MAMMOTH COMMUNITY WATER DISTRICT
WATER ASSESSMENT
FOR DRAFT TOWN OF MAMMOTH LAKES GENERAL PLAN

Introduction

Senate Bill 610 (SB 610) requires that water assessments be furnished to local governments for inclusion in any environmental documentation for certain projects subject to the California Environmental Quality Act. Water Code Section 10910 states that the city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to CEQA, shall identify any water system that is a public water system that may supply water for the project. The Town of Mammoth Lakes is currently preparing a Draft Town of Mammoth Lakes General Plan that includes proposed changes in zoning and density that would create additional demand on the public water system owned and operated by the Mammoth Community Water District. The Draft General Plan constitutes a project as it results in development that would account for an increase of ten (10) percent or more in the number of the District's existing service connections.

Since the District is the water supplier (public water system) for the project, it is responsible to determine whether the projected water demand associated with the proposed project was accounted for in the most recently adopted Urban Water Management Plan, and if not, shall prepare a SB 610 water assessment.

The District has determined that the projected water demand associated with the Draft General Plan was not accounted for in the most recently adopted urban water management plan, therefore a water assessment is necessary that includes a discussion with regard to whether the District's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project under the Draft General Plan.

The District's Board of Directors shall approve the completed water assessment prepared pursuant to Water Code Section 10910 at a regular or special meeting.

Documenting Water Supply

It is required that existing and planned sources of water available to the water supplier be identified and quantified in 5-year increments for a 20-year projection.

The following information regarding existing and planned sources of water available is taken from the District's current urban water management plan.

Existing Annual Amounts of Water For Each Entitlement and Right Under Normal Year Conditions

Supply	Acre-Feet/Year	Entitlement	Right	Ever Used
Local surface	2760	X		Yes
Groundwater	4000		X	Yes

Current and Projected Water Supplies

Water Supply Sources	**2005**	**2010**	**2015**	**2020**	**2025**
Lake Mary	2760	2760	2760	2760	2760
Well #1	500	500	500	500	500
GWTP #1	2000	2000	2000	2000	2000
GWTP #2	1500	1500	1500	1500	1500
Dry Creek			1500	1500	1500
Total	**6760**	**6760**	**8260**	**8260**	**8260**
Units of Measure: acre-feet					

Water sources that will serve the project include groundwater; therefore, specific groundwater information must be included in a water assessment. The following information is taken from the District's urban water management plan that was amended in 2004 to meet data requirements necessary to document available groundwater supplies.

The District is currently preparing a Groundwater Management Plan (GWMP) for the purpose of developing a monitoring and operation plan for the long-term use of local groundwater and surface water resources. The District is expected to adopt its GWMP by October 2004.

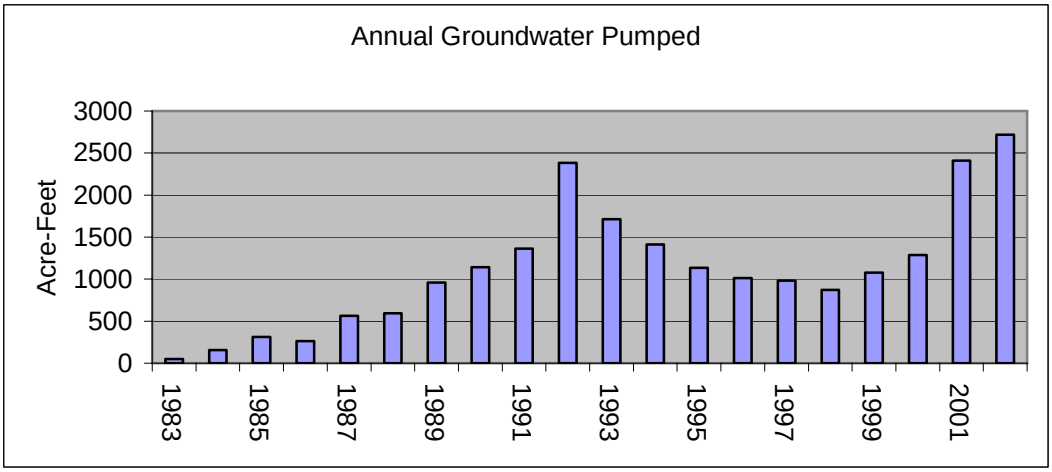
The District pumps groundwater from the Mammoth Basin watershed, which is located within the Long Valley Groundwater Basin identified by the Department of Water Resources as part of the South Lahontan Hydrologic Region. The Mammoth Basin is located on the eastern side of the Sierra Nevada Mountain Range. Surface elevations range from a high of about 12,000 feet at Mammoth Crest to 7,000 feet at the downstream easterly extremity. Mammoth Basin is the watershed of Mammoth Creek and is bounded on the south by the drainage divide of Convict Creek; on the west, by Mammoth Crest; on the north by the drainage divide of Dry Creek; and on the east extending along the watershed of Hot Creek. The area of the Mammoth Basin is about 71 square miles and extends approximately 13 miles west to east and 9 miles north to south.

