Section 3

Summary of the 2012 Monitoring Period

This section presents a description of the WY 2012 monitoring period in terms of the precipitation patterns, stream discharge, land use activities and regulatory structure in place between October 1, 2011 and September 30, 2012.

3.1 Precipitation Summary

The Natural Resources Conservation Service (NRCS) SNOpack TELemetry (SNOTEL) Tahoe City Cross and Truckee #2 gauges were the main sources of precipitation data for WY 2012 (USDA, 2012). The data are presented graphically in Figures 3-1 and 3-2 which include cumulative precipitation for WY 2012 and average cumulative precipitation, snow water equivalent (SWE) for WY 2012 and average SWE. Tables 3-1 and 3-2 present the monthly precipitation totals measured at these gauges for each of the three years of Phase 1 monitoring implementation (2010-2012) and the average monthly precipitation. Tables 3-3 and 3-4 present the monthly SWE values that were measured at these gauges for 2011 and 2012 and the average monthly SWE. Monthly SWE data for WY 2010 are not available from the NRCS website.

The total annual precipitation received during WY 2012 was approximately 72 percent of average at both gauges. Precipitation was above average in the months of March, April, and August and the greatest monthly precipitation occurred in March with totals equaling 196 and 151 percent of average at the Tahoe City Cross and Truckee #2 gauges, respectively. Very little precipitation occurred in December which received less than 5 percent of average and February was also well below average. Snowfall totals and SWE during WY 2012 were also all well below average.

During the first three years of TRWQMP implementation, annual precipitation amounts have shown an extremely high degree of variability. The annual precipitation in WY 2010 was very close to average, while in WY 2011 it was much higher at over 160% of average, and then WY 2012 was a drought year with only 72% of average annual precipitation.

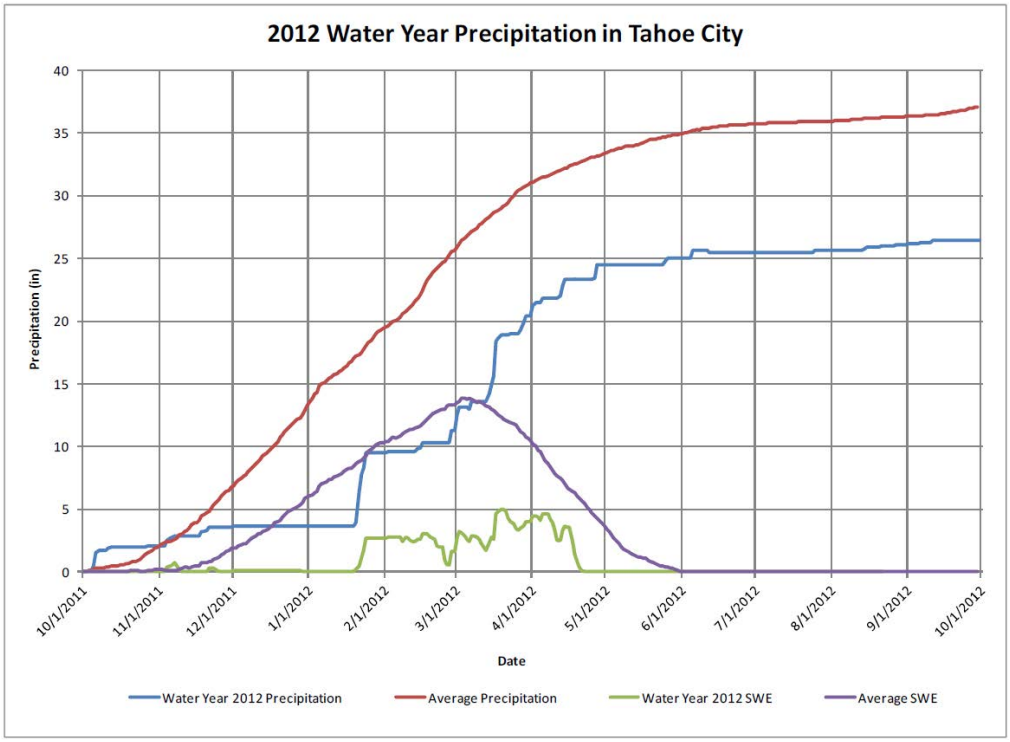


Figure 3-1
Daily Precipitation in Tahoe City, CA (USDA, 2012)

