2010 Urban Water Management Plan

North Lake Tahoe Public Utility District

Adopted July 9, 2013

Prepared for:

North Tahoe Public Utility District

Prepared by:

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Sustainable • Civil • Landscape

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Key Acronyms and Abbreviations Used in This Document

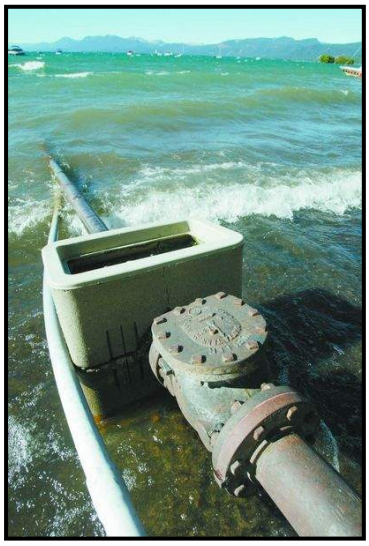
Act	Urban Water Management Planning Act
AF	Acre-feet
AFY	Acre-feet per year
Bgs	Below Ground Surface
BMP(s)	Best Management Practice(s)
CD(s)	Compact Disc(s)
Corps	United States Army Corps of Engineers
CUWCC	California Urban Water Conservation Council
DMM	Demand Management Measures
DWR	California Department of Water Resources
EIR	Environmental Impact Report
ERP	Emergency Response Plan
ETo	Evapo-transpiration of Common Turf Grass
General Plan	General Plan Update
GIS	Geographical Information System
Gpcpd	Gallons per capita per day
HET(s)	High Efficiency Toilet(s)
IRWP	Incremental Recycled Water Program
LUFT	Leaking Underground Fuel Tank
MCL(s)	Maximum Contaminant Level(s)

mgd	Million gallons per day
MOU	Memorandum of Understanding
O&M	Operations and Maintenance
DISTRICT	North Tahoe Public Utility District
NVE	Nevada Energy
SWG	Southwest Gas
SWRCB	California State Water Resources Control Board
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
UFW	Unaccounted for Water
UGB	Urban Growth Boundary
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
WAC	Water Advisory Committee
WRP	Water Reclamation Plant
WTSP	Water Supply and Transmission System Project

Section 1.0 Plan Preparation

1.1 Introduction and Law

The North Tahoe Public Utility District (District) supplies potable water to a population of approximately 5,300. This number will fluctuate greatly during the summer months as well as the holiday months due to the high volume of tourism in the District's service area. The District's potable water supply source is primarily Lake Tahoe and water pumped from groundwater wells owned and operated by the District.


Lake Tahoe Water Intake

The State of California Urban Water Management Planning Act (Act)[1] requires each urban water supplier with 3,000 or more connections, or which supplies at least 3,000 acre-feet per year (AFY) of water, to submit UWMPs to the California Department of Water Resources (DWR) every five years. The District has approximately 3,872 connections.[2]

The UWMP Act requires urban suppliers to report, describe, and evaluate water deliveries and uses, water supply sources, efficient water uses, and demand management measures (DMMs), including implementation schedule and strategy. The purpose of developing an UWMP is to evaluate whether a water supplier can meet the water demands of its water customers as projected over a 20- or 25-year period. The UWMP Act directs water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands. This evaluation is accomplished through analysis of current and projected water supply and demand for normal or average conditions, as well as during water shortages.3

Based on legislative changes resulting from the November 2009 passage of SBX7-7 (hereafter referred to as the Water Conservation Bill of 2009), development of UWMPs will enable water agencies and, in turn, the State of California to set targets and track progress toward decreasing

[1] State of California Urban Water Management Act (Division 6 Part 2.6 of the Water Code Sec. 10610-10656)

[2] 2010 Department of Water Resources Public Water System Statistics

daily per capita urban water use throughout the state. State law has extended the deadline for the 2010 Plans to July 1, 2011. Although submitted in 2011, 2010 UWMPs will be referred to as 2010 UWMPs because they include 2010 water data and to retain consistency with the five-year submittal cycle.[3]

1.2 Structure of Plan

The outline of this UWMP generally follows the December 21, 2010 "Guidebook to Assist Water Suppliers in the Preparation of a 2010 Urban Water Management Plan Draft" developed and the March 2011 "Guidebook to Assist Urban Water Supplier to Prepare a 2010 Urban Water Management Plan" developed by the Department of Water Resources. Some sections of the outline presented in the guidelines have been combined or moved into a different order than the guidelines, but all the information requested in the UWMP guidelines and act are described within this document. The UWMP is organized into 10 sections and appendices, as described below.

1.3 Appropriate Level of Planning

The Act specifies the required content of each UWMP and allows for the level of detail provided in each UWMP to reflect the size and complexity of the water supplier. The Act requires projections in five-year increments for a minimum of 20 years. This UWMP considers a 20 year planning horizon. Note that certain specific provisions of the Act require inclusion of historic information "if available."

1.4 Plan Adoption, Submittal and Implementation

Urban water suppliers are required by the Act to encourage active involvement of the community within the service area prior to and during the preparation of their UWMPs. The Act also requires urban water suppliers to make a draft of the UWMP available for public review and to hold a public hearing regarding the findings of the UWMP prior to its adoption.

The Draft UWMP was presented to the Board for its consideration and was approved on April 12th, 2011. The meeting was publicly noticed and the public was given the opportunity to offer comments to the UWMP and to ask questions regarding its findings.

[3] Guidebook to Assist Urban water Suppliers to Prepare a 2010 Urban Water Management Plan Draft, CA DWR December 21, 2011

The Final UWMP incorporates minor administrative revisions. It is available for public viewing at the office of the District's General Manager and on the District's website at http://www.ntpud.org. Per the Act, "after the hearing, the plan shall be adopted as prepared or as modified after the hearing (10642)". The final UWMP was presented before the Board and adopted by the Board on July 9th, 2013.

The adopted UWMP was returned by DWR for a revision on population determination. Newly published 2010 Census data, within NTPUD service area, allowed for the revision. The revision was consistent with DWR UWMP guidebook Methodology 3.

1.5 Agency Coordination

Suppliers are required to notify cities and counties in their service area of the opportunity to submit comments regarding the UWMP during the update process. The supplier may consult with, and obtain comments from, cities and counties that receive the notices required by this subdivision. According to the Act, "Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable (10620(d)(2))."[4] Table 1-1 displays the coordination with the appropriate stakeholders to the District's UWMP.

[4] State of California Urban Water Management Act (Division 6 Part 2.6 of the Water Code Sec. 10610-10656)

Section 2.0 Service Area Description

2.1 General Description of District

Table 1-1
Agency Coordination

Coordinating agencies	Commented on draft	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Schedule to receive final copy after approval
Placer County Department of Public Works	No comments received	Yes	Yes	Yes	Yes
Placer County Water Agency	No comments received	Yes	Yes	Yes	Yes
Incline Village General Improvement District (IVGID)	No comments received	Yes	Yes	Yes	Yes
Agate Bay Water Company	No comments received	Yes	Yes	Yes	Yes
Fulton Water Company	No comments received	Yes	Yes	Yes	Yes
Tahoe City Public Utility District (TCPUD)	No comments received	Yes	Yes	Yes	Yes

The District is located in Placer County, California on the north shore of Lake Tahoe. Boundaries range from the Nevada state line at Crystal Bay to Dollar Hill. The service area includes the communities of Kings Beach, Tahoe Vista, Brockway Vista, Carnelian Bay, Cedar Flat and Agate Bay. California State Highway 267 bisects the service area.

See Figure 1 for a proximity map of the District's service area.

View of Lake Tahoe from Kings Beach, CA

The total potable water service area is 3.4 square miles. The District primarily serves commercial, residential, and recreation customers. The total watershed area within the District

is 13,891 acres. The majority of land consists of Tahoe and Toiyabe National Forest mixed with developed areas. The entire District's watershed lies within California jurisdiction, excluding Lake Tahoe which shares boundaries with counties in Nevada and California.[5]

The District's watershed is fed by several streams which begin in the upper watershed and empty into Lake Tahoe. Watson Lake is the only other large body of water near the District's service area, other than Lake Tahoe, which is located beyond the western extent of the service area.

The District owns approximately 327 acres of the undeveloped land in the watersheds: The Firestone Property, the North Tahoe Regional Park, the Gentry Property, and multiple smaller parcels. The rest of the lands in the service area are owned by both private and public agencies and includes several public beaches, two marinas, boat ramps and public parks. State, Federal and District lands support a network of hiking and biking trails. Private land includes residential and small commercial lots. From a development perspective the area is built out.

The District relies mostly on surface water for its water supply and serves a population of approximately 5,300 customers.[6] The District services 3,872 water connections with approximately 3,326 of those serviced by the main system.[7] All the connections are metered as of 1984. These connections range from single family dwellings to business and tourism based establishments. There are also separate irrigation and fire systems. The District currently operates three separate and independent water systems. They are Dollar Cove, Carnelian Bay, and the Tahoe Main system.[8] Out of all the water service accounts, 221 are commercial establishments as of December 2010. Approximately 40 percent of the 221 are tourist commercial services for resorts and multiple unit motels. The remaining 60 percent are general commercial accounts such as shops, local restaurants, and laundries. The majority of the commercial establishments are located in the lower zone of the Kings Beach service area, with 23 in the Carnelian Bay service area and three in Dollar Cove.[9]

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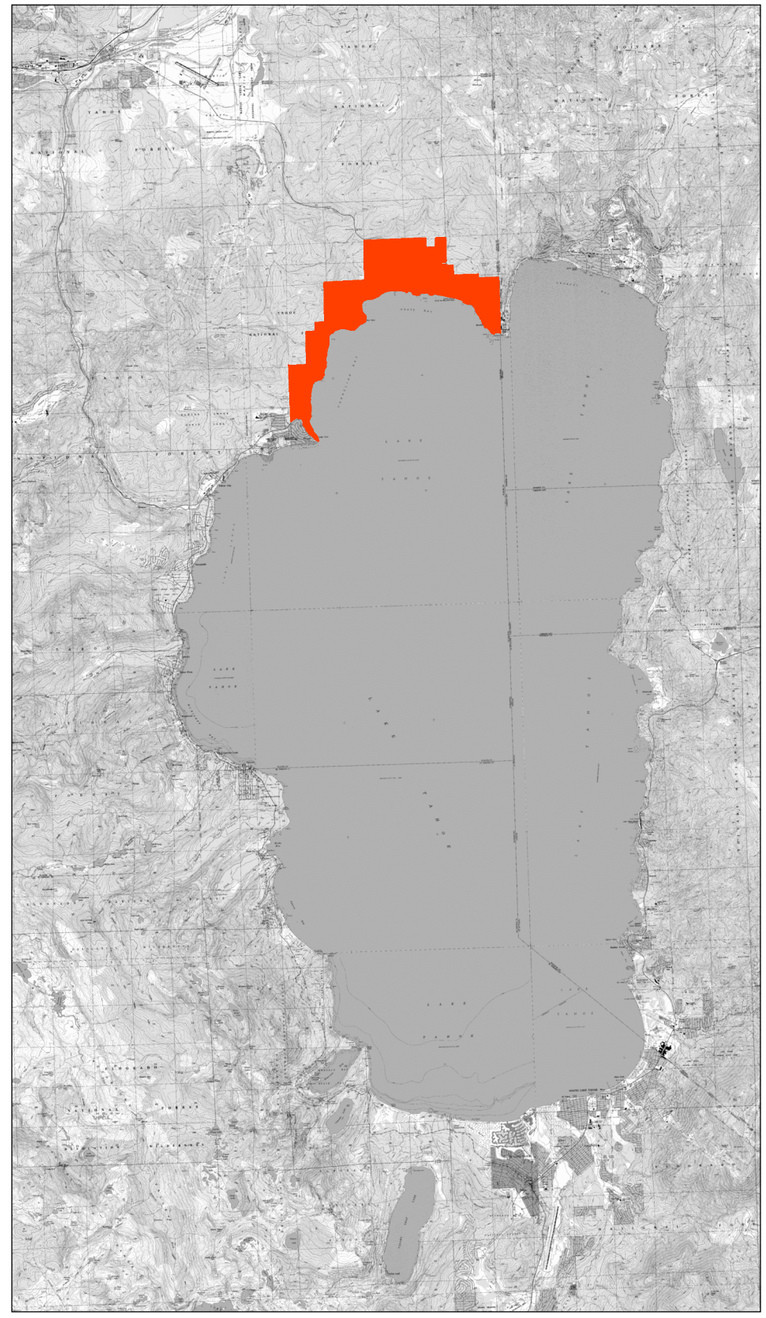
[5] Sanitary Survey and Watershed Control Program 2009 Update, Tahoe Water Suppliers Association.

[6] Tahoe Sierra Integrated Regional Water Management Plan, Tahoe Resource Conservation District, July 19, 2007.

[7] NTPUD Annual Water Quality Consumer Confidence Report for 2009, NTPUD.

[8] Sanitary Survey and Watershed Control Program 2009 Update, Tahoe Water Suppliers Association. Page 145

[9] 2010 Department of Water Resources Public Water System Statistics



LEGEND:

NORTH TAHOE PUBLIC UTILITY DISTRICT (NTPUD)

FIGURE 1: NTPUD SERVICE AREA PROXIMITY MAP

NORTH TAHOE PUBLIC UTILITY DISTRICT (NTPUD)

NORTH LAKE TAHOE ~ PLACER COUNTY ~ CALIFORNIA

0 10,000 20,000 40,000

1 INCH = 20,000 FEET

JUNE 14, 2011

N

2.2 System Physical Description

The District water system is comprised of three Lake intakes, three, shared groundwater wells, eight storage facilities with approximately 3.50 million gallons of storage, three booster systems and forty-five miles of water lines. Only one of the three lake intakes, the National Ave intake, is currently in operation. The existing water distribution system consists of six pressure zones.[10] See Figure 2 for the District's water system map.

The District operates three separate and independent water systems. The systems include the Tahoe Main, Carnelian Bay and the Dollar Cove system. These combined sources supplied just over 483 million gallons of water to our customers in 2010. Tables 2-1a and 2-1b summarize the District's past and current water supply and future water supplies during normal water years through 2030 in one and five year increments.

Tahoe Main System

The Tahoe main water system draws water from Lake Tahoe (surface water source) through an intake at the end of National Avenue in Tahoe Vista, as well as a single well (groundwater source) located in the North Tahoe Regional Park at end of Donner Road. The Main system serves the communities of Kings Beach and Tahoe Vista. The Main system has 3,326 connections and serves between 5,000 and 10,000 customers, which fluctuates on a seasonal basis due to tourism. The water pumped from Lake Tahoe is treated at the National Avenue Water Treatment Plant using both ultraviolet and chlorine disinfection processes, and provides approximately 90% of the water produced by the District.[11]

Carnelian Bay System

The Carnelian system serves the community of Carnelian Bay and receives its water from a well. This system is also tied into the Agate Bay Water Supply Company for emergency uses in case of well failure or repair; however, the unreliability of the source and unsuitability of the adjoining system as a backup underscore the need for an additional water source.[12] The Carnelian systems has 273 connections and serves between 600 and 900 customers, which fluctuates on a seasonal basis due to tourism.[11]

[10] www.ntpud.org/

[11] North Tahoe Public Utility District Emergency Response Plan, April 12, 2005. Page 3-2.

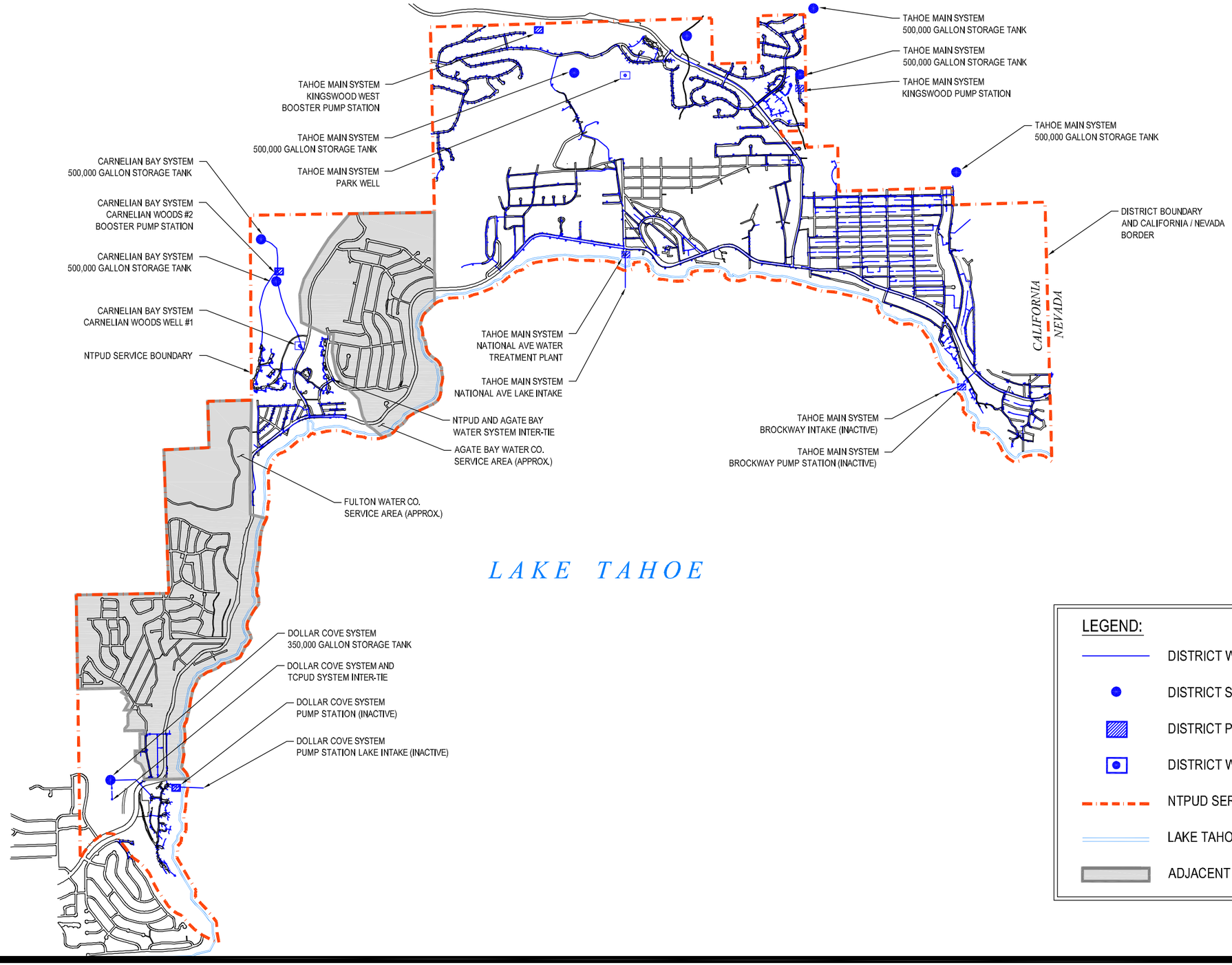


FIGURE 2: DISTRICT SYSTEMS MAP

NORTH TAHOE PUBLIC UTILITY DISTRICT (NTPUD)

NORTH LAKE TAHOE ~ PLACER COUNTY ~ CALIFORNIA

0 1500 3000 6000

1 INCH = 3000 FEET

JUNE 14, 2011

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Dollar Cove System

The Dollar Cove system serves the community of Dollar Cove and purchases its water from the Tahoe City Public Utility District (PWSID number 31-10036). With a contract for supply, including the jointly developed well and other TCPUD sources, NTPUD has a reliable source capacity. With respect to emergency reserves, the existing lake source is inactive; but, upon reactivation, could supply 240 gpm, if necessary. Also the Fulton Water Company may be able to supply a minimum level of supply, but is inadequate to meet the demands of Dollar Cove.[12]

The water received from the Tahoe City Public Utility District is a well blend that is comprised of five separate wells (groundwater source). The Dollar Cove system also has a lake intake, which is no longer in use. The Dollar Cove system has 273 connections and serves between 800 and 1,600 customers, which fluctuates on a seasonal basis due to tourism.[11]

Table 2-1a
Past Water Supplies - 1-Year Range (AFY)

Water Supply Sources	2000 act.	2001 act	2002 act.	2003 act.	2004 act.	2005 act.	2006 act.	2007 act.	2008 act.	2009 act.	2010 act.
Tahoe Main System											
National Ave. Lake Intake	1,150	1,183	1,187	1,349	1,396	1,331	1,367	1,351	1,398	1,343	1,322
Park (Well)	232	247	302	66	75	23	69	131	66	48	18
Carnelian System (Well)	86	87	101	92	92	92	85	80	80	71	67
Dollar Cove System (Well)	84	88	89	90	79	70	77	90	97	98	78
Transfers In or Out	-	-	-	-	-	-	-	-	-	-	-
Exchange In or Out	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-
Total	**1,552**	**1,605**	**1,678**	**1,597**	**1,642**	**1,515**	**1,599**	**1,652**	**1,640**	**1,560**	**1,485**

[12] Municipal Service Review, Area 3 Services, Placer Co. LAFCO.

Table 2-1b
Past, Current and Planned Water Supplies - 5-Year Range (AFY) [1]

Water Supply Sources	2005 act.	2010 act.	2015	2020	2025	2030
Tahoe Main System						
National Ave. Lake Intake	1,331	1,322	1,586	1,903	2,284	2,741
Park (Well)	23	18	21	26	31	37
Carnelian System (Well)	92	67	81	97	116	140
Dollar Cove System (Well)	70	78	93	112	135	161
Transfers In or Out	-	-	-	-	-	-
Exchange In or Out	-	-	-	-	-	-
Other	-	-	-	-	-	-
Total	**1,515**	**1,485**	**1,782**	**2,138**	**2,566**	**3,079**

1. The Annual Water Growth Rate of 4% from NTPUD Water Mater Plan was use to determine the Planned Water Supplies for 2015-2030.

2.3 Population Projections

The UWMP Act requires a 20-year projection for most required information. A variety of demographic factors may affect water use, including but not limited to current and projected population, climate, and the mix of customer types or uses.

Population estimates within the District's service area are based on the U. S. Census Bureau data as defined in 2010 UWMP Guidebook, Appendix A: Alternative Methodology for Service Area Population. The District's service area boundary was overlaid on the North Tahoe Census Block Map to identify the Census Tracts within the District's service area. See Appendix H and I. Four Census Tracts partially fall within the District's service area, including Census Tracts 201.04, 201.05, 201.06 and 201.07. Even though these four Census Tract areas are greater than the NTPUD service area, they provide actual data for 1990, 2000, and 2010. This Census Tract data was used to calculate the 20 Year Compound Annual Growth Rate (CAGR) of .74%, see Tables 2-2a and 2-2b. Census data for 2000 and 2010 within the District's service area was used to provide a 10 Year Compound Annual Growth Rate of -1.0%, see Table 2-2c. The negative growth rate was not consistent with the Annual Water Connection Growth Rate of .74%, therefore the 20 Year CAGR of .74% was used to project the District's population base for the next 20 years, over 5 year increments, see Table 2-2d.