Elevated areas on the north and west that are comprised largely of extrusive igneous rocks generally form the Mammoth Basin; a central trough filled with alluvial and glacial debris; and an abrupt southern flank of igneous intrusive and metamorphic rocks. The central trough area opens and drains to the east to the Owens River and Lake Crowley.

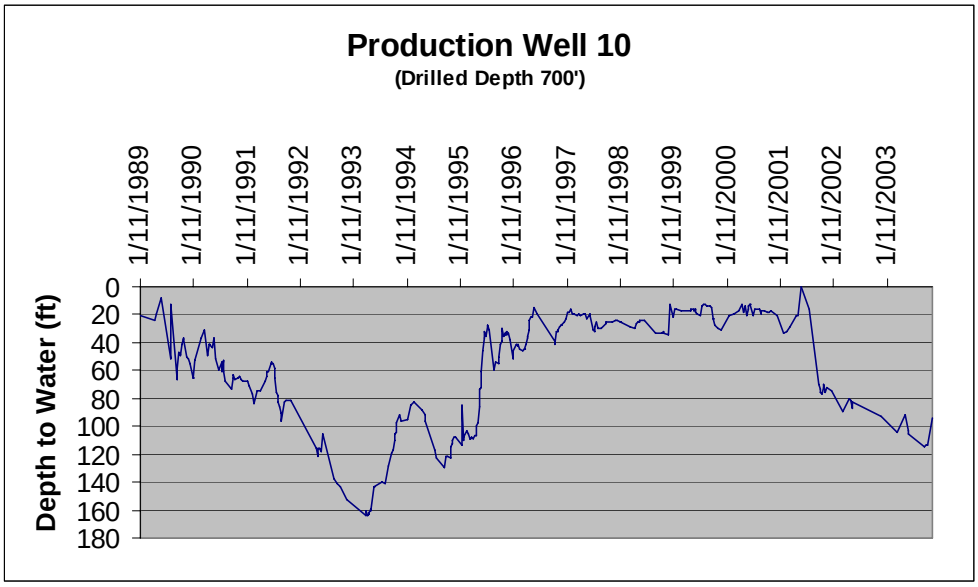
The California Department of Water Resources subdivided the Mammoth Basin into 6 internal drainage basins in its 1973 report for purposes of determining total water produced in the watershed. The area of the Mammoth Basin, together with the internal drainage basins, is shown in Appendix D.

The Mammoth Basin has not been adjudicated or identified by DWR as being overdrafted. In order to prevent the basin from being overdrafted, the District maintains an extensive groundwater and surface water monitoring system. Groundwater levels are monitored in 8 production wells and in 15 shallow and deep monitor wells. Surface water levels and flow rates are monitored at 12 locations throughout the basin watershed. Appendix E shows the location of District groundwater production wells, monitor wells, and surface water monitoring sites. The District prepares an annual groundwater monitoring report that provides an evaluation of groundwater level, surface flow, and water quality monitoring data accumulated throughout the year. Future plans include the use of water level sensors on all production wells connected to the District's supervisory control and data acquisition (SCADA) system to allow for automatic shutdown of production wells when targeted pumping groundwater levels are sensed.

