af/yr tributary supply from South Truckee Meadows water treatment plants

This scenario differs from Scenario 3 in that it assumes that TROA is not implemented.

Scenario 5:

- 119,000 af/yr TMWA supply with TROA implementation
- 15,210 af/yr TMWRF effluent reuse requiring 7,550 af/yr surface water rights for Truckee River in-stream flows
- 6,700 af/yr tributary supply from South Truckee Meadows water treatment plants

Scenario 5 shows the highest estimate of effluent reuse based on the need to meet Truckee River water quality standards through effluent reuse alone. This level of effluent reuse could be needed to meet Truckee River water quality standards if the benefits of potential non-structural water quality improvement projects are not realized.

Scenario 6:

- 119,000 af/yr TMWA supply without TROA implementation
- 9-year drought
- 15,210 af/yr TMWRF effluent reuse requiring 7,550 af/yr surface water rights for Truckee River in-stream flows
- 6,700 af/yr tributary supply from South Truckee Meadows water treatment plants

Scenario 6 differs from Scenario 5 in that it assumes that TROA is not implemented.

⁴ TMWA, 2005–2025 Water Resource Plan, pg 107

Table 6-10

Water Rights Balance in Support of Six Potential Water Resource Scenarios

Scenario 1		
	Summary Water Rights Requirement	Total Available Water Rights
Truckee River	39,300	57,000
Tributary Creeks	23,600	33,900
Total	62,900	90,900
Scenario 2		
	Summary Water Rights Requirement	Total Available Water Rights
Truckee River	28,800	57,000
Tributary Creeks	16,900	33,900
Total	45,700	90,900
Scenario 3		
	Summary Water Rights Requirement	Total Available Water Rights
Truckee River	39,300	57,000
Tributary Creeks	26,800	33,900
Total	66,100	90,900

Scenario 4		
	Summary Water Rights Requirement	Total Available Water Rights
Truckee River	39,300	57,000
Tributary Creeks	31,100	33,900
Total	70,400	90,900
Scenario 5		
	Summary Water Rights Requirement	Total Available Water Rights
Truckee River	28,800	57,000
Tributary Creeks	20,100	33,900
Total	48,900	90,900
Scenario 6		
	Summary Water Rights Requirement	Total Available Water Rights
Truckee River	28,800	57,000
Tributary Creeks	24,400	33,900
Total	53,200	90,900

Factors Affecting the Water Rights Balance

Table 6-10 assumes 100% efficiency in the conversion of water rights from agricultural and inactive uses to municipal supply. In actuality, market forces will determine how complete the conversion of water rights will be in the future. As water rights become scarce, the price per af will increase, with the result that there will be greater incentive to sell water rights that have remained in agricultural use. Additionally, a higher cost per af will provide the incentive to seek out and secure water rights that require more effort to obtain, such as those that are associated with public rights of way or on portions of parcels that are no longer irrigated.

The yield of tributary water rights will also affect the water rights balance. The water rights balance assumes that tributary water rights from Thomas Creek, Whites Creek, Galena Creek, and Steamboat Creek will be used for a number of purposes, including:

- Two South Truckee Meadows water treatment plants
- Satisfaction of the 6,700 af requirement of TROA
- Return-flow requirements

In the case of the South Truckee Meadows water treatment plants, the yield of the water rights that are proposed for use has been estimated and included in the calculations of water rights needed to support these facilities. The analysis of yield has not yet been completed for the remainder of tributary water rights on these creeks as they may be used for the 6,700 af requirement or return-flow requirements. There is also the potential that water rights dedicated for M&I supply at the South Truckee Meadows water treatment plants could serve multiple purposes during normal and wet year conditions because of the dedication requirements to provide a secure water supply during drought conditions.

The issues of yield and efficiency of water rights conversion introduce some uncertainty into the water rights balance. This uncertainty was identified in the RWPC report “Analysis of Available Decreed Truckee River Water Rights and Projections of Future Demand” (Stantec, 2001), where a range of potential water rights recovery percentages was presented based on the anticipated difficulty in obtaining certain water rights. In actuality, market forces will ultimately dictate how successful the conversion of water rights will be. Additionally, as the cost of Truckee River and tributary water rights increases, there will be greater incentive to develop new water resource projects for M&I purposes.

Close coordination between local government entities and the Tribe is essential to achieve regional water management objectives. By working together, the region can obtain the highest yield from the available water resources, help achieve long-term Truckee River objectives, and continue to provide for planned growth within the region.

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