Table 2-2a

Historical Full-Time Residential Population: Census Tracts 201.04 - 201.07 [1, 2]

Census Tract	1990 Population	2000 Population	1990-2000 Change [3]	2010 Population	2000-2010 Change [3]
201.04	1,511	1,806	20%	1,288	-29%
201.05	1,344	1,694	26%	1,352	-20%
201.06	1,286	1,931	50%	1,719	-11%
201.07	2,654	3,774	42%	3,510	-7%
Total Census Tract	6,795	9,205	35%	7,869	-15%
10 Year Compound Annual Growth Rate [4]	3.08%			-1.55%	
20 Year Compound Annual Growth Rate [4]	0.74%				

1. Placer County population data for 1990, 2000 and 2010 includes all Blocks and Block Groups within Census Tracts 201.04-201.07.
2. The population area captured within the Census Tracts 201.04-201.07 is greater than the NTPUD service boundary.
3. Example calculation for Population Change:
   1,806 [2000 population] / 1,511 [1990 population] = 1.19 - 1.0 = .195 or 20% change
4. Example calculation for 10 Year Compound Annual Growth Rate:
   CAGR(1990, 2000) = (9,205 [2000 total population] / 6,795 [1990 total population])1/1990-2000 - 1 = .0308 or 3.08%

Table 2-2b

Population - 1990-2010 and Projected to 2030: Census Tracts 201.04 - 201.07 [1, 2]

Year	1990 act.	1995	2000 act.	2005	2010 act.	2015	2020	2025	2030
Population	6,795	8,000	9,205	8,537	7,869	8,164	8,471	8,789	9,119

1. 20 Year Compound Annual Growth Rate of .74% from Table 2-2a was used to calculate the projected population.
2. Example calculation for projected population $F = Pe^{rn}$
   $F = (2010\ population)(1+.0074)^5 = (7,869)(1.0074)^5 = 8,164$ [2015 population]

Table 2-2c

Historical Full-Time Residential Population within NTPUD Service Area [1, 2]

Census Tract	2000 Population	2010 Population	2000-2010 Change [3]
Portion of 201.04	98	118	20%
Portion of 201.05	190	191	1%
Portion of 201.06	1,910	1,678	-12%
Portion of 201.07	3,702	3,318	-10%
Total Population within NTPUD Service Area	5,900	5,305	-10%
10 Year Compound Annual Growth Rate [4]	-1.0%		

1. Population data is based on the NTPUD service area overlaid on the 2000 and 2010 Census Block Maps. NTPUD service area boundary contains only a portion of Census Tracts 201.04-201.07. Refer to Appendix H and I for the Blocks and Census Tracts information.
2. Population data does not include Agate Bay Water Company and Fulton Water Company.
3. Example calculation for Population Change:
   98 [2000 population] / 256 [1990 population] = .382 - 1.0 = -.0617 or -62% change
4. Example calculation for Compound Annual Growth Rate:
   CAGR(2000, 2010) = (5,305 [2010 total population] /5,900 [2000 total population])$^{1/2000-2010}$ - 1 = .010 or 1.0%.

Table 2-2d
Population - 2000-2010 and Projected to 2030 within NTPUD Service Area [1, 2]

Year	2000 act. [3]	2005	2010 act. [3]	2015	2020	2025	2030
Population	5,900	5,603	5,305	5,507	5,716	5,934	6,159

1. 20 Year Compound Annual Growth Rate of .74% from Table 2-2a was used to calculate the projected population within the NTPUD service area.
2. Example calculation for projected population $F = Pe^{rn}$
   $F = (2010\ population)(1+.0074)^5 = (5,305)(1.0074)^5 = 5,507$ [2015 population]
3. Population data is based on the NTPUD service area and 2000 and 2010 Census Data.

During the early 1980's the District experienced a sharp decline in water use. The decrease was attributed to the installation of water meters on all accounts as well as system improvements and improved operating and maintenance practices.[9] Between the years 1989 and 1999, the District's water demand has increased an average of 4% per year. The growth in the customer base is approximately seventy-four-tenths of one percent annually (0.74%). Since the service area is near build-out scenario, these growth rates are conservative in accounting for and assessing future water supplies.

2.4 Climate

The District is located in a forested, alpine ecosystem above 6,000 feet in elevation and experiences cold, snowy winters and temperate summers. Spring snowmelt is the primary source of water supply recharge for the region's surface and ground water sources.

Evapotranspiration (ETo) describes the sum of evaporation and transpiration from the Earth's surface to the atmosphere. ETo accounts for the transformation of water to air from the soil, canopy and water bodies. As shown, the largest ETo demands occur in the summer months.

Table 2-3 displays the monthly climatic averages as measured by the National Weather Service Tahoe City Weather Station 048758. Both the rainfall and snowfall totals are typical for the Lake Tahoe basin.

Table 2-3
Monthly Climatic Averages

Month	Standard Monthly Average Eto (inches) [1]	Average Rainfall (inches) [2]	Average Snowfall (inches) [2]	Average Temperatures (°F) [3]
January	0	6.01	43	30.1
February	0	5.7	38	31.4
March	0	4.57	35	34.4
April	0	1.87	16	39.2
May	4.27	1.25	4	46.6
June	5.23	0.77	0	54.2
July	5.98	0.33	0	60.9
August	5.35	0.46	0	60.8
September	3.16	0.9	0	54.7
October	1.57	1.95	2.5	46.1
November	0	4.25	16	36.7
December	0	4.69	35	30.9
Totals	25.56	32.75	189.50	43.83

1. Provided by the Western Regional Climate Center www.wrcc.dri.edu/CLIMATEDATA.html
2. Provided by NOAA National Weather Service www.weather.gov/climate/xmacis.php?wfo=rev
3. The Annual Totals displays the average temperature for the region.

Section 3.0 System Demands

This section of the UWMP presents the actual water use and projected water demands at five year increments between 2010 and 2030. Water demand projections are based on population projections and the District's Master Water Plan as discussed in Section 3.1. However, the District's Master Water Plan was last updated in 1999. If the District's Master Water Plan is updated since the last update in 1999, the future water demands for the UWMP will need to be revised in the next update in 2015.

3.1 Water Use Projections

1984 through 1997 water production data is utilized to evaluate past and present trends of water use within the District's service area. The selection of 1984 as a starting point for analysis corresponds to the first year in which all water diverted by the District was metered. Due to the nature of the communities that compose the District's water service area, large variations in demand occur from season to season and month to month. Increases in occupancy and landscape irrigation, especially at the larger condominium complexes, result in increased system demands. The observed historical variation in water use is due to the relative percentage of vacation rental units in each system, which can be occupied to capacity one day

and half full the next. During holiday periods, additional visitors place even greater demands on the distribution system. The greater number of full time residents in the Kings Beach system dampens out this effect, resulting in moderate variations in use.[13]

Due to the political and legal conflicts presently impacting development within the basin, it must be assumed that development under the State of California's Lake Tahoe Basin Water Quality Management Plan (under section 208 of the federal Clean Water Act, 33 USC 466 et seq.) is the maximum which will occur over the next 20 year period. Future improvements to the District's sources, supply, transmission and distribution and storage facilities are based on the 208 development scenario. The maximum additional development within the North Tahoe Public Utility District boundaries is 1,002 dwelling units. [14]

Methodology

The actual usage and projected water demands were developed using the Technical Methodology 3: Base Daily Per Capita Water Use as presented in the 2010 UWMP Guidebook. The base daily per capita water use is defined in the 2010 UWMP Guidebook as average gross water, expressed in GPCD, used for a continuous, multiyear base period. The District has data to support both 10-year base period and 5-year base period to calculate the base daily per capita water use.

The service area population from Section 2.3, Table 2-2d above, provides the data for population estimates. Since the population is based on a 5-year range, a Compound Annual Growth Rate (CAGR) of -1.0% is used to determine the population growth for every one year from 2000 to 2010. To calculate the customer demand totals, data for water deliveries in acre-feet per year were provided for years 2000 through 2010. Additionally, unaccounted-for water, defined to be the difference between water produced and water sold to customers, is added to the gross water demand. This gross water demand is converted to million gallons per day and is divided by the population to calculate the annual daily per capita water use. A 10-year base period from 2001 through 2010 and the 5-year base period from 2006-2010 determined the average water uses in GPCD. These two GPCD numbers helped to calculate the 2015 and 2020 targets as defined below.

[13] NTPUD Master Water Plan 1999.

Water Use by Customer Type

As of 2010, the District has approximately 3,872 water service connections. The water accounts are distributed amongst the different customer type based on the 2009 Sanitary Survey and Watershed Control Program Update.[14] Table 3-2a displays the total water delivered by the District, every year from 2000 to 2010. Table 3-2b provides the breakdown by customer type during a 5-year range, with the District's total water deliveries of 1,485 acre-feet per year in 2010 and is projected to increase to 3,079 acre-feet per year in 2030. The number of water accounts is projected to increase to a total of 4,478 in 2030, using an Annual Water Connections Growth Rate of .74%. These 20 year projections assume plumbing code requirements are implemented (see Section 8 for a discussion of state mandated plumbing code requirements).

Table 3-1
Past, Current and Projected Water Accounts/Connections

Year	Total # of Accounts	Residential Houses [3]	Commercial-Hotel/Resorts [3]	Irrigation [3]	Fire [3]
1990 [2]	3,340	-	-	-	-
1995 [2]	3,371	-	-	-	-
2000 [2]	3,524	3,165	201	66	91
2005 [2]	3,711	3,333	212	70	96
2010 act. [1]	3,872	3,478	221	73	100
2015	4,015	3,607	229	76	104
2020	4,164	3,740	238	79	108
2025	4,318	3,879	246	81	112
2030	4,478	4,022	256	84	116

1. Active service accounts comes from DWR Public Water System Statistics 2010 and the customer type are taken from the Tahoe Water Suppliers Association Report of 2009.
2. Total number of accounts for 1990-2005 come from NTPUD data.
3. Water accounts/connections for residential, commercial, irrigation and fire are assumed for years 2000 and 2005.

[14] Sanitary Survey and Watershed Control Program 2009 Update, Tahoe Water Suppliers Association. Page 145

Table 3-2a
Past Water Deliveries - 1-Year Range (Acre-Feet/Year)

Year	Total Deliveries AFY
2000 act.	1,552
2001 act.	1,605
2002 act.	1,678
2003 act.	1,597
2004 act.	1,642
2005 act.	1,515
2006 act.	1,599
2007 act.	1,652
2008 act.	1,640
2009 act.	1,560
2010 act.	1,485

Table 3-2b
Past, Current and Projected Water Deliveries - 5-Year Range (Acre-Feet/Year)

Year	Total Deliveries AFY	Residential Houses	Commercial-Hotel/Resorts	Irrigation	Fire
2005 act.	1,515	1,361	86	29	39
2010 act.	1,485	1,334	85	28	38
2015	1,782	1,600	102	34	46
2020	2,138	1,920	122	40	55
2025	2,566	2,305	146	48	66
2030	3,079	2,765	176	58	80

3.3 Additional Water Uses and Losses

Table 3-3 shows unaccounted-for water, as defined in the Methodology section. This differential between water supply and metered water use includes system flushing, leak repair flushing, hydrant leaks, street sweeping and known leaks that are subsequently repaired. The remainder is "unaccounted-for water," that is, unmetered and/or water leaking from the system.

The District is committed to minimizing its unaccounted-for water and staying within the industry average of 10% loss (maximum). Billing records in 2010 indicate that the District's system losses are 35% of overall production. Unaccounted for water can be caused by unauthorized users, malfunctioning systems controls, inaccurate meters or the most common – leaking pipes. The District has no other uses such as groundwater recharge or conjunctive use. See Appendix A for a graph comparing the gallons of water produced to the unaccounted-for water in gallons per minute. The graph represents past trends. Unaccounted-for water is expected to be reduced by operative measures such as the active water main replacement

project, meter replacement plan, passive leak detection programs, and other water conservation efforts.

Table 3-3
Unaccounted-for Water (UFW)

	2004 act.	2005 act.	2006 act.	2007 act.	2008 act.	2009 act.	2010 act.	2015 [2]	2020 [2]	2025 [2]	2030 [2]
Unaccounted-for Water (AFY) [1]	278	387	448	464	540	536	515	618	742	890	1,068

1. Data provided by NTPUD.
2. 2015-2030 projects are based on a 4% Annual Water Growth Rate

3.4 Gross Water Demands

Table 3-4 summarizes the District's total past water demands on a yearly basis. The demand totals shown in this table are used to calculate the Annual Daily Per Capita Water Use.

Table 3-4
Past Gross Water Demands - 1-Year Range (AFY)

	2000 act.	2001 act.	2002 act.	2003 act.	2004 act.	2005 act.	2006 act.	2007 act.	2008 act.	2009 act.	2010 act.
Customer Demand Total	1,552	1,605	1,678	1,597	1,642	1,515	1,599	1,652	1,640	1,560	1,485
Unaccounted-for Water	-	-	-	-	278	387	448	464	540	536	515
Total	1,552	1,605	1,678	1,597	1,920	1,902	2,047	2,116	2,180	2,096	2,000

3.5 Baseline and Targets

Table 3-5 is the 10-year continuous period from 2001 through 2010 used to calculate the baseline per capita water use (10608.20). This 10-year base period was selected as there are accurate gross water usage data provided by the District. The 10-year average base daily per capita water use is307 GPCD., In addition, a 5-year base period is used to determine the minimum water use reduction targets (10608.12 (b) (3) and 10608.22) because the Base Daily per Capita Water Use is greater than 100 GPCD, see Table 3-6.

Table 3-5
Base Daily Per Capita Water Use - 10-Year Range

Base Period Year		Distribution System Population [1, 2]	Daily System Gross Water Use (MGD) [3]	Annual Daily per Capita Water Use (GPCD) [4]
Sequence Year	Calendar Year			
Year 1	2001	5,841	1.4	245
Year 2	2002	5,783	1.5	259
Year 3	2003	5,725	1.4	249
Year 4	2004	5,668	1.7	302
Year 5	2005	5,603	1.7	303
Year 6	2006	5,547	1.8	329
Year 7	2007	5,492	1.9	344
Year 8	2008	5,437	1.9	358
Year 9	2009	5,382	1.9	348
Year 10	2010	5,305	1.8	337
10-Year Average Base Daily per Capita Water Use				307

1. Population data is based on the NTPUD service area and 2000 and 2010 Census Data.
2. 2001 through 2009 population is based on a Compound Annual Growth Rate of 1.0%.
   Example calculation for Compound Annual Growth Rate:
   CAGR(2000, 2005) = (5,603 [2005 total population] / 5,900 [2000 total population]) $^{1/2000\text{-}2005}$ - 1 = -.010 or -1.0%
3. MGD = Millions Gallons per Day
4. GPCD = Gallons per Capita per Day

Table 3-6 is the second base period of 5-years which is used to determine the minimum water use reduction targets (10608.22). The 5-year continuous period years 2006 through 2010, with the average Base Daily per Capita Water Use of 343 GPCD.

Table 3-6
Base Daily Per Capita Water Use - 5-Year Range

Base Period Year		Distribution System Population [1]	Daily System Gross Water Use (MGD) [2]	Annual Daily per Capita Water Use (GPCD) [3]
Sequence Year	Calendar Year			
Year 1	2006	5,547	1.8	329
Year 2	2007	5,492	1.9	344
Year 3	2008	5,437	1.9	358
Year 4	2009	5,382	1.9	348
Year 5	2010	5,305	1.8	337
5-Year Average Base Daily per Capita Water Use				343

1. Population data is based on the NTPUD service area and 2000 and 2010 Census Data.
2. MGD = Millions Gallons per Day
3. GPCD = Gallons per Capita per Day

The District's service area water demands are on average higher than the statewide average base daily per capita water use. The Lake Tahoe region is a destination area driven by a tourist-based economy. During the high seasons of summer and winter months there is an influx of tourists and second home owners. Table 3-7 provides a breakdown of the types of units with seasonal units representing the highest occupancy type. The data is based upon the U.S. Census Bureau for Census Tracts 201.04-201.07.

Table 3-7

Historical Housing Occupancy: Census Tracts 201.04 - 201.07

	1990	2000	1990-2000 Change	2010	2000-2010 Change
Units Occupied	2,590	3,515	36%	3,397	-3%
Units Seasonal	3,825	3,671	-4%	4,161	13%
Units Vacant	436	249	-43%	457	84%
Total Units	6,851	7,435	9%	8,015	8%

The tourist population increases the water demand as these visitors may be in the area for a week at a time, but are not captured in the Census population data. They also impact commercial connections such as hotels and restaurants. Due to the inability to extract the gross water use for tourist population, the base per capita water demands appear to be higher than normal.

The code requires the District to develop per capita water use targets for 2015 and 2020 to meet the minimum water use reduction requirements (10608.22). Established by the California Legislature, these targets are intended to meet the goal of reducing statewide per capita water consumption by 20 percent by the year 2020.

Base Daily Per Capita Water Use – 10-Year Range	307 GPCD
Base Daily Per Capita Water Use – 5-Year Range	343 GPCD
2020 Target (80% of 10-Year Base)	246 GPCD
Interim Target (95% of 5-Year Base)	326 GPCD
2015 Target (Midpoint of 2020 Target)	276 GPCD

The District is committed to meeting the 2015 and 2020 target for demand reduction. There has already been a decrease in the annual daily per capita water use from 2008 to 2009 and 2010 as seen in Table 3-5. The installation of residential water meters, dedicated irrigation meters for commercial and institutional water accounts, residential plumbing retrofits and the new 2010

California Building Code as well as the 2009 Uniform Plumbing Code requirements will continue to result in reductions in water demands. The District has also implemented a portion of system water audits and leak detection, and repairs for their entire water system. The focus now will be completing the implementation of the water loss management strategies and addressing the BMP's discussed in Section 6.

Section 4.0 System Supplies

The District currently uses Lake Tahoe, a high-quality and very reliable water supply, for approximately 90% of the water it produces. Even during the drought years of 1976-77 and 1986-93, the District was able to continuously supply the required amounts of water to its customers as well as maintain a high degree of water quality. Routine monitoring and additional monitoring under the Compliance Order are performed as required by the California State Department of Health to verify the quality of the water for chemical, physical, and bacteriological constituents. The sampling program performed by the District is presented in Section 4-7.[15]

4.1 Water Rights

Ninety percent of all of the water used within the District's service areas is obtained from surface water diversions and ten percent is obtained from groundwater.

Rights from surface water diversions are subject to the State of California, Division of Water Rights permit process for surface waters. There are three categories of these rights that are directly applicable to the District.

1. Appropriative Rights - These rights are defined through a permit and license procedure of the Division of Water Rights, State Water Resources Control Board. The Board and its predecessors acting under statutes beginning with the Water Commission Act of 1913, have overseen and regulated the use of water for useful or beneficial purposes. This process is limited to surface waters or ground waters flowing through known and definite channels.

[15] NTPUD Master Water Plan 1999.

2. Pre-1914 Appropriative Rights - Claims for the use of water prior to December 19, 1914 fall under this category. Court adjudication is usually required for establishment of quantity and/or season.
3. Riparian Use - Rights for riparian use apply to lands adjacent (riparian) to surface waters. Subdivided parcels that are no longer riparian owners may in fact retain riparian rights if such rights are preserved in the subdivisions' deeds.

The District presently has five (5) permits, three (3) licenses and three (3) pending applications for appropriative water rights. In addition to these rights, the District files two statements of diversion for riparian and pre-1914 rights.

The use of ground water within the Tahoe Basin and not within a known definite and identifiable channel was not historically regulated. However, that was changed in 1990 by the "Truckee-Carson-Pyramid Lake Water Rights Settlement Act," Public Law 101-618 (herein the "Act"). Section 204(b)(1) of the Act provides, in part, "Total annual gross diversions for use within the Lake Tahoe basin from all natural sources, including groundwater, and under all water rights in the basin shall not exceed 34,000 acre-feet per year. From this total, 23,000 acre-feet per year are allocated to the State of California for use within the Lake Tahoe basin and 11,000 acre-feet per year are allocated to the State of Nevada for use within the Lake Tahoe basin." There is no gross diversion specifically allocated to the District's service area. The Brown and Caldwell Consulting Engineers recommended allocation of 3,920 acre-feet per year to the District's service area in 1999 is now out of date and the correct number is subject to review and reconsideration.

Section 204(b)(2) of the Act sets forth the method of calculation of total annual gross diversions. In particular, it allows fully metered water distribution systems to calculate gross diversions as the sum of all amounts of water supplied to each delivery point, provided there is in effect for such water distribution system a water conservation and management plan. The District's water system is such a fully metered system, however the two private water companies within the District's service area are not. Further, it provides that unmetered diversion or extraction by residences, such as lake intakes or individual wells, will be charged 0.4 acre-foot per year per residence. There are a number of such unmetered diversions and extractions within the District's service area.

Section 205(a) of the Act requires the Secretary of the Interior to negotiate an Operating Agreement (herein the "Truckee River Operating Agreement" or "TROA"). The full provisions

of the Act will not be effective until the negotiated Operating Agreement is effective. The TROA has been negotiated, was signed on September 6, 2008 and is in the process of being approved by necessary courts and agencies.

4.2 District's Water Supply Agreements and MOU(s)

Table 4-1 summarizes the District's water supply agreements. A detailed description of each agreement is included in the following section.

Table 4-1
NTPUD Water Agreements

Date	Agreement	Key Elements	Status
Inception: September 1983	Mutual Emergency Aid	Local District's agree to share emergency services for water and sewer.	Current
Inception: December 1990	Truckee-Carson-Pyramid Lake Water Rights Settlement Act	Law allocates 23,000 acre-feet per year of basin water to California water users	Current
Inception: December 1992	Dollar Hill	The NTPUD and TCPUD entered into an agreement to jointly develop a ground water source in the Dollar Hill area.	Current
Pending: 2008	Truckee River Operating Agreement	Allocates 3,920 acre-feet per year to NTPUD for surface water rights	Pending

<u>Agreement for Mutual Emergency Aid</u>

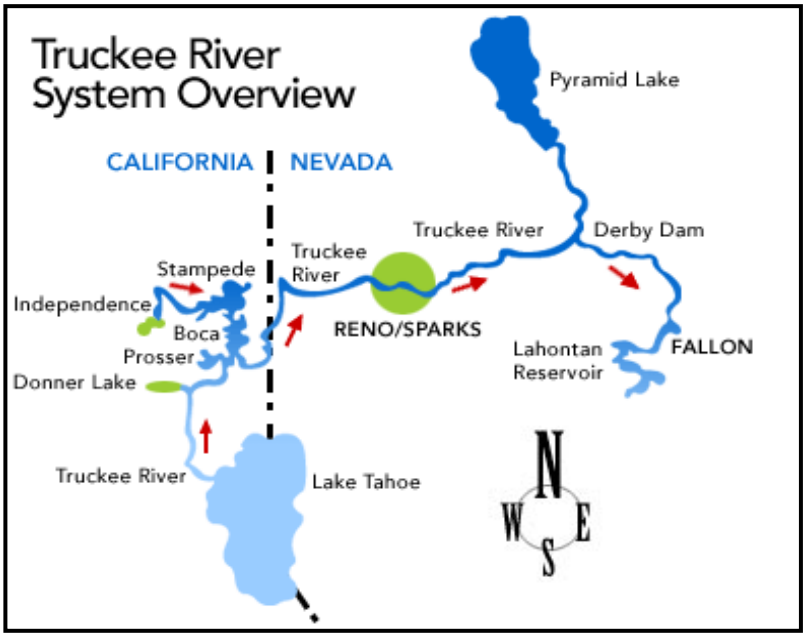
In 1983, the District entered into an agreement with Alpine Springs County Water District, Douglas County Sewer Improvement Dist. No. 1, Incline Village General Improvement District, Kingbury General Improvement District, Placer County Area 21 Northstar Community Services District, Round Hill General Improvement District, South Tahoe Public Utility District, Squaw Valley Community Improvement District, Tahoe City Public Utility District, Truckee Donner Public Utility District, Tahoe Truckee Sanitation Agency, and Truckee Sanitary District to furnish each other personnel who are trained in the emergency and operation and repair of sewage and water collection, transportation and treatment facilities, together with equipment, materials and supplies required for such operation and/or repair as may be necessary during emergency conditions.[16] This agreement is included in Appendix B.

[16] Agreement for Mutual Aid, 1983

Truckee-Carson-Pyramid Lake Water Rights Settlement Act/Truckee River Operating Agreement (TROA)

Congress, in 1990, adopted the Truckee-Carson-Pyramid Lake Water Rights Settlement Act as Public Law 101-618, an effort to resolve the long standing disputes over water rights and allocations of the waters of the Truckee River. This legislation proposed to finally codify a present allocation system that is voluntarily followed for water rights within the Lake Tahoe Basin, which allocates 23,000 acre-feet per year to California water users.

