# Clear Creek
# Watershed Management
# Agreement

# 2010 Annual Report

**Black Hawk /Central City Sanitation District**
**Central Clear Creek Sanitation District**
**Church Ditch Company**
**City of Arvada**
**City of Black Hawk**
**City of Central**
**City of Golden**
**City of Northglenn**
**City of Thornton**
**City of Westminster**
**Clear Creek County**
**Clear Creek Ski Company**
**Clear Creek Watershed Foundation**
**Climax Molybdenum Company**
**Colorado Department of Transportation**
**Farmers Highline Canal Company**
**Farmers Reservoir and Irrigation Company**
**Gilpin County**
**Jefferson County**
**Molson Coors Brewing Company**
**Saddleback Metro District**
**Shwayder Camp**
**St. Mary's Glacier Water & Sanitation District**
**Town of Empire**
**Town of Georgetown**
**Town of Idaho Springs**
**Town of Silver Plume**

**August 2011**

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## 1. EXECUTIVE SUMMARY

### i) INTRODUCTION

This report fulfills the obligations of the 1993 Clear Creek Watershed Management Agreement (Agreement) and provides a status report on 2010 water quality efforts towards achieving the narrative and chlorophyll standards on Standley Lake. The report is organized by activities: Public Education and Partnerships, Policy and Planning, Water Quality Monitoring, Nonpoint Source and Stormwater Controls, Wastewater Facilities Controls, and Water Protection Programs. The monitoring program is subdivided into three geographic subregions: 1) the Upper Basin, roughly Loveland Pass to Golden, 2) Tributary Basin, from the headgates of the three delivery ditches in Golden to Standley Lake, and 3) Standley Lake itself. A copy of the 1993 Agreement, water quality data, and a flow gaging report can be found in the Appendices located on the CD provided with the report.

The Clear Creek Watershed is located due west of Denver, Colorado, spanning 575 square-miles from the Creek's headwaters near the Continental Divide (14,000 feet in elevation) to just under one mile high when it joins the South Platte River in the northern metropolitan Denver area. The watershed includes five counties, and a considerable rural/mountain population. The historic Mineral Belt bisects the Clear Creek Watershed and while the mining and milling boom was an economic benefit to our State, it left a legacy of negatively impacted water quality throughout the watershed. Modern day threats to water quality include population growth, transportation corridors, wildfire threat, and beetle kill trees.

Clear Creek is a hard working Creek. It supplies water to approximately 350,000 people in the watershed, supports numerous industries, including those focused on recreation and farming, and provides habitat for some of the best fisheries close to an urban setting in Colorado. Standley Lake is the largest reservoir that is filled with water from Clear Creek. Standley Lake is an agricultural and municipal water supply storage reservoir for downstream users including the Cities of Northglenn, Westminster, Thornton and farmers on the plains of Adams and Weld counties. Standley Lake is owned and operated by Farmers Reservoir and Irrigation Company.

The cooperative Water Quality Monitoring Program is the cornerstone of the Agreement. Monitoring efforts for the three geographic watershed regions: Clear Creek above Golden, tributaries to the lake, and Standley Lake, focus on assessing contributions to nutrient loading into Standley Lake. The 2010 data is presented in this report and is compared to the previous five years data. Information regarding the numerous voluntary watershed protection efforts is discussed. The 2010 data is included in Appendix B and the Monitoring Program details are included in Appendix D.

ii) HISTORY OF WATER QUALITY EFFORTS

In response to a failed 1989 proposal for a phosphorus standard on Standley Lake, the Standley Lake Cities (SLC) of Northglenn, Thornton, and Westminster initiated discussions with upper basin stakeholders to negotiate an agreement that would address water quality concerns in Standley Lake. The Agreement, signed by twenty-three entities in December of 1993, resulted in the adoption of a narrative standard. The narrative standard states that Standley Lake will be maintained in a "mesotrophic" condition (medium range of water quality based on algal activity) using best management practices (BMP). The Agreement required development of a management plan for Standley Lake and a watershed monitoring plan to address nutrient loadings. In 2009, the SLC petitioned the Water Quality Control Commission for a chlorophyll standard on Standley Lake. The Commission adopted a chlorophyll standard of 4.0 ug/L with the stated purpose to preserve the current conditions and protect uses. The standard is to be attained in four of five years, and is defined as a nine month average (the average of the nine monthly averages of samples taken from March through November). The Commission also adopted an assessment threshold of 4.4 ug/L which is calculated using the annual arithmetic mean. The chlorophyll standard is intended to control the contribution of algae to the formation of disinfection by-product precursors. Disinfection by-products (DBPs) are formed during the water treatment process when certain organic compounds are exposed to chlorine. DBPs provide a public health risk from a variety of health effects. The Commission retained the narrative standard but removed the language regarding implementation through voluntary actions. Other significant milestones are included in the timeline below.

## Time Line of Significant Water Quality Efforts

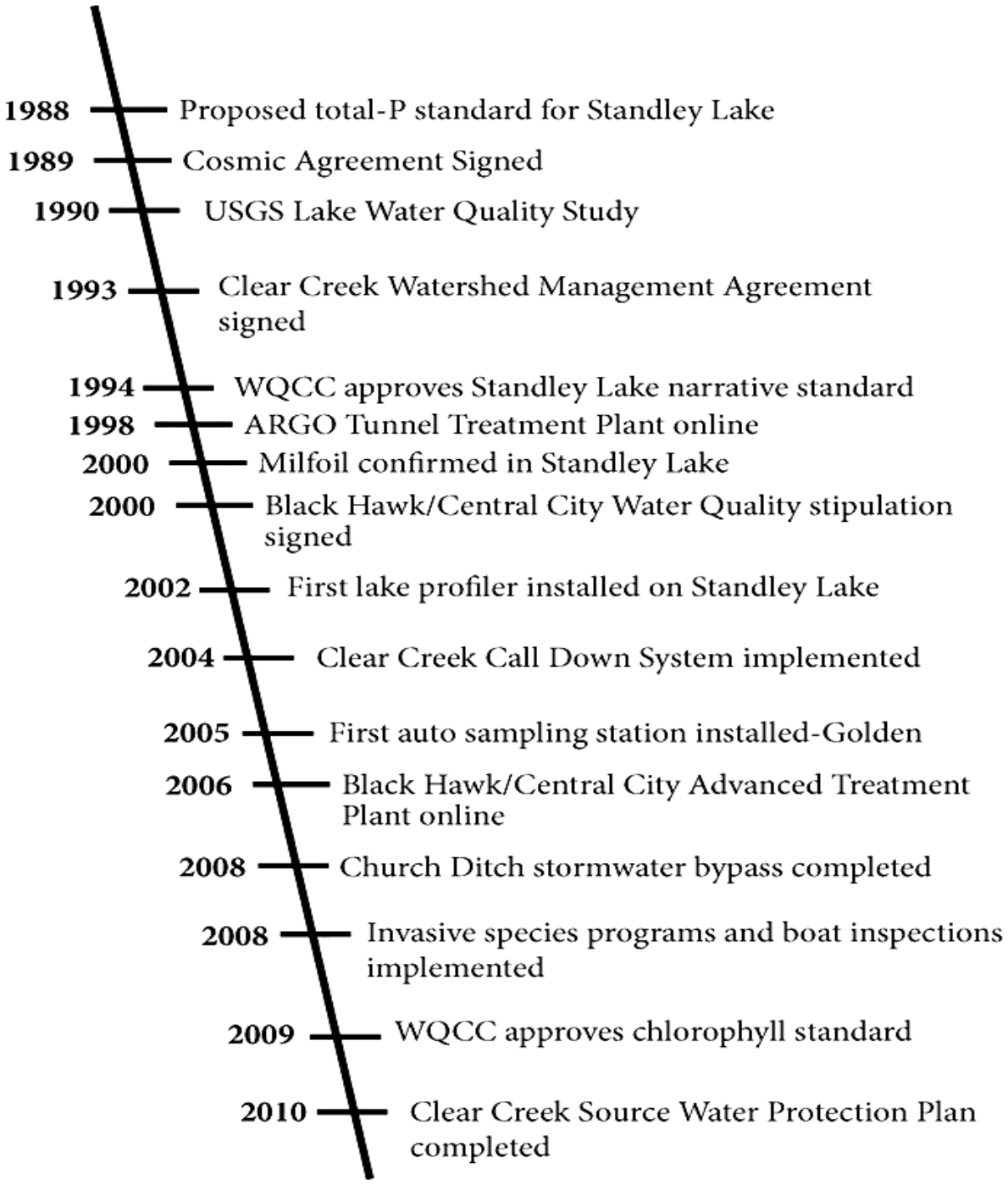



Figure 1

iii) WATER QUALITY STATUS

Monitoring Program

The Monitoring Program is coordinated by the SLC, and the Cities of Golden and Arvada. A total of 319 samples were collected in 2010 resulting in 6,173 analytical tests. Over 42,000 tests have been performed on 4,477 samples collected since the inception of the Monitoring Program in 1994.

Samples are collected on Clear Creek, the Tributary Basin, and at Standley Lake. The enclosed watershed map (Figure 11) shows the sampling locations. Unless otherwise identified, data presented in this report are single event grab samples, and/or composited autosampler results. Grab samples are also collected from nine upper basin wastewater treatment plants. It should be noted that wastewater data are end of pipe samples, not end of mixing zone (if one applies), and that nutrient reporting is not required in NPDES permits prior to and including 2010. Tributary samples are taken at canal headgates on Clear Creek and at delivery to Standley Lake. Several non-ditch contribution locations are included in the Tributary Basin Monitoring Program as well. Standley Lake is sampled at multiple locations within the lake, only the SL 10-00 location (the deepest location in the lake and the approximate location of municipal supply intakes) is reported.

Grab, ambient and event autosampler samples, and continuous, *in-situ*, monitoring are performed at numerous sites along Clear Creek. The autosampler program (AS) includes monthly, ambient 48-hour composite sampling from April through October, as well as, storm event sampling. The number of storm samples varies spatially and temporally. Grab samples from the canals and tributaries to Standley Lake are collected monthly when flowing. Ambient and event composite samples are collected on two canals at the inlets to Standley Lake, from April to October, to coincide with samples collected on Clear Creek. The monitoring schedule for Standley Lake includes two monthly grab samples, and top to bottom water column profiles, taken four times daily when ice is off the lake. Zooplankton tows and invasive species monitoring are also conducted.

Samples are tested for total nitrogen, nitrate + nitrite, ammonia, dissolved and total phosphorus, total organic carbon, suspended solids, pH, temperature, conductivity, dissolved oxygen, and turbidity. Some samples are analyzed for other test parameters such as chlorophyll, algae, and metals. All sample results can be found in Appendix B. Analysis is performed primarily by the SLC and City of Golden laboratories. Some testing is performed at contract labs; Clear Creek samples for metals are sampled by the Upper Clear Creek Watershed Association, UCCWA, and analyzed by the EPA.

Monitoring Program costs in 2010 for the SLC exceeded $200,000. In 2010, the City of Golden contributed $9,950 toward the environmental sampling program in Standley Lake. This payment reflects the reimbursement of costs related to the exercise of certain water rights in Clear Creek.

Staff Gages

Flow data is essential for calculating nutrient loads. Cooperative funding mechanisms between the USGS and stakeholders help ensure that critical gages remain functional throughout the watershed. Funding totaling more than $20,000 annually, for the calibration and maintenance of seven flow gages, is provided by SLC, UCCWA, and by upper basin local governments and businesses. UCCWA contributed $4,690; one UCCWA member, the Climax Molybdenum Company contributed an additional $1,100 to maintain the CC40 mid-basin gage, near Idaho Springs. The stream flows recorded at the USGS gage in Golden is the gage closest to the main diversion canals used to fill Standley Lake. The Golden gage is therefore used for comparing annual flow trends (Figure 2).

Above average snow fall in recent years has allowed Standley Lake to remain full for a longer period of time, providing conditions for good water quality in the lake. The 2010 average flow in Clear Creek was approximately 9% greater than the 2000 to 2009 average.