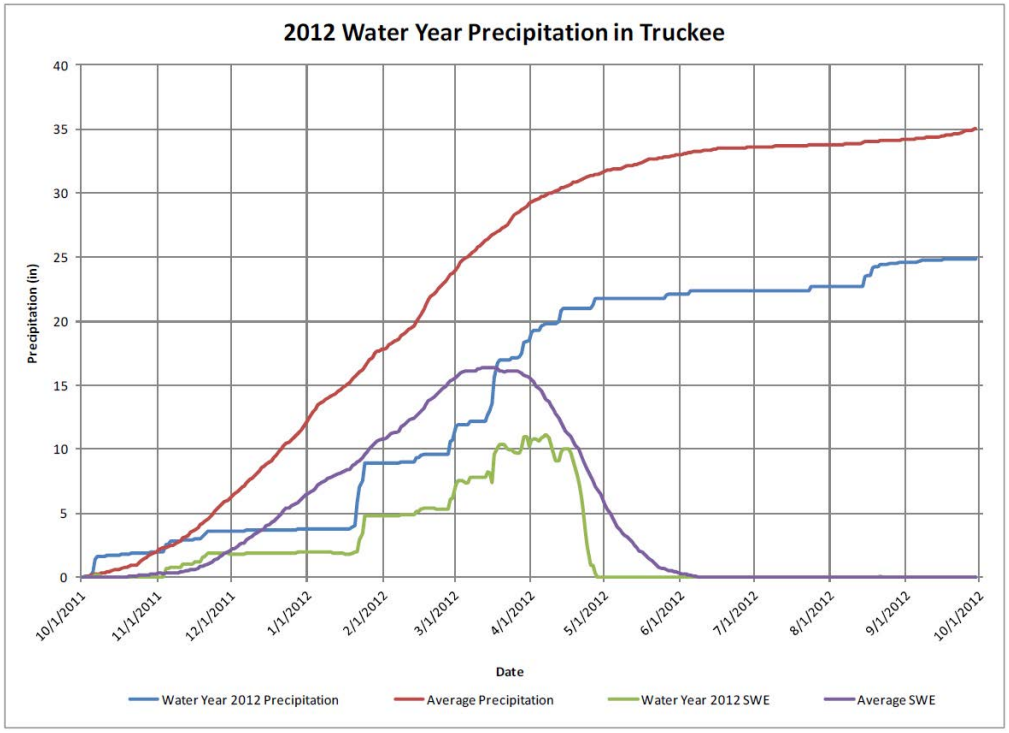


Figure 3-2
Daily Precipitation in Truckee, CA (USDA, 2012)

Table 3-1. Tahoe City Precipitation Totals for Water Years 2010-2012[1]

WY 2010	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Jul 10	Aug 10	Sep 10	Total
Monthly Precipitation Total	4.1	1.6	5.6	7.7	3.7	4.9	6.3	2.3	0.3	0.0	0.1	0.1	36.7
Average Monthly Precipitation[2]	2.0	4.7	6.4	6.4	6.2	4.6	2.4	1.7	0.8	0.2	0.4	0.8	36.4
Percent of Average	205%	34%	88%	120%	60%	107%	263%	135%	37%	0.0%	25%	13%	101%
WY 2011													
Monthly Precipitation Total	8.6	7.4	13.9	1.0	8.0	13.7	2.1	2.6	0.90	0.20	0.10	0.70	59.2
Average Monthly Precipitation[2]	2.0	4.6	6.4	6.4	6.1	4.6	2.5	1.7	0.82	0.22	0.34	0.76	36.4
Percent of Average	424%	161%	218%	16%	131%	295%	84%	150%	109%	90.1%	29%	92%	163%
WY 2012													
Monthly Precipitation Total	2.10	1.50	0.10	5.80	1.80	9.10	4.10	0.50	0.50	0.10	0.50	0.30	26.4
Average Monthly Precipitation[2]	2.2	4.7	6.3	6.3	6.2	4.6	2.5	1.8	0.83	0.22	0.33	0.76	36.5
Percent of Average	94%	32%	2%	92%	29%	196%	166%	28%	61%	45.2%	150%	40%	72%