Based on Section 204(b) of the Truckee-Carson-Pyramid Lake Water Rights Settlement Act, total annual gross diversions for use within the Lake Tahoe basin from all natural sources including groundwater, and under all water rights in the basin shall not exceed 34,000 acre-feet per year. From this total, 23,000 acre-feet per year are allocated to the State of California for use within the Lake Tahoe basin and 11,000 acre-feet per year are allocated to the State of Nevada for use within the Lake Tahoe basin.



California and Nevada Surface Water Systems

Dollar Hill Agreement

In 1992, the District and TCPUD entered into an agreement to jointly develop a ground water source in the Dollar Hill area, which is located just west of Cedar Flat. A pipeline interconnection was constructed in 1995 between the TCPUD system in the Highlands

subdivision and the Dollar Cove water tank. The two wells, constructed under this agreement, were placed into operation in December 1996. Use of the interconnection began in May 1997 but still awaits the execution of an operating agreement between the Districts.[17]

Memorandum of Understanding (MOU)

California's Urban Water Management Planning Act of 1983 requires utilities serving more than 3,000 customers, and utilities providing more than 3,000 acre-feet of water per year to prepare a water management plan to promote conservation and efficient water use. Since 1983, the District has complied with this requirement by entering into a Memorandum of Understanding (pending) with the California Urban Water Conservation Council (CUWCC). Over the past years the District's Master Water Plan has satisfied the requirement for an UWMP under this MOU.

4.3 The District's Water Supply Programs and Projects

Table 4-2 summarizes the District's recently completed as well as current water improvement projects.

NTPUD On-going Water Systems Improvement Projects

[17] NTPUD Master Water Plan 1999. Chapter 3

Table 4-2
NTPUD Water Supply Projects

Date	Project Name	Key Elements	Status
Completion Date: October 2011	Zone 1 Water Tank Project	The new 1.3 million gallon (MG) welded steel potable drinking water tank (reservoir), associated piping, and appurtenances off of SR 267 in Kings Beach at the end of Canterbury Drive. This tank will serve as added water storage and support wildfire suppression efforts. With the installation of this tank and booster station, the District will be able to demolish the existing Kingswood 500,000 gallon tank and booster station that is currently in the vicinity of the Griff Creek stream zone and restore the creek to its natural state.	Construction Information: December 8, 2010: The site has been graded and the retaining walls are in place. The concrete for the foundation has been poured and the site is shut down for the construction season. Construction will begin again on May 1, 2011, weather permitting. Completion Date: October 2011
Completion Date: October 2010	Zone 2 Water Tank Project	Located at the end of Lake Vista Court, this project will replace an undersized 120,000 gallon steel water storage tank with a 500,000 gallon welded steel water storage tank to provide sufficient fire protection in urban wildfire interface areas of our service district.	Construction Information: December 8, 2010: The new tank is installed and currently in use. A dedication was held on October 18, 2010. The old tank has been demolished.
Completion Date: November 1, 2010	Kingswood Water Main Replacement	The Kingswood Waterline Replacement Project includes waterline replacement, connection of the water line on North National Avenue from the Kingswood subdivision to the Kings Run condos, service reconnection, and all appurtenances for approximately 10,000 linear feet of water main and approximately 190 services in the Kingswood area. This area has had numerous leaks over the past few years.	November 1, 2010: The project is complete with all mains and services installed and in service. The pavement patches will be slurry sealed in Spring 2011. The contractor for this project is Marques Pipeline, Inc.
Completion Date: November 1, 2010	Carnelian Bay Water Main Replacement	The Carnelian Bay West Water Main Replacement Project includes waterline replacement, construction of new water main in Nevada and Center Streets, installation of five new fire hydrants, service reconnection, and all appurtenances for approximately 5,175 linear feet of water main and approximately 95 services in the Carnelian Bay West area.	November 1, 2010: The project is complete with all mains and services installed and in service. The pavement patches will be slurry sealed in Spring 2011. The contractor for this project is Campbell Construction Company out of Sparks, NV.
Completed	Cutthroat Water Main Replacement	NA	Completed
Completed	Tahoe Marina Estates Water Line Replacement Project	NA	Completed
Completed	Dollar Cove Water Treatment Study	NA	Completed
Completed	Lincoln Green Water Line Replacement	NA	Completed
Completed	Kingswood West Tank Security Fence	NA	Completed
Completed	Beaver Street Water and Sewer Line Replacement Project	NA	Completed

4.4 Surface Water

As previously mentioned, Lake Tahoe is the primary source water for the District. The District currently has three lake intakes;

1. National Ave. Pump Station
2. Dollar Cove Pump Station
3. Kings Beach Pump Station (Brockway Springs)

National Avenue Water Treatment Plant

The main lake intake for the District is located off National Avenue in Tahoe Vista, going from the shoreline at National Avenue extending 1,800 feet into Agate Bay. The National Avenue water system and intake are positioned in the Snow Creek and Griff Creek sub-watersheds. The intake is adjacent to the Brockway and Carnelian Canyon Creek sub-watersheds in the Lake Tahoe Basin.

The District's National Avenue Water Treatment Plant consists of a lake intake with raw water screens and three intake booster pumps, water chlorination/disinfection equipment, a 25 micron screen facility, a CT disinfection chamber, four UV disinfection units, UV Process monitoring equipment, two UV booster systems and a mercury containment vessel. In August of 2002, the District completed the new ultraviolet disinfection system for the water treatment plant.[18] The National Avenue intake is the primary supply source for the entire Tahoe Main system with a reliable capacity of 800-1600 gpm. The intake was last updated in 2006 with a conversion from chlorine gas to solution for safety purposes. Raw water entering the system is first chlorinated and then the passed through Ultra-Violet Disinfection for inactivation of Giardia and viruses. Sodium Hypochlorite 12.5% is applied as a secondary disinfectant and provides the additional log removal for Giardia and viruses as well as maintaining a residual throughout the system.[19]

The Dollar Cove Pump Station

The Dollar Cove Pump Station is not actively running due to the cost of complying with US Safe Water Treatment Rules. The National Avenue Plant is the only lake intake currently supplying water for the District's main system. The District has studied the feasibility of re-commissioning the Dollar Cove Pump Station. This feasibility study can be found on the District's website (http://www.ntpud.org/).

The Kings Beach Pump Station

The Kings Beach lake intake, located in the Brockway Springs development, was placed on inactive status in 1991 due to extremely low lake levels. The intake pipe was found to be unserviceable in the summer of 1995. The District has abandoned this location as a water source

[18] NTPUD 2005 Water Quality Report. Page 2.

[19] Sanitary Survey and Watershed Control Program 2009 Update, Tahoe Water Suppliers Association. Page 145

due to the cost to replace the intake pipe and the limited use available because of filtration requirements.[20]

4.5 Groundwater

This section defines and describes the hydrogeology of the basin used by the District for a small portion of its water supply. This section includes a description of the groundwater basin and also summarizes the District's current and historical use of groundwater within its Urban Growth Boundary (UGB). Refer to Figure 3 for a USGS Hydrogeology for the Lake Tahoe region. Major topics addressed in this section include the following:

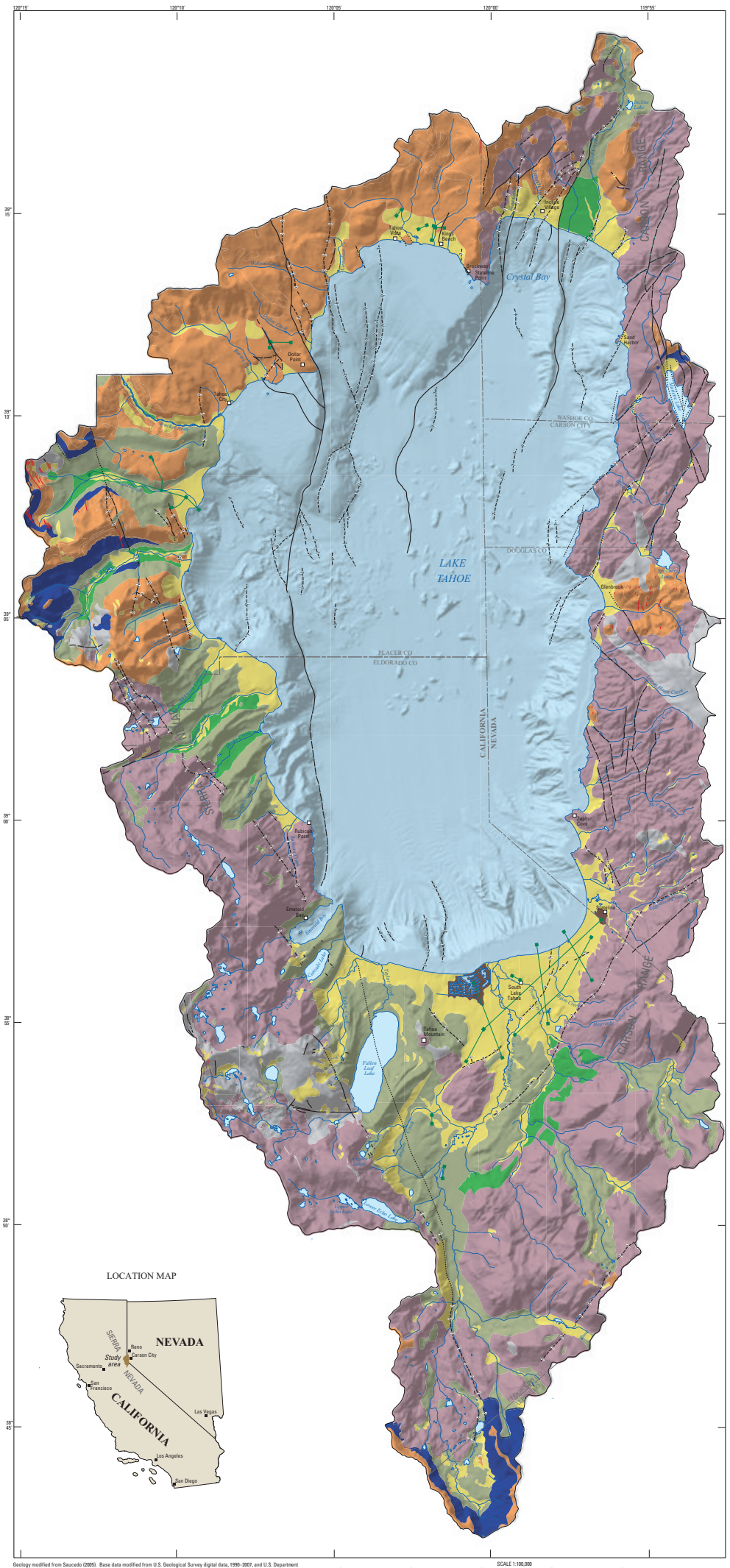
- UWMP requirements for groundwater sources;
- Hydrogeology of the groundwater basin;
- Groundwater Pumping
- Groundwater Conditions
- Groundwater Supply Sufficiency for Historic District Pumping

One of NTPUD's Water Storage Tanks

[20] NTPUD Master Water Plan 1999. Chapter 3

INTRODUCTION

Ground water in the Lake Tahoe basin is the primary source of domestic and municipal water supply and an important source of inflow to Lake Tahoe. Over the past 30–40 years, Federal, State, and local agencies, and research institutions have collected hydrologic data to quantify the ground-water resources in the Lake Tahoe basin. These data are dispersed among the various agencies and institutions that collected the data and generally are not available in a format suitable for basin-wide assessments. To successfully and efficiently manage the ground-water resources throughout the Lake Tahoe basin, the U.S. Geological Survey (USGS) in cooperation with the U.S. Forest Service (USFS) compiled and evaluated the pertinent geologic, geophysical, and hydrologic data, and built a geodatabase incorporating the consolidated and standardized data for the Lake Tahoe basin that is relevant for examining the extent and characteristics of the hydrogeologic units that comprise the aquifers. The Geodatabase can be accessed at http://water.usgs.gov/GIS/dsdl/SIM3063.zip, the shape files can be accessed at http://water.usgs.gov/GIS/dsdl/SIM3063_Shapefile.zip, and the XML Workspace Document can be accessed at http://water.usgs.gov/GIS/dsdl/SIM3063_XML.zip.



Geology modified from Saucedo (2005). Base data modified from U.S. Geological Survey digital data, 1990–2007, and U.S. Department of Agriculture Soil Survey Geographic Database (SSURGO), 2007. Universal Transverse Mercator projection, Zone 10; North American Datum of 1983. Shaded-relief base from 10-meter Digital Elevation Model. Bathymetry from the Lake Tahoe Clearinghouse (http://tahoe.usgs.gov), with sun illumination from the northwest 45° above horizon.

EXPLANATION

Geologic units

Construction fill—Lithology unknown.

Younger alluvium (Holocene and Pleistocene)—Moderately sorted sand and gravel of beach and lacustrine terrace deposits; clay, silt, sand, and gravel of flood plains; clay, silt, and sand of lake deposits; sandy-gravelly debris and coarse angular blocks of landslides and talus deposits; sand, gravel, and boulders of alluvial fans.

Glacial till (Pleistocene)—Clay, silt, and sand to large weathered granitic boulders; mostly preserved as moraines.

Glacial outwash deposits (Pleistocene)—Unconsolidated, poorly sorted boulders, cobbles, gravel, sand, and silt.

Older alluvium (Pliocene and Miocene)—Fluvial and lacustrine conglomerate, sandstone, and shale; rockslide-avalanche deposits consisting of large volcanic blocks in matrix of mudstone and ash.

Volcanic rocks (Pleistocene to Oligocene)—Rhyolitic tuffs of Oligocene age, mudflows of Pliocene and Miocene age, lava flows, and shallow intrusive bodies of Pleistocene, Pliocene, and Miocene age composed of basalt, andesite, latite, and dacite. Mostly found in northern and northwestern parts of the basin.

Intrusive igenous rocks (Cretaceous and Jurassic)—Compositions include granodiorite, diorite, quartz monzonite, granite, adamellite, alaskite, gabbro, and aplite dikes. Forms the bedrock basement of the Lake Tahoe basin.

Metamorphic rocks (Jurassic and Triassic)—Metamorphosed volcanic rocks, sandstone, siltstone, and limestone. Forms a small part of the bedrock basement west of Fallen Leaf Lake and east and southeast of Glenbrook.

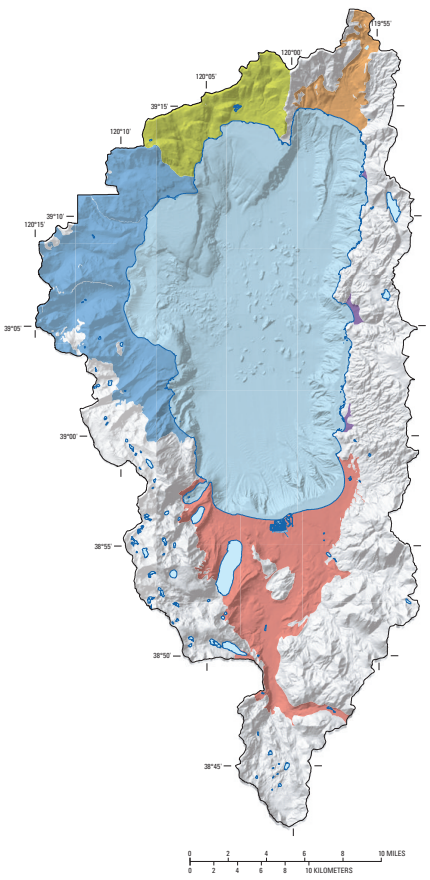
Faults

Fault—Dashed where approximately located; dotted where concealed; short dashed where inferred; queried where uncertain. Can function as conduits for ground-water flow because rock is generally fractured along the fault zone. However, gouge, consisting of finely pulverized rock along the fault zone, also can function as an impermeable seal.

Dike—Andesite, basalt, latite, and mafic dikes.

Resistivity or seismic reflection soundings—soundings from Blum, 1979; Niblack, 1988; and Markiewicz, 1992.

Figure 1. Geologic Map.



EXPLANATION

East Shore Aquifers

The East Shore Aquifers encompass 15 individual watersheds from the east side of the Incline Village area to the north side of the Stateline area (U.S. Army Corps of Engineers, 2003).Younger alluvium, underlain by weathered granitic rocks and in the Glenbrook area by metamorphic and volcanic rocks, is dispersed along the shoreline, is not continuous, and thus is not a contiguous aquifer. Aquifers of limited extent are at Sand Harbor, Glenbrook, and Zephyr Cove.

Aquifer materials are younger alluvium and adjacent granitic and metamorphic rocks. One well at Sand Harbor and six at Glenbrook penetrated silt, sand, gravel, and cobbles interbedded with clay from 19 to 274 feet below land surface. Additionally some granite, in places fractured, occurs from 97 to 480 feet below land surface. Specific capacity at the Sand Harbor well was 1 gallon per minute per foot and ranged from 0.2 to 0.5 gallon per minute per foot at the Glenbrook wells. Ten wells at Zephyr Cove penetrated sand and gravel to depths of 18 to 114 feet below land surface and granite, in places fractured, to depths of 55–321 feet. Specific capacity at the wells ranged from 0.1 to 0.9 gallon per minute per foot.

Incline Village Aquifer

The Incline Village aquifer is bounded by outcrops of granitic rocks that form Stateline Point on the west and the Carson Range on the east, and by the shoreline of Crystal Bay. Younger alluvium and glacial till and outwash cover much of the area, average about 150 feet in thickness (U.S. Army Corps of Engineers, 2003), and thicken to 1,000 feet near the lake shore (Markiewicz, 1992, p. 18).

Aquifer materials are predominantly sand with lesser amounts of boulders, clay, and silt. Deposits penetrated by 27 wells consist of sand, gravel, and boulders with interbedded clay to depths of 50–180 feet below land surface. Specific capacity of seven wells ranged from 0.5 to 40 gallons per minute per foot. One well penetrated granitic bedrock from land surface to 163 feet, and the specific capacity was 0.5 gallon per minute per foot.

Kings Beach/Tahoe Vista Aquifer

The Kings Beach/Tahoe Vista aquifer extends from Dollar Point on the west to Brockway on the east. Younger alluvium is limited to a thin strip along the shoreline except along Carnelian Creek, at Tahoe Vista, and Kings Beach where deposits extend 1–2 miles inland. In much of the area, the younger alluvium overlies volcanic rocks that overlie older alluvium (Muehlberg and others, 2003). Volcanic rocks also comprise uplands between Tahoe Vista and Carnelian Creek.

Aquifer materials range in grain size from clay to boulders and are up to 100 feet thick. Three wells in sections 11 and 12, T16N, R17E (fig. 3) penetrate mostly fractured rocks, probably volcanic, to depths of 860–890 feet. Specific capacity at these wells was 2, 12, and 540 gallons per minute per foot, respectively. Four other wells in sections 14 and 15, T16N, R17E and sections 6 and 19, T16N, R18E penetrated mostly interbedded clay, sand, gravel, and boulders to depths of 65–225 feet. Specific capacity at these wells ranged from 0.1 to 10 gallons per minute per foot. The well in section 6, T16N, R 18E penetrated granitic bedrock at a depth of 148 feet.

South Lake Tahoe/Stateline Aquifer

The South Lake Tahoe/Stateline aquifer extends from Emerald Bay on the southwest side of Lake Tahoe to north of Stateline, Nevada, on the southeast side (U.S. Army Corps of Engineers, 2003). Younger alluvium and glacial till and outwash generally range from 200 to 800 feet in thickness. These sediments can be as thick as 1,200 feet thick between Fallen Leaf Lake and Tahoe Mountain; however, this thickness includes a morainal ridge of glacial till that rises about 500 feet above the surrounding area (Woodling, 1987).

At land surface, aquifer materials consist of glacial outwash and till and younger alluvium. At depth the aquifer materials consist of three sand and gravel beds separated by laterally extensive clay beds between Tahoe Mountain and the Upper Truckee River (U.S. Army Corps of Engineers, 2003). Between Tahoe Mountain and Stateline, the deposits consist of interbedded sand, gravel, and clay. Sand and gravel beds range from 10 to 150 feet thick and clay beds from 10 to 100 feet thick (U.S. Army Corps of Engineers, 2003). Interbedded coarse- and fine-grained deposits likely results in a multi-layered aquifer system that includes a shallow, unconfined (water-table) aquifer and one or more deeper confined aquifers.

Tahoe City/West Shore Aquifer(s)

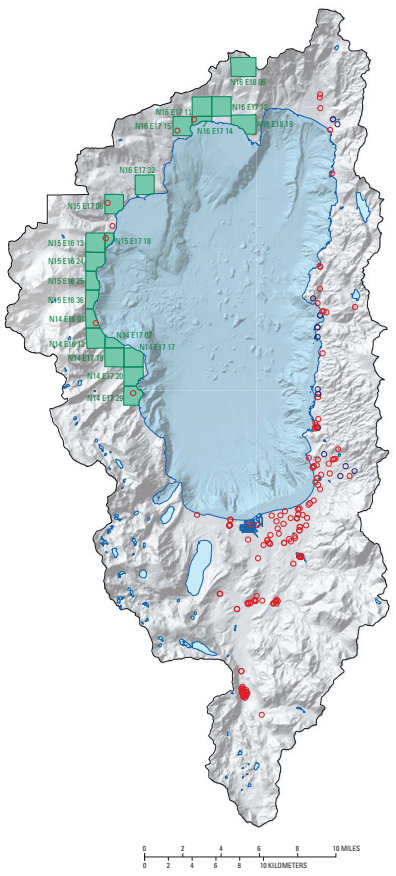
The Tahoe City/West Shore aquifer extends from Dollar Point on the north to Rubicon Point on the south, a shoreline distance of about 18 miles (U.S. Army Corps of Engineers, 2003). In the Tahoe City area, the sediments are about 590 feet thick consisting of interbedded lacustrine clay, silt, and sand that overlie Pliocene volcanic flows, which in turn overlie older sands and gravels (Markiewicz, 1992, p. 27, and Muehlberg and others, 2003). In the West Shore area, glacial processes dissected the area into eight watersheds, each underlain by glacial outwash and fluvial deposits (mostly sands and gravels) that overlie volcanic rocks. Ridges separating the watersheds consist of intrusive igneous rocks that in places are capped by glacial moraines or volcanics.

Aquifer materials penetrated by 31 wells consist of clay, silt, sand, gravel, and boulders, in places interbedded with volcanic rocks, to depths of 56–805 feet. The specific capacity of these wells ranged from 0.1 to 30 gallons per minute per foot.

Undesignated Areas

Areas not designated aquifer areas by the U.S. Army Corps of Engineers are uplands on the east, southwest, and south sides of the basin, and are underlain mostly by igneous intrusive rocks. Fourteen wells on the east side of the basin penetrated varying thicknesses of decomposed, fractured, and solid granite to depths of 72–230 feet. Specific capacity of the wells ranged from 0.1 to 1.1 gallons per minute per foot.

Figure 2. Aquifer areas modified from the U.S. Army Corps of Engineers (2003, p. 3-1, fig. 3-1, and sections 4 through 8).



EXPLANATION

Well in Nevada Division of Water Resources database at http://water.nv.gov/Engineering/wlog/wlog.cfm

Well in USGS National Water Information System (NWIS) database at http://waterdata.usgs.gov/nv/nwis/nwis

Generalized location of one or more wells in California. Specific locations prohibited by statute. Designation refers to section 6, T16N, R18E.

Figure 3. Locations of selected wells.

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HYDROGEOLOGY OF THE LAKE TAHOE BASIN, CALIFORNIA AND NEVADA

By
Russell W. Plume, Mary L. Tumbusch, and Toby L. Welborn
2009

UWMP Requirements for Groundwater Sources

UWMP requirements pertaining to the analysis of groundwater as a source of supply are summarized below. The District must meet the requirements detailed in Water Code Section 10631(b)(1-4), as described below. As stated in Water Code Section 10635 (a), "every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple-dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five year increments, for a normal water year, a single-dry water year, and multiple-dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional or local agency population projections within the service area of the urban water supplier."