During the past 5-year period the District pumped a total of 8,367 acre-feet of groundwater, averaging 1,673 acre-feet per year. The maximum volume pumped occurred in 2002 and amounted to 2,717 acre-feet. Groundwater was pumped from the District's eight (8) production wells located within the boundaries of the District's service area serving the Town of Mammoth Lakes (see location map in Appendix E). Production volumes of groundwater in any one year are dependent on the type of precipitation year experienced and consequent availability of surface water. The following graph shows historical annual groundwater volumes pumped by the District.



During dry-year periods, groundwater levels within the Mammoth Basin decrease due to increased pumping and less recharge. During normal and above-normal precipitation year's groundwater levels increase and tend to fully recover after two years of normal precipitation. The following graph depicts historical groundwater levels in one of the District's production wells and also shows the variability of groundwater levels based on pumping and type of recharge year.



Future groundwater production rates have been projected based on community growth projections and on type of climatic conditions. The following tables describe projected volumes of groundwater that will be pumped under normal and multiple dry-year water year conditions.

Groundwater Pumping Projections (acre-feet)
In Normal Year Conditions

Well No.	***2003***	***2005***	***2010***	***2015***	***2020***
1	*208*	*50*	*100*	*100*	*100*
6	*415*	*200*	*200*	*300*	*400*
10	*848*	*200*	*300*	*300*	*400*
15	*911*	*200*	*300*	*400*	*400*
16	*123*	*100*	*100*	*100*	*100*
17	*184*	*200*	*300*	*300*	*400*
18	*126*	*50*	*100*	*100*	*100*
20	*111*	*200*	*300*	*400*	*400*
Future Well(s)	*0*	*0*	*0*	*0*	*0*
Total	*2926*	*1200*	*1700*	*2000*	*2300*
Groundwater projections based on utilizing 2500 ac-ft of surface water in normal year to meet projected demand.					

Groundwater Pumping Projections (acre-feet)
In Multiple Dry Year Conditions

Well No.	***2003***	***2005***	***2010***	***2015***	***2020***
1	*208*	*100*	*200*	*200*	*200*
6	*415*	*400*	*500*	*600*	*600*
10	*848*	*400*	*500*	*600*	*600*
15	*911*	*500*	*500*	*600*	*600*
16	*123*	*100*	*200*	*200*	*200*
17	*184*	*400*	*500*	*500*	*500*
18	*126*	*100*	*100*	*100*	*100*
20	*111*	*400*	*500*	*500*	*500*
Future Well(s)	*0*	*0*	*0*	*100*	*300*
Total	*2926*	*2400*	*3000*	*3400*	*3600*
Groundwater projections based on utilizing 1200 ac-ft of surface water in multiple dry years to meet projected demand.					

As indicated by groundwater pumping projections for the future, the volume of groundwater currently available from existing wells is insufficient to meet the total demand under multiple dry-year conditions as the community nears build-out in the year 2015. A study conducted for the Mammoth Community Water District ("Investigation of Groundwater Production Impacts on Surface Water Discharge and Spring Flow", Wildermuth Environmental, Inc. November 2003) indicates that a total volume of 3800 acre-feet annually could be pumped from the Mammoth Basin without significant impacts to surface waters or spring flows within the basin.

Documenting Project Demand

The projected water demand associated with the proposed project (draft general plan) was not accounted for in the District's most recently adopted urban water management plan. Following is a table describing past, current, and future water demands from the District's urban water management plan.