1. Data acquired from the SNOTEL Tahoe City Cross Site
2. Based on all recorded data from water years 1976 to the current year

Table 3-2. Truckee Precipitation Totals for Water Years 2010-2012[1]

WY 2010	Oct 09	Nov 09	Dec 09	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Jul 10	Aug 10	Sep 10	Total
Monthly Precipitation Total	3.7	2	5.6	7.3	3.7	4.8	5.7	1.1	0.2	0.0	0.5	0.1	34.7
Average Monthly Precipitation[2]	1.8	4.2	5.8	5.7	5.5	4.9	2.4	1.4	0.5	0.2	0.4	0.9	33.7
Percent of Average	206%	48%	97%	128%	67%	98%	238%	79%	40%	0.0%	125%	11%	103%
WY 2011													
Monthly Precipitation Total	8.00	6.80	11.00	0.90	8.00	13.50	1.90	2.70	2.30	0.80	0.10	0.20	56.2
Average Monthly Precipitation[2]	1.86	4.13	5.80	5.78	5.49	4.93	2.48	1.36	0.51	0.16	0.39	0.84	34.4
Percent of Average	431%	165%	190%	16%	146%	274%	77%	198%	448%	504%	26%	24%	163%
WY 2012													
Monthly Precipitation Total	2.00	1.60	0.20	5.10	2.80	7.40	2.70	0.30	0.30	0.30	1.90	0.30	24.9
Average Monthly Precipitation[2]	2.05	4.22	5.65	5.63	5.56	4.89	2.46	1.41	0.57	0.18	0.38	0.82	34.5
Percent of Average	97%	38%	4%	91%	50%	151%	110%	21%	53%	167%	503%	37%	72%

1. Data acquired from the SNOTEL Truckee #2 Site
2. Based on all recorded data from water years 1976 to the current year

Table 3-3. Tahoe City Snow Water Equivalent for Water Years 2011-2012[1]

WY 2011	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12	May 12	Average
Snow Water Equivalent	1.3	7.1	12.8	14.8	24.5	20.2	2.8	11.9
Historical Snow Water Equivalent[2]	0.6	3.6	8.1	11.7	12.3	6.6	1.33	6.3
Percent of Average	210%	197%	159%	127%	200%	306%	214%	189%
WY 2012	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12	May 12	Average
Snow Water Equivalent	0.1	0.1	0.8	2.4	3.4	2.2	0.0	1.3
Historical Snow Water Equivalent[2]	0.7	3.7	8.2	11.8	12.7	7.0	1.4	6.5
Percent of Average	20%	2%	10%	20%	26%	32%	0%	20%

1. Data acquired from the SNOTEL Tahoe City Cross Site (USDA, 2012)
2. Based on all recorded data from water years 1982 to 2011

Table 3-4. Truckee Snow Water Equivalent for Water Years 2011-2012[1]