The part of Water Code Section 10631 related to groundwater as a source of supply is included below. Where noted in italics, the item is pertinent to the District's UWMP.

(b)…If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. The District has not adopted a groundwater management plan.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as over drafted or has projected that the basin will become over drafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

Hydrogeology of the Groundwater Basin

The California Department of Water Resources (DWR) defines a groundwater basin as an alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and a definable bottom (DWR, 2003). DWR has currently delineated 431 groundwater basins in the State of California and 24 basins are subdivided into sub-basins.

Groundwater recharge in the Tahoe Basin is primarily from infiltration of snow and precipitation into the soil, faults and fractures in bedrock, and decomposed granite that overlies much of the bedrock, and into unconsolidated basin-fill deposits. Groundwater is recharged over the entire extent of the flow path, except where the land surface is impermeable or where the groundwater table coincides with land surface. Stream flow also recharges ground water when the water-table altitude is lower than the water surface altitude of the stream.[21]

Groundwater Pumping

Overall, changes in ground-water storage for the District's basin have been minimal. Decreases in groundwater storage have resulted in areas of pumping. Increases in storage have resulted in areas where storm runoff is temporarily ponded in small basins.[22] The groundwater in the District's service area basin is not adjudicated; therefore there are no pumping limitations. Refer to Table 4-3 for detailed information concerning the district's groundwater sources. Table 4-4 and 4-5 display the past groundwater pumping and projected pumping for the aquifer.

[21] Thodal, Carl E. 1997. Hydrogeology of Lake Tahoe Basin, California and Nevada, and Results of a Ground-Water Quality Monitoring Network, Water Years 1990-1992. Water- Resources Investigations Report 97-4072. USGS. 53 p.

[22] Tahoe Valley Groundwater Basin, Tahoe Valley North Subbasin, California Groundwater Bulletin 118, 2/27/04.

Table 4-3
NTPUD Well Construction

Well Name	Construction Date	Wells by Aquifer Designation	Monitoring Entity
Carnelian	Well rehabilitated (including new pump) in 1996	Kings Beach/Tahoe Vista Aquifer	NTPUD
Park Well	Upgraded Pump in 1996	Kings Beach/Tahoe Vista Aquifer	NTPUD
Dollar Cove Wells	1997	Tahoe City/West Shore Aquifer	TCPUD

Table 4-4
Total Amount of Groundwater Pumped (AFY)

Aquifer	2005	2006	2007	2008	2009	2010
Kings Beach/Tahoe Vista Aquifer	115	154	211	145	119	85
Tahoe City/West Shore Aquifer	70	77	90	97	98	78
% of Total Water Supply	8%	10%	13%	9%	8%	6%

Table 4-5
Total Amount of Groundwater Projected to be Pumped (AFY)

Aquifer	2015	2020	2025	2030
Kings Beach/Tahoe Vista Aquifer	85	102	123	147
Tahoe City/West Shore Aquifer	78	93	112	135
% of Total Water Supply	4%	5%	6%	7%

Table 4-6
Groundwater Conditions: Hydrograph Review

Well Name	Wells by Aquifer Designation	Monitoring Entity
Carnelian	Kings Beach/Tahoe Vista Aquifer	NTPUD
Park Well	Kings Beach/Tahoe Vista Aquifer	NTPUD
Dollar Cove Wells per TCPUD	Tahoe City/West Shore Aquifer	TCPUD

Groundwater Conditions

In 1990, USGS and TRPA established a groundwater monitoring network with 32 sampling sites to provide a long-term database on the groundwater in the basin. Previous groundwater studies found concentrations of nitrogen, phosphorus, and iron to be greater in groundwater than in the lake. These studies indicated the need to better describe groundwater quality and rates of groundwater flow into the lake.[23] Table 4-6 displays the hydrograph review for the basin.

4.6 Groundwater Supply Programs and Projects

The District has no immediate plans for groundwater projects that would increase the number of wells.

[23] Stream and Ground-Water Monitoring Program, Lake Tahoe Basin, NV and CA, USGS, TRPA, June 1997.

4.7 Surface and Groundwater Quality and Monitoring

The water delivered to the District's customers meets or exceeds all standards set for quality and safety. During the 2005 calendar year monitoring period, the North Tahoe PUD had no water quality standard violations for any of their three systems.

In general, the inorganic quality of groundwater in the Lake Tahoe Basin is excellent.[24] Table 4-7a displays the most recent surface water and ground water quality data as published in the Annual Water Quality Consumer confidence Report for 2009.

Routine monitoring is performed as required by the California State Department of Health. The sampling program performed by the District is presented in Table 4-7b. For more water quality data see Appendix C.

[24] Thodal, Carl E. 1997. Hydrogeology of Lake Tahoe Basin, California and Nevada, and Results of a Ground-Water Quality Monitoring Network, Water Years 1990-1992. Water- Resources Investigations Report 97-4072. USGS. 53 p.

Table 4-7a
Water Quality

WATER QUALITY ANALYSIS REPORT
SAMPLING RESULTS FOR 2009

			Tahoe Main System		Carn. Woods	Dollar Cove+	
			System #3110001		Sys. # 3110023	Sys. #3110036	+Being served through Tahoe City Public Utility District
		PHG	Lake Tahoe	Groundwater	Groundwater	Groundwater	
Substance or Parameter	**MCL/UNITS**	**(MCLG)**	**Nat'l Ave.**	**Park Well**	**Carn. Woods**	**Tahoe City PUD**	**Typical Source of Contaminant**
CLARITY							
Turbidity (NTU) - Raw Source	TT/5 95% < 0.5 NTU	NS	Avg .121-.220	NR	NR	5 wells ND and .3 - .6	Soil runoff (erosion) that is made up of suspended matter that interfers with light
Turbidity (NTU) - Finished Water		NS	Avg .132-.236	NR	NR	95% ≤ 0.5 NTU	
MICROBIOLOGICAL							
Total Coliforms	1 Sample	0	159T/ 156A /1P		24T/20A/4P*	116T/116A/0P	Naturally present in the environment
E. Coli			159T/ 159A /0P		24T/24A/0P	116T/116A/0P	Related to human and animal fecal waste
NITRATE/NITRITE							
Nitrate-As N	45 mg/L		ND	ND	ND	ND,ND,ND,ND, 0.27	Runoff & leaching from fertilizers, septic tanks,sewage
Nitrite-As N	1 mg/L		ND	ND	NR	NR	Runoff & leaching from fertilizers, septic tanks,sewage
OTHER							
pH	NS	NS	Avg. 7.2 - 8.8	8.3			Affected by alkaline sources, organic matter, atmospheric CO2, and acidity from mineral sources
DISINFECTION BY-PRODUCTS							
Total Trihalomethanes (TTHM)	80 ug/L		4.5, 6.0, 9.6, 5.5 Annual RAA = 6.4			ND in NTPUD Sys.	By-product of drinking water chlorination
Haloacetic Acids (HAA5)	60 ug/L		2.3, 3.3, 4.8, 3.5 Annual RAA = 3.475			ND in NTPUD Sys.	By-product of drinking water chlorination
Chlorine	[MRDL = 4.0(as Cl2)]		RAA: 0.82, Range: .061-1.02		N/A	RAA: 0.46, Range 0.35-0.53	Drinking water disinfectant added for treatment
Violations :			**No**	**None**	**Yes***	**None**	

About our Coliform Violation: The District routinely monitors for drinking water contaminants. In the Carnelian Woods system, a single routine sample collected on September 15, 2009, tested positive for total coliform bacteria. Three of four repeat samples collected on September 17, 2009, also tested positive for total coliform bacteria. This constituted a failure of the total coliform standards. Following the failure of the total coliform standards, the water system was disinfected and flushed beginning September 18, 2009. After the District received results from four samples collected on September 21, 2009, indicating that coliform bacteria were no longer present in the system, the chlorination was discontinued. Five subsequent samples collected on October 20, 2009,

Terms And Abbreviations Used In These Reports

MCL = Maximum Contaminant Level - The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the PhG's and MCLG's as is economically or technologically feasible.
PHG = Public Health Goal - The level of a contaminant in drinking water below which there is no known or expected risk to health. PHG's are set by the California Environmental Protection Agency.
MCLG = Maximum Contaminant Level Goal - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's are set by the U.S. Environmental Protection Agency.
MRDLG = Maximum Residual Disinfectant Level Goal - The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MDRLGs are set by the U.S. Environment Protection Agency.
Primary Drinking Water Standard - Primary MCL's, specific treatment techniques adopted in lieu of primary MCL's, and monitoring and reporting requirements for MCL's that are specified in regulations.
Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water. Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance. 1. - Turbidity of the filtered water must be < than or = to 0.5 NTU in 95% of measurements in a month. 2. - Not exceed 1.0 NTU for more than eight consecutive hours. 3. - Not exceed 5.0 NTU at any time. Turbidity results which meet performance standards are considered to be in compliance with filtration

< = Less Than
> = Greater Than
pCi/L = Pico Curies Per Liter
mg/L = Milligrams Per Liter (Parts Per Million)
ug/L = Micrograms Per Liter (Parts Per Billion)
ND = Not Detected
NR = Not Required
NTU = Nephelometric Turbidity Unit
T/A/P = Tests/Absence/Presence
µS/cm = Microsiemens - Measure of electrical current flow through a solution
NS = No standard
RAA = Running Annual Average
Units = Number of units measured

Table 4-7b
Water Quality Monitoring

Bacteriological:
Main System - 13 samples per month (average)
Carnelian System - 1 sample per month
Dollar System - 1 sample per month

Turbidity:
Continuous sampling, results reported monthly
Pumping discontinued when sampling reaches 1 NTU

Type of Analysis	Groundwater	Surface water
General Mineral	Every 3 years	Every year (waived through 2001)
General Physical	Every 3 years	As required
Inorganic Chemical	Every 3 years	Every year (waived when 3 are samples negative)
Organic Chemical	As required	Every 3 years (waivers in effect through years 1999 to 2002 depending on classification of chemical)
Radium 226 & 228	Every 4 years	Every 4 years
Secondary Standards	Every 3 years	Every year (waived through 2001)

4.8 Transfer and Exchange Opportunities

The three systems that the District owns and operates are independent, have no inter-connections, and could not be easily connected even with the acquisition of intervening water systems. The opportunities in acquiring the adjacent systems and the option of the District's system interconnection are explored in the following sections. Figure 4 depicts the District's adjacent water purveyors, both private and public.

Adjacent Water Systems

The ability to interconnect with adjacent District operated systems to provide an emergency or supplemental supply would be advantageous. However, due to the District's systems' physical locations, temporary connections have been made with adjacent independent systems to provide emergency supplies.

The three systems owned and operated by the District are physically separated by other water systems which are independently owned and operated. The 4 other adjacent water systems are: Tahoe City Public Utility District (TCPUD), Incline Village General Improvement District (IVGID), Fulton Water Company (FW), and Agate Bay Water Company (ABW). Tahoe City Public Utility District is located to the west of the District's Dollar Cove system. Fulton Water Company is located in between the District's Dollar Cove and Carnelian systems. Agate Bay Water Company is located in between the District's Carnelian and Main systems.[25]

[25] North Tahoe Public Utility District Emergency Response Plan, April 12, 2005. Page 3-6.

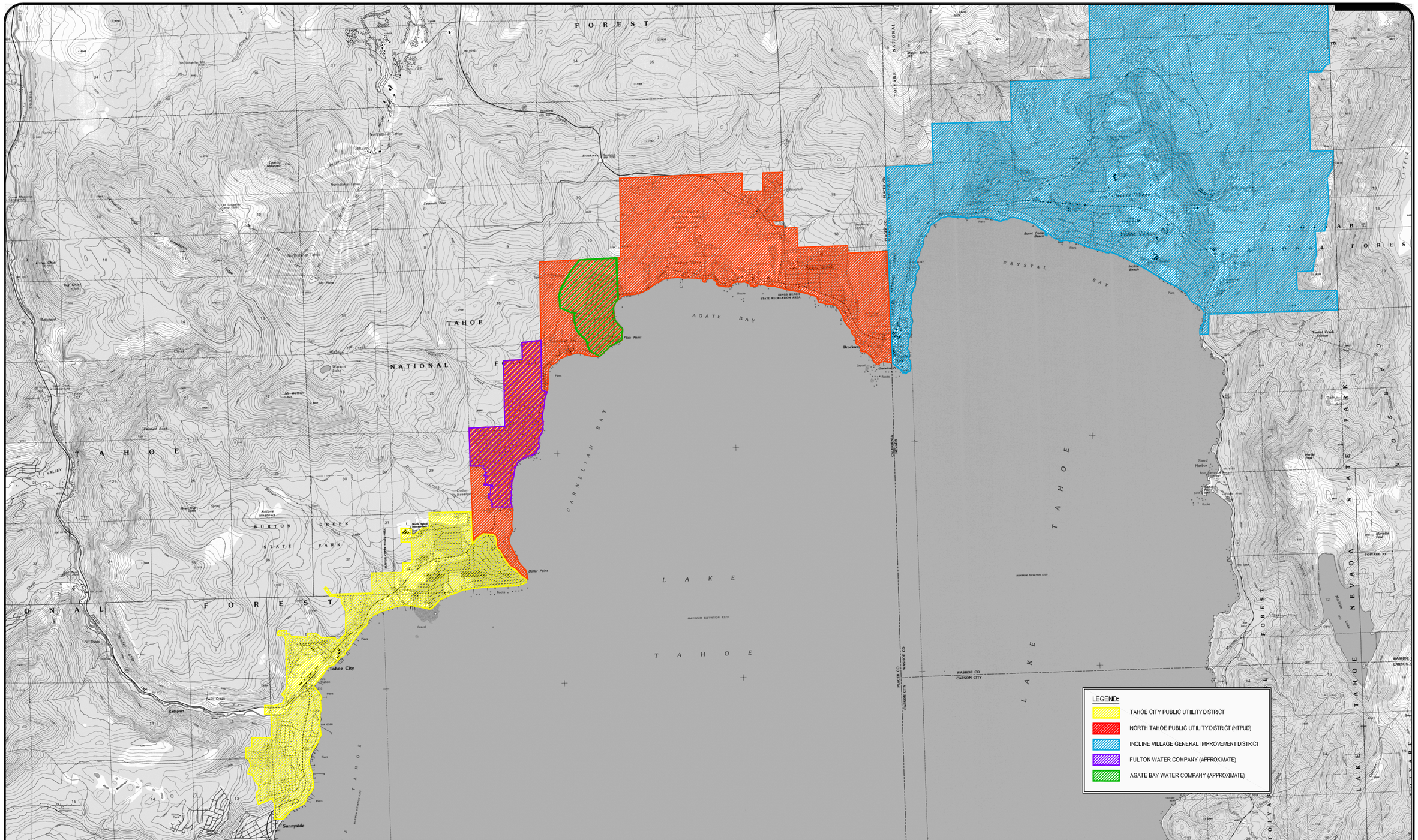

FIGURE 4: ADJACENT WATER SYSTEMS

NORTH TAHOE PUBLIC UTILITY DISTRICT (NTPUD)

NORTH LAKE TAHOE ~ PLACER COUNTY ~ CALIFORNIA

0 3000 6000 1200

1 INCH = 6000 FEET

JUNE 14, 2011

N

These water systems have their own water treatment and supply systems. To enable the District to have uninterruptible water service capability, a valve connection from the District's water distribution system to TCPUD is in place and is currently maintained by NTPUD. Interconnections between the District and IVGID, FW, and ABW are suitable only for temporary and partial water service. Interconnects with IVGID, FW, and ABW are not regularly maintained or necessarily reliable. In a limited capacity, the interconnection valves between the District and IVGID, FW, and ABW also enable the District to serve as an alternate water source for these agencies.[25]

The District is currently planning to undertake a capital improvements program to upgrade the existing facilities to meet standards set forth in this report. Completion of the improvements will reduce the need to rely on adjacent systems for emergency support.[26]

The District has no plans to acquire any of the adjacent private water systems as shown in Table 4-8. However, acquisition has been proposed in the past as a means of resolving certain supply and operational problems in the various systems. Any acquisition proposal should evaluate the economic feasibility and net public benefits of a combined system.[26]

Table 4-8
Transfer and Exchange Opportunities

Supplier	Agreement	Short-Term	Long-Term
NA	NA	NA	NA

See Figure 5 North Tahoe Water Systems Diagram.

[26] NTPUD Master Water Plan 1999. Chapter 5

NORTH TAHOE WATER SYSTEMS

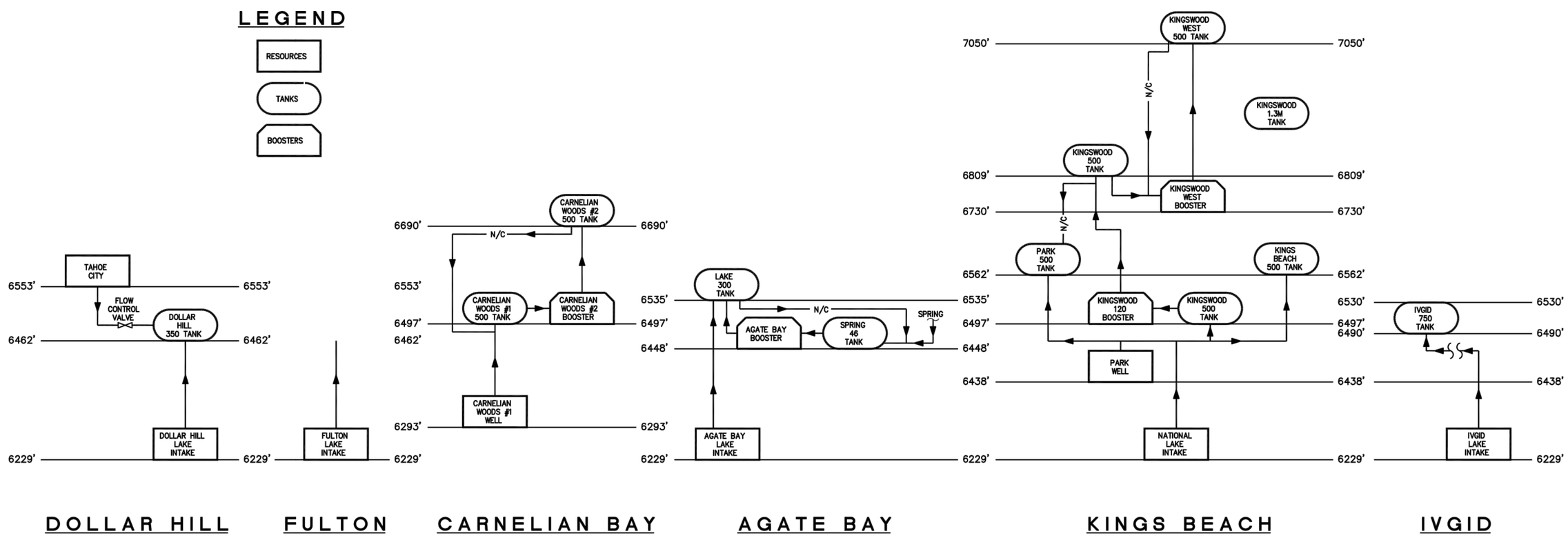

FIGURE 5: NORTH TAHOE WATER SYSTEMS DIAGRAM

NORTH TAHOE PUBLIC UTILITY DISTRICT (NTPUD)

NORTH LAKE TAHOE ~ PLACER COUNTY ~ CALIFORNIA

System Interconnection

System interconnection involves considerably more than the construction of a pipeline between the systems. The District's Master Water Plan 1999 provides a full detailed study with costs concerning the interconnection of the District's systems. Interconnection of the three water systems would be beneficial from a redundancy and reliability standpoint. Source capacity at one site could be used as backup capacity to other sources. For example a second well within the Carnelian system would provide enough capacity to supply Dollar Cove and provide a backup to the Kings Beach system, thereby lowering the treatment capacity required to be developed at the National Avenue lake intake. [26]

Failure of either source serving the Kings Beach/Tahoe Vista municipal area during a period of above average usage would result in water outages and create a significant threat to public health and safety. An interconnection with the Incline Village General Improvement District is available, but is incapable of providing sufficient volume to make up such a shortfall.

4.9 Recycled Water Plan

This section of the UWMP provides information regarding the potential for recycled water to be used as a water supply source in the service area. Section 10633 of the Act requires that this Plan include specific discussions related to the recycled water source. The District does not currently, and is not allowed per California Water Code, to recycle water in the basin.

Interagency Coordination

Table 4-9 shows the interagency coordination for the transmission and treatment of wastewater for the District's service area.

Table 4-9
Interagency Coordination

Agency Type	Agency Name	Plan Development Role
Water Reclaimation Facility	Truckee Tahoe Sanitation Agency (TTSA)	NA
Public Utility District	Tahoe City Public Utility District	NA
Partnership	Lake Tahoe Wastewater Infrastructure Partnership	NA

Wastewater Collection and Treatment System

Wastewater treatment is a major area of concern for water quality. In 1966, a significant control action took place to protect the pristine quality of Lake Tahoe when Nevada and California acted to prohibit the discharge of treated wastewater effluent into the lake. Treatment plants

were retrofitted with export pipelines and pump stations to transport the effluent out of the basin.[27]

Sewage systems were expanded to export untreated wastewater to the Truckee-Tahoe Sanitation Agency located in the Town of Truckee, California, for treatment and disposal. In 1971, both states prohibited septic tanks and required that all sewage generators be connected to an existing sewage system. These programs are administered by the Lahontan Regional Water Quality Control Board (LRWQCB) in California, and the Nevada Department of Environmental Protection (NDEP).[27]

All wastewater is discharged outside the Tahoe Basin. North Tahoe PUD and Tahoe City PUD, located in California, provide sewage collection for their customers and convey raw wastewater to the Truckee-Tahoe Sanitation Agency (TTSA) for treatment and disposal at the Truckee Water Reclamation Plant. TTSA was built in response to the passage of the Porter-Cologne Act that disallowed septic systems or any treatment of sewage in the Tahoe basin. TTSA treats and disposes of the waste that is transported to its facility in Truckee from the communities on the north shore of the Tahoe Basin as well as Squaw Valley, Alpine Meadows, Northstar and Truckee. All treatment and collection facilities participate in local and county spill notification programs.[27] Table 4-10 displays the District's total wastewater collected and treated by TTSA, every year from 2000 to 2010.

Table 4-10
Past Wastewater Collection & Treatment by TTSA - 1-Year Range (Acre-Feet/Year)

Year	Total Pumped AFY
2000 act.	1,178
2001 act.	985
2002 act.	1,058
2003 act.	1,036
2004 act.	1,021
2005 act.	1,091
2006 act.	1,235
2007 act.	967
2008 act.	967
2009 act.	871
2010 act.	927

[27] Sanitary Survey and Watershed Control Program 2009 Update, Tahoe Water Suppliers Association. Page 85

The Lake Tahoe Wastewater Infrastructure Partnership (LTWIP) was formed in 2007, as an association of local agencies providing wastewater collection services. Group activities are referenced in greater detail in this report.[27]

Section 5.0 Water Supply Reliability and Water Shortage Contingency Planning

The Act requires that each UWMP include an assessment of its water supply reliability in normal, dry, and multiple-dry water years. The following sections describe the reliability of the water supply for the basin and vulnerability to seasonal or climatic shortage.

This section also compares the available water supply with the projected water demands for the District's service area. As described in Section 4 (Water Supply), the District's water strategy for the Tahoe Main System is to use rely primarily on the lake intake, then the District's local groundwater supply during peak periods or during drought conditions. Section 5 addresses the reliability of the District's water supplies under normal and dry water year conditions. Below is additional information pertaining to the quantity of the District's surface water and groundwater supplies when subjected to future dry year water conditions.