Past, Current, and Projected Water Use (acre-feet)

Water Use Sector	**1992**	**1995**	**2001**	**2005**	**2010**	**2015**	**2020**
Single Family Residential	329	393	602	637	687	710	715
Condominium	678	805	1190	1251	1298	1298	1312
Multi-Family Residential	98	88	150	234	365	374	374
Commercial	206	218	250	315	379	444	497
Motel / Hotel	117	120	104	142	245	369	386
Public Sector	100	107	218	262	328	410	513
Golf Course**	21	23	208	141	141	141	141
Other*	74	100	60	65	70	75	80
Unaccounted	942	787	505	570	661	721	760
Total	**2565**	**2641**	**3287**	**3617**	**4174**	**4542**	**4778**

*Other = treatment plant process water, fire fighting, line cleaning, etc.
** Existing Snowcreek golf course (9 holes) pursuant to water rights arrangement.

Unaccounted = actual for 1992 & 1995, remainder years @ sales plus "Other" times 0.196 (actual for 2001). Commercial = 61,000 gallons per year per 1000 sq ft based on year 1998 data. Single-family residential = 7,499 gal/mo/unit. Condominium = 6,034 gal/mo/unit. Multi-family = 6,772 gal/mo/unit. Motel/Hotel = 1,963 gal/mo/unit. Public Sector = 70.881MG/yr in 2001 plus 5%/yr growth in future. Annual growth rates for SFR, MF, Condo & Motel/Hotel based on 2001 MMSA Bed Base Capacity Study.

The following table includes projections of water demand from the draft general plan. Total estimated water demand is separated into the four alternatives proposed in the draft general plan.

Past, Current, and Projected Water Use (acre-feet)

Includes Water Demand Caused by Project Alternatives

Water Use Sector	**1992**	**1995**	**2001**	**2005**	**2010**	**2015**	**2020**
Single Family Residential	329	393	602	637	687	710	715
Condominium	678	805	1190	1251	1298	1298	1312
Multi-Family Residential	98	88	150	234	365	374	374
Commercial	206	218	250	315	379	444	497
Motel / Hotel	117	120	104	142	245	369	386
Public Sector	100	107	218	262	328	410	513
Golf Course**	21	23	208	141	141	141	141
Other*	74	100	60	65	70	75	80
Unaccounted	942	787	505	570	661	721	760
Current Total	**2565**	**2641**	**3287**	**3617**	**4174**	**4542**	**4778**
Draft Gen Plan Alt. 1				**170**	**178**	**187**	**196**
Total Including Alt. 1				**3787**	**4352**	**4729**	**4974**
Draft Gen Plan Alt. 2				**563**	**591**	**621**	**652**
Total Including Alt. 2				**4180**	**4765**	**5163**	**5430**
Draft Gen Plan Alt. 3				**618**	**649**	**681**	**715**
Total Including Alt. 3				**4235**	**4823**	**5223**	**5493**
Draft Gen Plan Alt. 4				**-235**	**-247**	**-259**	**-272**
Total Including Alt. 4				**3382**	**3927**	**4283**	**4506**

*Other = treatment plant process water, fire fighting, line cleaning, etc.
** Existing Snowcreek golf course (9 holes) pursuant to water rights arrangement.

Unaccounted = actual for 1992 & 1995, remainder years @ sales plus "Other" times 0.196 (actual for 2001). Commercial = 61,000 gallons per year per 1000 sq ft based on year 1998 data. Single-family residential = 7,499 gal/mo/unit. Condominium = 6,034 gal/mo/unit. Multi-family = 6,772 gal/mo/unit. Motel/Hotel = 1,963 gal/mo/unit. Public Sector = 70.881MG/yr in 2001 plus 5%/yr growth in future. Annual growth rates for SFR, MF, Condo & Motel/Hotel based on 2001 MMSA Bed Base Capacity Study.

Documenting Dry-Year Supply

The projected water demand associated with the proposed project (draft general plan) was not accounted for in the District's most recently adopted urban water management plan. The following section and tables describe past, current, and future water demands from the District's urban water management plan.