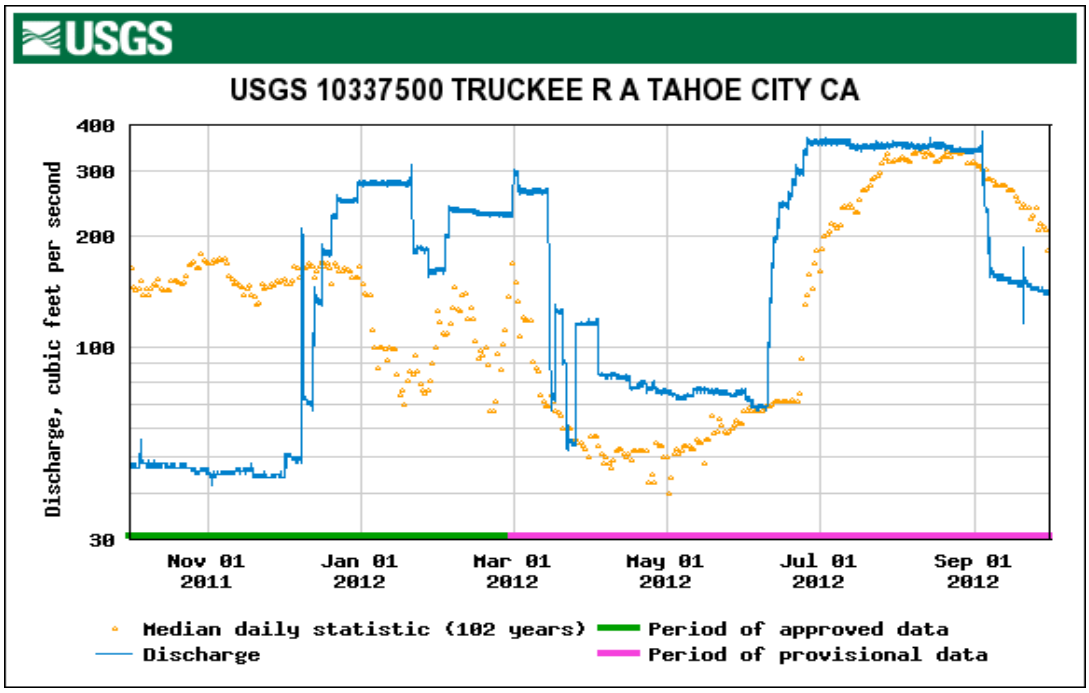
WY 2011	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12	May 12	Average
Snow Water Equivalent	1.6	9.2	15.3	18.4	31.6	32.9	10.6	17.1
Historical Snow Water Equivalent[2]	0.8	4.0	8.3	12.8	15.6	10.8	2.16	7.8
Percent of Average	195%	228%	185%	144%	203%	305%	491%	220%
WY 2012	Nov 11	Dec 11	Jan 12	Feb 12	Mar 12	Apr 12	May 12	Average
Snow Water Equivalent	1.2	1.9	2.8	5.2	8.9	7.3	0.0	3.9
Historical Snow Water Equivalent[2]	0.8	4.2	8.5	13.0	16.1	11.5	2.44	8.1
Percent of Average	143%	45%	32%	40%	55%	64%	0%	48%

1. Data acquired from the SNOTEL Tahoe City Cross Site (USDA, 2012)
2. Based on all recorded data from water years 1982 to 2011

3.2 Stream Flow Summary

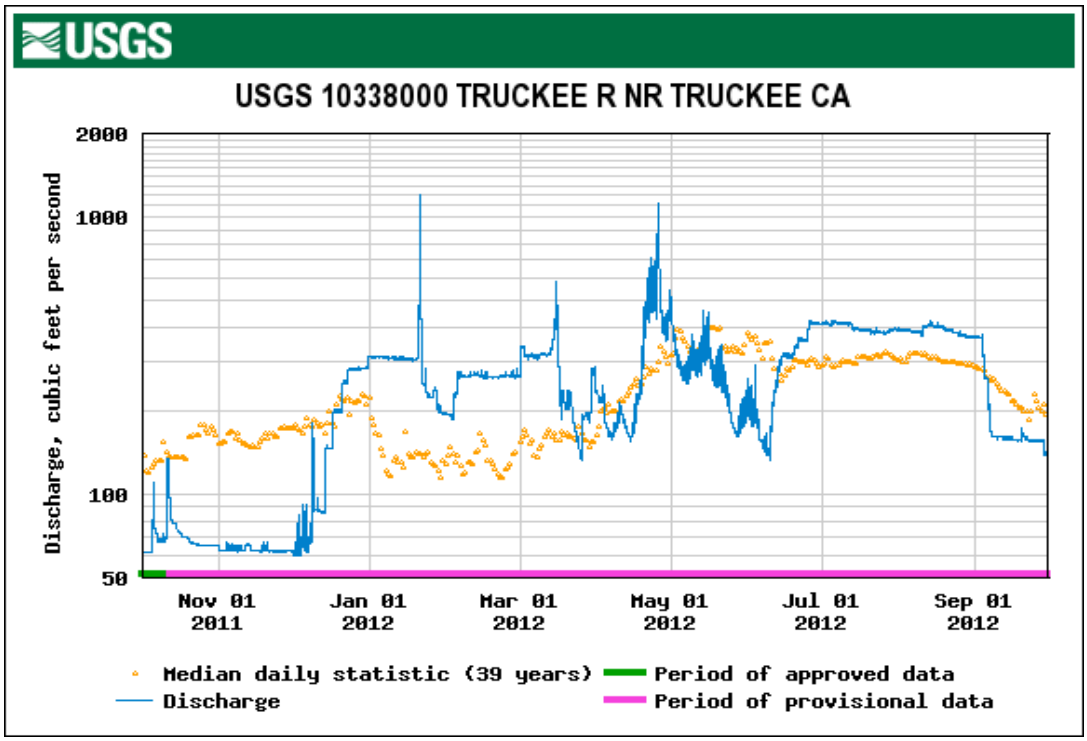
The discharge rates in the Middle Truckee River are partially regulated by dam operations on Lake Tahoe and Donner Lake. Additional flow is contributed by several unregulated tributaries including Bear, Squaw, Silver, Deer, Pole, Deep, Cabin, and Cold Creeks. Below downtown Truckee, additional flows are contributed by Martis, Union Valley and Prosser Creeks and the Little Truckee River.