Clear Creek Flow at Golden

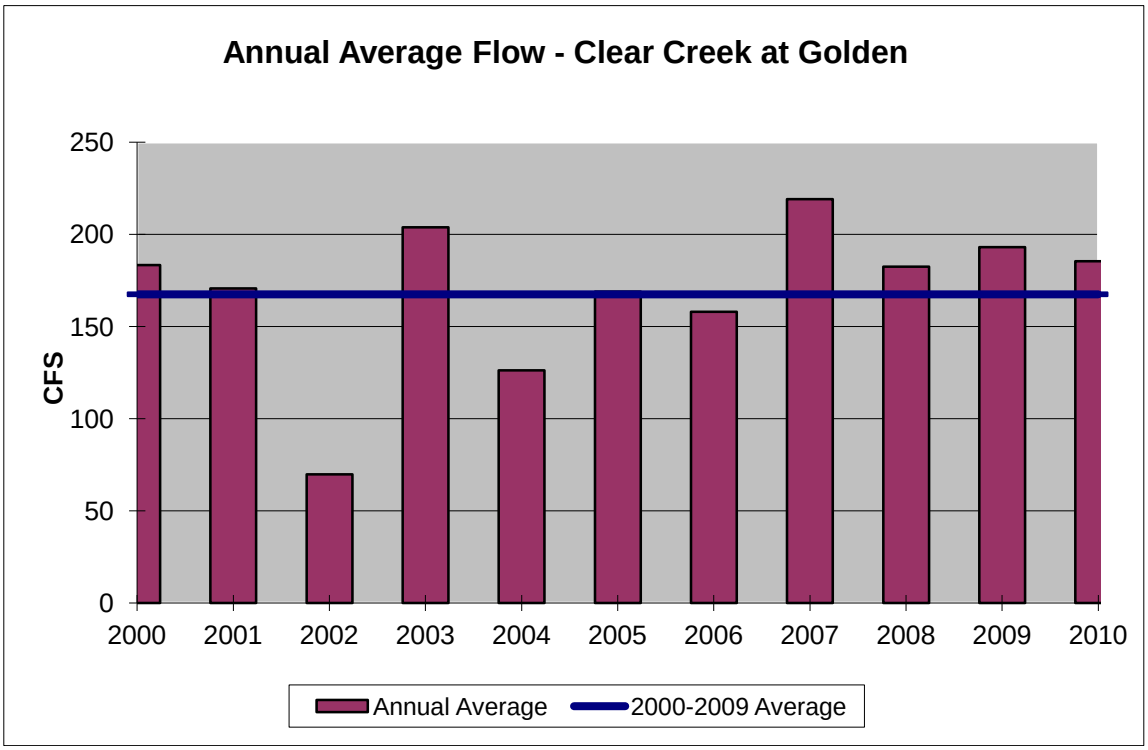



Figure 2

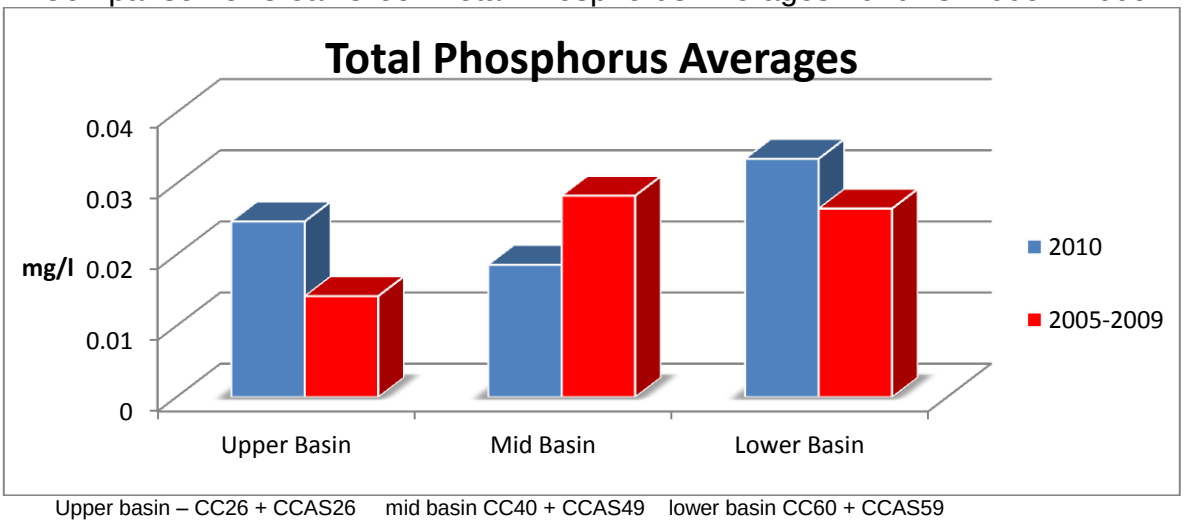
iv) CLEAR CREEK WATER QUALITY

Beginning in 2005, the Monitoring Program began moving from grab sampling to automated sampling and continuous monitoring with in-stream probes. Autosamplers collect samples over a 48 hour period which gives a more representative picture of water quality over the single, point in time grab sample. Better characterizations of loadings from storm events are also possible with autosamplers. Continuous monitoring of in-stream conditions captures the impacts to water quality and stream flows from natural precipitation events, as well as impacts from construction or other human activities. Four autosamplers have been installed since 2005, three on the mainstem and one on the North Fork of Clear Creek.

Ambient autosampler samples consist of two, 24 hour composite samples taken monthly from approximately April through October. Ambient autosampler data is supplemented with grab sample data during the winter season due to freeze potential. Event autosampler samples are triggered in response to certain conditions (increasing turbidity, change in flow, or precipitation) as such, the number of sampling events varies temporally and spatially.

2010 averages for total phosphorus (TP) and total nitrogen (TN) concentrations at the upper basin (Lawson), mid-basin (Idaho Springs), and downstream (Golden) locations were compared to averages for the 2005-2009 periods (Figures 3 & 4). Ambient autosampler and grab data were averaged. No storm event data was included in these graphs. The mid basin site (CC40, Idaho Springs) varied from this pattern with 2010 phosphorus and nitrogen concentrations elevated over 2005-2009 average.

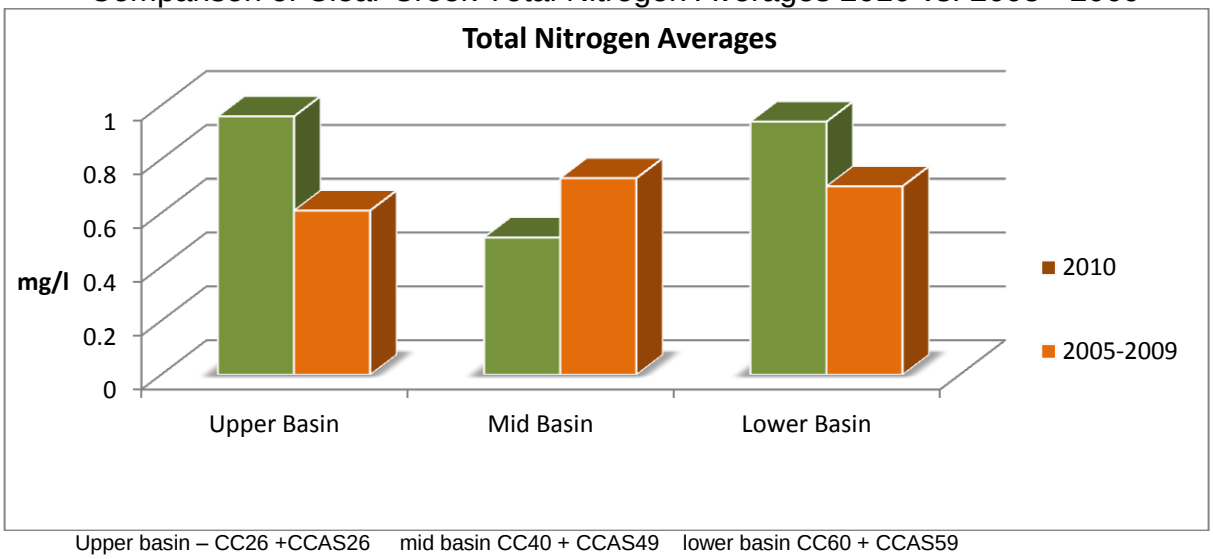
Comparison of Clear Creek Total Phosphorus Averages 2010 vs. 2005 – 2009




Upper basin – CC26 + CCAS26 mid basin CC40 + CCAS49 lower basin CC60 + CCAS59

Figure 3

Comparison of Clear Creek Total Nitrogen Averages 2010 vs. 2005 - 2009




Upper basin – CC26 +CCAS26 mid basin CC40 + CCAS49 lower basin CC60 + CCAS59

Figure 4

v) TRIBUTARY BASIN

Three ditches deliver water to Standley Lake from Clear Creek. They are: Croke Canal (Croke), Farmers' Highline Canal (FHL) and Church Ditch (Church). The Kinnear Ditch Pipeline (KDPL) delivers water to Standley Lake from Coal Creek and/or the Boulder Diversion Canal. Diversion seasons are identified in Table 1 below to assist in the characterization of pollutant sources by way of example, winter flows are predominately wastewater. Actual diversion dates may vary slightly due to the seniority of water rights on the South Platte and Clear Creek.

Table 1 – Average Nutrient Concentrations By Diversion (mg/l)

| Ditch | Diversion Season | lbs/acre-ft diverted | | % of Total 2010 Diversions |
|---|---|---|---|---|
| | | TP | TN | |
| FHL * | 4/14 to 10/31 | 0.073 | 1.08 | 28% |
| Croke Canal | 10/31 to 4/14 | 0.083 | 1.19 | 63% |
| Church | 4/14 to 10/31 | 0.083 | 0.92 | 3% |
| KDPL | Year round | 0.066 | 2.68 | 6% |

* Farmers High Line water was carried by the Croke Canal for a short period of time

vi) WASTEWATER TREATMENT PLANTS

There are nine wastewater treatment plants in the upper basin. Five of the wastewater treatment plants are sampled eight times a year; these facilities are highlighted in yellow in Table 2 below. The remaining wastewater treatment plants are sampled twice annually. Grab samples are taken by WWTP staff at the end of the treatment stream, i.e. end of pipe, field parameters (temperature, pH and dissolved oxygen), and discharge flow are also recorded. For the 2005-2010 time period, none of the plants were required to report TN or TP per their NPDES permits.

Table 2 – Wastewater Treatment Plant Nutrient Discharge (mg/l)

| Location | | n | Average TN 2005-2009 | Average TN 2010 | Average TP 2005-2009 | Average TP 2010 | Hydraulic capacity MGD |
|---|---|---|---|---|---|---|---|
| **CC1a** | Loveland Ski Area | 23 | 10.09 | 5.46 | 0.761 | 0.199 | |
| **CC3a** | Georgetown | 81 | 8.78 | 9.78 | 0.650 | 0.599 | 0.58 |
| **CC5a** | Empire | 21 | 14.62 | 15.70 | 0.970 | 0.141 | 0.06 |
| **CC7a** | Central Clear Creek | 85 | 24.11 | 7.99 | 3.529 | 0.401 | 0.1 |
| **CC8a** | St. Mary's | 21 | 7.01 | 3.52 | 2.033 | 0.433 | 0.6 |
| **CC12a** | Idaho Springs | 91 | 8.02 | 5.73 | 1.750 | 0.972 | 0.6 |
| **CC13ab** | BH/CC* | 91 | 6.26 | 6.01 | 0.247 | 0.142 | 1.13 |
| **CC14a** | Henderson Mine | 17 | 8.41 | 11.50 | 0.944 | 1.082 | 3.8 |
| **CC15a** | Eisenhower Tunnel | 33 | 4.33 | 3.95 | 0.438 | 0.342 | 0.072 |

*Advanced treatment plant on line July 2006
Total number of samples taken per year has varied with changes to the Monitoring Program
Hydraulic capacity taken from 2006 DRCOG, Clean Water Plan Technical Appendix

Average total nitrogen concentrations decreased at six of the nine plants in 2010 compared to the 2005-2009 time period, while total phosphorus decreased at eight plants.

vii) STANDLEY LAKE WATER QUALITY

Standley Lake has a long and rigorous data set that includes water quality sampling plankton tows, daily recording of meterological conditions, and prevention monitoring, and control of invasive species. Twice monthly grab samples are taken near the water supply intakes, designated as SL 10-00. This is the deepest area in the lake. A lake profiler is located at this site as well. The profiler sends a multi-probe sensor through the water column four times daily (Figure 5). The sensor collects data through the water column from the surface to five-feet from the bottom. The profiler records pH, temperature, conductivity, turbidity, dissolved oxygen, and chlorophyll data.

Lake Profiler

Figure 5

Total phosphorus and total nitrogen loadings into Standley Lake (Figures 6 and 7) increased in 2010. The specific reason(s) for this increase is not know, however some year-to-year variability is expected. Despite this increase, the chlorophyll standard was met, although the increase in chlorophyll average in 2010 from 3.0 to 3.5 ug/l (Figure 8) may be a result of this increase in nutrient loading.

Standley Lake Phosphorus Loading

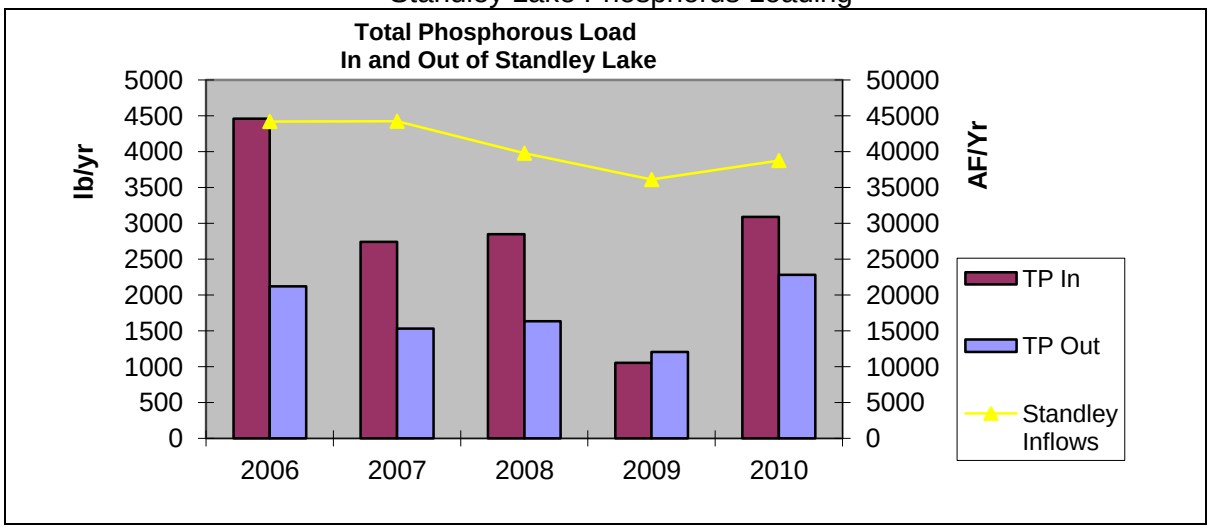



Figure 6

Standley Lake Nitrogen Loading

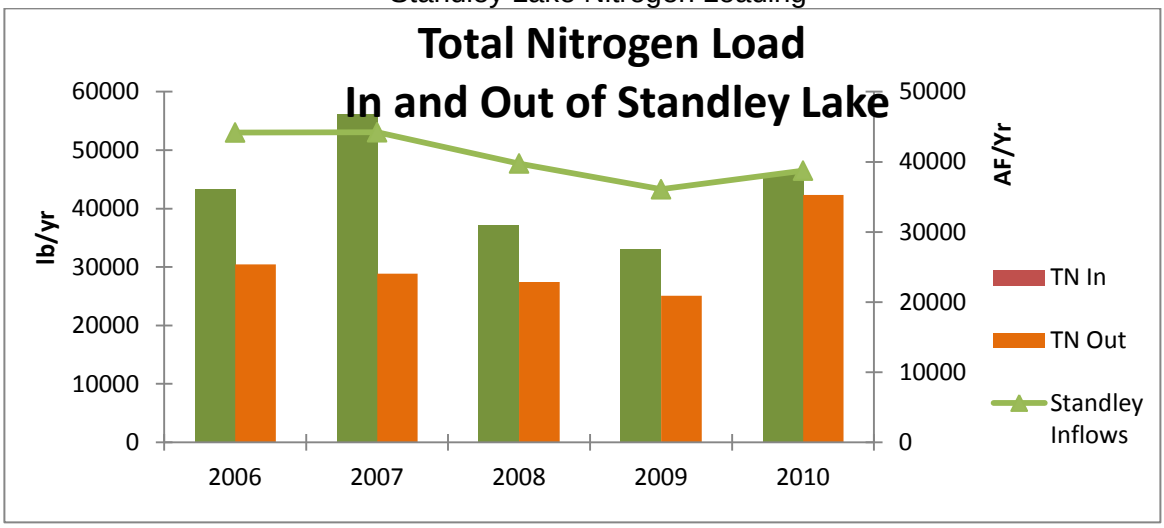



Figure 7

Standley Lake was in compliance with the 4 ug/l chlorophyll standard in 2010 (Figure 8). The standard is based on a five year average calculated from monthly averages of samples collected from March through November of each year. A significant algae bloom of 617 units/ml occurred in November and resulted in a chlorophyll spike of 8 ug/l.