RELIABILITY COMPARISON

The Mammoth Community Water District's sources of water supply consist of surface water and groundwater. The area is susceptible to drought and both of these sources of supply are impacted to various degrees. Surface water supplies are immediately impacted following a drought season whereas groundwater supplies tend to be effected by a extended drought period of several years.

Over the past thirty years, below average precipitation have been experienced 50% of the years. In 30% of the years, seasons with less than 70% of average precipitation have been experienced.

Table 8 provides water supply volumes for average, single dry, and multiple dry water years based on current supplies

Existing Water Supply Reliability

Multiple Dry Years				
Average/Normal Water Year	**Single Dry Water Year**	**Year 1**	**Year 2**	**Year 3**
6534	5083	5083	4534	4492
Units of Measure: acre-feet per year				

The following table describes how each water year type was derived.

Basis of Water Year Data

Water Year Type	Year(s) Data is Based Upon

Average Water Year Surface = 2534 ac-ft Groundwater = 4000 ac-ft	Based upon 1999 (87%) normal precipitation and 3.5 cfs maximum diversion at Lake Mary.
Single Dry Water Year Surface = 1370 ac-ft Groundwater = 3713 ac-ft	Lake Mary supply based upon actual diversion in 2001 (64% average precipitation). Groundwater based on actual pumpage in 1992 (last year of 6-year drought)) for wells 1,6,10&15, and actual pumpage in 2001 for wells 16,17,18&20.
Multiple Dry Water Years Surface = 1370, 1234, 1192 ac-ft Groundwater = 3713, 3300, 3300 ac-ft	Lake Mary supply based upon available diversion (@3.5 cfs max) and storage during drought period of 2001, 1991 & 1992. Groundwater based on averaged pumped for wells 1,6,10 &15 during 1990-1992, and actual pumped for wells 16,17,18&20 during 2001.

In comparing projected future water use data with current supply reliability data, the second and third years of multiple dry years result in a supply deficiency as the community nears build-out. Reductions in demand through water restrictions or through decreasing the percentage of unaccounted for water in the system would have beneficial impacts on supply deficiencies. Development of new groundwater sources such as in the Dry Creek watershed would increase supplies and resolve any potential deficiencies. The following table provides data on future water supply reliability including development of new groundwater supplies in the Dry Creek watershed.

Future Water Supply Reliability
Including Lake Mary Plant Improvements & Dry Creek Wells

		Multiple Dry Years		
Average/Normal Water Year	**Single Dry Water Year**	**Year 1**	**Year 2**	**Year 3**
8260	6463	6463	5779	5737
Units of measure: acre-feet per year				

Basis of Water Year Data

Water Year Type	**What Data is Based Upon**

Average/Normal Water Year Surface = 2760 ac-ft Groundwater = 4000 (Mammoth Basin) 1500 (Dry Creek)	Based upon 100% average precipitation and 5 cfs production capability of Lake Mary plant.
Single Dry Water Year Surface = 1370 ac-ft Groundwater = 3713 ac-ft (Mammoth Basin) 1380 ac-ft (Dry Creek)	Surface water and groundwater available in Mammoth Basin as described in Table 7. Dry Creek projected at same reduction as Mammoth Basin wells (8% of normal).
Multiple Dry Water Years Surface = 1370, 1234, 1192 ac-ft Groundwater = 3713,3300,3300 ac-ft/yr (MB) 1380,1245,1245 ac-ft/yr (Dry C)	Surface water and groundwater available in Mammoth Basin as described in Table 7. Dry Creek projected at same reduction as Mammoth Basin wells during 3-yr drought (17% of normal).

The following table provides data showing the impact on water demand from reducing unaccounted for water losses and instituting restrictions on water use during the landscape irrigation season.