Figures 3-3, 3-4, and 3-5 present WY 2012 hydrographs of the Truckee River at Tahoe City (gauge # 10337500), the Truckee River 2.5 miles upstream of Truckee (gauge # 10338000), and Donner Creek at Hwy 89 (gauge # 10338700), respectively. These gauges are maintained by the United States Geological Survey (USGS), and the data include mean daily discharge and historic median daily discharge values. The discharge of the Truckee River at Tahoe City was below the historic median through November of 2011. Discharge rates at the Tahoe City dam were then increased in December 2011 and remained above historic median values for much of the remaining water year. The discharge near Truckee closely resembles the Tahoe City discharge with additions during the spring snowmelt cycle from the unregulated tributaries. Donner Creek discharges were slightly below the historic median values for most of WY 2012.



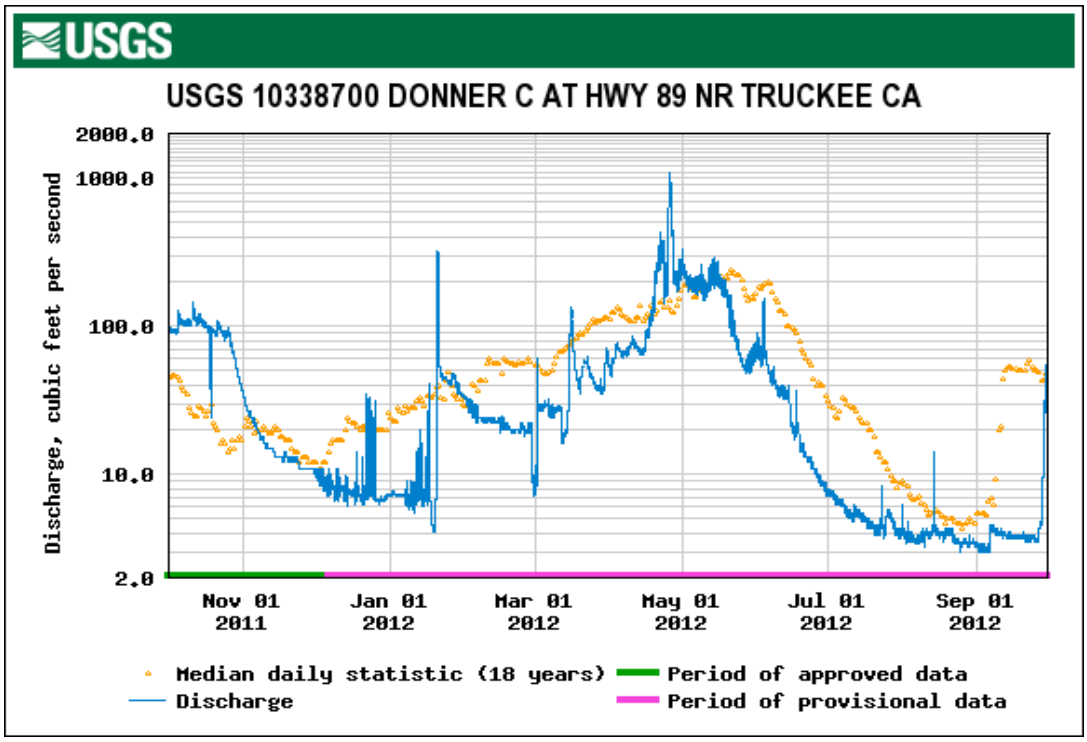
Source: http://waterdata.usgs.gov/nwis/dv?referred_module=sw&site_no=10337500