Standley Lake Chlorophyll

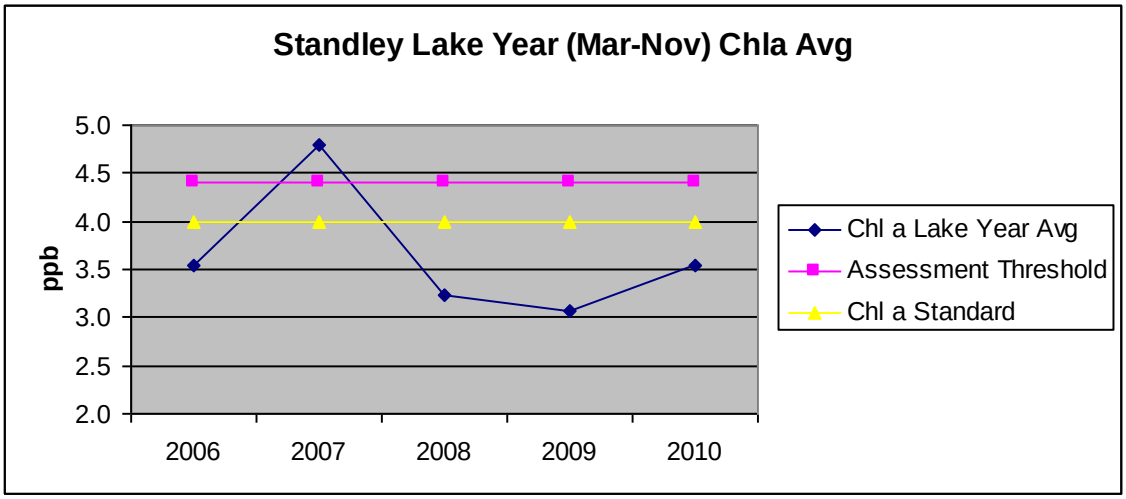



Figure 8

Eurasian watermilfoil, *Myriophyllum spicatum L* (milfoil), a noxious aquatic weed, was first observed in 1998 (Figure 9). It was positively identified in 2000. Milfoil is a non-native, aquatic, noxious weed that grows rapidly, and to a depth of 35 feet. Milfoil grows in dense mats that severely interfere with recreation, and has been known to provide a substrate for blue-green algae growth. Blue-green algae blooms can ultimately cause taste and odor events in drinking water supplies.

Eurasian milfoil weevils were stocked in Standley Lake in 2002, 2004, 2005, and 2006. Standley Lake was not stocked with weevils in 2010. Weevils are used to control the growth of milfoil. Weevils were stocked in eight locations on the west side of the reservoir.

Eurasian Watermilfoil


Figure 9

Eurasian Milfoil Weevil


Figure 10

Underwater weevil surveys are conducted annually and provide a status report on weevil population, survival, and evidence of weevil damage to plant stems. Bathymetric studies indicate a reduction in milfoil density, and reestablishment of native plant species in areas formerly colonized by milfoil.

viii) PLANNING ACTIVITIES

UCCWA is the designated 208 management agency for the upper basin responsible for testing, monitoring, overseeing and reporting water quality and water resource issues through the upper portion of the Clear Creek Watershed.

ix) SUMMARY OF RESULTS

Despite increased phosphorus and nitrogen loading into Standley Lake in 2010, the chlorophyll standard continued to be met (Figures 6 and 7). The data do not suggest distinct nutrient loading trends in Clear Creek or Standley Lake. Above average snow melt in the last several years has provided for favorable water quality conditions. The parties to the Agreement continue to work together cooperatively to preserve the water quality of Clear Creek and Standley Lake.

## 2. WATER QUALITY

i) MONITORING PROGRAM

The Monitoring Program is divided into three geographically based sub-programs: Clear Creek, Tributary Basin, and Standley Lake. All three programs are designed to provide water quality information for evaluation of nutrient loadings from their representative contribution areas. The Clear Creek and Tributary Basin Programs collect ambient grab samples, provide continuous in-stream monitoring data and automated collection of 48-hr ambient and event samples. This design is useful in evaluating relative contributions of the various nutrient sources (point and non-point), effectiveness of BMPs, wastewater treatment plant operational changes and nutrient reductions from treatment plant upgrades. Multiple locations on the mainstem of Clear Creek and several of its tributaries are sampled. The Monitoring Program for the tributaries to the lake, monitors the canals that deliver water from Clear Creek to Standley Lake to determine nutrient and other contaminant loading directly to the lake. A Monitoring Program for Standley Lake involves bi-weekly grab samples and daily profile data is collected on the lake during the ice off season. This program is instrumental in evaluating the water quality responses from nutrient loadings. Sampling locations are shown in Figure 11. Monitoring Program details are included in Appendix D.

Watershed Map

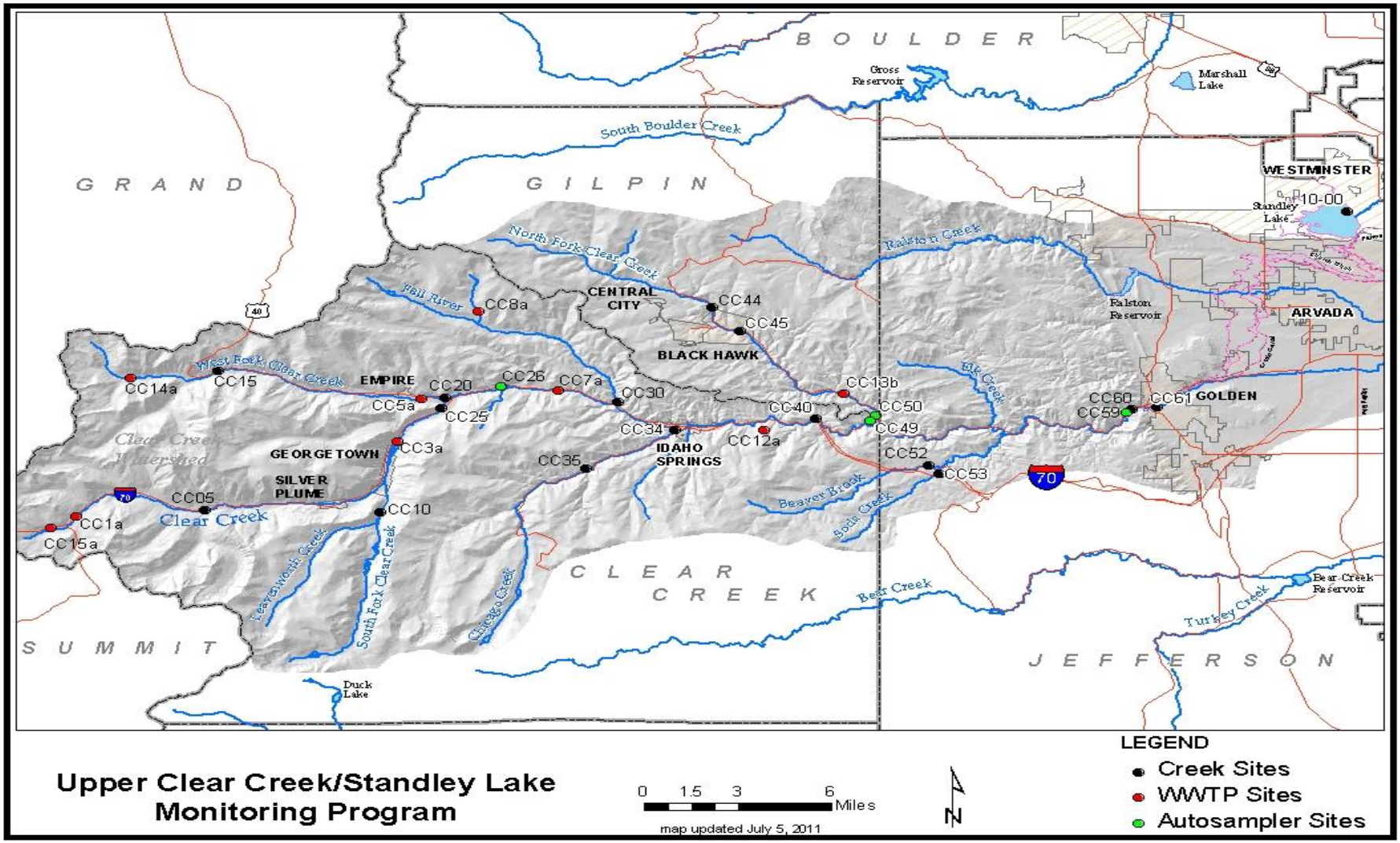



Figure 11

Table 3 - Monitoring Events Summary – 1994 through 2010

| Monitoring Program Description | Number of Sampling Locations | Number of Samples Collected in 2010 | Total Number of Samples Collected 1994 – 2010 |
|---|---|---|---|
| Creek (Grab) | 16 | 38 | 1,460 |
| Creek (Wastewater Plants) | 9 | 37 | 855 |
| Creek (Autosamplers) * | 4 | 73 | 250 |
| Tributaries/ Canals | 9 | 93 | 1,121 |
| Lake * | 4 | 78 | 787 |
| Total | 43 | 319 | 4,477 |

* Creek autosampler data period of record 2005 -2010. Lake data period of record is 1999 – 2010.

The 4,477 samples that have been collected since 1994 have resulted in over 42,000 individual analytical tests. The Monitoring Program cost for 2010 was approximately $200,000. The Monitoring Program Committee has instituted a rigorous Quality Assurance/Quality Control Program for analytical data evaluation. It is safe to say that monitoring is the foundation of the Agreement. Sample data results are available in Appendix B.

Clear Creek Ambient Grab Program

Grab samples are discreet samples collected in-stream, and at wastewater treatment plants (WWTPs) effluents throughout the watershed. Grab sample locations were selected to correspond with established USGS gaging stations. Sites have been added, dropped, or replaced with autosamplers as the Monitoring Program has evolved. Stream grab samples were collected four times in 2010 representing high and low flow periods. Winter grab samples supplement autosampler data when autosamplers cannot be deployed due to icing. Samples were collected from WWTPs eight times in 2010.

The Clear Creek grab sample data presented in this report is collected at three strategic locations on the creek.

The upper basin site CC26 is located near I-70 at Lawson. This site is below the confluences with the West Fork of Clear Creek, Leavenworth Creek, and the South Fork of Clear Creek.

The mid-basin site, CC40 located at the UCCWA sponsored gage east of Idaho Springs. This site is below the confluences with the West Fork, South Fork, Leavenworth Creek, Chicago Creek, and Fall River.

The lower basin site, CC60, immediately upstream of the Church Ditch Headgate in Golden includes contributions from all of the above tributaries as well as the North Fork of Clear Creek, Elk Creek, and Beaver Brook. Site CC60 is the farthest downstream site.

These sampling locations reflect water quality impacts from multiple WWTPs, on site waste (septic) systems, abandoned mine waste, rock and gravel mining, and stormwater run-off.

Sampling on Clear Creek

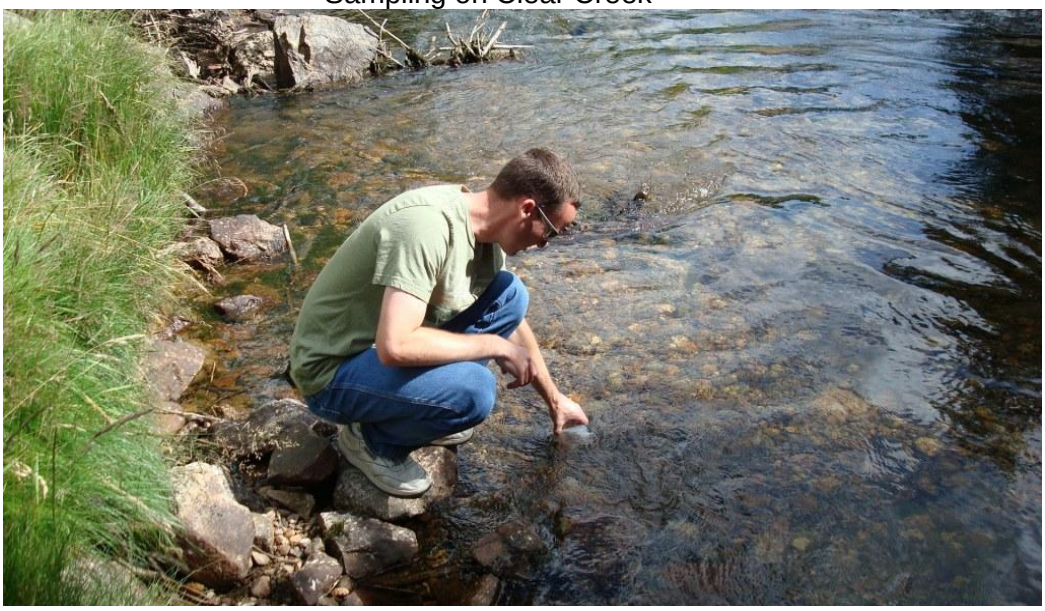


Figure 12

Clear Creek Autosampler Program

In addition to grab samples, the creek is also sampled with automated sampling equipment (autosamplers) and monitored with continuous in-stream probes. Autosamplers provide the ability to initiate remote sample collection. Continuous monitoring captures the impacts to water quality from precipitation events as well as anthropogenic activities such as construction activities. Autosamplers at three locations are set to trigger on a combination of changing environmental conditions (increasing turbidity, stream flow and precipitation) to facilitate capturing storm event impacts.

Four autosamplers have been installed since the inception of the Autosampler Program in 2005. Table 4 summarizes the data collection history for the Clear Creek autosamplers. Geographically situated on the main stem, and North Fork of Clear Creek, in an upstream to downstream configuration, these sites are identified as:

*CC AS 26—on the main stem of CC downstream of the confluence with the West Fork of CC (Lawson gage);*

*CC AS 49 – on the main stem of CC upstream of the confluence with the North Fork of CC;*

*CC AS 50 – North Fork of CC above the confluence with the main stem of CC;*

*CC AS 59 – on the main stem of CC approximately 100 yards upstream of the Church Ditch Headgate; west end of Golden city limits.*

Table 4 - Clear Creek Autosampler History

| Location | Data Period of Record | Number of Autosampler Monitoring Events | | | |
|---|---|---|---|---|---|
| | | 2005-2009 | | 2010 | |
| | | Ambient | Event | Ambient | Event |
| CC AS 26 | 2008 - 2010 | 12 | * | 6 | * |
| CC AS 49 | 2006 - 2010 | 21 | 15 | 6 | 5 |
| CC AS 50 | 2006 - 2010 | 22 | * | 6 | 6 |
| CC AS 59 | 2005 - 2010 | 23 | 17 | 6 | 5 |

* Not applicable – this autosampler is not programmed to collect event samples

Tributary Basin Program

Grab samples are collected on all the supply canals to Standley Lake on a monthly basis when the individual ditches are running. In addition, the Croke, Farmers' Highline, and Church Ditch canals are equipped with continuous monitoring probes and autosamplers at the lake inlets. Lake nutrient loadings by canal are calculated using the lake inlet water quality and flow data.

Standley Lake Program

Water quality efforts on Standley Lake include daily profiles (top to bottom), bi-weekly grab samples, zooplankton tows, and invasive species monitoring and prevention.