Impact of Reductions on Future Water Demand

Reduction	**2001**	**2005**	**2010**	**2015**	**2020**
No reduction	3287	3617	4174	4542	4778
Reduce water loss*	3158	3471	4005	4358	4584
Level 1 Restriction @ 25%	2893	3183	3673	3997	4205

Units of measurement: acre-feet per year
* 5% reduction in 2001 water loss rate
Water savings from restricted use applied only during months of June, July, August & September (these months represent 48% of annual demand)

Is the Projected Water Supply Sufficient or Insufficient for the Proposed Project?

The following tables compare current and projected supply and demand for normal, single dry and multiple dry years.

Comparison of Current Supply and Demand for Normal, Single Dry and Multiple Dry Years

Current Supply & Demand	Normal	Single Dry	2 Dry Years	3 Dry Years
Supply Total	6760	5083	4534	4492
Demand Total	4778	4778	4778	4778
Surplus or (Deficiency)	1982	305	(244)	(286)
Demand Total Including Alternative 1	4974	4974	4974	4974
Surplus or (Deficiency)	1786	109	(440)	(482)
Demand Total Including Alternative 2	5430	5430	5430	5430
Surplus or (Deficiency)	1330	(347)	(896)	(938)
Demand Total Including Alternative 3	5493	5493	5493	5493
Surplus or (Deficiency)	1267	(410)	(959)	(1001)
Demand Total Including Alternative 4	4506	4506	4506	4506
Surplus or (Deficiency)	2254	577	28	(14)

As can be seen by the above supply versus demand comparison table, the current available water supply is considered insufficient to meet demands from build-out of the community during dry water years. The extent of the insufficiency depends on the duration of dry year periods and on the proposed project alternative.

Under Water Code 10911, it is required that if, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies. In order to address water supply insufficiencies, the District has developed the following plans regarding implementation of water conservation measures, use of recycled water, and development of new supplies.

Implementation of Water Conservation Measures

Estimated Total Costs and Proposed Method of Financing

Reductions in water use would impact District revenues during the months of June through September. It is estimated that the decrease in revenue during this period would amount to approximately $150,000. The District maintains an operating reserve in its budget to compensate for conditions such as lost revenue due to emergencies.

Federal, State, and Local Permits, Approvals or Entitlements

Water conservation measures are included in the District's Code of Regulations, therefore the implementation of measures such as landscape irrigation restrictions would occur by action of the Board of Directors.

Source of Supply

In 1992 the District implemented water restrictions that included limiting landscape irrigation to 3 days per week. This restriction resulted in an average reduction in water demand of 25% for the irrigation period of June through September. At build-out of the community under the existing general plan, the projected savings from implementation of water conservation measures amounts to 379 acre-feet annually.

Estimated Timeframes for Implementation

Projections of available water supply are prepared each year after final snowpack measurements are made on April 1st. At that time, if projections indicate possible water supply insufficiencies, the District's Board of Directors may declare the existence or threatened existence of a drought and may then implement any level of restrictions as deemed necessary.

Utilization of Recycled Water

Estimated Total Costs and Proposed Method of Financing

The total estimated cost of a recycled water project for the purpose of golf course irrigation amounts to approximately $4,090,000. This project would provide the capability to produce 1.55 million gallons per day of recycled water. The Mammoth Mountain Ski Area (Sierra Star golf course) has already paid a connection fee of

$1,040,000 for their portion of recycled water once it is made available. The remaining costs of the project would be paid through additional connection fees and through the District's water capital expansion program budget.

Federal, State, and Local Permits, Approvals or Entitlements

Permits that would be required to provide recycled water for irrigation include a waste discharge permit from the State Water Quality Control Board and a design and use permit from the State Department of Health Services.

Source of Supply

The source of supply would come from the District's wastewater treatment facility. Although the facility can produce recycled water, there are some upgrades necessary to meet current State Department of Health standards and would be capable of producing up to 1.55 million gallons per day of recycled water. A recycled water pipeline would be installed from the wastewater facility site, following a path near the current bicycle path, through Mammoth Creek Park, Meadow Lane, Minaret Road, and Meridian Boulevard to the Sierra Star golf course.