Figure 3-3
Truckee River Discharge at Tahoe City (USGS, 2012)



Source: http://waterdata.usgs.gov/nwis/dv?referred_module=sw&site_no=10338000

Figure 3-4
Truckee River Discharge near Truckee (USGS, 2012)



Source: http://waterdata.usgs.gov/nwis/dv?referred_module=sw&site_no=10338700

Figure 3-5
Donner Creek Discharge at Highway 89 (USGS, 2012)

3.3 Land Use Conditions

Fifteen sub-watersheds drain to the Truckee River within the TRWQMP project area (Placer County and Town of Truckee). Based on the preliminary GIS analysis conducted during the development of the TRWQMP, seven of these sub-watersheds are classified as having high disturbance and three of them are classified as having moderate disturbance. These sub-watersheds are presented in Table 3-5 along with information on area size, land use, and relative disturbance rating. The remaining five sub-watersheds (Cabin Creek, Deep Creek, Deer Creek, Pole Creek, and Silver Creek) are classified with low disturbance and are not included in this table.

New construction activities in the project area during WY 2012 included roadway repair and drainage improvements on SR 267 and Hwy 89, residential construction, and new construction at Northstar-at-Tahoe. In 2011 and 2012, new construction at Northstar-at-Tahoe included new ski trails, a new chairlift and a 700-seat on-mountain restaurant. The majority of these activities occurred in the Martis Creek watershed.

During the summer of 2011, a restoration project was implemented by the Town of Truckee on Trout Creek near downtown Truckee. Additionally, the Truckee River Watershed Council began the restoration of a portion of Coldstream Creek project during the summer of 2012.

The Friends of Squaw Creek have collected stream discharge data between 2003 and 2010 from three locations along Squaw Creek. The data are available from their website at squaw.soundwatershed.com. A restoration project for Squaw Creek is currently in the early planning stages.

There were no major fires, landslides, floods or other events during this period, and the spring runoff was less than normal due to the small amounts of snowfall during the winter. Data collected during the 2012 monitoring period are representative of existing conditions and will improve the baseline dataset which will be used to evaluate future changes in the watershed.

Table 3-5. Summary of TRWQMP Sub-Watersheds with High and Moderate Disturbance Ratings[1]

Sub Watershed	Size (mi^2)	Land Uses	Disturbance Rating
Squaw Creek	8.2	Forest, meadow, ski resort, commercial, residential, dirt roads, golf course, secondary roadways	High
Martis Creek	40.9	Forest, meadow, ski resort, commercial, residential, dirt roads, golf course, primary roadway, secondary roadways	High
Truckee Town Corridor	14.1	Forest, commercial, residential, primary roadways, secondary roadways, legacy sites	High
Bear Creek	5.3	Forest, ski resort, commercial, residential, secondary roadways	High
Donner/Cold Creeks	17.0	Forest, residential, commercial, dirt roads, primary roadway, secondary roadways, legacy sites	High
Trout Creek	4.9	Forest, commercial, residential, primary roadway, secondary roadways, golf courses	High
Big Chief Corridor	23.4	Forest, commercial, residential, primary roadway	High
Glenshire/Union Valley	4.1	Forest, residential, secondary roadways	Moderate
Prosser/Alder Creeks	54	Forest, residential, ski area, dirt roads, secondary roadways	Moderate
Juniper Creek	10.8	Forest, residential commercial, dirt roads, secondary roadways	Moderate