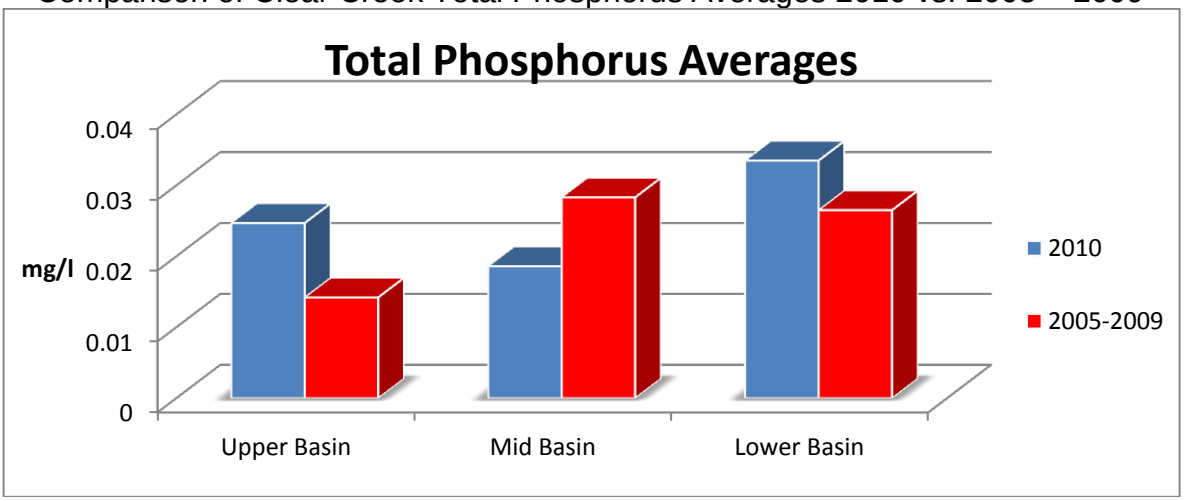
The primary sampling location for Standley Lake is located near the dam at the raw water supply intake structures (site SL10-00). Bi-weekly grab samples are taken at three depths during the ice-off season. Samples are collected at the surface, in the photic zone (two times the Secchi depth), and one meter from the bottom. Secchi depth is a measure of the clarity of water using a white and black disk. Sampling at various depths provides information useful in making drinking water treatment process decisions.

Standley Lake is also monitored using an automated profiler equipped with a multi-probe analyzer. The profiler is placed on the lake when the ice has melted in the spring and is retrieved from the lake before the surface freezes. Analytical probes measure standard field parameters plus chlorophyll in a depth integrated manner four times daily. The profiler executed at least one full column profile on 191 separate days in 2010.

## ii) STATUS OF CLEAR CREEK WATER QUALITY

Total phosphorus levels in Clear Creek for 2010, as compared to the previous five year averages, are represented in the graph below. Grab sample and autosampler data is used for this comparison.

Comparison of Clear Creek Total Phosphorus Averages 2010 vs. 2005 – 2009

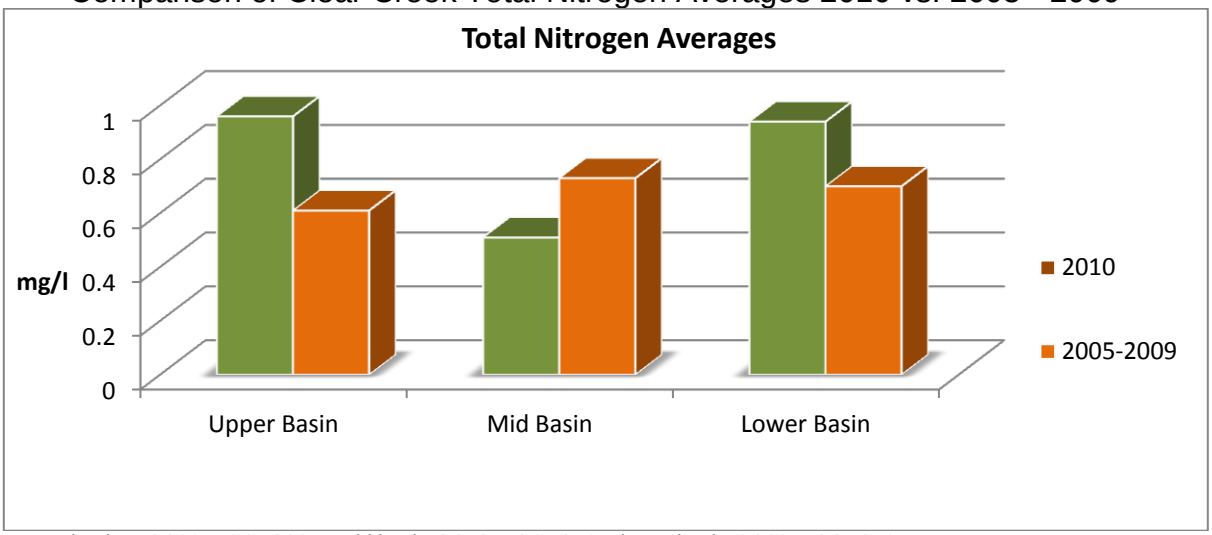



Upper basin – CC26 + CCAS26 mid basin CC40 +CCAS49 lower basin CC60 + CCAS59

Figure 3

Nitrogen levels in Clear Creek for 2010 are compared to the previous five year average in the graph below. Grab sample and autosampler data is used for this comparison.

Comparison of Clear Creek Total Nitrogen Averages 2010 vs. 2005 - 2009




Upper basin – CC26 + CCAS26 mid basin CC40 + CCAS49 lower basin CC60 + CCAS59

Figure 4

The graph below (Figure 13) combines autosampler and grab sample data for dissolved and total phosphorus for Clear Creek in Golden. (CC60 and CCAS59).

Total Phosphorus at Golden

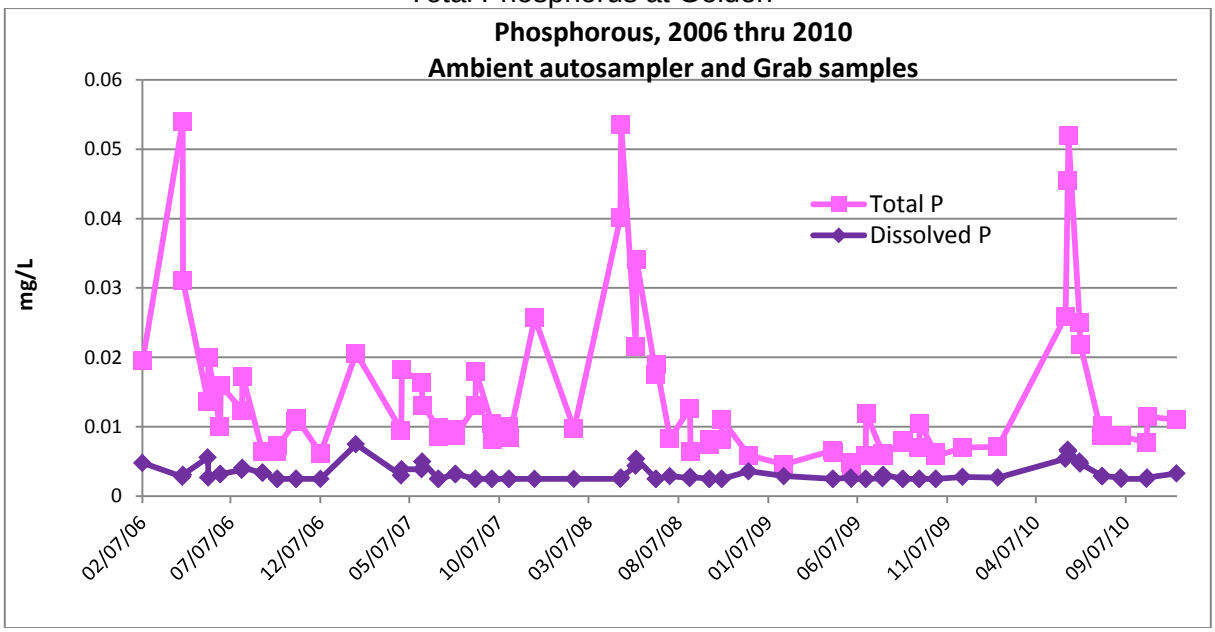



Figure 13

The graph below (Figure 14) combines autosampler and grab sample data for total nitrogen and nitrite + nitrate for Clear Creek in Golden. (CC60 and CCAS59).

Total Nitrogen at Golden

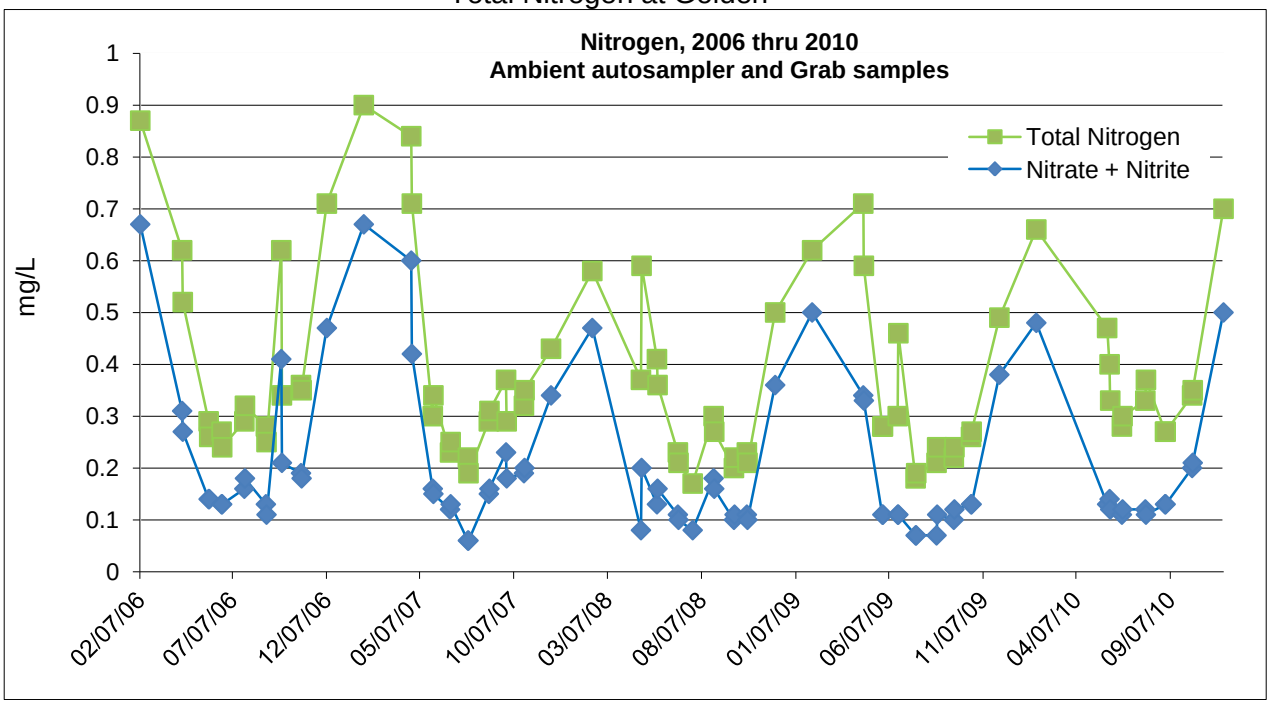



Figure 14

Autosampler Stations

The Monitoring Program has steadily moved from grab sampling to using autosamplers. The autosamplers provide more representative data by sampling over a 48-hour period. Autosampling season is generally from April through October depending on weather conditions. Two consecutive 24-hour composites are sampled and analyzed for nutrients and other parameters. In-stream field probes for pH, conductivity, temperature, and turbidity are installed at the autosampling stations for continuous monitoring via telemetry. During the winter months, only temperature and conductivity are collected because those probes are able to withstand the severe winter conditions. The autosampler stations are maintained by the cities of Golden and SLC.

The following seasonal graphs (Figures 15 & 16) display the entire data history for total phosphorus and total nitrogen at CCAS59, the lower basin site in Golden from 2006 – 2009. The phosphorus distribution suggests increased loading during the spring run-off where the nitrogen distribution suggests a different response; possibly influence from wastewater discharges during lower flow periods.

Total Phosphorus Distribution at Golden

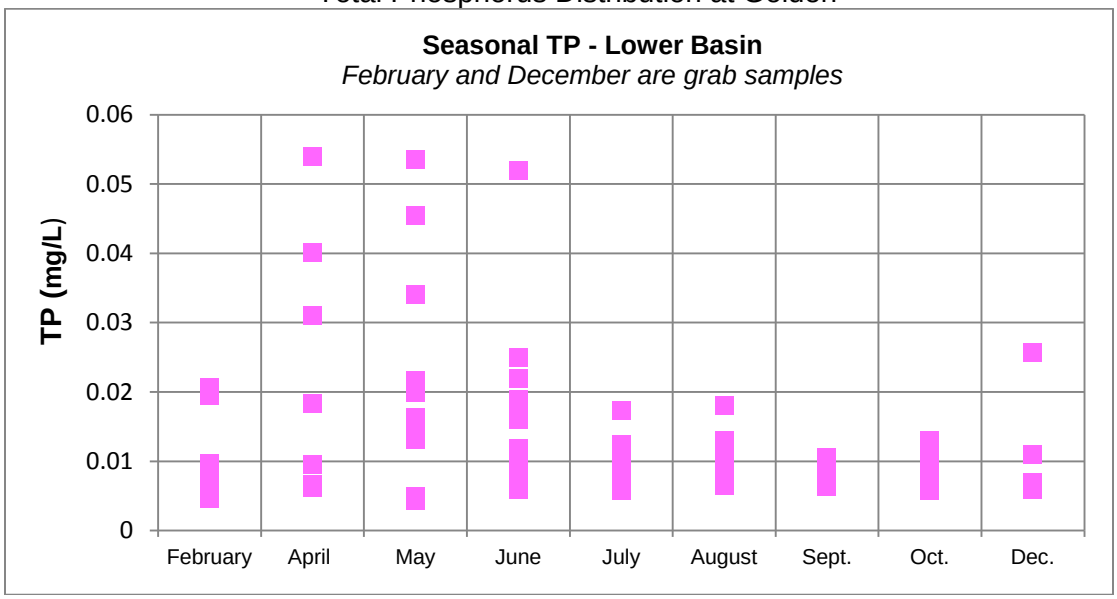



Figure 15

Total Nitrogen Distribution at Golden

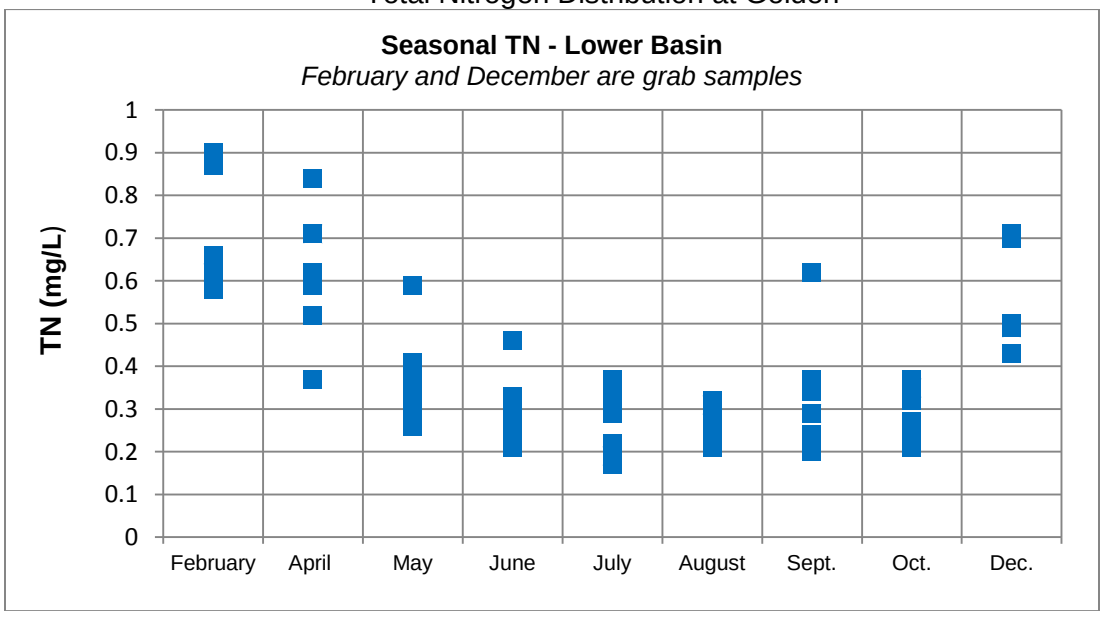



Figure 16

Autosampler - Storm Events

In addition to the 48-hour composites, some autosamplers are set to collect storm samples in response to increased turbidity, river level, and/or significant localized precipitation.