The District currently supplies untreated groundwater for irrigation of the Snowcreek and Sierra Star golf courses. The average annual volume of groundwater supplied over the past 3 years amounts to 356 acre-feet per year. 141 acre-feet of this volume has been forecasted as a demand in the District's future projections. The Snowcreek golf course also supplies approximately 120 acre-feet per year from its own well and is proposing to expand its existing 9-hole course to 18 holes, which will create an additional demand of approximately 200 acre-feet per year. It will be important that all golf course irrigation utilize as much recycled water as possible to reduce impacts from additional groundwater extraction in the Mammoth Basin. This will minimize the impacts of multiple dry-year periods on the groundwater system and provide a more dependable source for use by the community. Since only 141 acre-feet per year was projected in the District's future demand schedule, this figure would be the minimum volume of additional groundwater made available through the use of recycled water. The use of recycled water for all projected golf course irrigation demands would reduce the volume of groundwater pumped from the Mammoth Basin by approximately 550 acre-feet per year. This would have a positive impact on the dependability of groundwater storage in the basin and would provide a supplemental supply during dry years. It is difficult to estimate the actual volume that could be depended on as an additional source of supply during dry year periods; therefore a conservative figure of 250 acre-feet is used.

Estimated Timeframes for Implementation

It is currently estimated that the total project would take two construction seasons to complete, therefore recycled water is projected to be available for use by the summer of 2007.

Water System Loss Reduction

Estimated Total Costs and Proposed Method of Financing

The District funds water line replacement projects through its capital replacement program. A minimum of $1,125,000 per year over the next 10 years has been budgeted for this work. Funding for this program is derived from primarily property tax revenues.

Federal, State, and Local Permits, Approvals or Entitlements

Local permits are required for the excavation of pipelines in the public roadways.

Source of Supply

The District has been implementing an aggressive main water pipeline replacement program to replace old leaking water pipes. Over the past three years an average of 11,000 feet of pipeline per year has been replaced. As a result of this replacement work the District is achieving a savings of approximately 400 acre-feet annually in reduced water loss within the system.

Estimated Timeframes for Implementation

It is estimated that replacement of existing old pipelines in the entire system will occur over the next 20-year period. As stated above, approximately 11,000 feet of pipeline per year will be replaced.

Development of New Supplies

Estimated Total Costs and Proposed Method of Financing

Development of new groundwater supplies in the Dry Creek watershed are projected to cost approximately $6,700,000. If additional groundwater is determined to be available in the Mammoth Basin, this project would cost approximately $1,025,000. Both of these projects are budgeted in the District capital expansion fund, which is funded primarily by new water connection fees and some funding from property tax revenues.

Federal, State, and Local Permits, Approvals or Entitlements

These projects would require permits and approvals from the State Department of Health Services and the U.S. Forest Service where potential well sites are located on federal land. This project would also require both State of California and Federal environmental review.

Source of Supply

One source of supply would include the Dry Creek watershed. Volumes of groundwater projected to be available are estimated at 1,500 acre-feet per year during normal years and 1,245 acre-feet per year during multiple dry year periods.

Additional withdrawal of groundwater from the Mammoth Basin continues to be questionable as to whether or not there is available water to be pumped without causing environmental impacts. Continued monitoring of the Mammoth Basin over the next two years should provide sufficient data to evaluate any potential of additional groundwater that could be safely pumped from the basin.

Estimated Timeframes for Implementation

Evaluation of the potential for increased withdrawal from the Mammoth Basin should be completed within two years.

Potential groundwater extraction from the Dry Creek watershed is currently budgeted to begin within the five-year period commencing in 2014.

Summary of Additional Water Supplies

Supply Source	Potential Additional Volume (ac-ft / yr)
Water conservation measures	379 acre-feet
Water system loss reduction	400 acre-feet
Utilization of recycled water	250 acre-feet
Development of new groundwater sources	1,245 acre-feet