5.1 Supply Reliability

The District has complete surface water supply reliability due to its dependence on Lake Tahoe for 90% of its source water. There are no changes to quantity of water diverted from the lake during a dry year for the District. The percentages used in Table 5-1 reflect the results of the analysis. The projected surface water supply under normal, single-dry, and multiple-dry water years are expected to be 100% reliable. The basis for water years used in the reliability analysis for the District water supply is shown in Table 5-2 in the section that follows.

The District's local groundwater has reliably allowed the District to meet its historical water demands. The reliability of the groundwater supply from the District's wells is based on the District's analysis of their groundwater supply. According to the District's reliability analysis the wells' pumping capacity will remain the same during normal or dry years.[28] Table 5-1 reflects these assumptions. The groundwater used as a source of supply to meet projected water demands is expected to be completely reliable. The percentages used in Table 5-1 reflect the

[28] NTPUD Master Water Plan 1999. Chapter 5

results of the analysis. The projected groundwater supply under normal, single-dry, and multiple-dry water years are expected to be 100% reliable.

The three systems that the District owns and operates are independent, have no inter-connections and could not be easily connected even with the acquisition of intervening water systems. The systems will therefore be considered separately to meet the supply requirements.

Table 5-1
Supply Reliability

Water Supply	Single-Dry Year	Multiple-Dry Water Year			
		Year 1	Year 2	Year 3	Year 4
Tahoe Main System	100%	100%	100%	100%	100%
Carneilian Bay System	100%	100%	100%	100%	100%
Dollar Cove System	100%	100%	100%	100%	100%

5.2 Basis of Water Year Data

The water years are based on hydrologic data from 1900 to 2010. Based on the data compiled, the water years used for a normal (or average) water year, single-dry water year, and multiple-dry water years are listed on Table 5-2.

Table 5-2
Basis of Water Year Data

Water Year Type	Base Year(s)	Historical Sequence
Normal Water Year	2002	1900-2010
Single-Dry Water Year	1990	
Multiple-Dry Water Year[1.]	1987 to 1994	

1. The Lake Tahoe Water War – By Mark McLaughlin

5.3 Factors Resulting in Inconsistency of Supply

The factors that cause or have the potential to cause inconsistent supply are due to legal, environmental, water quality or climatic issues. These factors are summarized in Table 5-3.

Table 5-3
Factors Resulting in Inconsistency of Supply

Supply	Legal	Environmental	Water Quality	Climatic
Tahoe Main System	None	None	None	None
Carneilian Bay System	None	Well is operating at capacity	None	None
Dollar Cove System	None	None	None	None

5.4 Projected Normal Water Year Supply and Demand

Table 5-4 shows the District's current and planned water supplies in acre-feet per year during normal or average water year conditions. The amounts shown in the table indicate the percentage of normal water supply expected to be available during this hydrologic water year.

Table 5-4
Normal Water Year Supply (AFY)

	2005 act.	2010 act.	2015	2020	2025	2030
Tahoe Main System						
National Ave. Lake Intake	1,331	1,322	1,586	1,903	2,284	2,741
Park (Well)	23	18	21	26	31	37
Carnelian System (Well)	92	67	81	97	116	140
Dollar Cove System (Well)	70	78	93	112	135	161
Total	1,515	1,485	1,782	2,138	2,566	3,079

Table 5-5 compares the District's normal water year supply with actual and projected water demands in acre-feet per year. As shown in the table, there are adequate supplies to meet demands during normal water years.

Table 5-5
Normal Water Year Supply and Demand Comparison (AFY)

	2005 act.	2010 act.	2015	2020	2025	2030
Total Supply[1.]	1,515	1,485	1,782	2,138	2,566	3,079
Total Water Demands	1,515	1,485	1,782	2,138	2,566	3,079
Shortfall	None	None	None	None	None	None

1. Although more supply is available, the amounts shown are based on amounts needed to meet future demands.

5.5 Projected Single-Dry Water Year Supply and Demand

Table 5-6 shows the District's current and planned water supplies in acre-feet per year under single dry water year conditions as discussed. The quantity of supply for the service area does not change during a single dry year. For this comparison, the District's water supply is broken down into the two sources of supplies since the supply reliability is different for each supply source.

Table 5-6
Single-Dry Water Year Supplies (AFY)

	2005	2010	2015	2020	2025	2030
Lake Intake Water Supply (100%)	NA[1.]	NA	NA	NA	NA	NA
Wells	NA	NA	NA	NA	NA	NA
Total	-	-	-	-	-	-

1. NA stands for Not Applicable since the supply does not change during dry years.

Table 5-7 compares the District's single-dry water year supply with actual and projected water demands in acre-feet per year. As shown in the table, there are adequate supplies to meet demands during single-dry years.

Table 5-7
Single-Dry Water Year Supply and Demand Comparison (AFY)

	2005	2010	2015	2020	2025	2030
Total Supply	1,515	1,485	1,782	2,138	2,566	3,079
Total Water Demands	1,515	1,485	1,782	2,138	2,566	3,079
Shortfall	None	None	None	None	None	None

5.6 Projected Multiple-Dry Water Year Supply and Demand

Table 5-8 compares the District's current and planned water supplies in acre-feet per year under multiple-dry water year conditions. The quantity of supply for the service area does not change during multiple-dry water years. The numbers shown in the table indicate the quantity of normal water supply available during this hydrologic water year.

Table 5-8
Multiple-Dry Water Year Supplies (AFY)

	2005	2010	2015	2020	2025	2030
Lake Intake Water Supply (100%)	1,515	1,485	1,782	2,138	2,566	3,079
Wells (100%)	1,515	1,485	1,782	2,138	2,566	3,079
Total	None	None	None	None	None	None

Table 5-9 compares the District's multiple-dry water year supply with actual and projected water demands in acre-feet per year. As shown in the table, there are adequate supplies to meet demands during multiple-dry years.

Table 5-9
Multiple-Dry Water Year Supply and Demand Comparison (AFY)

	2005	2010	2015	2020	2025	2030
Total Supply	1,515	1,485	1,782	2,138	2,566	3,079
Total Water Demands	1,515	1,485	1,782	2,138	2,566	3,079
Shortfall	None	None	None	None	None	None

5.7 Water Shortage Emergency Plan

The UWMP requires a Water Shortage Emergency Plan be prepared to address methods to react to an emergency situation. The Water Shortage Emergency Plan shall be prepared to address methods to react to an emergency situation, which reduces supply by up to 50% of water available to the District. In 2005, the District completed an emergency action plan entitled "North Tahoe Public Utility District Emergency Response Plan." The majority of information for this UWMP is taken from the District's ERP. This UWMP looks at different stages of action for a 10%, 20%, and 50% shortage of supply. Each of these stages is discussed below.

Stages of Action

Water conservation requirements should be reasonably achievable for customers to encourage reductions in consumption. A typical conservation sequence would begin with voluntary rationing. In the second or third year of an extended drought, mandatory rationing might be expected. Factors that can change water use patterns during dry years include educational efforts and rationing policies established in water shortage contingency plans. This UWMP sets different reduction goals for different stages of water conservation shown in Table 5-10.

Table 5-10
Water Conservation Stages and Demand Reduction Goals (%)

Stage 1	Stage 2	Stage 3
Voluntary Conservation 10%	Mandatory Conservation 20%	Mandatory Conversation 50%

Estimate of Minimum Supply for Next Three Years

The District is required to quantify the minimum water supply available during the next three years based on the driest multiple-year historic sequence for its water supplies.

There is no water supply shortage expected during the next 25 years during a multiple-year drought. Table 5-11 illustrates that if there were to be a drought over the next three years of the

same severity of the worst drought on record which occurred in 1987 to 1994, there would not be a water supply shortage expected.[29]

Table 5-11
Estimated Three-Year Minimum Water Supplies (AFY)

Source	Normal	2011	2012	2013
Tahoe Main System				
National Ave. lake Intake	1,331	1,384	1,439	1,497
Park (Well)	23	24	25	26
Carnelian System (Well)	92	95	99	103
Dollar Cove System (Well)	70	72	75	78
Totals	1,515	1,575	1,639	1,704

Prohibitions, Penalties, and Consumption Reduction Methods

The District has the authority to declare a state of water shortage based on climate or other conditions. A water shortage stage shall also be declared (Stage 1, 2, or 3) based on the severity of the water shortage. The prohibitions of the three stages are listed in the table that follows:

• Stage 1 water shortage will be declared when there is a need for a District-wide reduction in water consumption by 10%. Stage 1 includes voluntary water use prohibitions as listed in Table 5-12.

• Stage 2 will be declared when a 20% reduction in water consumption is necessary. The prohibitions for Stage 2 are mandatory. Additionally, when Stage 2 is in effect, the voluntary prohibitions of Stage 1 become mandatory.

• Stage 3 is declared when a 50% reduction in water consumption is necessary. Stage 3 prohibitions are mandatory and also include the Stage 1 and Stage 2 prohibitions.

For each of these stages, the percent water consumption reduction goal is District-wide. The water consumption of individual water customers would not necessarily be tracked for a specific percent reduction in water use. For those customers who engage in water conserving activities or who have homes or businesses already fitted with water conserving plumbing fixtures and appliances, conservation would be more difficult, and requiring the same amount of conservation from them as normally non-conserving water customers would serve as a penalty to those water customers who conserve on their own.

[29] Truckee Meadows Water Authority, www.tmh2o.com/lake_level

Table 5-12 lists the prohibition uses, or non-essential uses, at each stage, estimated reduction goals and when the prohibitions become mandatory. Table 5-13 lists methods the District would use to ensure reductions.

Table 5-12
Water Use Prohibition

Stage	Compliance	Non-Essential Uses of Water/Water Waste Prohibitions	Water Reduction Goals
1	Voluntary	• Washing sidewalks, driveways, and other hard surfaces • Excessive plumbing leaks not repaired • Excessive irrigation run-off • Washing cars without a shutoff valve on hose • Water for single-pass evaporative cooling systems • Water for new non-recirculating industrial clothes wash systems • Irrigation during the hottest part of the day, when evaporation rates are at their highest • Fire suppression systems are exempt • Apply irrigation water during evening or early morning only • Reduce irrigation cycle when run-off occurs • Utilize water conservation incentives and rebates to replace plumbing fixtures and appliances • Utilize District information for water efficient landscaping	10%
2	Mandatory	Stage 1 prohibitions become mandatory • Filling or refilling swimming pools • Non-commercial washing of privately-owned motor vehicles, trailers, and boats except from a bucket and except that a hose equipped with a shutoff nozzle may be used to rinse a vehicle • Using water from a fire hydrant for non-essential uses • Use of potable water for dust control at construction sites	20%
3	Mandatory	Stage 1 and 2 mandatory prohibitions remain in effect • Watering any residential, commercial, or industrial lawn with potable water, at any time of day or night • Irrigation sprinkling with hand held nozzle only • Planting new landscape or annuals • Mandatory water rationing may take effect	50%

Table 5-13
Consumption Reduction Methods

	Public Outreach	Drive-by Inspections	Rate Increases for High Use	Penalties	Projected Reduction
Stage 1	x				10%
Stage 2	x	x	x	x	20%
Stage 3	x	x	x	x	50%

During conservation Stage 1, public outreach would be implemented in order to accomplish the 10% water use reduction. The utility bill would include pertinent information concerning the shortage including the cause of the water shortage and the voluntary prohibitions. The

information would also be included in public notices placed at public buildings and in the local newspaper. Outreach efforts will be repeated for the duration of the water shortage. All Stage 1 voluntary prohibitions would continue to be in effect during Stages 2 and 3 water shortages. Public outreach would continue to be implemented during Stages 2 and 3. In addition to outreach efforts, "drive-by inspections" could be conducted for evidence of violations during Stages 2 and 3 shortages.

Table 5-14 describes which penalties take effect at various stages. These penalties are to be used at the discretion of District authorities. Excess use penalties are, essentially, fines. Temporary tiered rates would be reflected in an adjusted water rate schedule that would charge customers an increasingly higher per unit charge as water use increases. The installation of a flow-restricting device would be used in only the most extreme examples of willful water waste.

Table 5-14
Penalties and Charges

Penalties and Charges	Stage When Penalty Takes Effect
Excess Use Penalty	Stage 2
Temporary Tiered Rates (for duration of drought)	Stage 2
Installation of Flow-Restricting Devices	Stage 3

Analysis of Revenue Impacts of Reduced Sales during Shortages

Although revenues would decrease due to a decrease in water use, there would be some corresponding decrease in expenditures such as operations and maintenance costs due to reductions in water pumping and treatment chemical use. Table 5-15 displays the estimated reduction in revenue corresponding to a reduction in sales. Table 5-16 explains the associated costs to the District.

Table 5-15
Actions and Conditions that Impact Revenues

Type	Anticipated Revenue Reduction
Water Use Reduction 10%	5%
Water Use Reduction 20%	12.50%
Water Use Reduction 50%	35%

It is estimated that an increase in public outreach would cost $5,000 during drought situation. This would cover the cost of placing notices in the local newspaper, on the local news and in the customer's water bills. In the event of a drought, it is anticipated that there would be no increases in the costs of staff, O&M, or treatment.

Table 5-16
Actions and Conditions that Impact Expenditures

Action Category	Anticipated Cost
Increases Staff Cost	None
Increases O&M Cost	None
Increases Cost of Supply & Treatment	None
Public Outreach (bill stuffers, advertisements)	$5,000

Proposed Measures to Overcome Revenue Impacts

There are measures that could overcome impacts of the reduced revenues during a water shortage emergency. These measures are listed in Table 5-17.

Table 5-17
Proposed Measures to Overcome Revenue Impacts

Measures	Effects
Excess Use Penalty	Minimal
Contingency Reserve	Maintain a reserve fund of 25% of annual revenue
Temporary Tiered Rates	Make up for losses not covered by the reserve fund

Although the effect on revenue for the District would be minimal, excess use penalties can be enforced during times of emergency water supply shortages. If such penalties were to be delegated, the effect would be greater on the conservation of water, rather than recovery of lost revenue.

During an extreme water shortage, temporary tiered water rates could be implemented. This method is intended to provide incentives for conservation and to reserve funds during water shortages.

Draft Ordinance and Use Monitoring Procedure

Water use prohibitions and enforcement mechanisms must be approved by the District's Board. At this time, the District does not have a Water Shortage Emergency Ordinance, but does have a Water Ordinance with a specific Drought Conditions section. The District is in the process of updating the Water Ordinance and plans on including specific language for a Water Shortage Emergency Ordinance at some point in the future. Below is the excerpt from the District's Water Ordinance, Section 13 Drought Conditions.

SECTION 13

DROUGHT CONDITIONS

13.01 GENERAL

Conditions of drought are not uncommon in the area served by the District by action of the District Board, drought conditions may be declared.

13.02 ACTIONS OF THE DISTRICT

In the event of declared drought conditions, the District will take such actions as necessary to insure the available District water supply is utilized for the benefit of the greatest number of District customers. The District may enact water rationing, time of use schedules, limitation of use, or such other measures as deemed necessary to insure continued water availability.

13.03 CUSTOMER RESPONSIBILITY

It will be the express responsibility of the customer to carefully observe all rules, regulations and prohibitions set by the District in the event of declared drought conditions. The unavailability of water or a prohibition of water use at certain times shall not relieve the customer of paying the fees set by the District as shown in EXHIBIT "A", WATER RATES.

Water Use Monitoring Mechanisms

During a drought, water consumption reduction would be monitored District-wide by tracking water use through monthly meter readings and production tracking. Annual water system audits may be conducted to identify water leaks in drought years.

Should the monitoring mechanisms indicate that the water conservation goals of the water shortage stage are not being met; public outreach efforts and monitoring for water violations should be increased.

Catastrophic Supply Interruption Plan

The Act requires each supplier to create a Catastrophic Supply Interruption Plan to ensure readiness for emergencies in the water system. The District's Emergency Response Plan (ERP)

identifies the District's emergency planning, organization, and response policies. The ERP includes a concept of recovery operations, a hazard analysis, responsibilities, and departmentalized standard operating procedures for emergency response. Because several of the hazards identified in the ERP could result in a catastrophic interruption of water supplies, the ERP provides the actions that the District would implement to minimize the impacts of supply interruption.

In the event of an attack on the water system, some or all of these agencies, as well as other state and federal agencies, may be called upon for assistance. The District entered into a mutual aid agreement with the surrounding water purveyors and wastewater collectors to furnish each other personnel who are trained in the emergency and operation and/or repair of sewage and/or water collection, transportation and treatment facilities, together with equipment, materials and supplies required for such operation and/or repair as may be necessary during emergency conditions.

A general summary of the hazards identified in the District's ERP related to the water system are provided below. For the Concept of Operations related to these disasters refer to the District's ERP.

Hazard Analysis

The District's water system is vulnerable to a wide range of threats. There are three broad categories of hazards: natural, technological, and domestic security threats.

Unpredictable Natural Hazards

- Natural Hazards
  - Wildland fires
  - Earthquakes
  - Floods
  - Landslides
  - Extreme weather/storms
- Technological/Manmade Hazards
  - Dam failure
  - Hazardous materials spills or contamination
  - Major vehicle accident

- Airplane crash

- Domestic Security Threats
  - Civil unrest
  - Terrorism

Section 6.0 Demand Management Measures

The Urban Water Management Planning Act provides two distinct methods for providing information related to Demand Management Measures (DMMs) and meeting the requirements of Water Code Section 10631 (f) and (g). Per the Act, "DMMs are mechanisms a water supplier implements to increase water conservation." Specific Best Management Practices or BMPs were originally identified and established by the California Urban Water Conservation Council (Council). The Council is a group that assists in increasing efficient water use State-wide, through partnerships among urban water agencies, private entities, and public interest organizations. The Council's goal is to integrate urban water conservation BMPs into the planning and management of California's water resources. An MOU was signed by approximately 100 urban water agencies and environmental groups in December 1991, including the District. These DMMs correspond to the 14 BMPs listed and described in the CUWCC MOU. The following section outlines the DMMs that are currently being implemented as well as the scheduled DMMs. See Certification for Compliance with Water Metering Requirements for Funding Applications dated January 5, 2011. Refer to Appendix D for the projected water savings due to the implementation of select DMMs.

6.1 Best Management Practices/ Demand Management Measures

A- Water Survey for Single/Multi-family Residential Customers

During 2013, the District will begin a series of indoor and outdoor Do-it-Yourself water surveys for single family and multi-family residences in the quarterly newsletters. The District will continue the surveys annually. The goal is to do a minimum of one mini-survey per year to educate their customers on how they can improve their water conservation. The Do-it-Yourself water survey will inform homeowners and landlords on how to conserve water while gathering survey data for District tracking. The survey will provide leak inspection and leak investigation guidelines for indoor and outdoor water use. With the collected information, the District will provide feedback and recommendations for customers who contact them with concerns about

their survey. The District plans on tracking the survey via a database program analyzing both seasonal and annual data. The District estimates a 5-15 gpcd conservation savings.

Currently, the District performs outreach to customers when high water usage is noted in meter reports. In addition, the District Water Quality Technician provides customer support and manages all high water bill complaints.

B- Residential Plumbing Retrofit

Beginning in the Fiscal Year 2013/2014, the District will set aside funds for low-flow shower heads, shower timers, faucet aerators, dye tablets, and other plumbing retrofit items for single family and multi-family residences. Coupons and information about the Plumbing Retrofit Kits are available in the quarterly newsletter and at special events. Customer information is collected when the Plumbing Retrofit Kit coupons are submitted. Using this information the District will track the effectiveness of the BMP/DMM year over year.

In addition, the District has a Toilet Retrofit Program which started in November 2012 providing 50% credit, up to $100, on the customer's water bill for replacing inefficient toilets. To date the District has received 25 applications.

The District estimates a conservation savings of 5-15 gpcd.

The District will continue to apply for grants for plumbing retrofit kits to help offset the District's costs for these programs.

C- System Water Audits, Leak Detection, and Repair

The District has implemented system water audits and leak detection, and repairs for their entire water system. The District is 50% complete for the implementation of this BMP/DMM. The District is committed to minimizing its unaccounted-for water and staying within the industry average of 10% loss (maximum).

Water main repairs and replacements have been ongoing since 1980. Monthly water audits started April 2004. Intermittent leak detection was performed by an outside contractor from the 1980's to 2007. In 2008, the District began performing leak detection in-house. The District evaluates the effectiveness of this BMP/DMM through zone meter reads, customer meter reads, water production, and sewer flow rates.

The District estimates a conservation savings of 10-20gpcd.

The District has applied for grant funding as well as requested District funds to meet the requirements of the MOU.

D- Metering with Commodity Rates for all new and existing connections

In 1984, the District began metering each connection. Today, all District water accounts are metered and all accounts are billed volumetrically, including new connections As a result of the District installing meters on all accounts, there was a sharp decline in water use during the mid to late 1980's. The decrease was attributed to the installation of water meters as well as system improvements and improved operating and maintenance practices. The District is 100% metered and continues to implement this BMP/DMM with all new connections.

The meters were installed prior to the timeframe that allows the District to claim credit for this water conservation effort as described in the Guidebook to Assist Urban Water Supplier to Prepare a 2010 Urban Water Management Plan.

E- Large Landscape Conservation programs and incentives

The District has implemented large landscape conservation programs and incentives for their customers. Dedicated irrigation meters, billed for every thousand gallons of water used, have been installed at all multiple unit development common area water accounts and on all park and school facilities (i.e. ball fields, park area, etc.) that have irrigated landscaping. The District began metering in 1984, customers were charged per 1,000 gallons in excess of the allowed amount per meter size. On January 14, 2003, the District enacted a two-tier rate system for water use in excess of the allowed amount. The District is 100% complete and will continue to implement this BMP/DMM.

F- High Efficiency Washing Machine rebate programs

High efficiency washing machine rebate programs have not been implemented as of 2013. The District is in the process of updating their Water Ordinance to include language in Chapter 10 Water Conservation Requirements which is scheduled to be implemented in 2014. The modified language is based on California Building Code, which requires all new construction of Single, Multi-family and Public Uses to install high-efficiency washing machines/ clothes washing equipment. This will be enforced through Placer County Building Department. High-

efficiency washing machines use about 50 percent less water than conventional machines. Conventional top-loading washing machines use about 40-45 gallons of water per load. High-efficiency washing machines use about 20-30 gallons of water per load. The estimated annual savings for a typical household is about 5,000 gallons per year. The District will monitor the water production and consumption to evaluate the effectiveness of this BMP/DMM.

Excerpt from NTPUD Water Ordinance with the new proposed language in i*alics*.

SECTION 10

WATER CONSERVATION REQUIREMENTS

10.01 WATER CONSERVATION REQUIREMENTS

These requirements are set forth to insure the most efficient use of the water resources available to the District and to enable the water system to be operated in the most cost effective manner for the benefit of all of the District water customers. *The following are requirements for new construction of Single Family, Multi-family, and Public Uses based on California Building Code.*

10.02 REQUIREMENTS

A. Requirements for New Single Family Uses

All new single family uses shall be equipped with approved water saving shower heads, water saving aerators on kitchen sinks and lavatories, water saving toilets, *high efficiency washing machines/clothes washing equipment* and pressure reducing valves when such a device is required to maintain 60 PSI or less within the structure.

B. Requirements for New Multi-Family Uses

All new multi-family uses shall be equipped with approved water saving shower heads, water saving aerators on kitchen sinks and lavatories, water saving toilets, *high efficiency washing machines/clothes washing equipment* and pressure reducing valves when such a device is required to maintain 60 PSI or less within the structures.

C. Requirements for New Public Uses

All new public uses shall be equipped with approved water saving shower heads, water saving aerators on kitchen sinks and lavatories, self-closing valves on lavatories, water saving toilets, *high efficiency washing machines/clothes washing equipment* and pressure reducing valves when such a device is required to maintain 60 PSI or less within the system.