Run-off from storm events contributes large nutrient loads into Clear Creek. A photo of Clear Creek near Golden below (Figure 17) illustrates a significant increase in both turbidity and nutrients following a particular storm event in July, 2010.

Storm Event – Clear Creek

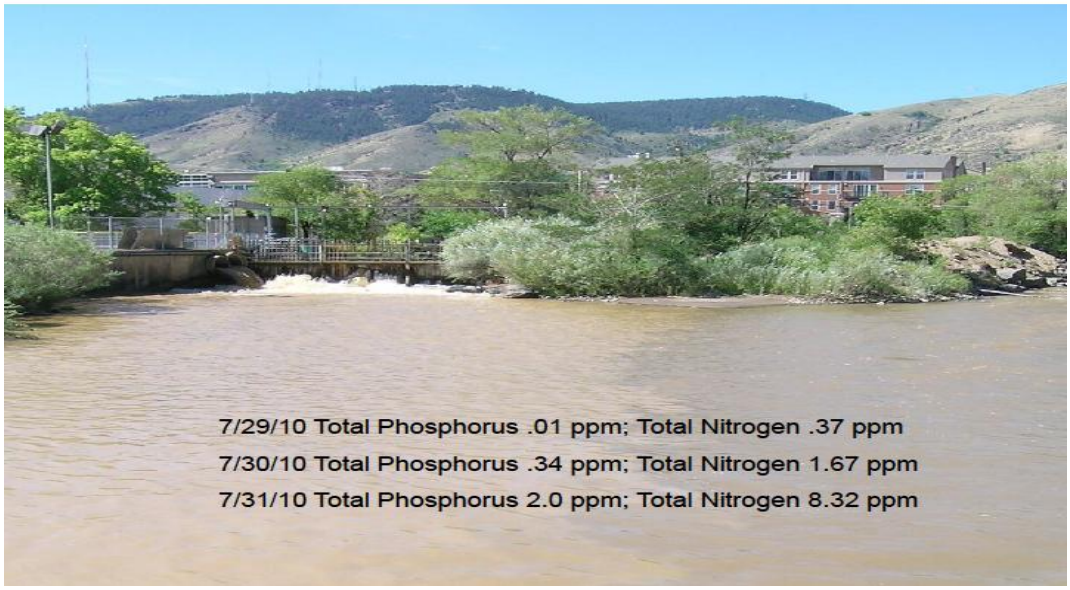



Figure 17

iii) STANDLEY LAKE WATER QUALITY

Total phosphorus and total nitrogen loadings into Standley Lake increased in 2010. Despite this increase, the chlorophyll standard was met, and year-to-year variability is expected. It is important to note that nutrients are removed from the lake through bottom (hypolimnetic) withdrawal to four drinking water treatment plants and agricultural releases to Big Dry Creek. The SLC continue to fine tune the Monitoring Program to identify potential nutrient sources along the tributary basin to better characterize storm-related loading.

Standley Lake Total Phosphorus Loading

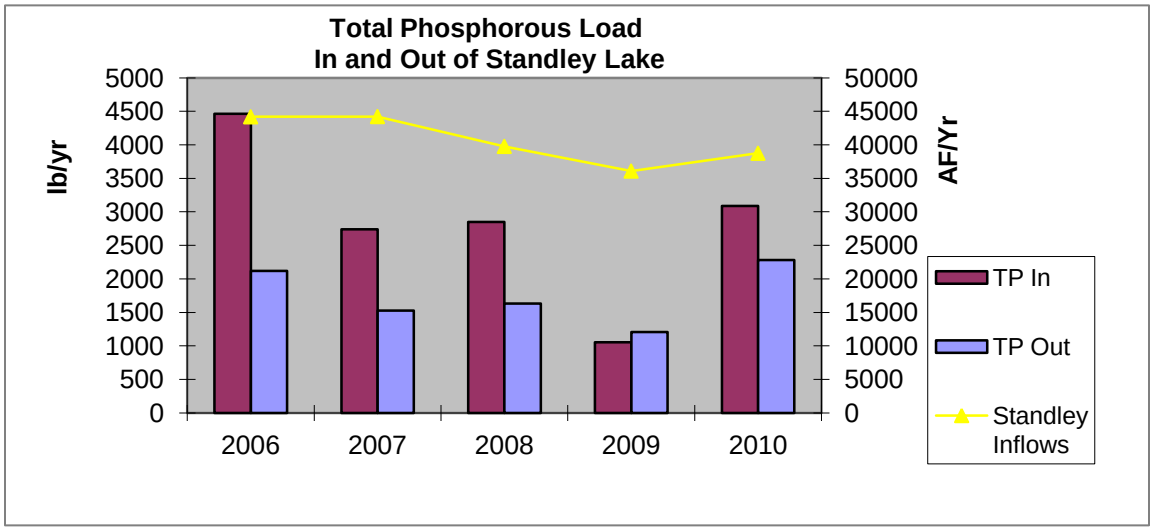



Figure 6

Standley Lake Total Nitrogen Loading

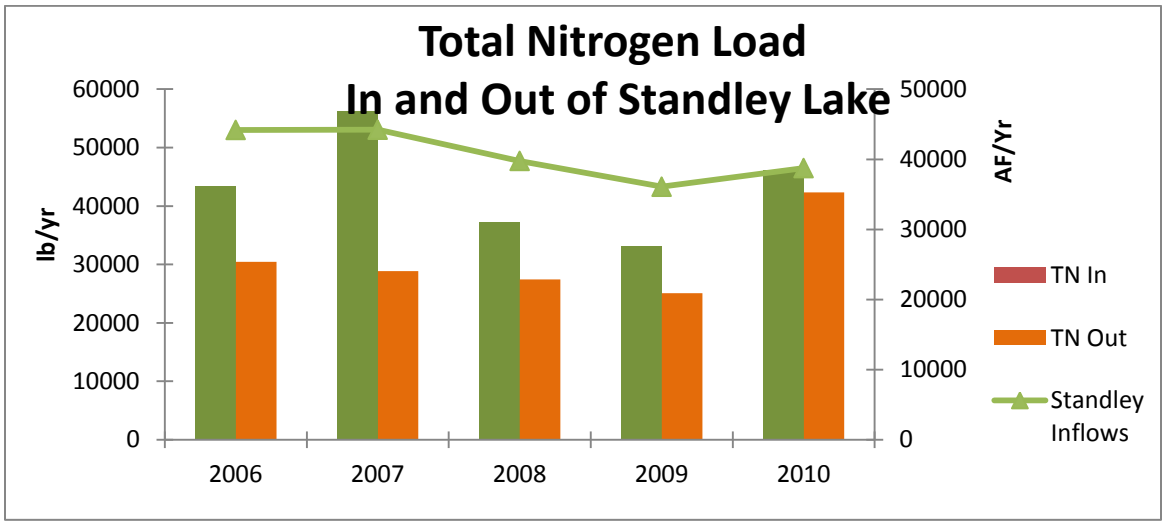



Figure 7

Anoxia

Figure 18 reveals the strong seasonality of oxygen concentration at the lake bottom during the summer months when the lake is stratified. The SLC believe it is important to note that dissolved oxygen (DO) is both an aquatic health and a drinking water concern. In evaluating DO for aquatic life, only data taken when the lake is isothermal (same temperature top to bottom) is evaluated. For drinking water treatment, all data regardless of stratification status, is evaluated because low DO results in nutrient and metal resuspension which increases treatment costs and increases the potential for taste and odor events. Anoxic conditions allow phosphorus in the sediments to re-dissolve into the water column allowing additional algae growth after lake turnover. Anoxic conditions allow phosphorus in the sediments to re-dissolve into the water column allowing additional algae growth after lake turnover. Other elements are also released by the sediments under anoxic conditions such as manganese.

Anoxic Period - Standley Lake 2010

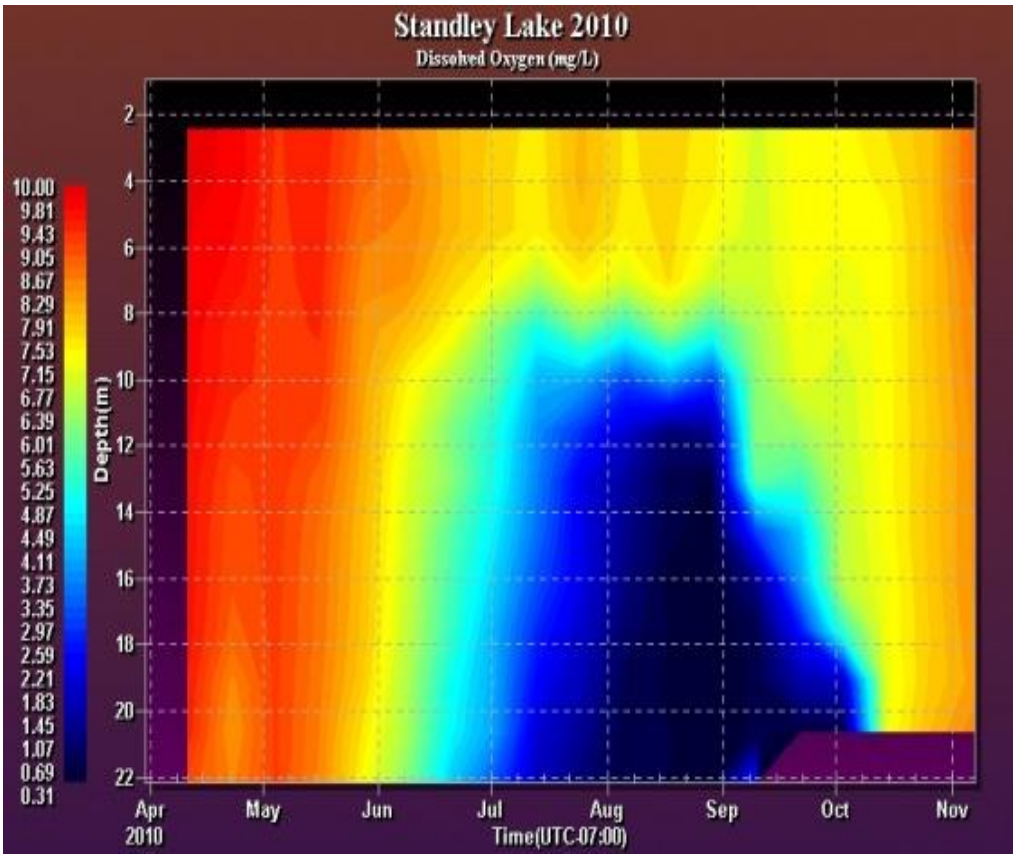



Figure 18

Chlorophyll

A chlorophyll standard of 4.0 micrograms/liter (five year running average) was approved by the Colorado Water Quality Control Commission in 2009. Figure 19, below, shows low algae in the lake in 2010 until the November algae (asterionella) bloom. These data are taken with a chlorophyll probe connected to the lake profiler. This increase in chlorophyll, when averaged through the year, did not cause an exceedance of the chlorophyll standard. It is important to note that the standard is assessed with grab samples and not profile data. Profile data is used to modify the drinking water treatment process.

Chlorophyll Standley Lake - 2010

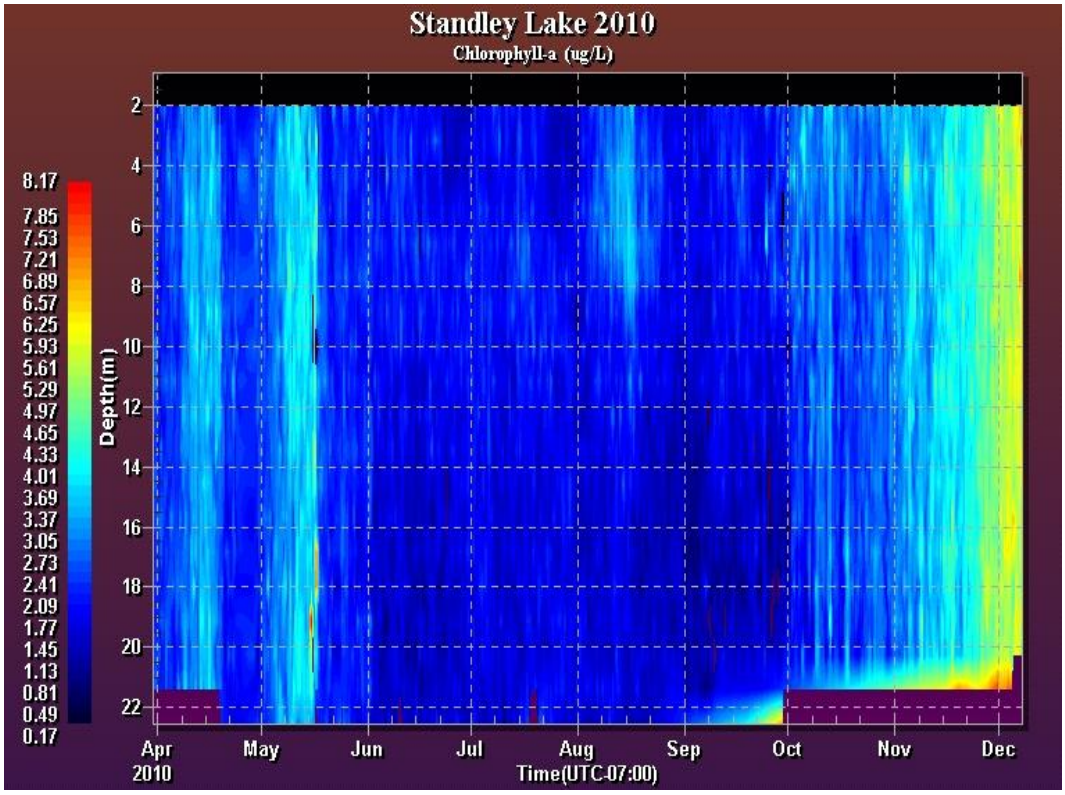



Figure 19

The graph below represents the algae and chlorophyll data from grab samples taken from the photic zone (area of light penetration where photosynthesis takes place). There is good correlation between algae count and chlorophyll concentration. The graph also correlates with the smaller algae blooms observed during the spring, and the large bloom late in the year. Algae concentration is represented on the left y-axis.