[1] Information acquired from the TRWQMP (2NDNATURE, LLC, 2008)

3.4 Regulatory Requirements

The development and implementation of the TRWQMP is guided by a series of regulations that center on protecting the beneficial uses defined for the Truckee River. The regulatory documents guiding the County and Town's development and implementation of the TRWQMP are summarized as follows:

- Section 13267 Board Orders required the County and Town to develop a comprehensive water quality monitoring plan (LRWQCB, 2007a).
- Water Quality Control Plan for the Lahontan Region (Lahontan Basin Plan). March 31, 1995. The Lahontan Basin Plan sets forth water quality standard for surface waters and ground waters within the Region. This Basin Plan for the Lahontan Region identifies general types of water quality problems and requires or recommends control measures for these problems. In some cases, it prohibits certain types of discharges in particular areas (LRWQCB, 2005).
- Total Maximum Daily Load for Sediment, Squaw Creek, Placer County. April 2006. The objective of the Squaw Creek TMDL is to attain sediment-related water quality objectives that focus on the protection of in-stream aquatic life. The TMDL establishes indicators for biologic health and physical habitat. For biologic health, the target is to have a biologic condition score of 25 or more when flows are continuous. For physical habitat, the TMDL establishes a D50 target of 40 mm or greater and a decreasing trend in percent fines and sand approaching 25% or less of the stream bottom. Responsible entities are required by the TMDL to implement monitoring programs (LRWQCB, 2006).
- Total Maximum Daily Load for Sediment, Middle Truckee River, Placer, Nevada and Sierra Counties. May 2008. The objective of the Middle Truckee River TMDL is to attain sediment-related water quality objectives that focus on the protection of in-stream aquatic life. The TMDL establishes a water column indicator and target value as an annual 90th percentile suspended sediment concentration (SSC) of less than or equal to 25 milligrams per liter (mg/L) at Farad (USGS gauge 10346000). Additional implementation based indicators for the TMDL include road sand application BMPs and recovery tracking, ski area BMPs and maintenance, dirt road improvement or decommissioning, and legacy site BMPs and restoration. Responsible entities are required to implement these programs. The estimated time frame for meeting the numeric targets and achieving the TMDL is 20 years (LRWQCB, 2008b).
- Truckee River Basin Stormwater Management Program (SWMP). December 14, 2007. This document provides a comprehensive plan to implement the County's SWMP for the years 2007-2012. It describes the six minimum control measures (MCMs) required by the program as well as funding, monitoring, water quality monitoring, and evaluation. The six MCMs are public education and outreach, public involvement/participation, illicit discharge detection and elimination, construction site stormwater runoff control, post-construction stormwater management, and pollution prevention (Placer, 2007).
- Town and County Stormwater Management Programs (SWMP). These documents provide a comprehensive plan to implement the SWMP for the years 2007-2012. They describe the six minimum control measures (MCMs) required by the program as well as funding, monitoring, and evaluation. The six MCMs are public education and outreach, public involvement/participation, illicit discharge detection and elimination, construction site

stormwater runoff control, post-construction stormwater management, and pollution prevention (Truckee, 2007) and (Placer County, 2007).

- Martis Valley Community Plan. December 16, 2003. Prepared by Placer County. The Martis Valley Community Plan (MVCP), in combination with the Placer County General Plan, is the official statement of Placer County setting forth goals, policies, assumptions, guidelines, standards, and implementation measures that will guide the physical, social, and economic development of the Martis Valley area to at least the year 2020. The MVCP includes the goals, policies, standards, implementation programs, the Land Use Diagram, the Circulation Plan Diagram, and the Recreation and Trails Diagram which together constitute Placer County's formal policies for land use, development, and environmental quality (Pacific Municipal Consultants, 2003a).
- Martis Valley Community Plan Environmental Impact Report. The Environmental Impact Report (EIR) identified environmental resources, including water quality, which would potentially be impacted by implementing the MVCP. (Pacific Municipal Consultants, 2003b). One of the mitigations for potential water quality impacts included the development of a comprehensive water quality monitoring program by the County.