(End excerpt)

G- Public Information Programs

For the past 10 years, the District has implemented public information programs for their customers and will continue to provide winterization and water conservation tips during power outages in the quarterly newsletter. Public outreach and education includes: outreach campaigns in the quarterly newsletter, tips on the District's website, Facebook and various events through the TWSA membership. Public information booths reguarding water conservation are set up at public events such as Earth Day, SnowFest NTPUD Pancake Breakfast and Music on the Beach. Through the popularity of giveaways, website and Facbook hits, the District believes the Public Information Program has been effective. The District is 50% complete for the implementation of this BMP/DMM. The District has requested grants as well as District funding to meet the requirements of the MOU.

"Drink Tahoe Tap" Outreach Campaign

H- School Education Programs

In 2011, the District teamed with the Sierra Watershed Education Partnership (SWEP) to provide funding to develop and coordinate educational assemblies at all North Tahoe schools. These educational assemblies were adapted to meet the goals of the District's Conservation program. With the funds, SWEP developed cooperative partnerships for a regional water conservation outreach program and help to establish an Envirolution club at North Tahoe High. This on-going partnership with SWEP and the school education programs has proven to be effective by gauging the popularity and continued involvement of the Envirolution club. The District has applied for grant funding to assist in meeting the requirements of the MOU.

Envirolution Club

I- Conservation Programs for Commercial, Industrial, and Institutional Accounts

The District has implemented on-going conservation programs for commercial, industrial, and institutional accounts for their customers. All commercial, industrial, and institutional accounts are metered and the District has a tiered rate structure to encourage conservation. The District began metering in 1984; customers were charge per 1,000 gallons in excess of the allowed amount per meter size. On January 14, 2003, the District enacted a two-tier rate system for water use over the allowed amount.

Additional conservation programs include the low-flow toilet rebate credit program for commercial customers which began May 1, 2013. The District plans on tracking savings for the low-flow toilet rebate program to compare in 2014. The metering is ongoing; however, new customers are not eligible for the toilet rebate credit program since the building code requires low flow plumbing fixtures on all new construction. Together with the Tahoe Resource Conservation District, the District will also be conducting a water wise landscaping workshop in the summer of 2013.

The District is 100% complete for the implementation of this BMP/DMM.

J- Wholesale Agency Programs

The District is currently exempted from this BMP/DMM as it is not a water wholesaler.

K- Conservation Pricing

The District has and continues to implement conservation pricing for their customers. As mentioned above, the District began metering in 1984; customers were charge per 1,000 gallons in excess of the allowed amount per meter size. On January 14, 2003, the District enacted a two-tier rate system for water use over the allowed amount. The tier water rates are available at http://ntpud.org/rate-information. The District is 100% complete for the implementation of this BMP/DMM within the first year of the MOU.

L- Water Conservation Coordinator

Currently, District staff in the Executive Office, Engineering Department, and Utility Operations Department share the duties of a typical "Conservation Coordinator". These people report to the General Manager, Paul Schultz, for program implementations. Together, these people coordinate and implement the various residential and commercial programs. These programs include outreach and education; school education; low-flow toilet rebates; leak detection on both the District's water mains and customer's side of the meter; customer leak notifications; submittal of grant applications; and grant administration. The District is also a voting member for the Tahoe Sierra Integrated Regional Water Management group. The District will continue to implement this BMP/DMM as a shared responsibility of existing staff.

M- Water Waste Prohibitions

The District has and will continue to implement conservation pricing for their customers. In addition, wasting water is part of the District's Water Ordinance. If a customer fails to meet the Water Conservation provision, the customer is in violation of the Ordinance. The District began metering in 1984, customers were charge per 1,000 gallons in excess of the allowed amount per meter size. On January 14, 2003, the District enacted a two-tier rate system for water use over the allowed amount. The tier water rates are available at http://ntpud.org/rate-information. The District is 100% complete for the implementation of this BMP/DMM.

N- Residential Ultra-Low Flush Toilet Replacement Programs

In Novemner 2012, the District implemented the residential ULFT replacement program for their customers. This program will be on-going until the current grant money is exhausted. To date, the District has replaced 25 ULFT and will continue to track savings for the program for comparison in 2014.

The District estimates a conservation savings of 5-15 gpcd.

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Stream and Ground-Water Monitoring Program, Lake Tahoe Basin, Nevada and California, USGS and TRPA, June 1997.

Tahoe Sierra Integrated Management Plan, Tahoe Resource Conservation District, July 19, 2007.

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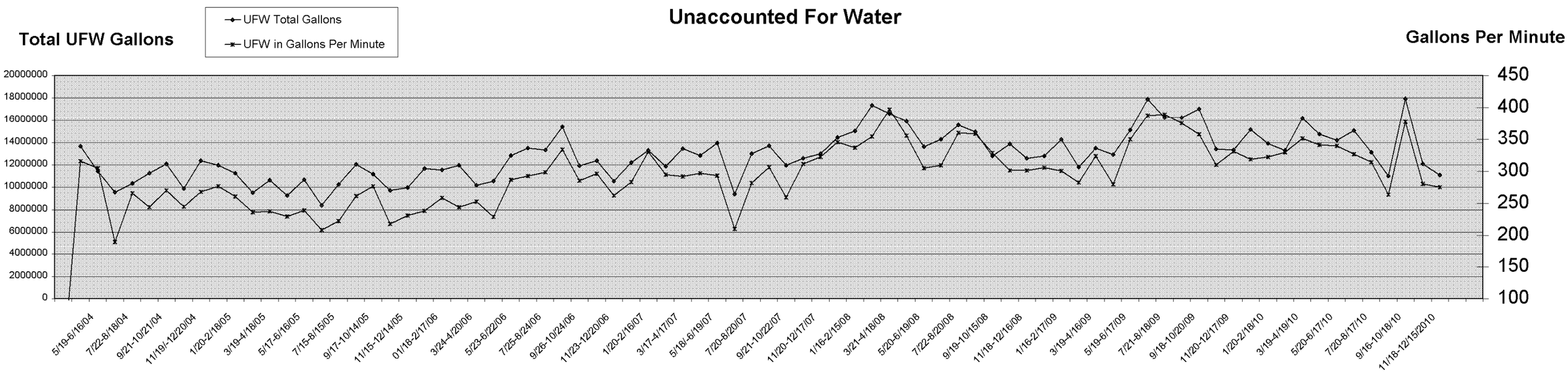
Appendix A – Unaccounted-for Water Graph


Unaccounted For Water
UFW Total Gallons
UFW in Gallons Per Minute
Total UFW Gallons
Gallons Per Minute
20000000
18000000
16000000
14000000
12000000
10000000
8000000
6000000
4000000
2000000
0
450
400
350
300
250
200
150
100
5/19-6/16/04
7/22-8/18/04
9/21-10/21/04
11/19/-12/20/04
1/20-2/18/05
3/19-4/18/05
5/17-6/16/05
7/15-8/15/05
9/17-10/14/05
11/15-12/14/05
01/18-2/17/06
3/24-4/20/06
5/23-6/22/06
7/25-8/24/06
9/26-10/24/06
11/23-12/20/06
1/20-2/16/07
3/17-4/17/07
5/18/-6/19/07
7/20-8/20/07
9/21-10/22/07
11/20-12/17/07
1/16-2/15/08
3/21-4/18/08
5/20-6/19/08
7/22-8/20/08
9/19-10/15/08
11/18-12/16/08
1/16-2/17/09
3/19-4/16/09
5/19-6/17/09
7/21-8/18/09
9/18-10/20/09
11/20-12/17/09
1/20-2/18/10
3/19-4/19/10
5/20-6/17/10
7/20-8/17/10
9/16-10/18/10
11/18-12/15/2010

Appendix B – Mutual Emergency Aid Agreement

AGREEMENT FOR MUTUAL EMERGENCY AID

This Agreement is made and entered into on the dates set forth below by and between the public agencies set forth below.

WHEREAS, the agencies party to this Agreement maintain and operate sewage and/or water collection, transportation and treatment facilities in the Lake Tahoe-Truckee areas; and

WHEREAS, the parties hereto have heretofor engaged in an informal policy of mutual cooperation wherein the resources of each were available to the other on an as-available basis for the purposes of minimizing environmental damage due to leakage from or destruction of such facilities and of promoting public health; and

WHEREAS, it is the desire of the parties hereto to execute a mutual aid agreement wherein the policy of mutual cooperation is formalized and expanded to meet projected needs of the parties.

NOW, THEREFORE, the parties hereto mutually agree as follows:

1. To furnish to each other personnel trained in the emergency and operation and/or repair of sewage and/or water collection, transportation and treatment facilities, together with equipment, materials and supplies required for such operation and/or repair as may be necessary during emergency conditions.

2. To provide such emergency aid within the ability of the agencies party to this Agreement, provided, however, that no party shall be required to deplete its own resources, personnel, services or facilities to the detriment of its normal responsibilities or the detriment of anticipated needs. No agency shall incur any liability orbe found at fault for failure to furnish personnel, equipment, materials or supplies when such are available. In addition, each agency shall have the right, at the sole discretion of said agency, to order any personnel, equipment, materials or supplies furnished to another agency be returned to the furnishing agency, without any liability for said order.

3. That no response to an emergency aid request provided for in this Agreement will be made by any party hereto unless such request is received through established communication channels and made by a previously designated responsible official of the agency requesting such aid. The Manager of each agency shall be deemed a responsible official and shall have the authority to designate alternate responsible officials to other agencies. No such designation shall be effective until received, in writing, by other agencies.

4. That any emergency aid extended under this Agreement is extended with the express understanding that the responsible local official (in whose jurisdiction and incident requiring emergency aid has occurred) shall remain in charge at such incident including the direction of personnel and equipment provided through the operation of this Emergency Aid Agreement. Any agency providing personnel or equipment may require that equipment be furnished with operators or that supervisory or safety personnel be furnished with the personnel and/or equipment.

5. That at the sole discretion of the agency supplying aid, the benefiting agency shall pay each agency supplying aid monthly, on receipt of invoice, costs for the equipment, personnel, materials and supplies furnished. These costs shall be computed in accordance with the schedule of rates shown in Exhibit "A" attached hereto and incorporated herein by this reference.

6. That the benefited agency will indemnify and hold harmless each supplying agency against all liability and claims for damages, personal injury and death arising out of the use of vehicles, equipment or other property, or personnel of the supplying agency by the benefited agency, except where vehicles, equipment or other property, or personnel remain within the control of the supplying agency, in which case the supplying agency will indemnify and hold harmless the benefited agency against all such liability and claims.

That each agency shall maintain coverage for liability, property damage, and worker's compensation for industrial injury or illness through insurance or self-insurance, including coverage for its equipment and employees when used by other agencies under this Agreement. Any agency party to this Agreement shall have the right to evidence of such coverage upon request.

7. That this Agreement shall not operate to merge any of the parties hereto, to subject any of the parties hereto to the jurisdiction of any regulatory agency not having jurisdiction in the absence of this Agreement, or to require that any party hereto cooperate with or report to any agency not a party to this Agreement.

8. That this Agreement shall become effective as to each party upon execution by said party and shall remain in full force and effect as to each party until terminated by said party. Any party hereto may terminate its rights and obligations under this Agreement by giving all other parties thirty (30) days prior written notice, however such termination shall not affect the rights and obligations of the remaining parties hereto or any rights and obligations of the withdrawing party occurring prior to the effective date of termination.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the days and years set forth below.

ALPINE SPRINGS COUNTY WATER DISTRICT

Date: 8/6/82 By: John M Bergenski

Attest:

DOUGLAS COUNTY SEWER IMPROVEMENT DIST. NO. 1

Date: 8/16/83 By: James B. Ward

Attest: Ralph Kinney

INCLINE VILLAGE GENERAL IMPROVEMENT DISTRICT

Date: 8-11-83 By: Jane Maxfield

Attest:

KINGSBURY GENERAL IMPROVEMENT DISTRICT

Date: 8-16-83 By: R W Westhoff

Attest: William Bigham

NORTH TAHOE PUBLIC UTILITY DISTRICT

Date: 7-6-82 By:

Attest:

PLACER COUNTY SERVICE AREA 21, NORTHSTAR

Date: 8-9-83 By: Robert P. Mahan

Attest:

Antoinette Sharp

ROUND HILL GENERAL IMPROVEMENT DISTRICT

Date: 18 Aug 83 By: Donald W Kelly

Attest:

William Laughlin

SOUTH TAHOE PUBLIC UTILITY DISTRICT

Date: 8-18-83 By: James R. Jones

Attest:

Mary D. Ambrose

SQUAW VALLEY COUNTY WATER DISTRICT

Date: 7-30-82 By: James H. Harrison

Attest:

Carla A. Jackson, Secretary

TAHOE CITY PUBLIC UTILITY DISTRICT

Date: 9/2/82 By: Preston R. Kelley

Attest:

Norman Winkenstein

TAHOE DOUGLAS SEWER DISTRICT

Date: 8/19/83 By: [illegible]

Attest:

Jane S. Sauer

TAHOE - TRUCKEE SANITATION AGENCY

Date: 8/10/83 By: Albert J. Dougherty

Attest:

Betty Lemmon

TRUCKEE SANITARY DISTRICT

Date: 8-2-83 By: Ron Sweet

Attest:

Jack Marquette

APPROVED:

BRIAN MC KAY
ATTORNEY GENERAL
State of Nevada

Dated: 9-29-83 by: Scott W. Doyle

EXHIBIT "A"

Equipment Rate Schedule

Dump Truck	$15/hr - $75/day
Vactor Jet Rodder	$75/hr - w/two operators
Backhoe	$30/hr - w/two operators
Construction Truck, Flatbed	$15/hr - $75/day
Hydraulic Flusher	$40/hr - w/two operators
T V System	$50/hr - w/three operators
T V & Grouting System	$60/hr - w/three operators
Compressor Truck w/Tools	$20/hr - $100/day
Rodding Truck	$25/hr - w/operator
10" Pump w/Trailer w/Hoses	$20/hr - $100/day
6" Pump w/Trailer w/Hoses	$15/hr - $75/day
3" Diaphragm Pump w/Hoses	$12/hr - $60/day
2" Centrifical Pump w/Hoses	$7/hr - $35/day
Generator w/Trailer	$15/hr - $75/day
Compactor Wacker	$10/hr - $50/day
Compactor, Plate Vibrating	$10/hr - $50/day
Pipe Locator, Goldak TR-4	$5/hr - $25/day
Pipe Locator, Goldak Ferret	$10/hr - $50/day
Metal Locator, Goldak 720	$3/hr - $15/day
Leak Detector, Goldak 777	$10/hr - $50/day
Concrete Mixer	$5/hr - $30/day
Pipe Saw, Homelite	$4/hr - $25/day plus blade
Welder, Marquett w/leads	$10/hr - $50/day
Pneumatic Drill w/attachments	$5/hr - $30/day
Steam Cleaner	$8/hr - $40/day
Sand Blaster	$5/hr - $30/day plus sand
Recorder, Pressure (Bristol)	$4/hr - $20/day
Water Meter Test Kit Hersey	$4/hr - $20/day
Rodder, Gasoline Portable	$5/hr - w/operator
Wet Tap Machine, Mueller	$5/hr - $30/day
Pickup Truck 2 WD	$5/hr - $30/day
Pickup Truck 4 WD	$6/hr - $40/day
Electrical SV Truck 4 WD	$7/hr - $50/day

All labor will be billed at actual rate paid plus 25% for benefits

All expendable materials will be billed at cost.

Appendix C – Water Quality Analysis Report

Water Quality Analysis Report 2005

Tahoe Main System System # 3110001

Contaminant	MCL/UNITS	PHG (MCLG)	Lake Tahoe Nat'l Ave.	Groundwater Park Well	Year of Sampling	Violation	Typical Source of Contaminant
Turbidity (NTU)	TT	n/a	0.159	0.25	2005 / 2004		Soil runoff
National Ave. Range of Detection:			.113 - .203				
Microbial Contaminants							
Total Coliforms	1 Sample	0	156 Tests / 156 Absence		2005		Naturally present in the environment
Inorganics							
Aluminum	1000 ug/L	600 ug/L	ND	ND	2005 / 2004		Erosion of natural deposits
Antimony	6 ug/L	20 ug/L	ND	ND	2005/2004		Discharge from petroleum
Arsenic	50 ug/L	4 ppt	ND	ND	2005/2004		Erosion of nat'rl deposits; runoff of prod. wastes
Asbestos	7 MFL	7MFL	ND	ND	2005		Corrosion-absestos cement mains; nat'rl deposits
Barium	1 mg/L	(2) mg/L	0.0114	0.0513	2005/2004		Oil drilling wastes; erosion of nat'rl deposits
Beryllium	4 ug/L	1 ug/L	ND	ND	2005/2004		Discharge from metal refineries, & industries
Cadmium	5 ug/L	.07 ug/L	ND	ND	2005/2004		Internal corrosion of galvanized pipes, etc.
Chromium (total)	50 ug/L	-	ND	ND	2005/2004		Dischg -steel/pulp mills, chrome plating,erosion
Cyanide (CN)	150 ug/L	150 ug/L	ND	ND	2005/2004		Dischg -steel/metal, plastic and fertilizer factories
Fluoride (By Temp.) naturally occuring	2000 ug/L	1000 ug/L	ND	ND	2005/2004		Erosion nat'rl deposits; fertilizer/aluminum factories
Mercury	2 ug/L	1.2 ug/L	ND	ND	2005/2004		Erosion nat'rl deposits; dischg -refineries/factories
Nickel	100 ug/L	12 ug/L	ND	ND	2005/2004		Erosion nat'rl deposits; discharge from metal
Selenium	50 ug/L	-	ND	ND	2005/2004		Dischg-petro,glass,metal refineries; livestock feed
Thallium	2 ug/L	0.1 ug/L	ND	ND	2005/2004		Leaching from ore processing sites; factories
Secondary Standards- Aesthetic Standards Established by the State of California, Dept. of Health Services							
Color	15 Units	-	3	3	2005/2004		Erosion of natural deposits
Copper	1000 ugL	170 ug/L	ND	ND	2005/2004		Internal corrosion-plumbing; erosion nat'rl deposits.
Foaming Agents (MBAS)	0.5 mg/L	-	ND	ND	2005/2004		Erosion of natural deposits
Iron	300 ug/L	-	ND	ND	2005/2004		Erosion of natural deposits; Leaching from pipes
Manganese	50 ug/L	-	11	ND	2005/2004		Erosion of natural deposits
MTBE	5 ug/L	13 ug/L	ND	ND	2005		Leaking underground fuel tanks
Odor Threshold @ 60 C	3 Ton	-	ND	ND	2005/2004		Erosion of natural deposits
Silver	100 ug/L	-	ND	ND	2005/2004		Erosion of natural deposits
Turbidity	5 NTU	-	0.4	ND	2005/2004		Movement of sediments and minute deposits
Zinc	5000 ug/L	-	ND	ND	2005/2004		Erosion of natural deposits; fertilizer runoff
Secondary Standards- Aesthetic Standards Established by the State of California, Dept. of Health Services							
Chloride	250-500 mg/L	-	1.8	0.7	2005/2004		Erosion of natural deposits
Specific Conductance (E.C.)	2,200 u/S	-	93.6	199	2005/2004		
Sulfate	250-500 mg/L	-	1.8	ND	2005/2004		Erosion of natural deposits
Total Dissolved Solids (TDS)	1500 mg/L	-	63.0	154	2005/2004		Erosion of natural deposits
General Mineral							
Bicarbonate	None / mg/L	-	53.7	131	2005/2004		Erosion of natural deposits
Carbonate (CO3)	None / mg/L	-	ND	ND	2005/2004		
Calcium	None / mg/L	-	8.3	18.6	2005/2004		Erosion of natural deposits
Hardness (Total) as CaCo3	None / mg/L	-	30	72	2005/2004		Erosion of natural deposits
Hydroxide (OH)	None / mg/L	-	ND	ND	2005/2004		
Magnesium	None / mg/L	-	2.1	6.3	2005/2004		Erosion of natural deposits
pH Desired Range:	6.5 - 8.5	-	8.0	8.1	2005/2004		Erosion of natural deposits; some water treatments
Nitrate-NO3	45 mg/L	45 mg/L	ND	0.17	2005/2004		Runoff & leaching from fertilizers, septic tanks,sewage
Nitrite- As N	1000 ug/L	400 ug/L	ND		2005		
Sodium	None / mg/L	-	5.1	10.5	2005/2004		Erosion of natural deposits
Tot. Alkalinity	None / mg/L	-	44.0	107	2005/2004		Erosion of natural deposits
DBPR (Disinfection By-Products)							
Total Trihalomethanes (TTHM)	80 ug/L		8.3, 8.4, 9.2, 7.7, Annual Avg. = 8.4		2005		By-product of drinking water chlorination
Haloacetic Acids (HAA5)	60 ug/L		5.0, 5.2, 5.7, 4.0, Annual Avg. = 5.0		2005		By-product of drinking water chlorination
Regulated/Unregulated Volatile & Non-Volatile Organics & Synthenic Organic Chemicals							
EPA 502.2 - 64 Chemicals Tested	ug/L		ND	ND	2005		Discharge from industrial & chemical factories
EPA -5 1613B-Tetra (SOC)	ug/L			ND	2005		Discharge from industrial & chemical factories

Treatment Techniques: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. In August of 2002 the Di

WATER QUALITY ANALYSIS REPORT FOR 2005
DOLLAR COVE SYSTEM #3110036
BEING SUPPLIED THROUGH T.C.P.U.D.

Contaminant	MCL/UNIT	PHG (MCLG)	HIGHLANDS WELL #1	HIGHLANDS WELL #2	T.C. #2 LOWER WELL	T.C. #2 MIDDLE WELL	TAHOE TAVERN WELL	Year of Sampling	Typical Source of Contaminant
Microbial Contaminants									
Total Coliforms	1 Sample	0	No. Tahoe P.U.D. - Conducted within our District = 12 Tests - 12 Absence					2005	Naturally present in the environment
			Tahoe City P.U.D. - Conducted within their System = 128 Tests / 127 Absence / 1 Presence					2005	
Inorganics									
Aluminum	1000 ug/L	600 ug/L	ND	ND	ND	ND	ND	2005	Erosion of natural deposits
Arsenic	50 ug/L	4 ppt	5	3.1	ND	2.1	ND	2005	Erosion of nat'rl deposits; runoff of prod. wastes
Barium	1 mg/L	(2) mg/L	ND	ND	ND	ND	23.9	2005	Oil drilling wastes; erosion of nat'rl deposits
Chromium (total)	50 ug/L	-	ND	ND	ND	ND	ND	2005	Dischg -steel/pulp mills, chrome plating,erosion
Secondary Standards - Aesthetic Standards Established by the State of California, Dept. of Health Services									
Aluminum	200 ug/L	-	ND	ND	ND	ND	ND	2005	
Color	15 Units	-	3	4	<3	<3	<3	2005	
Corrosivity	Non Corrosive		11	10.94	7.8	11.1	10.9	2005	
Iron	300 ug/L	-	ND	86	ND	ND	ND	2005	
Maganese	50 ug/L	-	ND	ND	ND	ND	ND	2005	
Odor	3 TON		ND	ND	ND	ND	ND	2005	
Turbidity	5 NTU	-	ND	ND	0.35	0.3	0.6	2005	
Zinc	5000 ug/L	-	ND	ND	ND	ND	ND	2005	
General Mineral									
Bicarbonate	None	-	112	99.7	91.9	83.9	108	2005	
Calcium	None	-	91.4	81.7	75.4	68.8	88.5	2005	
Hardness (Total) as CaCo3	None	-	7.8	7.8	7.8	7.8	7.3	2005	
Magnesium	None	-	7.6	8.1	ND	ND	17	2005	
Nitrate-NO3	45 mg/L	45 mg/L	ND	ND	ND	ND	ND	2005	
pH Desired Range:	6.5 -8.5	-	5.9	5.7	ND	6.4	7.7	2005	
Sodium	None	-	14.7	10.5	4.7	4.6	4.9	2005	
Total Alkalinity	None	-	43	44	ND	553	74	2005	
Secondary Standards - Aesthetic Standards Established by the State of California, Dept. of Health Services									
Total Dissolved Solids	500-1000 mg/L	-	139	139	98	96	77	2005	
Specific Conductance	900-1600 u/S	-	173	173	140	138	96.5	2005	
Chloride	250-500 mg/L	-	0.5	0.5	0.4	0.3	3.5	2005	
Sulfate	250-500 mg/L	-	1.4	1	1.9	2.6	0.3	2005	
Natural Radioactivity									
Radium 228	2 pCi/l								
DBPR (Disinfection By Products)									
Total Trihalomethanes (TTHM) Site #1	80 ug/L		ND					2005	By product of drinking water chlorination
Haloacetic Acids (HAA5) Site #1	60 ug/L		ND					2005	

Terms and Abbreviations

MCL = Maximum Contaminant Level - The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the PhG's and MCLG's as is economically or technologically feasible.