Chlorophyll vs Algae

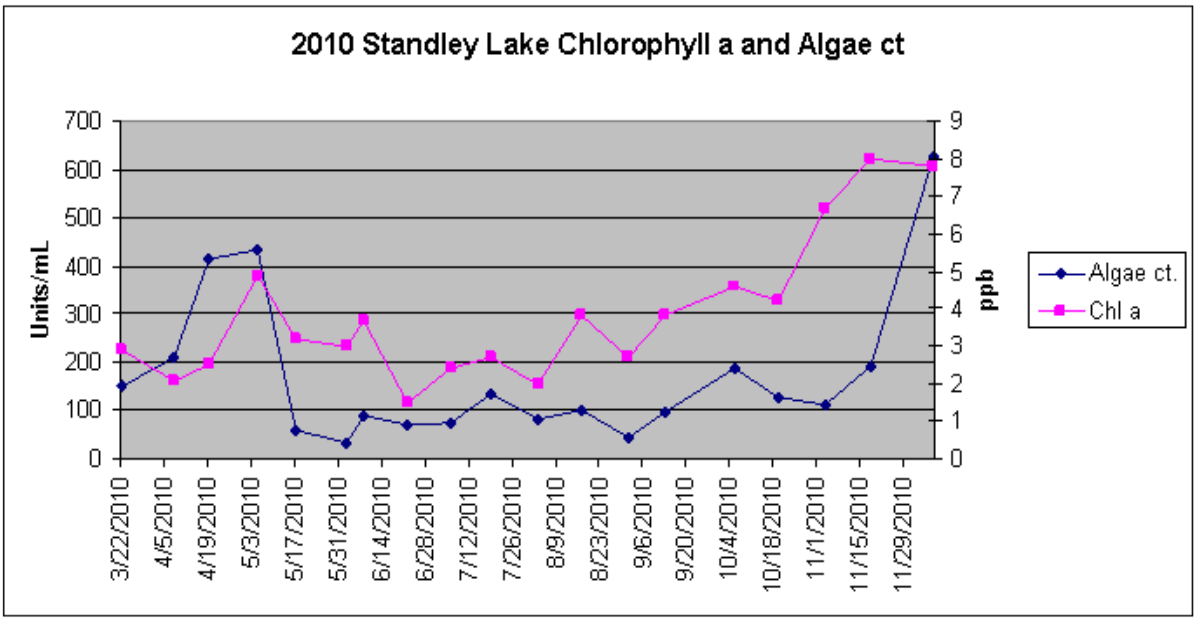



Figure 20

This pie chart below (Figure 21) shows the distribution of different types of algae in 2010.

Standley Lake Algae Types

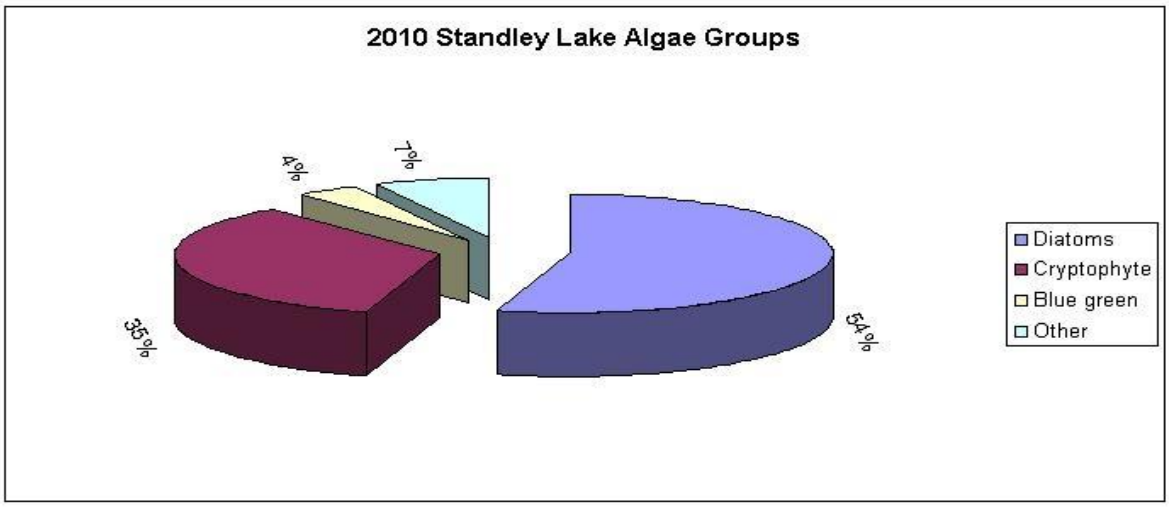



Figure 21

iv) WASTEWATER TREATMENT PLANTS

Georgetown

Georgetown continued construction of Phase II WWTP improvements and anticipated the new system coming on-line in early 2011.

City of Idaho Springs

The City of Idaho Springs received its new WWTF discharge permit in November of 2010. Added from the previous permit are monthly ammonia limits, total nitrogen and phosphorus reporting, arsenic, E. Coli, and numerous changes and additions for metals.

2010 annual averages for nutrient discharge: Ammonia 2.47, Nitrate 0.73, Total Phosphorus 0.95

The 1.5 million dollar WWTF upgrades finally got under way in late 2010, with substantial completion slated for summer 2011.

Black Hawk Central City Sanitation District

Black Hawk Central City Sanitation District (BHCCSD) continues to achieve excellent nutrient removal in the wastewater treatment plant (WWTP) effluent. The District's WWTP is considered a Level 4 treatment plant and employs enhanced biological nutrient removal (BNR) treatment plus filtration and UV disinfection. The concentration of total phosphorus (TP) measured in the effluent ranged from 0.03 mg/L to 0.70 mg/L during 2010. The total inorganic nitrogen (TIN) concentrations ranged from 2.3 mg/L to 9.45 mg/L. A brief increase in TP and TIN concentrations were observed in the WWTP effluent during April 2010. The District believes the isolated increase in TP and TIN concentration was related to cleaning of a sewer line. In general, the BHCCSD WWTP effluent TP and TIN concentrations were similar to the concentrations observed during 2009, which ranged from 0.02 mg/L to 0.15 mg/L, and 1.40 mg/L to 8.30 mg/L, respectively. The average daily flows remained around 0.422 million gallons/day. The District continues to operate its enhanced BNR treatment plant and remove nutrients to very low levels as an on-going component in their efforts to protect water quality in Clear Creek.

Town of Silver Plume

The Town of Silver Plume was notified, in 2010, that the Town will receive a grant from the Colorado Department of Local Affairs to perform infrastructure repairs of the Wastewater Collection system. In addition, an application was submitted to the Colorado Power and Water Authority for a loan that will allow an extensive project of improvements to remediate inflow and infiltration to the system. The project is expected to begin in the early summer, and be completed in the fall of 2011. Upon completion of the project, it is expected that flows into the newly constructed Georgetown Wastewater Treatment Plant will be significantly reduced, thus lowering O&M costs of the plant.