PHG = Public Health Goal - The level of a contamiminant in drinking water below which there is no known or expected risk to health. PHG's are set by the California Environmental Protection Agency.

MCLG = Maximum Contaminant Level Goal - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's are set by the U.S. Environmental Protection Agency.

Primary Drinking Water Standard - Primary MCL's, specific treatment techniques adopted in lieu of primary MCL's, and monitoring and reporting requirements for MCL's that are specified in regulations.

Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water.

< = Less Than **>** = Greater Than
pCi/L = Pico Curies Per Liter
mg/L = Milligrams Per Liter (Parts Per Million)
ug/L = Micrograms Per Liter (Parts Per Billion)
ppt = Parts Per Trillion
ND = Not Detected
n/a = Not applicable
NTU = Nephelometric Turbidity Unit
TON = Threshold Odor Units

Water Quality Analysis Report 2005
Carnelian Woods System # 3110023

Contaminant	MCL/UNITS	PHG (MCLG)	Groundwater Carnelian Well		Year of Sampling	Typical Source of Contaminant
Turbidity (NTU)	TT	n/a	0.20		2005	Soil runoff
Microbial Contaminants						
Total Coliforms	1 Sample	0	12 Tests / 12 ABSENCE		2005	Naturally present in the environment
Inorganics						
Asbestos	7 MFL	-	ND		2005	
General Mineral						
Nitrate-NO3	45 mg/L	45 mg/L	ND		2005	

Water Quality Analysis Report 2004

Carnelian Woods System #3110023

Contaminant	MCL/UNITS	PHG (MCLG)	Groundwater Carnelian Well	Year of Sampling	Violation	Typical Source of Contaminant
Turbidity (NTU)	TT	n/a	0.20	2004		Soil runoff
Microbial contaminants						
Total Coliforms	1 Sample	0	12 Tests / 12 ABSENT	2004		Naturally present in the environment
Inorganics						
Aluminum	1000 ug/L	600 ug/L	ND	2004		Erosion of natural deposits
Antimony	6 ug/L	20 ug/L	ND	2004		Discharge from petroleum
Arsenic	50 ug/L	4 ppt	ND	2004		Erosion of nat'rl deposits; runoff of prod. wastes
Barium	1000 ugL	2000 ug/L	0.0265	2004		Oil drilling wastes; erosion of nat'rl deposits
Beryllium	4 ug/L	1 ug/L	ND	2004		Discharge from metal refineries, & industries
Cadmium	5 ug/L	.07 ug/L	ND	2004		Internal corrosion of galvanized pipes, etc.
Chromium (total)	50 ug/L	-	ND	2004		Dischg -steel/pulp mills, chrome plating,erosion
Cyanide (CN)	150 ug/L	150 ug/L	ND	2004		Dischg -steel/metal, plastic and fertilizer factories
Fluoride (By Temp.) naturally occuring	2000 ug/L	1000 ug/L	ND	2004		Erosion nat'rl deposits; fertilizer/aluminum factories
Lead	N/A	2 ug/L	0.0096	2004		Corrosion of household plumbing
Mercury	2 ug/L	1.2 ug/L	ND	2004		Erosion nat'rl deposits; dischg -refineries/factories
Nickel	100 ug/L	12 ug/L	ND	2004		Erosion nat'rl deposits; discharge from metal
Selenium	50 ug/L	-	ND	2004		Dischg-petro,glass,metal refineries; livestock feed
Thallium	2 ug/L	0.1 ug/L	ND	2004		Leaching from ore processing sites; factories
Secondary Standards- Aesthetic Standards Established by the State of California, Dept. of Health Services						
Aluminum	1000 ugL	600 ug/L	ND	2004		Erosion of natural deposits
Color	15 UNITS	-	4	2004		Erosion of natural deposits
Copper	1000 ugL	170 ug/L	0.129	2004		Internal corrosion-plumbing; erosion nat'rl deposits.
Foaming Agents (MBAS)	0.5 mg/L	-	ND	2004		Erosion of natural deposits
Iron	300 ug/L	-	0.377	2004		Erosion of natural deposits; Leaching from pipes
Manganese	50 ug/L	-	ND	2004		Erosion of natural deposits
MTBE	5 ug/L	13 ug/L	ND	2004		Leaking underground fuel tanks
Odor Threshold @ 60 C	3 Ton	-	ND	2004		Erosion of natural deposits
Silver	100 ug/L	-	0.028	2004		Erosion of natural deposits
Turbidity	5 NTU	-	0.20	2004		Movement of sediments and minute deposits
Zinc	5000 ug/L	-	0.114	2004		Erosion of natural deposits; fertilizer runoff
Secondary Standards- Aesthetic Standards Established by the State of California, Dept. of Health Services						
Chloride	600 mg/L	-	0.4	2004		Erosion of natural deposits
Specific Conductance (E.C.)	2,200 u/S	-	174	2004		
Sulfate	600 mg/L	-	ND	2004		Erosion of natural deposits
Total dissolved solids (TDS)	1500 mg/L	-	119	2004		Erosion of natural deposits
General Mineral						
Bicarbonate	None / mg/L	-	112	2004		Erosion of natural deposits
Carbonate (CO3)	None / mg/L	-	ND	2004		
Calcium	None / mg/L	-	15.1	2004		Erosion of natural deposits
Hardness (Total) as CaCo3	None / mg/L	-	74	2004		Erosion of natural deposits
Hydroxide (OH)	None / mg/L	-	ND	2004		
Magnesium	None / mg/L	-	8.8	2004		Erosion of natural deposits
pH Desired Range:	6.5 - 8.5	-	7.3	2004		Erosion of natural deposits; some water treatments
MTBE's	.005 mg/L	-	ND	2004		Leaking underground fuel tanks
Nitrate-NO3	45 mg/L	45 mg/L	ND	2004		Runoff & leaching from fertilizers, septic tanks,sewage
Sodium	None / mg/L	-	5.5	2004		Erosion of natural deposits
Tot. Alkalinity	None / mg/L	-	91.4	2004		Erosion of natural deposits
Radioactivity						
Gross Alpha	15 pCi/L	0	-0.2	2004		Erosion of natural deposits
Regulated/Unregulated Volatile & Non-Volatile Organics						
EPA 502.2; 504.1; 505; 515.3; 525.2; 531.1;	ug/L	-	ND	2004		
EPA 547; 548.1; 549.2	ug/L	-	ND	2004		

Terms and Abbreviations

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Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water.

< = Less Than

> = Greater Than

mg/L = Milligrams Per Liter (Parts Per Million)

ug/L = Micrograms Per Liter (Parts Per Billion)

ppt = Parts Per Trillion

u/S = Microsiemens: Measure of electrical current flow through a solution

ND = Not Detected

n/a = Not applicable

pCi/L = Pico Curies Per Liter

NTU = Nephelometric Turbidity Unit

TON = Threshold Odor Units

Appendix D – BMP Based Method 4 GPCD Target Calculator, Certification for Compliance with Water Metering Requirements for Funding Application & California Urban Water Conservation Council Memorandum of Understanding AB 1420 Self-Certification Tables 1, 2 & 3

BMP-Based Method 4 GPCD Target Calculator

Color Key

User Input
Model Assumption
Model Calculation

Water Supplier:	NTPUD	
Hydrologic Region:	N. Lahontan	
Mid Point of Base Period	2010	*<<Assume 2010*
Baseline Population	5,305	*<<From UWMP Table 2-2*
Baseline Gross Water Use (AF)	1,485	*<<From UWMP Table 2-1*
Baseline Water Use (GPCD):	249.9	*<<Calculated*

BMP Savings (GPCD):

		Go To
BMP 1.2 Water Loss Control	-57.5	Calculator
BMP 1.3 Metering	0.0	Calculator
BMP 3.1 Residential Assistance	0.0	Calculator
BMP 3.2 Residential Landscape	0.0	Calculator
BMP 4 CII	-1.5	Calculator
BMP 5.2 Landscape Budgets	0.0	Calculator
Subtotal BMP Savings	***-59.0***	

Plumbing Device Saturation Savings (GPCD):

		Go To
Single Family Toilets	0.0	Calculator
Multi Family Toilets	0.0	Calculator
Residential Washers	0.0	Calculator
Residential Showerheads	0.0	Calculator
CII Toilets	0.0	Calculator
CII Urinals	0.0	Calculator
Subtotal Plumb. Device Savings	***0.0***	

GPCD Adjustment	-2.0	*<<Adjustment needed to achieve statewide 20% reduction.*
Total Savings (GPCD):	-61.0	
Total Savings (% of Baseline):	-24.4%	
BMP-Based Target (GPCD):	**188.8**	

Comparison to Methods 1 and 3 Targets

	Target	% Savings	
BMP-Based Target:	188.8	-24.4%	
Method 1	199.9	-20.0%	*BMP-based target is 11.1 gpcd less than Method 1 target.*
Method 3	164.4	-34.2%	*BMP-based target is 24.5 gpcd greater than Method 3 target.*

California State Water Resources Control Board
California Department of Water Resources
California Department of Public Health

CERTIFICATION FOR
COMPLIANCE WITH WATER METERING REQUIREMENTS
FOR FUNDING APPLICATIONS

Funding Agency name: Department of Water Resources

Funding Program name: IRWM Proposition 84

Applicant (Agency name): North Tahoe Public Utility District

Project Title (as shown on application form): Tahoe Sierra IRWMP

Please check one of the boxes below and sign and date this form.

☐ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the agency is not an urban water supplier, as that term is understood pursuant to the provisions of section 529.5 of the Water Code.

☒ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the applicant agency has fully complied with the provisions of Division 1, Chapter 8, Article 3.5 of the California Water Code (sections 525 through 529.7 inclusive) and that ordinances, rules, or regulations have been duly adopted and are in effect as of this date.

I understand that the Funding Agency will rely on this signed certification in order to approve funding and that false and/or inaccurate representations in this Certification Statement may result in loss of all funds awarded to the applicant for its project. Additionally, for the aforementioned reasons, the Funding Agency may withhold disbursement of project funds, and/or pursue any other applicable legal remedy.

Paul A. Schultz, P.E.
Name of Authorized Representative
(Please print)

Signature

General Manager/CEO
Title

March 19, 2013
Date

AB 1420 Self- Certification Statement Table 1

Note: Table 1 documents Status of Past and Current BMP implementation.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1, and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1, and Table 2 and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory Paul A. Schultz, P.E. Title of Signatory General Manager/CEO Signature of signatory [signature] Date 3/19/13

Application Date:

Proposal Identification Number: CUWCC Member? Yes/No Yes

Has Urban Water Supplier submitted a 2005 Urban Water Management Plan? Yes/No No

Is the UWM Plan Deemed Complete by DWR? Yes/No No

Applicant Name: Tahoe Sierra IRWMP, Tahoe Resource Conservation District (Lead Agency), North Tahoe Public Utility District reportee

Project Title:

Applicant's Contact Information: Name: Suzi Gibbons Phone: 530-546-4212 E-mail: sgibbons@ntpud.org

Participants:

Retailer (List Below)	*Wholesaler (List Below)*
North Tahoe Public Utility District	

C1	C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
				BMP Implemented by Retailers and/or Wholesalers / *BMP*			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 1 Water Survey for Single/Multi-Family Residential Customers														
	✓	BMP 2 Residential Plumbing Retrofit														
✓	✓	BMP 3 System Water Audits, Leak Detection	Yes	NA	NA			X	NA	NA	NA	No	NA	NA	UWMP adopted June 14, 2011	Yes
✓	✓	BMP 3 Leak Repairs	Yes	NA	NA			X	NA	NA	NA	No	NA	NA	UWMP adopted June 14, 2011	Yes
	✓	BMP 4 Metering with Commodity Rates for All New connections	Yes	NA	NA			X	NA	NA	NA	Yes	NA	NA	UWMP adopted June 14, 2011	Yes
	✓	BMP 4 Retrofit of Existing Connections	Yes	NA	NA			X	NA	NA	NA	Yes	NA	NA	UWMP adopted June 14, 2011	Yes

C1	C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
				BMP Implemented by Retailers and/or Wholesalers / *BMP*			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
		✓	BMP 5 Large Landscape Conservation Programs and Incentives														
		✓	BMP 6 High-Efficiency Washing Machine Rebate Programs														
	✓	✓	BMP 7 Public Information	Yes	NA	NA			X	NA	NA	NA	No	NA	NA	UWMP adopted June 14, 2011	Yes
	✓	✓	BMP 8 School Education	Yes	NA	NA			X	NA	NA	NA	No	NA	NA	UWMP adopted June 14, 2011	Yes
		✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts														
	✓		BMP 10 Wholesale Agency Assistance Programs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		✓	BMP 11 Conservation Pricing	Yes	NA	NA			X	NA	NA	NA	Yes	NA	NA	UWMP adopted June 14, 2011	Yes
	✓	✓	BMP 12 Conservation Coordinator	Yes	NA	NA			X	NA	NA	NA	Yes	NA	NA	UWMP adopted June 14, 2011	Yes
		✓	BMP 13 Water Waste Prohibitions	Yes	NA	NA			X	NA	NA	NA	Yes	NA	NA	UWMP adopted June 14, 2011	Yes
		✓	BMP 14 Residential ULFT Replacement Programs														

***C6:** Wholesaler may also be a retailer (supplying water to end water users)
****C8, **C9, **, and C10:** Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.

(1) For details, please see: http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, and lack of legal authority criteria as detailed in the CUWCC MOU
(3) Non MOU signatories must submit to DWR reports and supporting documents in the same format as CUWCC.

AB 1420 Self- Certification Statement Table 2

Provide Schedule, Budget, and Finance Plan to Demonstrate Commitment to Implement All BMP's to Become in Compliance with BMP Implementation - Commencing Within 1st Year of Agreement for Which Applicant Receives Funds.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1 and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1 and Table 2, and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory Paul A. Schultz, P.E. Title of Signatory General Manager/CEO Signature of signatory Date 3/19/13

Application Date:

Proposal Identification Number:

CUWCC Member? Yes/No Yes

Applicant Name: NTPUD FOR TAHOE SIERRA IRWMP (TRCD Lead Agency)

Is the UWM Plan Deemed Complete by DWR? Yes/No No

Project Title:

Applicant's Contact Information: Name Suzi Gibbons, NTPUD, 530-546-4212

Participants:	Retailer (List Below)		
	North Tahoe Public Utility District		

C1	C2	C3	C4	C5	*C6	C7	C8	**C9	**C10	**C11	C12			C13	C14	C15	C16	C17	C18	C19
				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
1. Utility Operations Programs																				
1.11	✓	✓	BMP 12 Conservation Coordinator							X										
1.12		✓	BMP 13 Water Waste Prohibitions							X										
1.13	✓		BMP 10 Wholesale Agency Assistance Programs							X										
1.20	✓	✓	BMP 3 System Water Audits, Leak Detection/Repair	Yes	No	No	No			X				1/1/2009	50%	Ongoing	$50,000 annually	NTPUD funds & Prop 84 Grant Funds	Yes	Yes
1.30		✓	BMP 4 Metering with Commodity Rates for All New/Retrofit of Existing connections							X										
1.40		✓	BMP 11 Conservation Pricing							X										
2. Educational Programs																				
2.10	✓	✓	BMP 7 Public Information	Yes	No	No	No			X				1/1/2008	50%	On going	$20,000 annually	NTPUD funds & Prop 84 Grant Funds	Yes	Yes
2.20	✓	✓	BMP 8 School Education	Yes	No	No	No			X				8/1/2011	10%	On going	$20,000 annually	NTPUD funds & Prop 84 Grant Funds	Yes	Yes
3. Residential																				
3.11		✓	BMP 1 Indoor Water Survey for Single/Multi-Family Residential Customers																	
3.12			BMP 1 Outdoor Water Survey for Single/Multi-Family Residential Customers																	
3.20		✓	BMP 2 Residential Plumbing Retrofit																	
3.30		✓	BMP 6 High-Efficiency Washing Machine Rebate Programs																	
3.40		✓	BMP 14 Residential ULFT Replacement Programs																	

CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
				Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
4. Commercial, Industrial, Institutional																				
4.00		✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts												100%					
5. Landscape																				
5.00		✓	BMP 5 Large Landscape Conservation Programs and Incentives					NA	NA	NA				NA	NA					

*C6: Wholesaler may also be a retailer (supplying water to end water users)
**C9, ** C10, and **C11: Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.
(1) For details, please see http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, or lack of legal authority, as detailed in the CUWCC MOU.

AB 1420 Compliance Table 3

Note: This Table may be completed only if Funding Agency provides cost-share grant funds for BMP implementation and only if Applicant requests such funds.

Applicant: Tahoe Sierra IRWMP, Tahoe Resource Conservation District (Lead Agency), North Tahoe Public
Pin Number:

FILL IN THE SHADED AREAS ONLY. THE TABLE IS FORMATTED WITH FORMULAS.

(I)	Year 1 $	Year 2 $	Year 3 $	Total $	Contingency % (III)	Cost + Contingency = $ (IV)	Applicant cost share = $ (V)	State Share = $ (VI)	Life of investment in years (VII)	Annualized Costs (IX)
Foundational: Utility Operations Programs										
Operations (BMP 12 Conservation Coordinator)										
subtask 1-	$85,000	$85,000	$85,000	$255,000	10%	$280,500	$0	$280,500		-----
subtask 2-				-		-		-		-----
Subtotal	$85,000	$85,000	$85,000	$255,000		$280,500	--	$280,500		$0
Operations (BMP 13 Water Waste Prohibitions)										
subtask 1-	N/A			-				$0		-----
subtask 2-				-		-		-		-----
Subtotal	--	--		-		--	--	--		$0
Operations (BMP 10 Wholesale Agency Assistance Programs)										
subtask 1-				-	10%	#VALUE!	$0	#VALUE!		-----
subtask 2-				-		-		-		-----
Subtotal	--	--	--	-		#VALUE!	--	#VALUE!		$0
Water Loss Control (BMP 3 System Water Audits, Leak Detection/Repair)										
subtask 1-	$50,000	$50,000	$50,000	$150,000	10%	$165,000	$82,500	$82,500		-----
subtask 2-				-		-		-		-----
Subtotal	$50,000	$50,000		$100,000		$165,000	$82,500	$82,500		$0
Metering (BMP 4 Metering with Commodity Rates for All New/Retrofit of Existing connections)										
subtask 1-	N/A			-		-		-		-----
subtask 2-				-		-		-		-----
Subtotal	--	--		-		--	--			$0
Pricing (BMP 11 Conservation Pricing)										
subtask 1-	N/A			-		-		-		-----
subtask 2-				-		-		-		-----
Subtotal				-						
Foundational: Educational Programs										
Public Information Programs (BMP 7 Public Information)										
subtask 1-	$20,000	$20,000	$20,000	$60,000	10%	$66,000	$33,000	$33,000		-----
subtask 2-				-		-		-		-----

(I)	Year 1 $	Year 2 $	Year 3 $	Total $	Contingency % (III)	Cost + Contingency = $ (IV)	Applicant cost share = $ (V)	State Share = $ (VI)	Life of investment in years (VII)	Annualized Costs (IX)
Subtotal	$20,000	$20,000		$40,000		$66,000	$33,000	$33,000		$0
School Education Programs (BMP 8 School Education)										
subtask 1-	$20,000	$20,000	$20,000	$60,000	10%	$66,000	$0	$66,000		-----
subtask 2-				-		-		-		-----
Subtotal	$20,000	$20,000		$40,000		$66,000	--	$66,000		$0
Programmatic: Residential										
Residential-Indoor (BMP 1 Indoor Water Survey for Single/Multi-Family Residential Customers)										
subtask 1-	$100,000			$100,000	10%	$110,000	$0	$110,000		-----
subtask 2-				-		-		-		-----
Subtotal	$100,000	--		$100,000		$110,000	--	$110,000		$0
Residential-Outdoor (BMP 1 Outdoor Water Survey for Single/Multi-Family Residential Customers)										
subtask 1-	$100,000			$100,000	10%	$110,000	$0	$110,000		-----
subtask 2-				-		-		-		-----
Subtotal	$100,000	--		$100,000		$110,000	--	$110,000		$0
Residential-Plumbing (BMP 2 Residential Plumbing Retrofit)										
subtask 1-	$100,000			$100,000	10%	$110,000	$0	$110,000		$110,000
subtask 2-				-		-		-		-
Subtotal	$100,000	--		$100,000		$110,000	--	$110,000		$110,000
Residential-Financial Incentive Programs (BMP 6 High-Efficiency Washing Machine Rebate Programs)										
subtask 1-	$100,000			$100,000	10%	$110,000	$0	$110,000		$110,000
subtask 2-				-		-		-		-
Subtotal	$100,000	--		$100,000		$110,000	--	$110,000		$110,000
Residential-UFLT Programs (BMP 14 Residential ULFT Replacement Programs)										
subtask 1-	$100,000			$100,000	10%	$110,000	$0	$110,000		-----
subtask 2-				-		-		-		-----
Subtotal	$100,000	--		$100,000		$110,000	--	$110,000		$0
Programmatic: Commercial, Industrial, Institutional										
Conservation Programs (BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts)										
subtask 1-	N/A			-		-	$0	-		-----
subtask 2-				-		-		-		-----
Subtotal	--	--		-		--	--			$0
Programmatic: Landscape										
Conservation Programs (BMP 5 Large Landscape Conservation Programs and Incentives)										
subtask 1-	N/A			-		-	$0	-		-
subtask 2-				-		-		-		-
Subtotal	--	--		-		--	--			$0
TOTAL	$0	$0		$0		#VALUE!	$115,500	#VALUE!	**$7,975,000**	
Percentage							**#VALUE!**	**100%**		

Appendix E – District Board of Directors Presentation

REVISED 2010 URBAN WATER MANAGEMENT PLAN

PUBLIC HEARING
JUNE 11, 2013

REVISED 2010 URBAN WATER MANAGEMENT PLAN

Urban Water Management Plan (UWMP) Background

- The UWMP Act (California Water Code 10610) requires urban water suppliers to report, describe and evaluate the following over a 20- or 25-year period:
  - Water deliveries and uses
  - Water supply sources
  - Efficient water uses; conservation efforts
  - Demand Management Measures (DMM's), including implementation strategy and schedule
- State of California Urban Water Management Planning Act requires water suppliers to submit UWMP to the California Department of Water Resources every 5 years on years ending in a '0 or '5.

REVISED 2010 URBAN WATER MANAGEMENT PLAN

Why is the UWMP required?

- NTPUD provides water service to a population of approximately 7,500 on the North Shore of Lake Tahoe
- Lake Tahoe is NTPUD's primary source of water, serving commercial, residential, and recreational customers
- Water suppliers with 3,000 or more connections are required to submit an UWMP
- NTPUD has approximately 3,872 connections

REVISED 2010 URBAN WATER MANAGEMENT PLAN

What information does the UWMP contain?

- Physical description and population of the District
- Water demands, baseline and targets, water demand projections and conservation plans
- System supplies, water supply reliability, system projects, water shortage contingency planning and drought planning
- Demand management measures

REVISED 2010 URBAN WATER MANAGEMENT PLAN

Why was the UWMP revised?