Wastewater Treatment Plant Total Phosphorus 2010

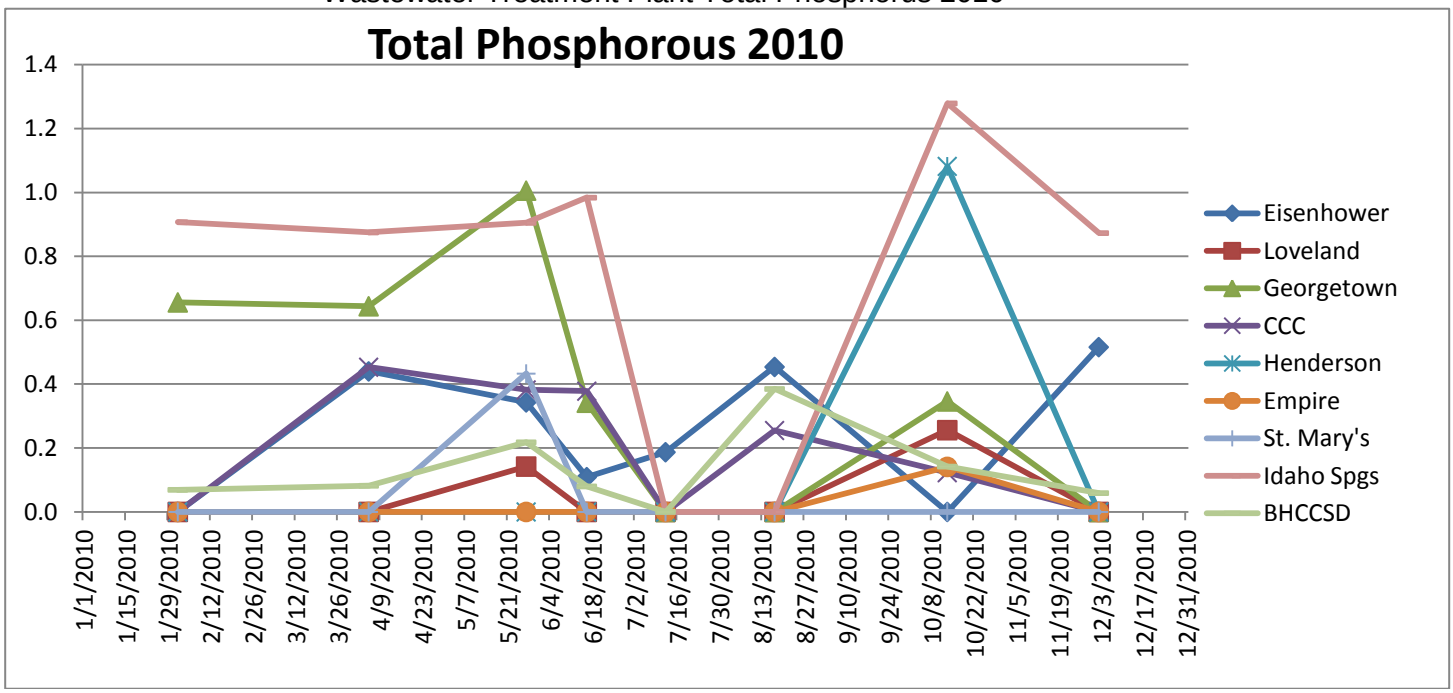



Figure 22

Wastewater Treatment Plant Total Phosphorus 2006 - 2010

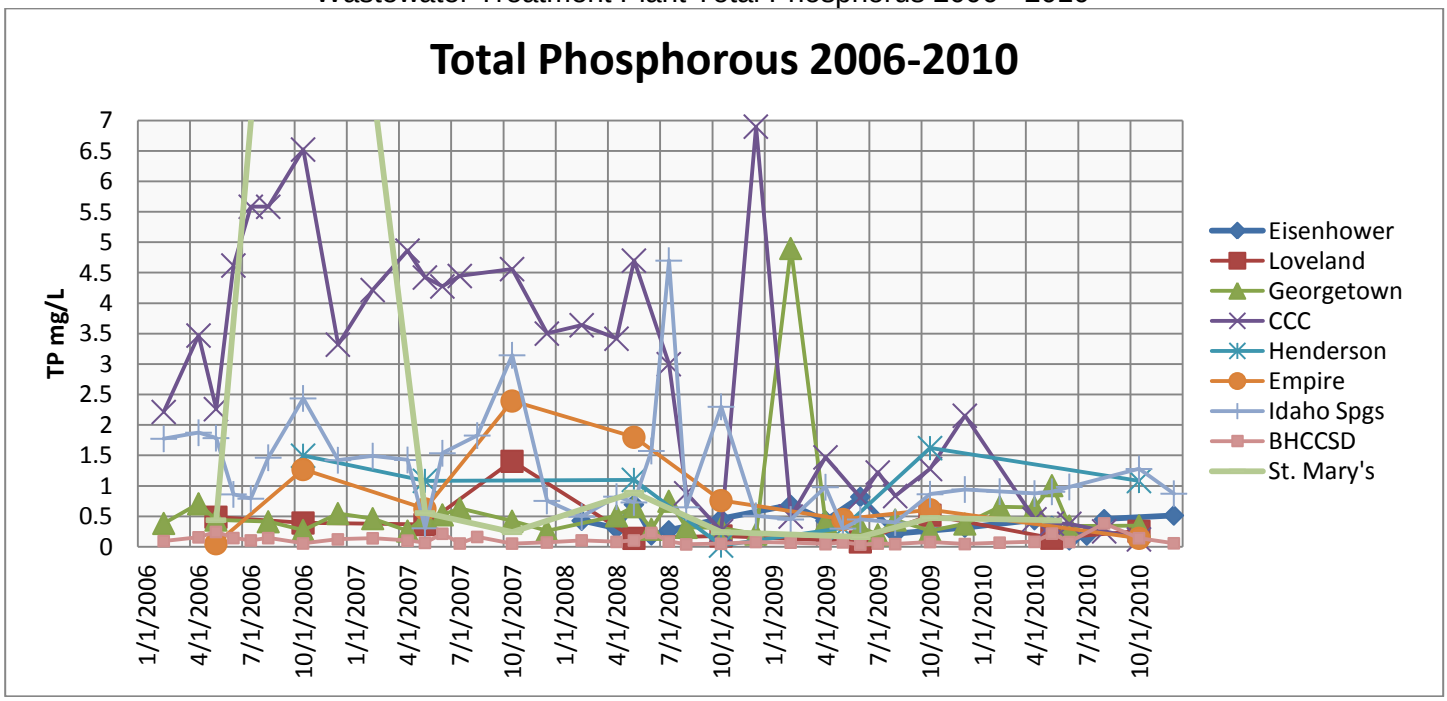



Figure 23

Wastewater Treatment Plant Total Nitrogen 2010

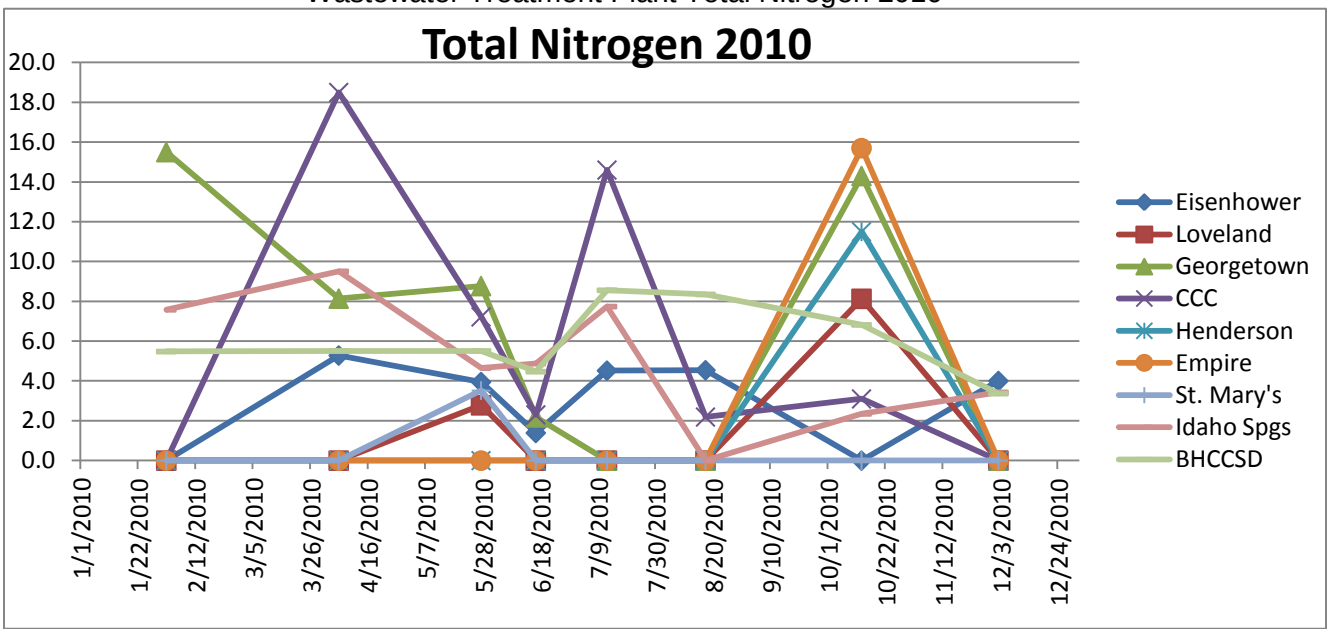



Figure 24

Wastewater Treatment Plant Total Nitrogen 2006 - 2010

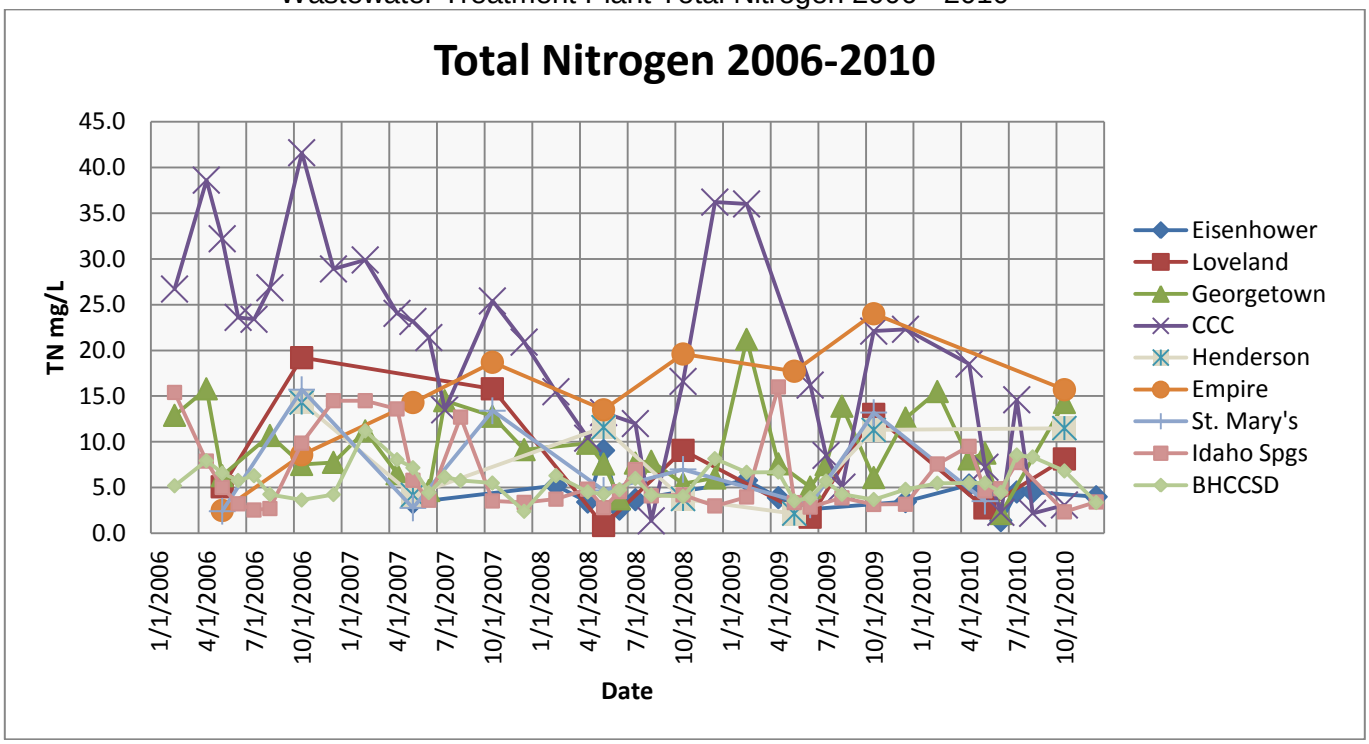



Figure 25

## 3. SPECIFIC SOURCE WATER PROTECTION PROGRAMS

### i) TRIBUTARIES/DITCH COMPANIES

The Croke Canal, Church Ditch, and Farmers' High Line Canal divert water from Clear Creek to Standley Lake. Western Slope water via the Moffat Tunnel, and water from Coal Creek are also diverted to Standley Lake through the Kinnear Ditch Pipe Line. Additional trans-basin water from the Fraser River Basin is diverted via the Berthoud Pass Ditch to Clear Creek, where it is picked up by the Church Ditch for delivery to Standley Lake. These water delivery structures received routine maintenance in 2010. Routine maintenance related to water quality includes the following activities:

- Diverting the first flush of the canals to prevent trash and other contaminants that accumulate in the canals during the off-season from entering Standley Lake
- Stopping diversions into the canals in response to events that potentially impact water quality such as: significant storm events, mine blow-outs, vehicle crashes, and other occurrences reported through the emergency call-down system.
- Maintaining and cleaning canals to restore capacity.
- Placing the removed spoils below the canals' banks and grading slopes to drain away from the canals.
- Requiring all development projects, adjacent to the canals to install BMP's to mitigate impacts caused by stormwater drainage, or to re-route stormwater drainage from developments around Standley Lake.

### ii) PUBLIC EDUCATION & PARTNERSHIPS

Arvada

Public Education and Outreach is a major component of Arvada's Stormwater Program and is intertwined with many other activities. Education for contractors, City personnel, citizens, and students is provided by the City on an on-going basis. This ensures that the public is aware that City storm drains flow directly to waterways, and certain activities can contaminate those waterways. The City provides the public with various resources to increase their awareness, such as Adopt-A-Street or Trail Program, storm drain marking, household hazardous chemical disposal and recycling, and brochures and demonstrations that are focused on preventing stormwater pollution.

Jefferson County

Jefferson County participates in the Rooney Road Organic Recycling Program which was bolstered by fire mitigation efforts. More than 18,000 participants provided approximately 61 million pounds (78,000 cubic yards) of yard waste, construction lumber and tree limbs to be ground, chipped, and recycled into mulch and compost.

Jefferson County provides opportunities for residents and visitors in the watershed to learn and be involved in environmental stewardship and programs that promote water quality.

The county has a comprehensive storm sewer outfall map to trace sources of potential illicit discharges and illegal dumping in the watershed.

City of Golden

Golden has partnered with the Institute for Environmental Solutions, a local non-profit, to use science and community involvement to address environmental challenges. The focus is to educate consumers on ways to reduce their chemical footprint, and to ultimately reduce pollutants discharged downstream.

Colorado Lake and Reservoir Management Association (CLRMA) Awards

CLRMA recognized the City of Westminster's, Mary Fabisiak and Kelly Cline, for their work in maintaining high water quality in Standley Lake, the source of the cities of Westminster, Northglenn, and Thornton's drinking water. Kelly Cline, Chemist, was recognized for his innovations in lake management related to understanding the relationships between nutrients and aquatic life. Mary Fabisiak, Water Quality Administrator, was honored for her leadership, and foresight in leading Colorado's Nutrient Criteria development efforts to protect drinking water supplies.

Clear Creek Watershed Foundation (CCWF)

CCWF continued its tradition of public education and outreach about watersheds, water quality, environmental restoration, and mining history through attendance and presentations made at numerous meetings, public/school tours of the Clear Creek Watershed Exhibit, elementary school classroom presentations, and its website. CCWF continued to advance projects, partnerships, funding and implementation strategies in the areas of Alternative Energy & Transportation, Water & Wastewater Management/Waste Stream Reduction, Preservation and Promotion of Historic Mine Sites, and Natural Resource Managements.

CCWF organized and hosted the second annual Clear Creek Watershed Festival in September 2010. Over 800 participants attended and visited the 29 environmental education booths and enjoyed fishing on the creek.

Clear Creek Watershed Festival Activities

Figure 26

Clear Creek County

Clear Creek County hosted the second annual, one day Household Hazardous Waste (HHW) Collection Day. This program is instrumental in keeping hazardous waste out of sanitary and storm sewers. A total of 25,378 pounds of HHW were collected. Materials collected included batteries, chemicals, paint, pesticides, greases, aerosols, and flammable liquids. Based on the event's success, the County began development of a full-time program at its landfill and recycling center to accept HHW. The new program is expected to continue in 2011. Contributors include UCCWA $1,000, Clear Creek Watershed Foundation $2,000, Climax Molybdenum Co. $3,000, Molson Coors $3,000, and Clear Creek County $20,000, and SLC $500.

iii) CALL DOWN SYSTEM

In order to notify downstream users of water from Clear Creek of any potential contamination from an upstream source, Clear Creek County uses the Code Red Emergency Call-Down System. The Clear Creek Office of Emergency Management Director continues to update and maintain the database for the call lists. The system applies to incidents/spills into Clear Creek and tributaries leading into Clear Creek that occur in Clear Creek County. Based on a review of the Code Red database for 2010, the Clear Creek Office of Emergency Management reports no launches were initiated by Clear Creek County Dispatch. Three calls were launched by Golden Dispatch.

iv) GAGING STATIONS

There are ten stream gaging stations along Clear Creek and its tributaries. These gages are maintained by USGS, the State Division of Water Resources, and one is privately owned and operated by UCCWA.

The data from the flow gages are vital to the Water Quality Monitoring Program for estimating loadings. They are also instrumental in water rights administration. Without the support from UCCWA members and SLC, many of these gages would be abandoned for lack of funding. The CC40 (Idaho Springs) Stream Gaging Report is available in Appendix C.

Clear Creek Gaging Station – CC40 Idaho Springs

Figure 27

v) HIGH QUALITY WATER STUDY

The Cities of Arvada and Westminster participated in the High Quality Water Study conducted by the University of Colorado and CDPHE during the summer of 2010. The Cities successfully completed all ten sampling events and submitted all samples for analysis of nutrients, chlorophyll, and algae. These data will be used to support the development of nutrient criteria for the protection of direct use water supplies.

vi) POLICY & PLANNING

UCCWA is the designated 208 management agency responsible for testing, monitoring, overseeing and reporting water quality, and water resource issues through the upper portion of the Clear Creek Watershed. In that capacity, UCCWA reviewed and commented on six referrals; one for a municipal government, three for a county government, and two for DRCOG/CDPHE. In addition, UCCWA reviewed and commented on one mining application made to DRMS (Division of Reclamation and Mine Safety).

UCCWA has 19 members including municipalities, counties, dischargers, and related entities located in the Upper Clear Creek Watershed in Clear Creek, Gilpin and Jefferson counties.

In 2010, UCCWA participated in and monitored the process to establish W.E.T. (whole effluent toxicity) regulations. UCCWA also continues monitoring the activity of the Nutrient Workgroup.

UCCWA was signatory to CDOT's SWEEP MOU (Stream and Wetland Ecological Enhancement Program).

The UCCWA membership continues to monitor activities of any kind that may impact its members.

Molson Coors Brewing Company

Molson Coors has started a program that will strengthen our focus on corporate responsibility through partnerships with the United Nations CEO Water Mandate, Beverage Industry Environmental Roundtable (BIER), and other agencies that report water use. The goal of this program is to make the public aware of water use by Molson Coors, and efforts underway to decrease the amount of water used globally at all of our breweries. A large portion of this program will be based on the success that has been achieved within the Clear Creek Watershed.

vii) STORMWATER/BEST MANAGEMENT PRACTICES

Arvada

A significant portion of the Standley Lake canal basin lies within the City of Arvada (City). For almost two decades, Arvada has improved stormwater quality by returning flows into natural drainage ways, and by developing a comprehensive Stormwater Program. In 2010, the City continued to divert flows from the basin by working with associated cities on re-routing discharges from Arvada's new development into Church Ditch, which flows around Standley Lake.

In addition to returning flows to natural pathways, Arvada has continued to focus on improving the quality of runoff through the operation of a Municipal Separate Storm Sewer System (MS4) Stormwater Program. A major component of this program is related to active construction site erosion control. In 2010, 1161 erosion and sediment control inspections were conducted on 86 active construction sites. As a result of these inspections, 22 notices of violation and one stop work order was issued until sites met runoff control requirements. Further, one Show-Cause hearing was held to notify developers that action may be taken to remedy their noncompliant site.

In addition to active construction sites and temporary erosion control best management practices (BMPs), the City of Arvada carries out inspection and enforcement related to post-construction, permanent BMPs. In 2010, a total of 52 permanent stormwater BMPs on 41 developments were inspected. After inspection, corresponding reports that identified noncompliant issues needing to be addressed were sent to owners of the stormwater conveyance.

Arvada continues to operate an Ilicit Discharge Detection and Elimination Program. In 2010, the City responded to over 70 complaints from citizens and City field staff. There were 20 written and 34 verbal warnings issued. In three instances, a professional environmental clean-up firm was contracted. Further, Arvada annually conducts dry-weather screening inspections of outfalls into our waterways to identify potential sources of illicit discharges, and if necessary, eliminate them. In 2010, 418 outfalls were inspected with 34 outfalls requiring maintenance from concrete work to cleaning of debris.