- NTPUD Board of Directors adopted original version of 2010 UWMP on June 14, 2011
- After adoption, UWMP was submitted to California Department of Water Resources (DWR) for review and approval
- DWR had significant comments to UWMP which required numerous discussions and revisions
- DWR is now satisfied with the UWMP and authorized NTPUD to move forward with re-adopting the plan

REVISED 2010 URBAN WATER MANAGEMENT PLAN

What information was changed in the revised UWMP?

- Measurement of population projections within District based on U.S. Census Bureau data
- Additional wastewater collection and treatment data was included
- Demand management measures were expanded upon and will be measured by gallons per capita per day method

REVISED 2010 URBAN WATER MANAGEMENT PLAN

What documents were reviewed to create the UWMP?

- "Guidebook to Assist Urban Water Suppliers to Prepare 2010 UWMP", DWR 2010
- "Master Water Plan", NTPUD Staff, dated 1999
- "Hydraulic Model Documentation Report", Camp Dresser McKee (CDM), dated September 2006
- "Water Distribution System Deficiency Study Technical Memorandum", CDM, dated November 2006
- "Kings Beach Grid Water Line Replacement Project", Auerbach, dated Sept 2007
- "Sanitary Survey and Watershed Control Program, TWSA, 2009
- "Sewer Master Plan", Kennedy/Jenks/Chilton Consulting Engineers, dated 1991
- California Urban Water Conservation Council Self-Certification Tables

REVISED 2010 URBAN WATER MANAGEMENT PLAN

How will the UWMP be used by the NTPUD?

- As a reference to provide supporting documentation for grant funding
- As a tool to comply with Federal and State Mandates
- 20 by 20 Plan: Reduce water consumption 20% by 2020
- As a summary document of previous studies and reports
- As the base document for all future UWMP updates (required every 5 years)

REVISED 2010 URBAN WATER MANAGEMENT PLAN

UWMP Findings

District Growth

2010 Total Water Accounts = 3,872
2030 Projected Water Accounts = 4,478

- Based on an Annual Water Connection Growth Rate of .74%

District Water Supply

The projected surface water supply under normal, single-dry, and multiple-dry water years are expected to be 100% reliable from 2010 - 2030.

District Preparedness

The District has the following plans:

- Emergency Response Plan
- Water Shortage Emergency Plan (as part of UWMP)
- Mutual Aid Agreement

District Conservation

- Residential plumbing retrofit
- Fully metered water system
- Entered into MOU with California Urban Water Conservation Council to implement water conservation BMPs
- Current Conservation and Outreach programs

REVISED 2010 URBAN WATER MANAGEMENT PLAN

Next Steps?

May 24: Open Public Review Period

June 11: Public Hearing at NTPUD Board Meeting of DRAFT UWMP

July 9: Close Public Review Period

July 9: Board Adopts FINAL REVISED UWMP

July 15: NTPUD Submit Adopted UWMP to DWR

Aug 8: Adopted UWMP Submittal Deadline DWR

Sept 7: Public Review of DWR Approved UWMP

Oct 7: NTPUD to Distribute DWR Approved UWMP

Appendix F – DWR California's Groundwater Bulletin 118 – Excerpts 2004

Tahoe Valley Groundwater Basin, Tahoe Valley North Subbasin

- Groundwater Basin Number: 6-5.03
- County: Placer
- Surface Area: 2,000 acres (4 square miles)

Basin Boundaries and Hydrology

The Tahoe Valley North Subbasin of the Tahoe Valley Groundwater Basin is located about 150 miles east of the San Francisco Bay area, and about 90 miles east of the Sacramento Valley. The Tahoe Valley Groundwater Basin is located within the larger structural feature commonly referred to as the Lake Tahoe Basin. The groundwater basin consists of three alluvial areas surrounding the California side of the lake on the south, west, and north. The Tahoe Valley North subbasin lies in the northern portion of the Tahoe Valley Groundwater Basin. The subbasin occupies a triangular area along the north shore of Lake Tahoe. The basin boundaries approximate an area in which basin-fill deposits have accumulated. From the southern boundary of Lake Tahoe, the subbasin extends north about 2 miles to the triangular apex. The triangular base is about 2.5 wide miles and lies within the area approximated by the north shore of Agate Bay. Elevations within the subbasin range from 6,225 feet at lake level to 6,500 feet in the north.

Griff Creek flows through the subbasin where it empties into the Lake near Kings Beach State Recreation Area. The towns of Tahoe Vista and Kings Beach lie within the subbasin. Average annual precipitation in the subbasin ranges from 23 inches to 40 inches, increasing from south to north.

Hydrogeologic Information

Water Bearing Formations

According to the 1997 USGS publication on hydrogeology of Lake Tahoe Basin, exposed basin-fill deposits are comprised of Quaternary age glacial and lacustrine sediments. Granitic, volcanic, and metamorphic rocks, collectively referred to as bedrock, underlie the basin-fill deposits. Geophysical surveys along the northern shore of the Lake indicate that basin-fill deposits overlying volcanic rock are less than 100 ft thick. However, a well log near Tahoe Vista indicates clay and gravel contact at 96 feet and basalt at 197 feet below sea level (Thodal 1997). DWR driller logs within the subbasin indicate a varied subsurface lithology. In addition, groundwater appears to occur in unconsolidated basin-fill sediments, in volcanic rock interbedded with the basin-fill sediments as well as in fractured rock. DWR well logs and information from North Tahoe Public Utility District (NTPUD), suggest groundwater within the subbasin is inconsistent in nature, and its occurrence may not be described accurately as a basin "aquifer", but more so a fracture-flow system.

Basin-fill deposits Glacial outwash material is typically composed of rock ranging from fine silt to large boulders that have been sorted and stratified by the action of water flowing from the glacier (Freeze and Cherry, 1979).

Permeability of these deposits can be moderate to high. These deposits are generally unsorted, have high clay content, and are produced by the grinding glacial action. Permeability of these deposits can be moderate to high.

Lacustrine deposits. These deposits are a result of fluctuating lake levels, occurring as high as 600 feet above the current lake level (about 6,225 ft). Deposits containing well-sorted beach sand have relatively high permeability; those containing a high silt and clay content have lower permeability (Thodal 1997).

Groundwater Level Trends

Groundwater elevation changes are directly related to changes in groundwater storage. As reported by Thodal (1997), changes in groundwater storage have been minimal. Decreases in groundwater storage have resulted locally in areas of pumping.

Recharge Areas

Groundwater recharge in the study area is primarily from infiltration of precipitation into faults and fractures in bedrock, into the soil and decomposed granite that overlies much of the bedrock, and into unconsolidated basin-fill deposits. Groundwater is recharged over the entire extent of the flow path, except where the land surface in impermeable or where the groundwater table coincides with land surface. Stream flow also recharges ground water when the water-table altitude is lower than the water-surface altitude of the stream (Thodal 1997).

Groundwater Storage

Changes in ground-water storage have been minimal. Decreases in ground-water storage have resulted locally in areas of pumping, whereas increases in storage have resulted in areas where storm runoff is temporarily ponded in small basins.

Groundwater Storage Capacity. No published groundwater storage capacity data was found.

Groundwater in Storage. No published groundwater in storage data was found.

Groundwater Budget (Type C)

Due to lack of groundwater budget data, inflows, including natural, applied, and artificial recharge and outflows including urban and agricultural extraction have not been included.

Groundwater Quality

Limited published groundwater quality information for the basin was found.

Characterization. In general the inorganic quality of groundwater in the Lake Tahoe Basin is excellent (Thodal 1997). Total dissolved solids average 800 mg/L based on 1 well sampled (North Tahoe Public Utility District, 1998). Electrical conductivity averages 800 mg/L based on 1 well sampled (North Tahoe Public Utility District, 1998).

Well Production Characteristics

	Well yields (gal/min)	
Domestic	Range: 15–65	Average: 39 (9 wells, Well Completion Reports)
Municipal/Irrigation	Range: NA	Average: 800 (1 well, North Tahoe PUD)
	Total depths (ft)	
Domestic:	Range: 33–415	Average: 135 (11 wells, Well Completion Reports)
Municipal/Irrigation	Range: NA	Average: 900 (1 well, North Tahoe PUD)

Active Monitoring Data

Agency	Parameter	Number of wells /Measurement frequency
	Groundwater levels	No wells are monitored at this time
	Miscellaneous water quality	No wells are monitored at this time
Department of Health Services and cooperators	Title 22 water quality	1 well (North Tahoe Public Utility District)

Basin Management

Groundwater Management:	None identified
Water Agencies	
Public	North Tahoe PUD
Private	

References Cited

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Freeze, R.A. and J.A. Cherry. 1979. *Groundwater*. Englewood Cliffs, N.J.: Prentice-Hall, Inc. 604p.

North Tahoe Public Utility District, *Consumer Confidence Report* for 1999.

Thodal, Carl E. 1997. *Hydrogeology of Lake Tahoe Basin, California and Nevada, and Results of a Ground-Water Quality Monitoring Network, Water Years 1990-1992*. Water-Resources Investigations Report 97-4072. USGS. 53 p.

United States Geological Survey (USGS). 1997. *Stream and Ground-Water Monitoring Program, Lake Tahoe Basin, Nevada and California*. Fact Sheet FS-100-97. 6 p.

Additional References

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Errata

Changes made to the basin description will be noted here.

Appendix G – UWMP Administrative Draft Checklist

Table I-1 Urban Water Management Plan checklist, organized by legislation number

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	System Demands		Sec. 3.5
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	System Demands	Retailer and wholesalers have slightly different requirements	Sec. 1.4
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	N/A
4	Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)	Plan Preparation		Sec. 1.5
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)	Water Supply Reliability . . .		Sec. 4.2, 4.5 & 5.1
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)	Plan Preparation		Sec. 1.4
7	The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).	10621(c)	Plan Preparation		Sec. 1.4

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
8	Describe the service area of the supplier	10631(a)	System Description		Sec. 2.1
9	(Describe the service area) climate	10631(a)	System Description		Sec. 2.4
10	(Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . .	10631(a)	System Description	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Sec. 2.3
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	System Description	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Sec. 3.5
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		Sec. 2.2 & 2.3
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	System Supplies	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Sec. 2.2, 4.4 & 4.5
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	System Supplies	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Sec. 4.5 & 4.6

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	System Supplies		N/A Sec. 4.6
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		Sec. 4.5
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	System Supplies		N/A
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	System Supplies		N/A
19	For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)	System Supplies		N/A
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)	System Supplies		Sec. 4.5
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	System Supplies	Provide projections for 2015, 2020, 2025, and 2030.	Sec. 4.5

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Water Supply Reliability . . .		Sec. 5.1-5.6
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	Water Supply Reliability . . .		Sec. 2.4, 4.7 & 5.3
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		Sec. 4.8
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof;(I) Agricultural.	10631(e)(1)	System Demands	Consider “past” to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Sec. 5.4-5.6

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
26	(Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra-low-flush toilet replacement programs.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Sec. 6.0 & 6.1
27	A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.	10631(f)(3)	DMMs		N/A
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)	DMMs		N/A

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
29	An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.	10631(g)	DMMs	See 10631(g) for additional wording.	N/A
30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)	System Supplies		Sec. 4.4-4.6 & 5.1
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	System Supplies		N/A

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Sec. 6.0
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	System Demands	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Sec. 1.1 N/A
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	System Demands		Sec. 3.1
35	Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.	10632(a)	Water Supply Reliability . . .		Sec. 5.7
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)	Water Supply Reliability . . .		Sec. 5.7
37	(Identify) actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)	Water Supply Reliability . . .		Sec. 5.7

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
38	(Identify) additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)	Water Supply Reliability . . .		Sec. 5.7
39	(Specify) consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)	Water Supply Reliability . . .		Sec. 5.7
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability . . .		Sec. 5.7
41	An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)	Water Supply Reliability . . .		Sec. 5.7
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability . . .		N/A Sec. 5.7
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability . . .		N/A
44	Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	System Supplies		Sec. 4.9
45	(Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	System Supplies		Sec. 4.9
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	System Supplies		N/A Sec. 4.9

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	System Supplies		N/A Sec. 4.9
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	System Supplies		N/A Sec. 4.9
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)	System Supplies		N/A Sec. 4.9
50	(Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	System Supplies		N/A Sec. 4.9
51	(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	System Supplies		N/A Sec. 4.9
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	Water Supply Reliability . . .	For years 2010, 2015, 2020, 2025, and 2030	Sec. 4.7, 5.1 & 5.4

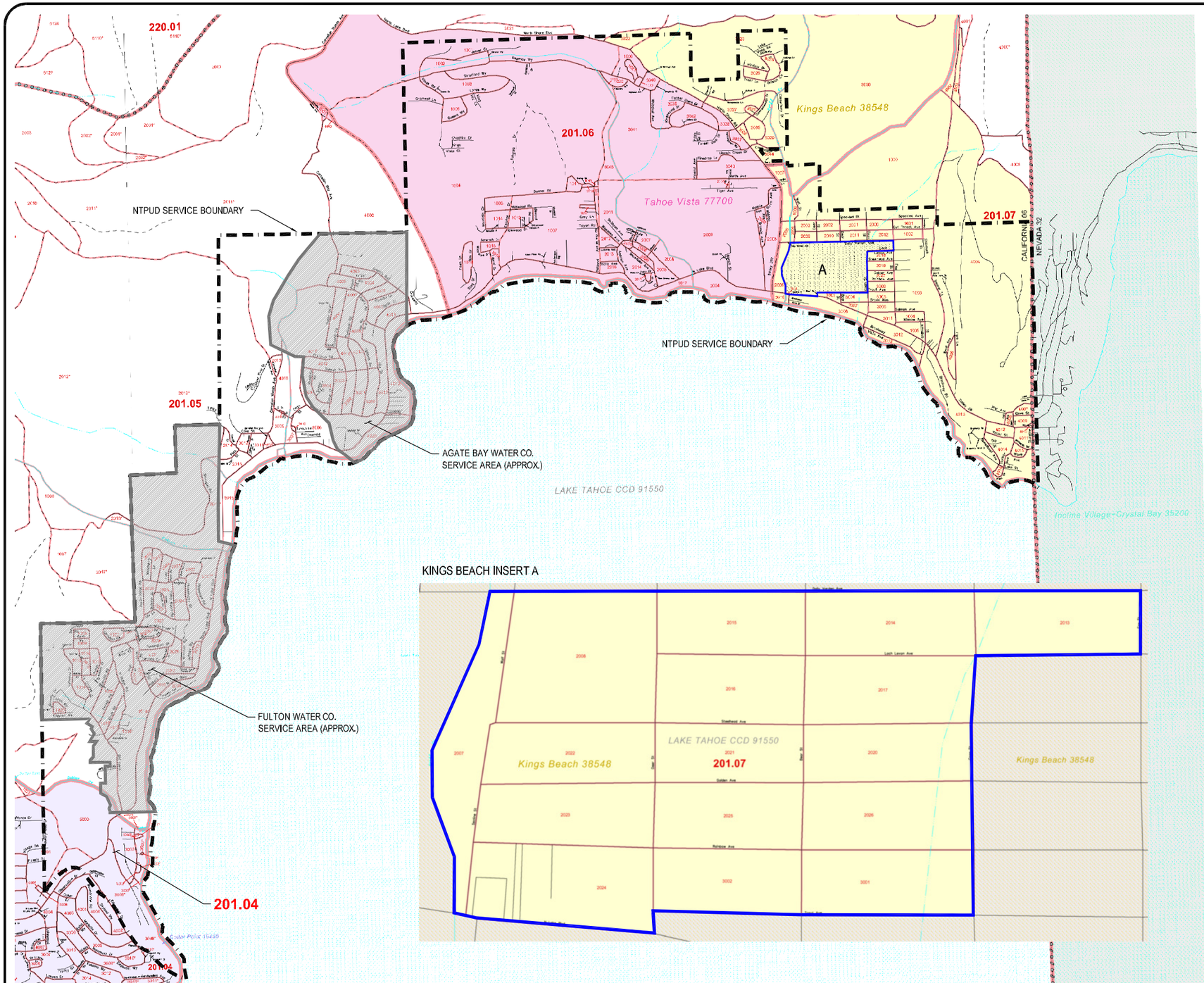
No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
53	Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Water Supply Reliability . . .		Sec. 5.4-5.6
54	The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.	10635(b)	Plan Preparation		Sec. 1.4
55	Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642	Plan Preparation		Sec. 2.3 & 3.1
56	Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642	Plan Preparation		Sec. 1.4
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	Plan Preparation		Sec. 1.4
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	Plan Preparation		Sec. 1.4

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)	Plan Preparation		Sec. 1.4
60	Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.	10645	Plan Preparation		Sec. 1.4

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Appendix H – 2000 Census Block Map



CENSUS BLOCKS WITHIN NTPUD BOUNDARY

TRACT 201.04	TRACT 201.05	TRACT 201.06		TRACT 201.07	
3000	2013	1000	2007	1001	4004
3001	2014	1001	2008	1002	4006
3002	2015	1002	2009	1003	4007
3003	3006	1003	2010	1004	4008
3004	3007	1004	2011	1005	4009
3009	3008	1005	2012	1006	4010
5000	3009	1006	2013	1007	4011
5009	3010	1007	2014	2000	4012
	3011	1008	2015	2001	4013
	3012	1009	2016	2002	4014
	3013	1010	3022	2003	4015
	4018	1011	3023	2004	4016
	4019	1012	3025	2005	
		1013	3026	2006	
		1014	3027	2009	
		1015	3028	2010	
		1016	3029	2011	
		1017	3035	2012	
		1018	3036	2018	
		1019	3037	2019	
		1020	3038	2027	
		1021	3039	3000	
		1022	3040	3003	
		2000	3041	3004	
		2001	3042	3005	
		2002	3043	3006	
		2003		3007	
		2004		3008	
		2005		3009	
		2006		3010	
				3011	
				3012	
				3013	

LEGEND:

- NTPUD SERVICE AREA
- ADJACENT WATER SYSTEMS
- 201.07 CENSUS TRACT
- 2039 CENSUS BLOCK

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APPENDIX H: 2000 CENSUS BLOCK MAP

NORTH TAHOE PUBLIC UTILITY DISTRICT (NTPUD)

NORTH LAKE TAHOE ~ PLACER COUNTY ~ CALIFORNIA

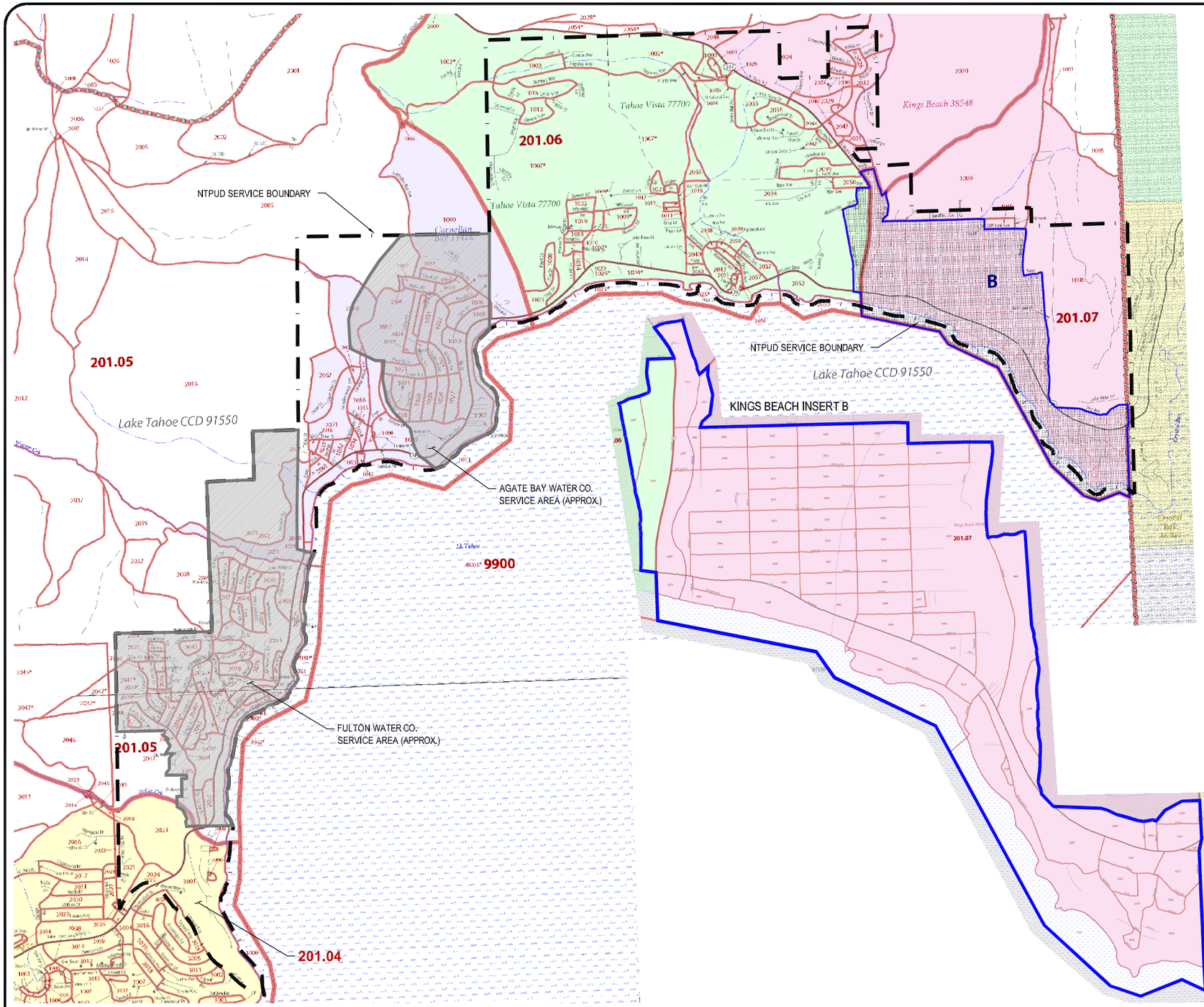
0 1500 3000 6000

1 INCH = 3000 FEET

SEPTEMBER 26, 2011

N

Appendix I – 2010 Census Block Map



CENSUS BLOCKS WITHIN NTPUD BOUNDARY

TRACT 201.04	TRACT 201.05	TRACT 201.06		TRACT 201.07	
2021	1008	1000	2040	1007	2012
2023	1012	1001	2041	1008	2013
2024	1013	1002	2042	1010	2014
2025	1014	1003	2043	1011	2015
3000	1015	1004	2044	1012	2016
3001	1016	1005	2045	1013	2017
3006	2017	1007	2046	1014	2018
3008	2018	1008	2047	1015	2019
	2020	1009	2048	1016	2020
	2021	1010	2049	1017	2021
	2022	1011	2050	1018	2022
	1028	1012	2051	1019	2023
	2032	1013	2052	1020	2024
	2033	1014	2053	1021	2025
	2034	1015	2055	1022	2026
	2035	1016	2056	1023	3000
	2061	1018	2057	1024	3001
	2067	1019	2058	1025	3002
		1020	2059	1026	3003
		1022	2060	1027	3004
		1023		1028	3005
		1024		1029	3006
		1025		1030	3007
		1026		1031	3008
		2024		1032	3009
		2025		2000	3010
		2026		2001	3011
		2029		2002	3012
		2031		2003	3013
		2032		2004	3014
		2033		2005	3015
		2034		2006	
		2035		2007	
		2036		2008	
		2037		2009	
		2038		2010	
		2039		2011	

LEGEND:

- NTPUD SERVICE AREA
- ADJACENT WATER SYSTEMS
- 201.07 CENSUS TRACT
- 2039 CENSUS BLOCK

north tahoe PUBLIC UTILITY DISTRICT est. 1948

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APPENDIX I: 2010 CENSUS BLOCK MAP

NORTH TAHOE PUBLIC UTILITY DISTRICT (NTPUD)

NORTH LAKE TAHOE ~ PLACER COUNTY ~ CALIFORNIA

0 1500 3000 6000

1 INCH = 3000 FEET

SEPTEMBER 26, 2011

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