Pollution Prevention is another on-going component of Arvada's stormwater protection efforts. City facilities with run-off control plans are inspected twice annually. In 2010, more than 65 employees attended pollution prevention training at the City's Indiana Service Center, Wadsworth City Shops, and Wastewater facilities. The training focuses on:

- Potential facility-specific pollutant sources;
- Potential activity-specific pollutant sources;
- Spill response procedures.

In January 2010, Arvada implemented a permit-required Standard Operating Procedure for typical municipal activities. The 2010 training focused on those procedures. Further, in 2010, the City's maintenance staff concentrated on its storm sewer system, with over 315 tons of material being removed from underground pipes and inlets. Additionally, staff maintained over 200 manholes, inspected 7,194 inlets (cleaning 1,863 of them), and conducted 17 open pipe repairs.

Arvada is dedicated to protecting stormwater quality in order to protect the environment and to ensure that activities in Arvada do not contribute significantly to water degradation downstream.

Colorado Department of Transportation

CDOT has contracted for a Sediment Control Action Plan (SCAP) study to assess the impacts of I-70 on sediment loading to Clear Creek. This is part of the work that was promised under the SWEEP Program (Stream and Wetland Ecological Enhancement Program) in the I-70 Mountain Corridor Programmatic Environmental Impact Study (or PEIS). The contractor has begun field work for the study. The contract includes both assessment of impacts and recommendations for Best Management Practices to minimize such impacts, particularly for the upper reaches of Clear Creek (where winter traction sand is used the most). The SCAP is similar to studies that were completed in 2002 for the west side of the Eisenhower Tunnel, and of Vail Pass. Those SCAPs have been used to guide construction and maintenance of sediment reduction plans on Straight Creek, and Black Gore Creek.

Superfund/CDPHE

The Colorado Department of Public Health and Environment (CDPHE), in coordination with the Environmental Protection Agency (EPA) have continued working on Operable Unit 4 (OU4) of the Central City/Clear Creek Superfund Site.

Clear Creek County

The Clear Creek County Site Development Department issued nine Best Management Practices (BMP) permits, thirteen Grading and Excavation permits, and two Flood Plain permits in 2010. In addition, since 2009, the Site Development Department has required infiltration units for all commercial BMP permits and for houses with roof square footage in excess of 1,750 square feet. Five infiltration systems were installed in 2010.

Jefferson County

Jefferson County supports many Stormwater Management Programs in the watershed, including the Rooney Road Recycling Center, which also serves as watershed prevention BMP. The Rooney Road Recycling Center provides Proper Disposal Programs for residents of Unincorporated Jefferson County, and the cities and towns of, Arvada, Golden, Lakewood, Mountain View, Lakeside, Edgewater, Morrison, Westminster, and Wheat Ridge, to recycle their household hazardous waste (HHW).

Jefferson County also maintains an Erosion and Sediment Control Program as part of their MS4 permit. The County maintains a small-site erosion control manual that explains the basic principles of erosion control and illustrates techniques to control sediment from small development sites. Jefferson County has an Inspection Program for illicit discharges, construction activities, and includes post-construction inspections.

Gilpin County

Gilpin County continues its program requiring Erosion Control Best Management Practices.

City of Golden

The City of Golden's Stormwater Program continues its public education campaign by distributing educational materials and attending public events.

The City responded to 33 reports of discharges, or potential discharges, to the storm sewer system, issuing ten written warnings. The City administered 37 stormwater quality construction permits; conducted 986 erosion and sediment control inspections; issued 285 written notifications of violation, 174 verbal notifications of violation, withheld one permit, and used performance security for corrections at five sites.

The Stormwater Maintenance Program conducted 184 inspections of permanent water quality BMPs, and sent 163 letters requesting maintenance to land owners, with subsequent 100% compliance.

The City continues to implement procedures to prevent or reduce pollutants in run-off from municipal operations.

Climax Molybdenum Company

A new back-up generator was installed at the seepage collection below the Lower URAD Tailings pond. This generator will minimize the chance of process water leaving the Henderson property and entering Woods Creek during power outages. New toe drains were installed in the Upper and Lower URAD tailings dams. These toe drains help to ensure the stability of the tailings dams.

The parshall flume located upstream of Henderson Mine was equipped with an atomic measuring device and data logger.

Central City Parkway

The SLC conducted an inspection of the stormwater BMP's along the Central City Parkway. Inspection results are typically sent to Central City. The field notes described good conditions and evidence of good maintenance:

"*In general – a minimal amount of road sand buildup throughout parkway on both sides of the road."*

*"Revegetation – due to later winter and mild spring – lots of good revegetation up and down roadway, even on the cut rock faces."*

*"Good, pro-active maintenance to reduce sediment buildup in detention ponds reduces required pond maintenance actions."*

Some silt and sediment accumulation was noted in the report, particularly in the Russell Gulch area:

"*Still significant sediment buildup from off-site - has buried large rocks in place at toe of road embankment on west side. Not much that can be done here, except for monitoring to make sure sediment doesn't clog the culvert under the highway."*

*Hidden Valley Exit*

Figure 28

viii) INVASIVE SPECIES MITIGATION

*Standley Lake*

Eurasian Watermilfoil (EWM), *Myriophyllum spicatum L*, is a non-native, aquatic, noxious weed that grows rapidly, and to a depth of 35 feet. EWM grows in dense mats that severely interfere with recreation, and has been known to provide a substrate for blue-green algae growth. Blue-green algae blooms can ultimately cause taste and odor events in drinking water supplies. EWM was first observed in Standley Lake in 1998, and it was positively identified in 2000.

Eurasian Watermilfoil Weevils were stocked in Standley Lake in 2002, 2004, 2005, and 2006. Weevils are used to control the growth of EWM. Weevils were stocked in eight locations through out the west side of the reservoir. Adult weevils hibernate along the shoreline in the winter and migrate out to the milfoil plants in the spring. They lay their eggs on the top part of the stem and the larvae burrow into the plant, which causes it to fall out of the water column. As the weevils graze and damage the milfoil, the height and densities decrease. Weevils will never get rid of milfoil completely, but they can control the density of the plants. The milfoil has been the predominant vegetative species in the lake, but the population continued to decline in 2010.

Zebra mussels were discovered in Colorado in Lake Pueblo in 2008. The City of Westminster continues to operate a boat inspection and quarantine program to protect Standley Lake from an infestation of zebra and/or quagga mussels. The program includes a combination of inspecting, tagging and quarantining boats, spray washing stations, restrictions on aquatic bait, and an education program for the public and Standley Lake guests. The SLC took a proactive approach to protection of Standley Lake from zebra mussel infestation by increasing the length of the quarantine period prior to the start of boating season in 2009.

To date, no zebra or quagga mussels have been detected in Standley Lake. Monitoring methods initiated in 2008 continued in 2010 and includes microscopic analysis, FlowCAM analysis, shoreline surveys, and substrate samplers. Early detection efforts are important to best prepare operations staff of threats to the drinking water treatment infrastructure.

FlowCAM technology was acquired to assist in monitoring Standley Lake for algae, zooplankton, and aquatic nuisance species. The instrumentation developed by Fluid Imaging Technologies is a non-destructive analysis of water samples using flow cytometry and a high speed digital camera to identify and quantify the diverse biological species present in the lake. The biological diversity in lakes change based on a variety of seasonal factors including temperature, dissolved oxygen, nutrient inputs, and also by the unintentional introduction of aquatic nuisance species. The FlowCAM technology allows the three cities to monitor and record changes in biological diversity and understand the impacts of different input to the lake ecology.

Eurasian Water Milfoil – Standley Lake

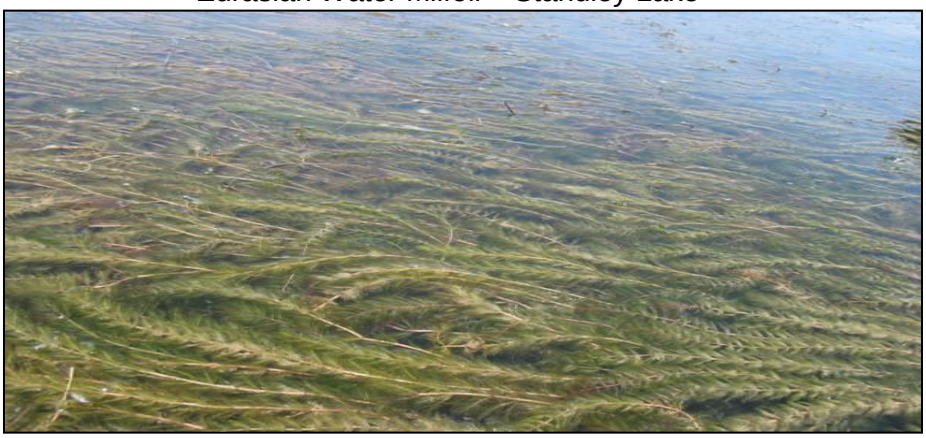


Figure 29

Eurasian Watermilfoil Density

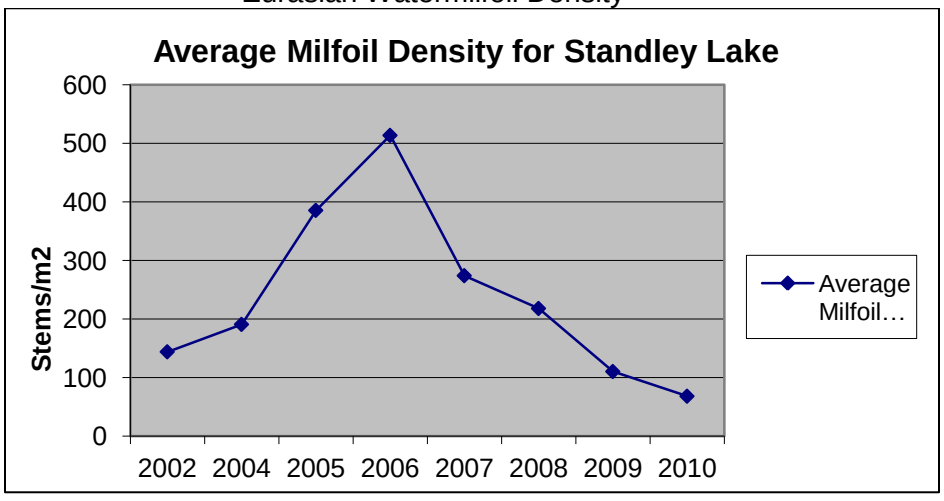



Figure 30

Arvada

To prevent the spread of invasive species, the City of Arvada has maintained a boat inspection, Tagging and Quarantine Program on Arvada Reservoir since 2008. In 2010, 85 volunteer rangers who admit boats to Arvada Reservoir attended training to perform boat inspections, and recognize invasive species. Over 500 boat-launches were made in 2010, and over 200 inspections were performed on boats that had not been previously inspected, tagged, and quarantined.

The City of Arvada has been actively managing Eurasian Watermilfoil using herbicide since 2007, and spot treatment for milfoil was conducted in 2010. Arvada also posted warning signs advising reservoir users that milfoil is present in Arvada Reservoir, and provided documents related to Aquatic Nuisance Species to users who applied for boat permits.

ix) MINING RECALMATION EFFORTS

Clear Creek Watershed Foundation

As part of its Orphan Mine Remediation focus, CCWF accomplished the following:

- The Gilson Gulch Outlet Project and the Silver Cycle Project were both completed in 2010. This work involved channel stabilization and sediment control.
- North Empire Creek/Aorta Mine Project to improve sediment control, channel and culvert flow capacity, and water quality in North Empire Creek was completed. The passive treatment process enhanced mixing of groundwater from the Aorta Mine area with the flow in North Empire Creek. The relatively high pH (nearly three orders of magnitude greater than the creek water), and high iron content of the seep water serve to both neutralize and precipitate metals such as zinc from the creek.
- Trail Creek Beneficial Mine Waste Reuse Study was completed to conduct engineering and chemical analysis of potential reuse applications for three waste piles in the Trail Creek sub watershed.
- Water quality monitoring continues on these and previously completed projects.

Molson Coors Brewing Company

Molson Coors Brewing Company continues to fund stormwater efforts, water quality monitoring, and habitat restoration funding throughout the Clear Creek watershed. In particular, Molson Coors funded $30,000 to the Clear Creek Watershed Foundation in continued support of orphaned mine restoration.

Virginia Canyon

Although run-off from Virginia Canyon into Clear Creek generally is minimal, the water often reaches flood level during heavy rainstorms and post-winter snow melt/run-off events. This water severely undercuts and erodes the various mine waste piles located in Virginia Canyon. Based on recommendations in the 2009 Five-Year Review, this removal action addresses the threat of waste rock eroding into Virginia Canyon Gulch, and greatly reduces the contaminant loading to Clear Creek.

Two Brothers Mine

An EPA removal action performed during the summer of 2010 addressed five major, and a few secondary waste rock piles located along the Two Brothers Mine Road in Virginia Canyon, halfway between Central City and Idaho Springs.

Gregory Incline

An amendment to the OU4 Record of Decision was finalized in April 2010. This amendment changed the water treatment component of the original remedy to allow for active treatment of the National Tunnel and Gregory Incline discharges, and the Gregory Gulch base flows (including the Quartz Tunnel discharge) at a new water treatment plant to be constructed within CDOT right-of-way along State Highway 119, south of Black Hawk. An architectural and engineering team was placed under contract in November 2010 to design the new water treatment plant. It is anticipated design will be complete late 2011.

Mine Tailings - Russell, Willis, Nevada Gulches

Sediment-control measures and mine-waste remediation in Russell, Willis, and Nevada Gulches were implemented over three phases during 2006-2010. Twenty waste rock or tailings piles projects were implemented. Actions included removal to the Church Placer Repository, in-place capping, and erosion controls such as run-on/run-off controls and revegetation. Additional sediment-control measures included construction of sediment-retention basins in Russell and Nevada gulches and drop structures and check dams in Russell and Willis gulches.

Church Placer Repository

Construction of a new cell at the Church Placer Repository was completed during fall 2010. The cell will accommodate an additional 37,000 cubic yards of mine-related waste from remedial actions. Approximately 2,000 cubic yards of tailings and contaminated soil were removed from the riparian corridor of the North Fork to the existing repository located at the Church Placer.

x) SEPTIC SYSTEM EFFORTS

Clear Creek County

The Clear Creek County Environmental Health Department issued 25 Individual Sewage Disposal System (ISDS) permits (18 new, 7 repairs) in 2010, and 111 inspections were conducted.

Gilpin County

Gilpin County continues programs implemented under the Watershed Agreement, including strengthened ISDS regulations, particularly in identified sensitive areas, and in areas with higher densities.

## 4. NEXT STEPS

The SLC will begin work in 2011 on upgrading the Standley Lake Water Quality Model. This effort will link the Clear Creek water quality model with the lake model.

The parties to the Clear Creek Watershed Management Agreement have agreed to work on an updated agreement. Several meetings have been held to brainstorm the interests of all parties in the types of revisions that are needed and how the agreement can be used to continue a spirit of cooperation.